THE
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NEW SERIES.

CONDUCTED BY

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PROSPECTUS.

The duty of superintending the publication of the EDINBURGH JOURNAL OF NATURAL AND GEOGRAPHICAL SCIENCE, having devolved exclusively upon the present Editor, the attention of the scientific public is requested to a brief detail of certain alterations which appear to him to be desirable in the plan of the work.

In consequence of various circumstances, entirely of a private nature, it was at one time proposed to publish the future numbers at intervals of two months, and an announcement to this effect accompanied the concluding number of the second volume. So many remonstrances, however, have been conveyed to the Editor against such an arrangement, by those gentlemen who have agreed to devote their talents to the execution of their respective departments, and the superior usefulness of a monthly publication has been so strongly urged upon him by the subscribers at large, that it has been found impossible not to accede to these representations.

This Journal will therefore continue to appear, as heretofore, at monthly intervals; whereby the same priority of information will be obtained, and the numerous advantages to be derived from frequent communication amongst the cultivators of science, will be secured to the supporters of the work.

The present era in the history of science, has been well named by Cuvier the epoch of the *division of labour*, the usefulness of which, first taught by the Arts, is now duly appreciated in the different branches of Science. Impressed with the importance of this method of prosecuting the dissemination, as well as the acquisition, of knowledge, the Editor has sought for and obtained the co-operation of those individuals whose distinguished names appear in the list of Directors. At once capable of producing original articles on the subject which is under his charge, and possessed of that power of discriminating between the useful and the unimportant, which experience alone can give, each of these gentlemen will have the exclusive direction of his particular portion of the work. By this means, it is expected that this Journal will in future be found to be an accurate register of all that is worth knowing in the progress of discovery, and a work of reference, upon which the historian of science may confidently rely.

The superior advantages to be derived from a periodical which may be referred to as a *record of facts*, have, from the Editor's recent intimacy with similar works, become strikingly apparent to him,—the more particularly, that in this country there does not seem to be a single publication in which this subject has been sufficiently kept in view. This Journal will consequently be in future considered as a repertorium of facts, in which it will be the anxious desire of the Directors to collect every thing that may be useful to the testing of opinions, and to the foundation of legitimate theory.

The work will be divided into three principal heads:—I. Original Articles; II. Collections of Facts; and III. Notices and Analyses of New Books and Papers, in our own and other languages.

I. Under the head of Original Articles, are intended to be comprized *translations* of entire original papers, which the former arrangement of the work excluded from its pages.

In this division alone, *controversial subjects* will be admitted, under the sanction of the authors' names,—with the view to limit that kind of discussion which, under an anonymous form, occasionally disfigures the pages of scientific works. But, with the responsibility of the author's name, the utmost latitude, consistent with the courtesies of society, will be allowed to the expression of opinion.

II. The Collections will be distributed in the following order:—

1. Geographical Collections:

Under which head it is expected that, from the recent establishment of a Geographical Society in London, a fund of information, previously unattainable, will be laid before the public.

2. Zoological Collections, including Comparative Anatomy and Physiology.
3. Botanical Collections, with Vegetable Physiology.
4. Geological Collections, including Mineralogy.

It will be observed that a slight alteration is thus made in the general heads under which the Collections are arranged. A more minute subdivision might at first sight seem desirable, and was indeed proposed, but not being found practically applicable, has on consideration been abandoned. The departments of Natural Philosophy and Chemistry, being too extensive to be fully treated in this work, are discontinued. *Original Articles* in these branches of natural science will nevertheless be retained.

III. The same order as is employed in the Collections, will be pursued in the NOTICES AND ANALYSES OF NEW BOOKS AND PAPERS ; and this division will be precisely similar in plan to the Catalogue Raisonné of the former Series, but more extended in its execution.

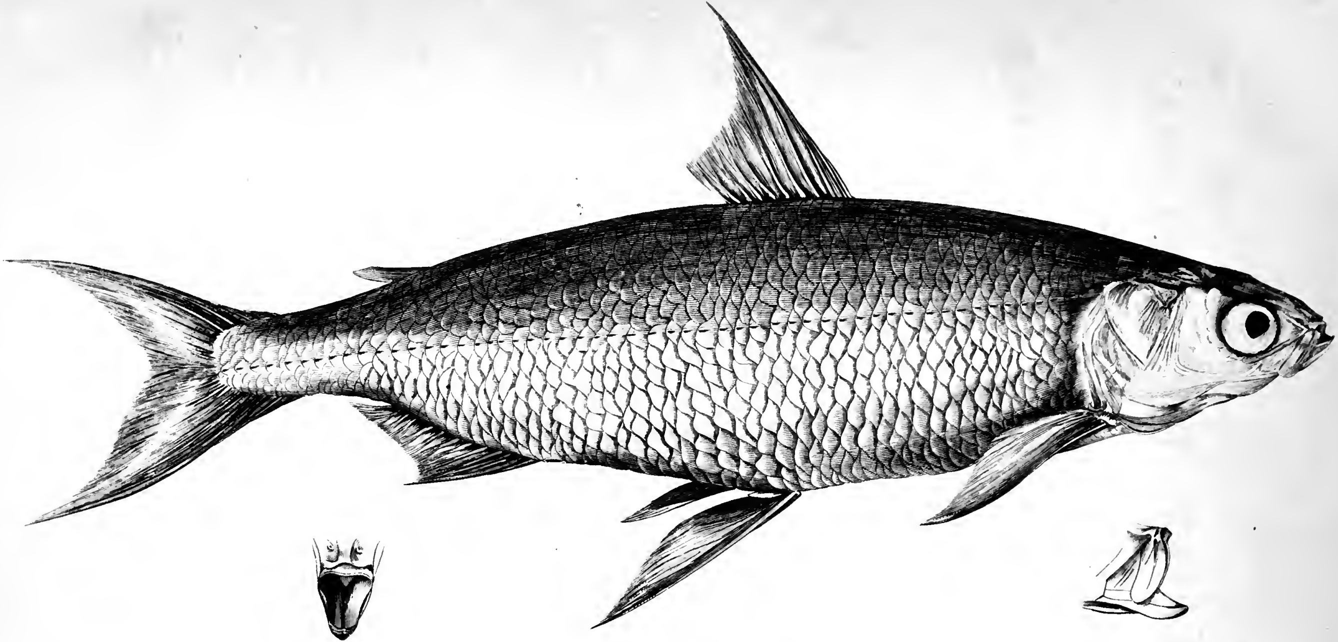
The department of SCIENTIFIC REVIEWS, not being exactly adapted to the size of a monthly Journal, will be substituted by this section.

NOTICES and PROCEEDINGS OF SCIENTIFIC INSTITUTIONS, and MISCELLANEOUS INTELLIGENCE, will, as heretofore, complete the Number.

It appears to be unnecessary here to dilate upon the objects of this work, as they were fully stated in a Prospectus which accompanied the First Number, in October 1829, and as they are sufficiently indicated in the two volumes already published. It may, however, be useful to mention, that Geography will continue to be one of its leading features.

From the numerous expenses incident to the publication of a monthly work, and which could not be included in the original estimate, it is found necessary to assist the credit page of the account by the addition of sixpence to the price of each Number; but it is hoped that the advantages which must result from the cooperation of the Directors of the New Series, and the comparative amount of information which must, from the improved arrangement, be found in each future Number, will be more than equivalent for the trifling increase of price.

*** Letters and Communications (post paid) to be addressed to the EDITOR, at the Publishers', JOHN ANDERSON JUN. 55. North Bridge Street, Edinburgh ; WHITTAKER, TREACHER, & ARNOT, London; WILLIAM CURRY & Co. Dublin; or J. B. BAILLIERE, Paris.



Coregonus Marænula.

Eng^d. by W.H. Liz[illegible]

THE

EDINBURGH JOURNAL

OF

NATURAL AND GEOGRAPHICAL SCIENCE.

DECEMBER 1830.

ORIGINAL ARTICLES.

ART. I. *Observations upon rare or little known British Fishes.* By Sir WILLIAM JARDINE, Bart. F.R.S.E., F.L.S., M.W.S., F.Z.S., &c.

No. I.—*The Vendace or Vendis* of the Lochmaben Lochs.* (Plate I.)

THE genus *Coregonus* seems to have been established by Artedi for the reception of the gregarious *Salmonidæ,* with membranous mouths, similar to that of the common herring and its allies, and clothed with large and strong scales. He also included the graylings in this genus; but it is probable that the generic term will be restricted to those species which are destitute of the large and powerful dorsal fin, and that this form, to which our native species belong, will rank only as a sub-genus to the former. The two species of this country, which strictly belong to *Coregonus,* seem to be referrible to the *C. maxilla superiore longiore, pinna dorsi ossiculorum quatuordecim,* Artedi; *Salmo Lavaretus,* Linn.; and the *Salmo Marænula,* Gmel.: the former agreeing with the schelley of Ulswater and Lochlomond, the true guiniad; the latter, with the *Vendace* of the Lochmaben lochs.

The elegant little fish, which is the subject of the present remarks, has been confounded by nearly all our modern naturalists,—even

* I am not sure of the proper orthography of this name. Pennant spells it Vangis, and thinks it a corruption from the French *vendoise,* a dace.—I have kept it as near the ordinary pronunciation as possible. If the fish were really introduced by the French, Pennant's etymology is very probably right.

those who have written within the last few years,—with the guiniad, *Salmo Lavaretus*, Linn. The extreme locality of the species may be advanced as some excuse for this error; but the time ought to be long since gone by, when one individual was satisfied with copying from the observations of another, without actually re-examining for himself. The guiniad appears to range abundantly in many of the lakes of Britain and Europe, and, as far as our present knowledge extends, is confined in distribution to these countries. The only locality that I am aware of for the Vendace is the lochs in the neighbourhood of Lochmaben, in Dumfries-shire. I have heard it said that it was an inhabitant of some lake in Wales, but have no opportunity of ascertaining the accuracy of this assertion. Linnæus gives several lakes in Germany and Silesia as habitats; and I have seen specimens from the Lake of Geneva, in Switzerland. The Vendace also seems entirely European; it is not referrible to any of those described in the Appendix to Capt. Franklin's first voyage; and, having been examined by Dr. Richardson, it is found to be equally at variance with any of those procured during the last northern expedition.

In the district of Lochmaben some traditions and curious opinions exist regarding it. It is well known to almost every person in the neighbourhood, and if, among the lower classes, fish should at any time form the subject of conversation, the *Vendace* is immediately mentioned, and the loch regarded with pride as possessing something of great curiosity to visitors, and which is thought not elsewhere to exist. The story that it was introduced into these lochs by the unfortunate Mary Queen of Scots, as mentioned by Pennant, in his description of the guiniad, (and it is likely that his information was derived from this vicinity,) is still in circulation. That the fish was introduced from some continental lake I have little doubt; but would rather attribute the circumstance to some of the religious establishments which at one time prevailed in the neighbourhood, and which were well known to pay considerable attention both to the table and the cellar. Mary would scarcely prefer a lake so far from even her temporary residence, for the preservation of a luxury of troublesome introduction, and leave her other fish-ponds destitute of such a delicacy.

An idea prevails, that this fish, if once taken from the water, will die, and that an immediate return would be of no avail; and it is also believed that it will not exist in any other water except that of the castle loch. These are of course opinions which have gradually, from different circumstances, gained weight, and have at last been received as facts. The fish is of extreme delicacy,—a circumstance which may have given rise to the first notion,—and the introduction of it must have taken place by means of the spawn; the fish themselves, I am confident, could not be transported alive even a few miles. As to the second opinion, they are not confined to the castle loch, but are found in several others, some of which have no communication with that where they are thought to be peculiar.

In general habits the Vendace nearly resemble the guiniad, and indeed most of the allied species of the genus. They swim in large shoals, and during warm and clear weather retire to the depths of the lakes, apparently sensible of the increased temperature. They are only taken with nets, a proper bait not being yet discovered; and the fact that little excrement is found in their intestines, has given rise to another tradition, that they are able to subsist without food. They are most successfully taken during a dull day and sharp breeze, approaching near to the edges of the loch, and swimming in a direction contrary to the wind. They spawn about the commencement of November, and at this time congregate in large shoals, frequently rising to the surface of the water, in the manner of the common herring, and making a similar noise by their rise and fall to and from the surface. The sound may be distinctly heard, and the direction of the shoal perceived, during a calm and clear evening. They are very productive. The lochs abound with pike, of which they are a favourite food, but their quantity seems in no degree to be diminished, notwithstanding that immense numbers must be destroyed. They are considered a great delicacy, resembling the smelt or spirling a good deal in flavour, and though certainly very palatable, the relish may be somewhat heightened by the difficulty of always procuring a supply. During the summer, fishing parties are frequent, introducing some stranger friend to this Lochmaben whitebait; and a club, consisting of between twenty and thirty of the neighbouring gentlemen, possessing a private net, &c. meet annually in July to enjoy the sport of fishing and feasting upon this luxury.

The Vendace is one of the most elegant of the genus; its length is from four to ten inches; the head is of an angular shape, and small, compared with the size and depth of the body. The under jaw is considerably longer than the upper, and when closed bends into the upper as into a groove. The crown of the head is very transparent, so that the form of the skull and brain is seen through the integuments, heart-shaped, and the heart on the forehead is one of the first things that are pointed out to a stranger. The eye is large and brilliant; the interior of the maxillæ destitute of teeth; the tongue placed far back, small, and triangular, and covered with very fine and minute teeth, which can only be seen with the assistance of a magnifying lens, or felt by a light touch of the finger. The body rises gracefully to the back fin, and recedes with a gradual line to the tail; the under line of the body is nearly straight from the gills to the ventral fin; the upper parts are of a delicate greenish-brown colour, shading gradually into a clear silver lustre; the scales are of considerable size, oval, and nearly smooth on the outer surface; the dorsal fin is greenish-brown, the anterior edge much lengthened and pointed; the lower fins are all bluish-white; the tail very much forked; the stomach and intestine are very simple; the roe is minute and abundant, of a bright orange colour; the swimming-bladder large; the flesh white, rich, and fat. The following may stand as the specific characters of the species:*—

Coregonus Maræna, *Mihi.* Salmo Marænula, *Bloch, Gmel.*

C. argenteus,† dorso brunnescente viridi, capite acuto subdiaphano, ex viridi brunnescente, iridibus genisque argenteis; ore edentulo, mandibula inferiore curvata, superiori angustiore; lingua brevi, cartilaginea, dentibus minutissimis instructa; cauda furcata.

Long. 4-10 pollices.

Pinna dorsi ossiculis 12: 1mo. brevi, 4to. 5to. longissimis, 12mo. bifurcata.

Pect.	-	-	-	15-17.
Vent.	-	-	-	12-13.
An.	-	-	-	14.
Caud.	-	circiter		30.
Branch.	-	-	-	9.
Verteb.	-	-	-	50-52.

Hab. lacis Europæ præsertim Genevæ, (Germaniæ, Silesiæ, Lin.) In Britanniæ lacubus Lochmaben, Dumfries-shire.

* *Salmo Albula,* Linn. seems to be a very closely allied species; and if the "Coregonus edentulus, maxilla inferiore longiore," of Artedi, had not been quoted to this as a synonyme by Linnæus, who must have been acquainted with the species of Artedi, I should have been inclined to have placed it with *S. Marænula.* I may add that I have scarcely ever been able to reconcile the number of rays in the fins of many of our British species, particularly the *Salmonidæ,* with those of older authors, and in one of a later date our numbers are at total variance. The difference in the present instance will be seen in comparing my generic characters with Br. 7. D. 10. P. 15. V. 11. A. 14. C. 20. of Gmelin's *Salmo Marænula.* My numbers were taken from an examination of several specimens, and with as much exactness as possible.

† I here add part of the generic character given by Gmelin, which agrees so well with the habits of the species above described:—"6-8-10 pollices longus, squamis argenteis facile deciduis tectus, argenteus, dorso cærulescens, vitæ minus tenacis, fertilissimus, ova in locis lacuum herbosis pariens, herbis in fundo nascentibus, vermibus et insectis victitans, piscium aliorum et avium aquaticarum frequens præda, carne alba, multiplici modo esculenta."

ART. II. *On the Functions of the Spiral Vessels and the Pith in Vegetables.* By WILLIAM COLVILL, Esq.

IT has been well remarked by Keith, that, notwithstanding "all the elucidation that has been thrown on the subject, the function of the spiral tubes is as much involved in obscurity as ever." * Phytologists appear to be divided betwixt the two opinions, whether they be sap-vessels or air-vessels. It may be deemed a bold step, then, for an individual, scarcely known in the field of science, to advance the opinion that they are neither, but are the peculiar organs by means of which the longitudinal growth of the plant is effected. Such, however, is the conclusion at which I have arrived after a careful investigation.

Without attempting directly to combat the opinion advanced by others, I may be permitted to remark that, if the spiral tubes or tracheæ be sap-vessels, it is remarkable that their existence cannot be traced in the root,† by the medium of which plants are supplied with sap. On the other hand, if they be air-vessels, is it not equally remarkable that they are not to be found either in the root or among the ligneous layers of the stem? ‡

Before entering upon the investigation of the functions of the spiral vessels, it will be proper to ascertain those parts of vegetables in which they are to be found. These it will be sufficient at present merely to indicate. They are the stem, and in woody plants always surrounding the pith; the leaf-stalk, mid-rib, and ramifications of leaves; the flower-stalk, the calyx, the stamens, the pointal, and the other parts of the flower, and the cotyledons and plumula of the seed. Such being their situation, let us proceed to the consideration of their functions. As conservatory organs, they must be destined either to promote the growth or the preservation of the plant. || Permit us, in the first place, to inquire how far they are essential to the preservation of the plant.

The operation of grafting demonstrates that it is not essential to the existence of the scion that a continuity of spiral vessels be preserved through the plant; for in this operation, that continuity is completely broken, and both the stock and scion nevertheless continue to flourish. But not only may the continuity of the spiral vessels be broken with impunity, but the vessels themselves may be wholly removed from the stem without injury either to its exis-

* Keith's Physiological Botany, B. iv. C. 3. Sec. 2.

† Library of Useful Knowledge, Veg. Phys. pp. 13, 14.; Keith, B. iii. C. 3. Sec. 2.; De Candolle, Vol. I. B. i. C. 3. Art. 2.

‡ De Candolle, Organographie Vegetale, Vol. I. B. i. C. 3. Art. 2.; Lib. of Useful Knowledge, p. 6.; Smith's Introduction to Botany, C. 8.; Keith, B. iv. C. 3. Sec. 2.; De Candolle, Vol. I. p. 38.; Knight, Philosophical Transactions.

|| Lib. of Useful Knowledge, Veg. Phys. p. 1.

tence, or to its lateral increase. As has been already observed, in the stem of the tree the spiral vessels are all ranged round the centre or pith. * Every one is aware, however, that many examples are furnished by the stems and branches of decayed trees, in which, " even after the heart is become hollow," and the woody part almost wholly removed, the tree still continues to vegetate, and new layers of wood to be annually added for a long series of years. † These facts, I apprehend, demonstrate that the existence of the spiral vessels in the stem or branch is not necessary either to its preservation, or its lateral increase.

Hitherto we have spoken of the spiral vessels only, but the same conclusion must be formed with regard to the pith. In the decayed trees already adverted to, the pith also is absent, while the tree nevertheless continues to vegetate; and Mr. Knight having contrived to abstract from some annual shoots a portion of their pith, so as to interrupt its continuity, found that the shoots were not materially affected by the operation. ‡

We are hence entitled to conclude, that subsequent to the formation of the annual shoot, when it becomes fitted for the operation of grafting, neither the spiral vessels nor the pith are essential to its preservation or growth. At what period then do they exercise their functions? Let us trace them from their origin in the bud.

Buds, according to Sir J. E. Smith, " consist of scales closely enveloping each other, and enfolding the embryo plant or branch."|| But it will be asked, what are the organs of which this embryo plant or branch consists? The author of the article on Vegetable Physiology, in the Library of Useful Knowledge, furnishes this information.§ " The first which can be distinctly recognized is the pith: surrounding this, we next perceive lines, which are the first traces of the spiral vessels of the future branch, running in a direction from the centre of the parent branch to the peak of the stem: indications of the separation of the cellular matter into scales are next perceptible." In the bud, then, the pith, medullary sheath, and cellular integument already have their existence. But the existence of the pith can be traced anteriorly to the existence of the spiral vessels. The pith, therefore, has not been produced by the agency of the spiral vessels, neither has the cellular integument been so, because it is part of, and connected with, the cellular integument of the parent plant. But if the spiral vessels have not been the agents of the production of any of the other organs of the bud, it is a just inference that, while in the bud, the functions of

* Smith's Introduction to Botany, C. 8. p. 38, &c.
† Ibid. C. 7. p. 32; Keith, B. iv. C. 3. Sec. 2.
‡ Philosophical Transactions, 1801.
|| Smith's Introduction, C. 14.
§ Lib. of Useful Knowledge, Veg. Phys. p. 19.

the spiral vessels have not been fulfilled. Besides this, we know that in the bud the pith and spiral vessels are essential to its further development, because if they sustain any injury in the operation of budding it will prove fatal. Loudon directs the operator to observe whether the eye or gem of the bud (which consists of the pith and spiral vessels,) remains perfect; because if not, it is improper, or, as gardeners express it, the bud has lost its root, and another must be prepared. *

It is evident, then, that the functions of the spiral vessels have not been fulfilled in the bud; and it has been already shown, that in the full grown twig the spiral vessels are no longer necessary, or, in other words, that their functions have ceased. Of course it must follow, that it is during the progress of the development of the bud into a shoot that the functions of these organs are in activity. Let us therefore compare the shoot with the bud, and endeavour to ascertain what modifications the former has undergone, and what new organs have been formed in its development.

On examining a young shoot after the first year's growth, it will be found to consist of a pith, medullary sheath, ligneous layer, bark, and cellular integument. In addition to the organs found in the bud, therefore, we now have a ligneous and a cortical layer. But neither of these have been generated through the agency of the spiral vessels, for these are likewise produced on *roots*, where there are no spiral vessels; and we have already seen that ligneous and cortical layers are produced in stems and branches where the pith and spiral vessels have been wholly removed or decayed. What other modifications, then, has the bud undergone in the development of the twig? Nothing but its longitudinal increase. It therefore remains to be inquired how far we are justified in ascribing this to the agency of the spiral vessels.

If the conclusions deduced from the facts before stated be correct, the functions of the spiral vessels were not developed in the bud. Again, it is equally clear that their functions were developed by the time that the growth of the twig was completed. During this interval, the only modification which the bud had undergone, and which could not be ascribed to other organs, was in its longitudinal growth: and as nature forms no organ in vain, and the spiral vessels appear by their structure to be peculiarly adapted for facilitating the elongation of the stem, are not these sufficient reasons to justify the belief that the longitudinal increase of the twig is effected by means of the spiral vessels?

But if such be the case, it must follow that spiral vessels must be found in every part of the plant which may undergo a similar development. Besides the stem, we know that the leaves, the flower-stalk, the calyx, the stamens, the pistil, the cotyledons

* Loudon Enc. of Gardening, 2057.

and plumula, all undergo a similar development; and while it will be recollected that the spiral vessels are to be found in each of these organs, it must not be forgotten that these are the only parts of the plant in which the spiral vessels have hitherto been traced. It may be objected, however, that the root undergoes a longitudinal increase, but that, as is already admitted, no spiral vessels are to be found in it. True; but there are two modes by which the augmentation of the different parts of a plant is effected. "The root is elongated merely by the extremity,"* but "the development of the shoot from the stem is not effected in the same manner as that of the root,—by additions to the extremity only,—but by the intro-susception of additional particles throughout its whole extent, at least in its soft and succulent state, the longitudinal extension diminishing in proportion as the shoot acquires solidity, and ceasing entirely when the wood is perfectly formed; though often continuing at the summit after it has ceased at the base."† This manner of increase is not peculiar to the stem, but may likewise be observed in all the other parts in which the spiral vessels can be traced. Strictly speaking, therefore, the spiral vessels are not the organs by which every increase in length is effected, but merely the organs by means of which the peculiar elongation of the stem, leaf, flower-stalk, &c. is produced.

The functions of the pith must not, however, be lost sight of. This organ is to be seen in its full vigour in the bud, and in the young growing stems or branches, it is "a tolerably firm juicy substance,"‡ but "becoming dry before the first layer of wood is perfected, except near the final bud, or where branches are given off, in which places it retains its moisture."|| Mr. Knight's experiment has shown that the pith is not essential to the existence of the young shoot or stem, and the circumstance of its becoming dry so soon as the elongation of the plant ceases, demonstrates that at this period its functions are terminated.

But what are these functions? It has been already shown that the pith is not necessary to the subsequent existence of the stem. It has been likewise shown that the existence of the pith is not necessary to the production of the annual ligneous and cortical layers. Its functions, therefore, must be confined to supplying nourishment to the bud and stem during their elongation.

It is not my intention, in this essay, to enter upon any investigation of the manner by which the elongation of the bud into a stem is effected by the medium of the spiral vessels and pith. My sole object is to demonstrate, if not the certainty, at least the very great probability, that exists, that such is the use of these organs.

* Keith, B. iv. C. 4. Sec. 4. Sub-sec. 1.

† Keith, B. iv. C. 4. Sec. 4. Sub-sec. 2. See also De Candolle, B. ii. C. 4. Sec. 2. Art. 4. where this subject is fully treated.

‡ Smith's Introduction, Chap. vii.

|| Lib. Useful Knowledge, Veg. Phys. p. 12 and 18.

There are two remarkable circumstances, however, which, in connection with this subject, I cannot overlook. In the development of shoots, it cannot fail to be remarked that the elongation is generally less at the base of the shoot than in the middle, and again becomes less at the summit. Contrast this fact with the observation made in the Library of Useful Knowledge,* that the pith varies "in diameter in the same tree, even when young, being smallest at the base of the stem, longer in the middle, and smaller again at the summit, and these variations are observable in the growth of each future year." Again, Hedwig has observed, that "in the peduncle of the *Colchicum autumnale*, the rings of the tubes are closer when it begins to appear above ground, than at the time of flowering."†

These observations demonstrate the existence of some intimate connection betwixt the pith and spiral vessels, and the elongation of the stem.

In conclusion, permit me to submit the following summary of the principal reasons which induce me to view the spiral vessels and pith, as the organs by means of which this peculiar longitudinal increase of the plant is effected.

1*st*, These organs are essential to the plant or bud, previous to its undergoing this peculiar development, but cease to be necessary so soon as the elongation is completed.

2*d*, During the progress of this development, the plant undergoes no modification, which cannot be ascribed to the agency of other organs, with the exception of its longitudinal growth or elongation; and for the promotion of this, the spiral vessels, by their structure, appear to be peculiarly adapted.

3*d*, The spiral vessels can be traced in every part of the plant which undergoes this peculiar development, and they have hitherto been traced in such parts only, and no where else.

Abbey-House, Arbroath, Oct. 6. 1830.

* Veg. Phys. p. 18.
† Keith, B. iii. C. 3. Sec. 2.

ART. III. *On the Granite of the Upper Districts of Aberdeenshire.* By WILLIAM MACGILLIVRAY, A.M.

THE granitic mountains of Braemar, in the upper part of Aberdeenshire, forming a portion of the broad range of the Grampians, and rising to a greater elevation than the mountains of any other part of Great Britain, are peculiarly deserving of the examination of the geologist. Their huge rounded masses, magnificent precipices, simicircular hollows, and long winding valleys, afford objects of study, which are exceeded in no part of Scotland. The great valley of the Dee, with its pine and birch forests, green meadows, and cultivated patches; the torrents from the heath-clad hills, marking their course with long streaks of stones and gravel; the blue lakelets of the mountain corries, destitute of vegetation, scantily peopled by the finny tribe, and filled by the water that has oozed from the masses of snow which lie all the year round in the shaded recesses of the rocks; the bare and sterile summits of the great masses of granite, swept by the winds and rains, and crumbled by the storms and frost of ages into vast accumulations of debris, through which the weather-beaten prominences of granite project, fissured and frittered into the form of huge cairns:—These are the principal geological features of this wild and romantic region.

Of my wanderings in this district I have a few words to say, that my opportunities of observation may be the better estimated. I first visited it in the summer of 1816. In the autumn of 1819, I took it in one of the many zigzag lines of a pedestrian journey from Aberdeen to London. Again, in 1830, I had the pleasure of accompanying Dr. Graham and some of his pupils over several of its mountains, and of examining others in the company of an amiable and accomplished friend. To obtain a competent geological knowledge of the district would require the observation of several months. What I have to offer is the result of a few days' inspection, frequently diverted by other objects.

The geographical and political divisions of the district I shall not attempt to describe, although the positions and forms of the mountains are very erroneously represented in all the maps that I have seen. Of the groups of mountains, of which I intend to speak, three, the Ben-Vrotan, Ben-na-muic-dui, and Ben-na-buird groups, are situated to the north of the valley of the Dee, while another, the Loch-na-gar group, is placed on the south side of that valley, between Castletown and Ballater. Let the reader take any tolerable map which comprehends the district, and he will find these mountains marked.

Ben-Vrotan Group.—About four miles above the Linn, the Dee is joined by a branch coming from the desolate central moor which extends in the direction of Blair Atholl. Ascending the Dee in a northerly direction, you soon come in sight of a magnificent rock, with a mountain peak of great elevation behind it. Passing this rock, you enter a valley bounded by very lofty and rugged mountains, and terminating in a vast mass, towering above the whole. This mass is Ben-Vrotan, which, together with all the neighbouring mountains and rocks, is of coarse-grained granite, of the same nature as that of the Ben-na-muic-dui group, about to be described. At the upper end of the valley, the stream branches, and, following the course of the western division, you proceed up a narrow valley, having a splendid range of precipices on one side. Benighted in this valley, I looked up at midnight, and, with a kind of superstitious awe, viewed the huge cliffs, partially illuminated by the moon, while masses of grey vapour rolled silently along the mountain tops, some of which presented a conical form, with serrated peaks. The rising sun beamed upon a circular hollow or corry farther up, in the bottom of which was a lake of light blue water, from which a torrent rolled over the sloping shelves, fringed with numerous alpine plants. The streamlets which feed the lake are derived from several springs near the summit of the mountain. Proceeding northward, you come upon a range of precipices, from the summits of which you see a deep valley, with a lake and stream, ending, eastward, in a plain partially covered with pines. This plain is the valley of the Spey. The great mass of which the Ben-Vrotan, Ben-na-muic-dui, and Ben-na-buird groups form a part, is thus situated between the valleys of the Spey and Dee. In all this space there are no human habitations, and the only animals that attract the notice of the wanderer are the red-deer, the grouse, and the ptarmigan, of the latter of which immense flocks are met with on the summits of the mountains.

Ben-na-muic-dui Group.—This group consists of several mountains of great magnitude, presenting rounded outlines, mural precipices forming corries, and summits and sides covered with grit, sand, and disintegrating and decomposing blocks and stones. The rock is everywhere granite, and exhibits little diversity in its structure or colour. It is composed of flesh-coloured felspar, dark-grey quartz, and black mica. The latter substance is in small scales, not generally exceeding one-eighth of an inch in diameter, and bears a very small proportion to the other ingredients. The felspar appears to form more than half of the mass, and presents concretions of all sizes, from the smallest up to a diameter of an inch. The quartz presents no regularity of form, but in transparency approaches to rock crystal, of which irregular pieces of considerable size sometimes present themselves. Sometimes also there are irregular crystals of felspar, of the length of about half an inch, interspersed. In general, however, the uniformity of the mass is very remarkable, there being few concretions, patches or veins of large-grained granite. Some small veins of white quartz occur, but rarely, and in general present a tendency to the crystalline arrangement, the irregular prisms being transverse to the direction of the vein.

Ben-na-muic-dui (the mountain of the black hog,) consists of a huge rounded mass, said to be 4300 feet high, which, on the western side, towards the summit, presents a corry (or semicircular hollow) formed by a range of precipices, the rocks of which are marked by nearly perpendicular fissures, with transverse rents, long slopes of debris running from their base into a small lake, named Lochan-uaine (the green lakelet,) the waters of which are singularly clear, and have a blueish-green tint, which produces a remarkable effect as contrasted with the ordinary tints of the Scottish lakes. On these precipices, as well as other parts of the mountain, patches of snow remain unmelted during the summer and autumn.

On the eastern side, the mountain, from a broad, rounded, and, to a great extent, nearly flat summit, slopes irregularly toward the head of Loch Avin, terminating in a magnificent range of precipices. The rocks at the head of this lake are divided by two wide rents into three great masses, which present nearly perpendicular faces to the lake. These rocks appear to be from three to eight hundred feet high, and exhibit a tendency to the columnar structure. The fissures in two of them are perpendicular, with transverse rents; in the other, inclined at angles of from 45° to near the perpendicular. There is no stratification, although the perpendicular, and sometimes pretty regular fissures, and, on the other hand, the cracks or clefts at right angles to these fissures, might lead a superficial or prejudiced observer to fancy the existence of strata. These masses bear a striking resemblance to many greenstone rocks, but have a coarser aspect, owing to the disintegration of their surfaces, which leaves them rugged and granulated, and destitute of vegetable incrustation. Toward the top they are much broken, and the irregular columns there separate into transverse tabular masses, disintegration having taken place so as to form parallel fissures, and the uppermost plates lying quite loose. The great rents between the masses, exhibit along their sides colums and obelisks of various forms, resembling ruins, and afford beds to the torrents which have carried the debris toward the lake in the form of long reddish stripes.

Toward the right of these precipices, when one faces them, the mountain is seen descending toward the lake in a broad slope of bare granite, which has suffered little disintegration, or at least is at present encumbered with few fragments. A torrent which rushes along this slope, is full of blocks and stones toward the bottom.

Some of the blocks which have fallen from the precipices are of enormous size. One of them, probably ten yards in diameter, has settled so as to leave a large cavity beneath, which the shepherds have rudely walled up, so as to convert it into a cave capable of containing about twenty persons. As usual, the largest blocks have rolled to the greatest distance.

On the left hand, as one looks down the lake, is a range of lofty precipices, with steep slopes at their base, covered by debris. These precipices form part of the Cairngorm group, which is, properly speaking, a branch of the Ben-na-muic-dui group. The other side is less precipitous, but of the same general character. The lake, which is apparently two miles long, is narrow. Its waters are exceedingly clear, and of a greenish-blue colour. No vegetation is seen in it, but it is said to contain a few small trouts.

On the south-western side of Ben-na-muic-dui, separated in part by a steep and narrow valley, is a ridge of less elevated but still lofty mountains, of which the highest bears the name of Cairngorm. This ridge terminates to the eastward in a semicircular range of precipices, several hundred feet high, partially inclosing Loch Etagan, which has the same transparency and colour as the other lakes. It contains few trouts and no vegetation. I looked for mollusca in these lakes, but found no traces of them. The bottom consists of stones and sand, as clear and bright as those of the surrounding wastes. The water of all the rills is also exceedingly clear.

The Brae-raich mountains form a group to the north and north-east of Ben-na-muic-dui, and although I have only viewed them from the latter mountain, I may safely say that they are of the same general character.

Ben-na-buird Group.—Ben-na-buird and the neighbouring mountains, Meal-teanail and Ben-avin, consist of granite precisely similar to that of Ben-na-muic-dui. The precipice on the north-east side of Ben-na-buird is apparently about a mile in length, and in some places nearly seven hundred feet high. It forms a corry, having at its base a circular lake named the Duloch, (Black lake,) the water of which is of a deep blue colour. Some parts of the cliff are magnificent. Enormous blocks have fallen from it, some of them apparently of late years; and I was informed by a person accustomed to visit these mountains, that huge masses sometimes come down in winter. The precipice winds round the head of a long glen, and becoming less abrupt, forms part of the southern side of Meal-teanail, a ridge of the same mass. The summit of Ben-na-buird is comparatively flat, whence its name, which, rendered into English, is Table Mountain.

The summit of Ben-Avin is remarkable for the protuberances which appear upon it. Several of these protuberances are also seen upon other mountains of these groups. They consist of granite much disintegrated, forming tabular masses, intersected perpendicularly by fissures, and are evidently portions of the mass of the mountain, which have either originally protruded beyond the surface, or have resisted disintegration.

General Observations.—These groups, separated from each other by lower mountains and hills, send off long irregular ridges towards the valley of the Dee, on the sides of which mica slate passing into quartz rock is principally seen. The relation of the granite to this rock I reserve for another occasion.

The mountains of this district are very remarkable for their extreme sterility, and the desolate aspect which they present. The summits are rounded, sometimes nearly flat, to a great extent, and entirely covered by disintegrating blocks and stone, together with grit and sand, excepting in a few places where the singular protuberances mentioned above present themselves. Most of them exhibit perpendicular precipices near the summit, which generally assume the semicircular form, constituting the hollows named corries, and having a lake at their base. The rock near the surface, wherever it is exposed, has split into tabular masses, generally pretty regular, and exhibiting the appearance of strata, intersected by rectangular fissures. The true nature of these tables, however, is readily understood on examining the precipices, where they are best seen, and where, notwithstanding, the perpendicular fissures more resemble the seams of strata. There is no tendency in any part that I have seen to the concentric or globular arrangement, nor do the masses in decomposing or disintegrating ever present that appearance.

In many cases, the granite, in decomposing, assumes a whitish colour, but in general more or less of the red tint of the felspar is preserved. In fact this tint, together with the long stripes of debris along the torrents, has given their name to the Braeriach mountains, *brae* signifying an upper district, and *riach* striped with red.

Excepting along the slopes at the base of the precipices, it is difficult to determine whether the blocks and stones which cover these mountains are partially disintegrated and decomposed fragments of the constituent masses, or of diluvial or other origin. They are generally flattened or tabular, lie in all directions, and at present have in very few places any decided appearance of being fragments broken and decomposed *in situ*. In other places, where the rock appears at the surface, the disintegrated portions lie in regular stratiform plates, with little or no covering of debris, so that, upon the whole, it is not unreasonable to infer that the greater part of the fragments has been produced by some cause different from ordinary disintegration effected by the weather in a quiescent state of the earth's surface. A native of the district, on being questioned by me as to what he conceived to be the origin of this debris, said, "I dinna ken, but it has maybe lain there sin Noah's flood." He thought it had no connection with the regular mass of the mountain.

On the summits there are extensive tracts of grit and sand, among which hardly any fragments occur, excepting occasionally pieces of quartz. In other places, the covering consists of fragments intermixed with grit and sand; and in others of tabular fragments irregularly distributed, with very little grit in their intervals. Rounded fragments, such as usually appear in diluvium or alluvium, are no where to be seen. The grit and sand formerly contained numerous crystals of quartz and rock crystal, which have in a great measure been removed by persons who have searched these mountains for them. Crystals still occur, and I found many in the course of my excursions, as well as numerous fragments of white quartz. The debris on the declivities is of the same general nature.

Numerous springs exist on the summits and sides. These form rills, which, enlarged by rains and the melting of the snow, carry down the fragments. In the beds of the torrents we find the blocks and stones worn and rounded. In those of the larger streams at the bottom of the hills, and in the valleys, the blocks and stones are much whiter than on the mountains, the felspar having become softer, and altered in colour. In many fragments I found it converted into a substance resembling steatite, sometimes white, sometimes red, green, and even black.

In the large glens there are immense deposits of diluvium or alluvium. Hillocks of from ten to sixty or eighty feet occur abundantly. These hillocks are generally of an oblong form, but hardly present any appearance by which the direction of the currents that had formed them could be decidedly inferred. Their general direction is that of the valley, although they are also sometimes transverse to it, and often rounded. Where the present streams have cut through them, they present numerous irregular strata of sand, gravel, pebbles, and rounded blocks. These blocks are generally solid at their surface, and hardly ever present the crumbling appearance exhibited by the tabular fragments and the rocks of the mountain-summits and precipices. Granite of the same kind as that of the surrounding mountains forms exclusively the materials of which these accumulations of debris are composed. There can be no doubt, therefore, that they have been derived from the mountains.

The view from the summits of these mountains extends in a circle comprehending the wildest and most desolate scenery of Scotland. On all sides, to the verge of the horizon, are seen mountain summits and ridges, with glimpses of the Moray Firth and German Ocean. Small portions of the valleys of the Dee and Spey are the only parts in which cultivation is seen. The murmur of the distant torrents, the rushing of the winds, and the croak of the ptarmigan, are the only sounds that are heard. The bare and light-grey summits, the declivities furrowed with the reddish streaks left by the torrents, the long strata of blue clouds resting on the distant hills, and the white wreaths of thin vapour floating over the ridges, form together a picture of grandeur and sterility, the view of which excites a melancholy feeling, and inspires religious awe. Viewed from Ben-na-muic-dui or Ben-na-buird, the mountains seem to have no regular direction, but run amongst each other in long round-backed ridges. The proportional size of the valleys is very small, contrary to the idea which one might form in passing along their bottoms.

Loch-na-gar Group.—The mountain of Loch-na-gar, which is the highest of those on the southern side of the Dee, is, in certain of its aspects, the most picturesque of the Dee mountains. Viewed from the Spittal of Glen Muic, at the distance of about four miles, its corry and summits present the appearance of a volcanic crater. From a very extended base, bounded by Glen Muic, Loch Muic, the mountains of the upper part of Glen Callader, and the Dee from Invercauld to near Ballater, it rises in long acclivities and rounded masses, sometimes with abrupt faces, to the base of its summits and precipices. On the eastern side, under the two highest summits, is a semicircular range of magnificent cliffs, which, at the eastern extremity, are about a thousand feet in height. The whole mountain consists of granite, having nearly the same appearance as that of the Ben-na-muic-dui and Ben-na-buird groups, but in general smaller in the grain and less red. The fissures in the precipices are nearly perpendicular, with transverse rents, giving the rock the appearance of being stratified. An enormous quantity of blocks and fragments lies on the slopes at the base of these rocks, which are separated by several deep gaps, and variously broken into ridges and shelves. At the base of the slope is a small lake with dark brown water. Toward the west of the highest summit, another range of precipices stretches along the flattish summit of the mountain. These are of inferior elevation, but present the same general appearances, and have also a lake at their base. The loose blocks and stones which in some places cover the summits and sides, are less disintegrated than those of the Ben-na-muic-dui and Ben-na-buird groups, and are partially crusted with lichens and mosses.

The granitic mountains of the Grampian range are very different from the micaceous, the former being broad and massy, with rounded or flattened summits, while the latter rise into narrower summits, and have generally a less extended base. Loch-na-gar, in fact, presents an extensive group of summits, ridges and precipices separated by hollows and valleys. Its slopes are more rapid toward Loch Muic, which is bounded laterally by rather steep hills of moderate elevation. At the upper end of this lake is a semicircular hollow or corry, opening northward into a rugged glen, bounded by high mountains, and at its upper part by magnificent precipices, named the East and West Craigs, with a lake, named the Duloch, at their base. The waters of this lake are dark-coloured, as are those of the stream that issues from it, on which is a beautiful fall, about half a mile from Loch Muic.

Loch Muic is about two miles long. Its waters are dark-coloured, and it contains abundance of small trouts, but no salmon, a fall of the river preventing the latter from ascending. The rills which enter this lake are all dark-coloured, owing to their being impregnated with peat, which to a greater or less depth covers all the lower parts of the Loch-na-gar group. This arises from the circumstance that the granite of that group is much less decomposed than that of the mountains to the north of the Dee. This may seem strange to some, inasmuch as disintegration is generally supposed favourable to vegetation. But let it be remembered that the deepest accumulations of peat are generally upon rocks which appear to have undergone no disintegration, as may be seen in the Outer Hebrides, and especially in the islands of Uist and Lewis.

Structure of Granite.—Geologists speak of the stratification of granite, and I have anxiously looked for appearances of it in the numerous precipices presented by the mountains. The tendency to form pretty regular cracks or fissures, generally approaching the perpendicular, is decided, and in the faces of the precipices might easily be taken by a careless observer for the seams of strata. But these fissures, although frequently parallel, are not always continuous in the whole of the exposed surface, and often terminate abruptly, while at other times they run obliquely to the general direction. In short, they greatly resemble those of many of the trap rocks, as of the Castle Rock of Edinburgh, but on a larger scale. On the other hand, the tabular pieces into which the rock resolves in becoming disintegrated, and of which the protuberances on the summits, and the upper parts of the precipices consist, might still more decidedly lead to the supposition of their being strata. These tabular masses, however, are only seen on the more exposed parts of the precipices, towards their summits, and on the edges of the great fissures, and never appear in the lower and more solid parts.

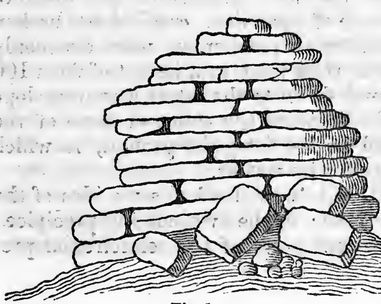


Fig. 1.

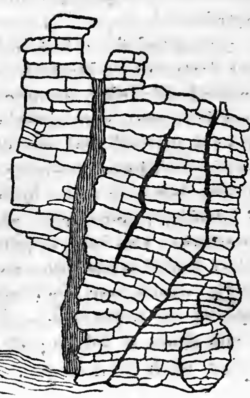


Fig. 2.

Fig. 1. represents the general appearances of the protuberances on the summits of the granitic mountains. Fig. 2. represents a portion of a columnar mass at the upper part of the corry of Loch-na-gar.

Granite has been described as composed of concretions, the intervals between which consist of softer materials. When it is exposed to the action of the weather, the harder portions emerge from the rubbish, and assume a spherical form. The Braemar granite, in becoming disintegrated, never presents spherical forms, but resolves itself into tabular masses, more or less rounded on the edges and angles. Without supposing any concretionary structure in it, this phenomenon is easily accounted for. If the granite had been originally at a high temperature, it would, on cooling, have cracked into seams more or less parallel, one set at right angles to the other. The atmosphere acting upon the surfaces of the cracks, would produce the tabular fragments. The same effect might result from the accidents of a mass originally liquid. At all events, the Braemar granite is apparently uniformly granular in its mass, and although portions may occur harder than others, I have found no evidence of a concretionary structure in it. Fragments of any size, having a rounded form, occur only in the beds of streams, and on the slopes, where the phenomena may be accounted for by more obvious causes than an original disposition of the rock into harder masses separated by less coherent portions.

Drusy cavities occur in the granite, but in what proportion, or of what size, I am unable to say. One, which I observed in the face of a rent in the precipice of Ben-na-buird, was about a foot in diameter, and presented the constituents of the granite regularly crystallized. A few simple minerals, as topaz and beryl, are said to have been found on these mountains.

Precipices and Corries.—The corries, or semicircular hollows of these mountains, and their long precipices of irregular height and direction, present the most remarkable geological phenomena connected with them. There are various ways by which they might be accounted for; but it is first necessary to describe them. The first feature is a lake of nearly circular form, and unknown depth. Around this lake, on one side, and at a greater or less distance from it, rises a semicircular range of precipices, cracked and broken into ridges and shelves, sometimes perpendicular, more commonly sloping. These precipices, from their base, at a height of from 100 to 500 feet above the lake, send down to the latter a curved slope of blocks, stones, and gravel. Toward the valley or slope of the mountain, the lake is bounded by low irregular ground, in which it has found a tortuous passage for its waters.

The accompanying diagram, Fig. 3. will afford some idea of the form of these corries:—*a*, the lake; *b*, the overhanging precipice; *c*, the slope of debris; *d*, *d*, distant parts of the semicircular precipice, with their slopes.

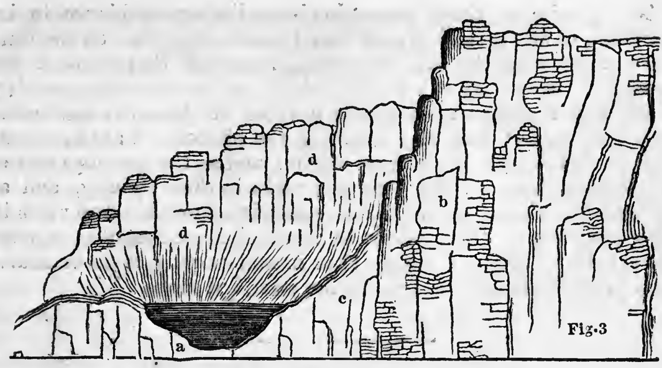


Fig. 3

That such a hollow might be formed by the crater of a volcano, is an idea altogether preposterous. That it might have been formed by the disintegration of a portion of the mountain, following the supposed natural curvature of the granite concretion on the large scale, is hardly less so. The blocks and stones, converted into gravel, might be washed away; but they would not leave a hollow for a lake, but a plain or curved slope. The accompanying diagram, Fig. 4. represents the supposed original form of the supposed strata, which might by supposition be inferred to produce the phenomena: *a, a, a,* the seams of stratification; *b, b, b,* the present surface line. But I have nowhere seen traces of such curved lines in the precipices, which are invariably marked by more or less perpendicular fissures, with transverse cracks.

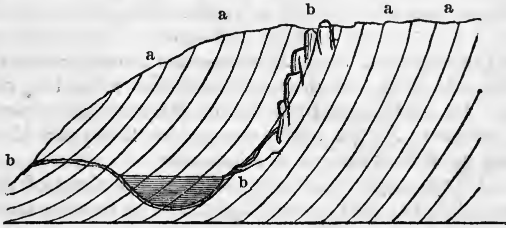


Fig. 4.

Lastly, At the original formation of the mountains, or subsequently, a mass might have subsided, leaving an edge of abrupt rocks: or when the mountain was raised up from beneath, the part which now forms the bottom of the corry being already consolidated, or from various causes not being liable to be acted upon by the upheaving force, remained in the position which it had assumed, while a neighbouring part, separated perhaps by a deep rent, had been thrust up. Other means might easily be imagined to produce the effect.

The granite of these mountains bears little resemblance in its accidents to any stratified rock that I have seen, but, on the contrary, approaches to the trap rocks, insomuch that many of the precipices, were they of a darker colour, and less coarsely granular, would bear a perfect resemblance to those of the rocks now generally admitted as igneous. None of the phenomena are incompatible with the idea of igneous origin; and as the granite veins of this district intersect the stratified rocks in their vicinity, and as the granite veins in other primitive districts resemble trap veins in their phenomena, there seems to me much more reason in supposing granite of igneous origin, than in maintaining it to be analogous in its mode of formation to the stratified rocks.

ART. IV. *Baron Cuvier's Lectures on the History of the Natural Sciences.—(Continued from* Vol. II. p. 451.*)

History of the Sciences under the Roman Republic.

We have brought the history of the sciences to the end of the Grecian period, that is to say, to the time when the kingdoms founded by the lieutenants of Alexander fell under the domination of Rome. We have now, therefore, to follow the track of human knowledge in the Roman Empire; but, before proceeding farther, let us stay a moment to consider this extraordinary people, whose influence already extended through all the civilized part of the western world.

Rome was founded 750 years before Christ,—more than 700 years after Cecrops and Danaus had sown the first germs of civilization in Greece,—three centuries after the Greeks had established themselves on the shores of Asia Minor,—one century after their emigration towards Italy,—and one century also after the building of Carthage. Its foundation preceded by 80 years the renewal of the relations between Egypt and Greece, by 200 years the epoch of Cyrus, and by 400 the reign of Alexander.

Rome, at first subject to kings, changed the form of its government about the year 508 before Christ. The Greeks were at that time established with all their civilization on the coasts of Italy,

* Consistent with the plan of our New Series, in which the "Collections" are restricted to the recital of facts alone, the lectures of M. Cuvier are now brought into a situation more accordant with their nature, and perhaps more likely to obtain for them their proper estimation. It may be useful to mention, that the reports which we are enabled to give of these lectures, being drawn from *Le Globe* newspaper, must be viewed in the light of mere epitomes of the eloquent details which compose the course of M. Cuvier; but from a comparison with still more abstracted reports contained in the *Revue Encyclopédique*, we feel authorized in considering that we give a sufficiently extensive view of the subject. Ed.

and principally in the district of Naples; but the interior was occupied by the aborigines. The new republic, organized for war, hastened to subdue its neighbours. The Latins, the Volscians, the Etrurians, were successively conquered, and, at the death of Alexander, almost the whole of Italy was subjugated. Two centuries later, that is to say, about 30 years before Christ, Rome, pushing her conquests one by one, became mistress of the whole circumference of the Mediterranean, and extended her power far into the interior of Asia, of Europe, and of Africa.

We may now examine into the state of science amongst this people at the time when they thus became masters of the civilized world; and we may investigate the course by which they arrived at their knowledge.

The Phœnicians were certainly the first who carried any notions of science or of commerce towards the west, and that from the most remote period. Shortly after the taking of Troy, they founded Utica (1170), Carthage (1183), and farther west still, but on the other side of the Mediterranean, different manufactories on the coast of Spain. They established in all these countries their commerce, religion, and manners. The Carthaginians appear to have been especially the depositories of their opinions and sciences. From what we know of this latter people, it would appear that their knowledge was less speculative than practical. We can only judge, however, from a single work, the Periplus of Hanno, written in the time of Socrates, and known to Aristotle, who quotes it. We learn from this narrative, of which we only possess a Greek translation, that Hanno passed beyond the Pillars of Hercules, and that, directing his course to the south, he explored the coasts of Africa, as far as Senegambia. It contains descriptions of some phenomena which may appear to be fabulous, but which are nevertheless susceptible of explanation. Thus we find an account of hairy women, caught by the sailors, who attempted to carry them away; but they bit, pinched, and scratched, and at length died of hunger. Their skins were preserved and hung up in the temple of Juno at Carthage. It is probable that these females were nothing else than great apes. There is a notice, again, of rivers of fire descending from the mountains, perceived by the crew at night. From what we know of the customs of African shepherds, it seems likely that the illusion was produced by the burning of ravines filled with grass, to which they set fire in the rainy season, in order that the new shoots may afford a more tender pasturage to the cattle.

Another Carthaginian author was Mago, who wrote twenty-eight books on agriculture. Scipio the Younger, after the destruction of Carthage, carried them to Rome, where they were translated into Latin by order of the Senate. A translation was afterwards made into Greek; but both are now lost, and we only know the work by some fragments preserved by Columella.

The Romans were able to learn but little from the Carthaginians, with whom they were almost always at war; but they gained much knowledge from communication with the Etrurians, who were their nearest neighbours, who had a very remarkable religious and philosophical system, and amongst whom the sciences and the arts had arrived at a high degree of perfection. The origin of the Etrurians is very uncertain. Some persons think that they came from Lydia; others, that they descended from the Tyrrhenian mountains, but that they had held communication with the Greeks since their establishment. However this may be, it is of interest to the question that they established themselves at the epoch of the great Egyptian migrations. The Etrurians at first extended as far as the Alps; but, being attacked by the Gauls, they were forced to withdraw towards Tuscany; they fell back to the Tiber, and from that time, being in the immediate vicinity of the Romans, they were almost constantly at war with this people, until they were conquered, about 282 years before Christ, a little after the death of Alexander.

In examining the monuments of the Etrurians, and what we know of their arts and sciences, we find an extraordinary relation between them, and the Indians and Egyptains. They all formed canals in the alluvia of the great rivers; they all had monuments of a pyramidal form, like the tomb of Porsenna. We see from the ruins of the wall at Volterra that they were far advanced in the art of building, and it even appears that the famous cloacæ of Rome were their work. The Egyptians were unacquainted with the vault, so that this was an undoubted advance which the Etrurians made in architecture.

The Etrurians had a mythological system which greatly resembled that of the Indians and the Egyptians. They were also governed by a caste which seems to have been both sacerdotal and martial. It is at least certain that these noble Etrurians were the possessors of superstitious secrets which they transmitted to the Romans. From them the Romans received the auguries. Their letters were derived, like our own, from the Phœnician alphabet; but it seems that they had not received the Greek, from their preserving the oriental manner of writing, that is from right to left, and suppressing the short vowels, since replaced by points. They had, therefore, to a certainty, had communication with the people of India; but their most beautiful works are posterior to their intercourse with the Greeks: for all their designs represent the mythological emblems of Greece.

The Etrurians were the first instructors of the Romans, and from them this people adopted the division into patrons and clients, which must not be confounded with the division into patricians and plebeians. They could not, however, communicate much knowledge in the natural sciences—perhaps a few notions in ornithology; for the practice of divination from the flight of birds must have obliged the priests to study the manners of these animals. Pliny gives many Etrurian names of birds; but he is doubtful in their application,—which shows that in his time the augurs had already lost the Etrurian traditions. It was the Greeks, then, who truly enlightened the Romans. The Roman colony of Æneas without doubt carried with it their mythology. At a later period, as we have already remarked, the Greeks established themselves on the coasts of Italy. Græcia Magna always kept up communications with the mother country: philosophers passed from one to the other; the two countries were but one. It was natural, then, that the Romans should derive their knowledge from the Greeks, the more particularly as ambassadors were sent to them by this people; but the government discouraged the sciences and the arts, from a notion that they tended to enervate men and unfit them for war. During a long period Rome did not possess an author: more than 500 years passed before the poet Ennius appeared, and he was born in a very distant part of Italy, in the town of Rudiæ in Calabria. This poet composed the annals of Rome in verse, and also some tragedies. Fabius Pictor, a little younger than Ennius, but nevertheless his contemporary, was the first prose historian. This want of chronicles for so long a period explains the obscurity which envelopes the first ages of the republic, whose history can only be looked upon as authorized fables.

Neither Ennius nor Fabius Pictor wrote any thing relating to the natural sciences. After them came Cato the Censor, the first Latin writer from whom a complete work has been handed down to our times; and of whom Cicero remarked, that he was the most ancient author worthy of being read. He wrote on history, morals, and agriculture. He lodged, during one of his travels, with a Pythagorean, and drew from him a smattering of Greek literature: however he was not less constant to the old Roman customs, of which he gave a proof on his return to Rome. A difference having arisen between Athens and Scione, the Athenians chose the Romans for arbiters, and sent to them, as deputies, Carneades, leader of the third academy, and two peripatetics, Critolaüs and Diogenes. These three persons made public speeches, and gave lectures, to which the young Romans went in crowds. Cato was so much alarmed at this novelty, that he quickly settled the matter which had brought over the ambassadors, so as not to leave them a pretext for remaining longer in the city. But when once the mind is directed towards an object, it is not to be arrested by such means: thus the Romans soon gave themselves up to the study of Greek letters, and Cato himself, in his old age, after having struggled a long time against the torrent, at length gave way to it.

Cato has left us a treatise, *De re rustica,* which is rather a collection of receipts than an exposition of a system of agriculture. We find something of everything relative to the management of a farming estate. He tells us how to conduct ourselves towards the steward and the slaves, and his advice on this subject is atrocious.

He recommends that they be locked up all night, and even that they should be chained, although there were no reason for the slightest mistrust. We find also, in this volume, various details on domestic economy, the method of making hams, sausages, &c. The author speaks also of diseases of domestic animals, and their cure. But the whole is limited to the use of some whimsical formulæ, composed of words which are neither Greek nor Latin, and to which Cato attributed a magic power. He had, however, received the instruction of a Pythagorean, as we have before stated; but these philosophers themselves, especially after the renovation of the school, were disposed to admit the influence of mysterious words, as well as numbers.

Some years after the visit of Carneades, the Romans extended their empire to Greece. They were yet at this period so ignorant in respect of the arts, that the consul Mummius, having taken Corinth, and ordered the brazen statutes which ornamented this city to be carried away, declared to the persons employed to convey them to Rome, that if any one of them was lost, they should furnish another of the same weight. This barbarism, however, soon wore away when the Romans were finally masters of Greece. Their connection with Athens, in particular, tended to their improvement. A comparison of the works of Cato with those of Varro, who wrote sixty years after him, will show the rapidity of their progress.

Marcus Terentius Varro was born in the year 116 B.C. He went to Athens to study with Cicero, whose friend he was, and to whom he dedicated his treatise *De Lingua Latina.* He was, as well as Cicero, banished by Antony; but he found means to escape death, and lived to a good old age. He was considered as the most learned of all the Romans. He was even acquainted with the practice of medicine, and it is said that he stayed a very destructive epidemic which ravaged the island of Corcyra. He wrote, under the form of dialogues, a treatise *De re rustica,* which, in its method and elegance, presents a striking contrast with the ruder production of Cato. The first book of this work treats of agriculture in general, and of the nature of soils: the second, of domestic animals, their produce, and their diseases: the third, of farm-yard fowls. We find, from this book, that the Romans already reared peacocks for the table. They had also all our domestic birds, and even thrushes, which we do not keep. They reared in inclosures many species of quadrupeds, which now live only in the woods, such as stags, roebucks, wild boars, three kinds of hares, the common hare, the Spanish hare or rabbit, and the *lepus variabilis,* whose fur becomes white in winter. They also fattened the dormouse, and even snails, which, by a particular kind of food, they raised to a prodigious size. Varro speaks also of the fish-ponds of the Romans, and of the different kinds of fish which they contained.

Cicero, the contemporary of Varro, was, as every one knows, as great a philosopher as an orator; but he was only occupied with the speculative parts of philosophy. We however find in his treatise, *De Natura Deorum,* some passages connected with our subject. He introduces in this dialogue, as interlocutor, a Platonist, who, to prove the existence of a divine Providence, cites different facts in natural history, with a view to illustrate the doctrine of final causes.

Two other authors of the same period, who did not write expressly upon the sciences, but in whose works we find some information, are Julius Cæsar and Lucretius.

Julius Cæsar was born 98 years B.C. In his youth he travelled to Greece, as was the custom amongst Romans of distinction, and he afterwards went to Rhodes to study under Apollonius Molo. He was six years younger than Cicero, and died four years before him. Every one is acquainted with the writings he has left, but few people know, that in his works the first notices of the animals of Germany are to be found. Cæsar made an incursion into Germany after the conquest of Gaul; but he met with so vigorous a resistance, that after some battles he recrossed the Rhine. He has given, in his memoirs, the results of the observations which he made during this short expedition. He speaks of the physical constitution of Germany, of the manners of the inhabitants, and the animals which lived in that country. Amongst these, he mentions the rein-deer, the elk, and the urus, three species which have disappeared from the provinces which were visited by Cæsar. The aurochs, or urus, is now only found in the forests of Lithuania, the rein-deer and elk in the north of Russia and Sweden.

Cæsar had an expanded mind: he loved the sciences, and in the midst of the tumults of his life, he found time to study them. We know that by his own labour, as well as by that of the astronomers whom he employed, he prepared the reform of the calendar, —a reform which lasted fifteen or sixteen centuries after his time, and was only supplanted by that of Pope Gregory.

Lucretius, who of all the writers of the republic, was most occupied with natural philosophy, was the contemporary of Cicero and Cæsar: he was only four years younger than the latter. It was said that he received a charm in his youth which affected his reason, and that it was in his lucid intervals that he composed his poem *De natura rerum.* He died at the age of 43 years, 50 years B.C.

The work of Lucretius, which is a dogmatical treatise on the philosophy of Epicurus, is most remarkable in a literary point of view. Notwithstanding the repetition of somewhat harsh verses, and the very frequent use of antique phrases, it is certainly one of the most beautiful specimens which we possess of Latin poesy: the invocation in the first canto, and the view of the progress of human society in the fourth, are passages which scarcely admit of imitation.

Lucretius treated of exactly the same things as Epicurus, in the same order, and upon the same principles: he is even in some respects more complete: he was the last of the atomists, and recapitulated the labours of the school. He repeated the ideas which we have already exposed under our account of the fourth philosophical school. He admitted nothing in nature but a void and atoms, which are the ultimate and indivisible particles of matter. These atoms, approximated by an oblique motion, have formed the world and all living beings. The human soul is composed of the most subtle atoms, diffused through all the body. Our sensations are produced by the corporeal images of external objects; our very ideas result from the impressions left upon our organs by these images. The world has had a commencement; it will have an end. Neither the sun nor the stars are gods,—they are only aggregations of atoms, liable, like all others, to destruction.

Amongst the compound bodies to which the approximation of atoms has given rise, many have had only a transient duration; not presenting the necessary conditions of existence, they have been destroyed as soon as formed. Animated bodies, possessing all the requisite conditions, comprizing the capability of re-production, have given origin to the species which exist at this day.

In his last book, Lucretius speaks of motion; but his general physics is no better than his philosophy.

ART. V. *On the Effects of Electricity on the Liquified Gases, and on the conducting power of these Fluids.* By K. T. KEMP, Lecturer on Chemistry, Edinburgh.

THE following series of experiments on the liquified gases, was undertaken with the view to discover whether they are conductors, or non-conductors of electricity, by causing them to form part of the galvanic circle, and to ascertain what changes are effected in them when acted on by this agent.

In conducting the experiments I made use of bent tubes, similar to those employed by Mr. Faraday: the part of the tube intended for the reception of the liquified gas, was, however, drawn out to a smaller diameter than the remainder, in order to give more facility in determining the changes which might take place in such small portions of liquid.

The shape of the tube which was used to form the circuit in the galvanic arrangement, will be seen from the annexed figure, where the platina wires are represented sealed into the ends of the tube. AB is a strong glass tube. CD is a platina wire sealed into the larger extremity, and passing

through to be continued to nearly the other end of the tube. E is another platina wire sealed into the smaller end of the tube, and continued inwards so as to leave a small distance between it and the other wire.

Some of the tubes had a small tubular opening F, for introducing the substances to form the gases.

Sulphurous Acid Gas.—Pure mercury and concentrated sulphuric acid were poured into the larger end of the tube, through the extremity E, by means of a small funnel, to keep the smaller end of the tube perfectly clean: a portion of gas was then generated, so as to fill the tube, and the wire E sealed into it, at a very short distance from the extremity of the other wire CD. The gas was again generated by applying heat to the thick end of the tube, while the other end was kept cool. In this manner the sulphurous acid gas was allowed to pass over and be condensed, until it filled a portion of the smaller end of the tube, and rose high enough to have both the extremities of the platina wires immersed in it. The liquid acid, which was now in contact with the platina wires, had not the slightest action on them.

The liquid sulphurous acid gas being made to form part of the galvanic circle of a battery of 250 pairs of plates, the shock received through it was just as powerful as if a continuous metallic communication had existed. When the wires were placed into water, decomposition proceeded as rapidly as when a continuous metallic wire was used. Sparks were also taken from the ends of the wires, and the effect upon the galvanometer was greater in this instance than that produced when the electricity is passed through any other liquid. Liquid sulphurous acid gas may therefore be considered to be an excellent conductor of electricity.

During the passage of the electricity through the tube, a violent action took place in the liquified gas, accompanied with the evolution of a gaseous substance at the positive wire; no change was observed at the negative one. After the action had continued nearly five hours, and the liquid had diminished about a third, a small quantity of sulphur began to deposit itself on the negative wire. The conducting power of the liquid appeared to be considerably less than at the commencement of the experiment.

When the liquid sulphurous acid gas is first subjected to the action of electricity, it appears to lose its oxygen, and is converted into hypo-sulphurous acid, which is retained in a liquid state by the consequent pressure. Whether the oxygen evolved exists free in the tube, or again enters into combination with the materials in the other end, is what I could not ascertain. I am rather inclined to suppose that it does not exist in the gaseous state, as, if this had been the case, the pressure, when the tube was broken, ought to have been much greater than it was. On the tube being broken, the liquified gas disappeared in the same manner as sulphurous acid gas. The odour resembled sulphurous acid; but as it was not collected, this could not be accurately ascertained.

A quantity of the liquid sulphurous acid gas being kept in contact with sulphur for several days, not the slightest chemical affinity seemed to exist between them. It, however, acts on the inferior metals.

Cyanogen.—Exp. I. Dry cyanuret of mercury was placed in a tube, and a platina wire sealed into both ends, as in the former experiment. The thick end of the tube was then heated, and the gas liquified in the smaller end. When a quantity had been obtained sufficient to immerse the extremities of the two wires within the tube, it was made to form the circuit of a galvanic battery of 300 pairs of plates, two inches square. No shock was received through it, nor did water or any acid liquid, when placed in the circuit, suffer any decomposition, neither did it affect the galvanometer. Cyanogen is therefore a perfect non-conductor of electricity of this intensity.

While the liquified cyanogen remained in the circuit, it appeared to undergo no decomposition. A few very minute globules of gas arose from both wires; but this did not appear to depend on electricity, and was evidently not a decomposition of the liquified gas, for it continued after the galvanic circle had been broken. The only apparent cause is, that the platina wires being better conductors of heat than the glass, they might cause the liquid to undergo a slight ebullition at their points. One of the wires was very slightly acted on by the cyanogen.

Exp. II. In this experiment a tube without the platina wires was used. Dry cyanuret of mercury being placed in the thick end of the tube, cyanogen was generated so as to fill it; a small roll of litmus paper was then introduced into the smaller end of the tube, and, after the air had been perfectly expelled, it was sealed, thus leaving the litmus paper in contact with the gaseous cyanogen, on which no change of colour took place. By increasing the temperature at the thick end of the tube, gas was generated in greater quantity, and as the pressure increased, the blue colour of the paper was gradually changed, until the gas became liquified, when it passed into a faint red colour. The tube being afterwards cut, the whole of the liquified cyanogen instantly disappeared, leaving the paper perfectly dry, and permanently reddened. Upon the application of an alkali, the original colour of the paper was restored. The cyanogen in this instance seems to have acted the part of an acid, as no moisture was supposed to be present, and consequently neither cyanic nor hydro-cyanic acid could be formed. It may be somewhat difficult to determine where the acidifying principle resides, unless we admit that cyanogen itself, when subjected to pressure, and in the liquid state, has this property; or, as nitrogen, the nature of which is still involved in obscurity, is one of the constituents of cyanogen, it is not at all improbable that the acid property may exist in that substance.

Liquified cyanogen, kept in contact for two or three days with flowers of sulphur, gradually changes the sulphur into a dark gray substance, without dissolving it. At this period the tube being broken, the whole of the liquified gas disappeared, leaving the dark gray substance, which upon examination was found to contain a quantity of cyanogen in combination with it. Liquified cyanogen also acts slowly on phosphorus, and in the space of three or four days dissolves a portion of it, probably forming the cyanuret of phosphorus.

Chlorine.—Exp. I. A portion of the peroxide of manganese, and strong muriatic acid, were introduced through the opening F, which was immediately sealed, into the thick end of the tube AB, which had a platina wire sealed into it, as seen in the figure. The smaller end of the tube had then a platina wire also sealed into it. Heat being applied, the gas passed over, and was condensed in the smaller part of the tube, until the quantity was sufficient to immerse both extremities of the platina wires.

The liquid chlorine being now made to form part of the circuit of a galvanic battery of 250 pairs of plates, two inches square, there was no shock received, neither did water nor acid suffer any decomposition when placed in the circuit. Liquified chlorine may be therefore considered a non-conductor of electricity of this intensity.

While the liquified chlorine formed the circuit, not the slightest action took place in it, nor were the platina wires which remained immersed in it, in the least degree acted on. Chlorine, therefore, as my friend Mr. Brown observed at the time, can scarcely be regarded as the solvent of gold and platina in the nitro-muriatic acid.

Exp. II. In this experiment a tube was employed of nearly the same form as that previously used, but having an apartment in the centre.

A portion of black oxide of manganese, and concentrated muriatic acid, were introduced into the thick end of the tube; the centre cavity was filled with fragments of recently prepared chloride of calcium. Heat was then applied to the tube, and gas generated, so as to fill the whole of it. A roll of litmus paper was next passed into the smaller end of the tube, which was then sealed. Heat being again applied, the gas was generated, and having to pass through the chloride of calcium, it was perfectly free from moisture. The litmus paper suffered no change until a small portion of the gas was liquified, and as the paper became immersed in the liquified chlorine, its blue colour was completely destroyed, leaving the paper perfectly white.

The bleaching power of chlorine has been attributed to the decomposition of water, the chlorine being supposed to combine with the hydrogen of the water, forming muriatic acid, while the oxygen acts the part of the discolouring agent; but as the gas in this instance had to pass through the dry chloride of calcium before it was condensed, it can hardly be supposed to have carried along with it a quantity of water sufficient to produce this effect. Chlorine I would therefore be inclined to consider the bleaching agent when it is liquified, whether, as in the present instance, by pressure, or by the solvent power of water, and that the decomposition of water which accompanies this process, is merely an accidental circumstance.

The tube was afterwards broken under mercury, and a portion of the chlorine collected in a jar of fluo-boracic acid. No indication of moisture was perceived, which proved at all events that no free water existed in the remaining portion of the gas. The litmus paper remained permanently bleached, and quite dry on the disengagement of the gas.

Another experiment which tends to prove that chlorine is the bleaching agent, is, that when a stream of it is transmitted through a vegetable infusion, and the experiment conducted in the dark, the colour is destroyed; and as chlorine has not the power of decomposing water in the dark, the bleaching power cannot be supposed to depend on the decomposition of water.

Ammoniacal Gas.—Ammoniacal gas was condensed in the same manner as the preceding gases; and when it was made to form part of the galvanic circle, water brought into the circuit suffered no decomposition. The shock was distinctly perceived, and a considerable degree of ebullition, or probably decomposition, ensued within the tube as the electricity passed through the ammonia, but whether any new compound of hydrogen and nitrogen was formed by this action, was not ascertained. Whether or not liquified ammoniacal gas be a conductor or non-conductor of electricity, could not in this instance be very well determined; for at one time the shock was distinctly perceived, and a considerable ebullition took place within the tube, when again, in a few minutes after, no shock was perceived, and the ebullition ceased. This change I attributed to the gas not being perfectly free from water, or perhaps to the effects of the variation of pressure, by the materials having a tendency to absorb the gas.

(*To be continued.*)

ART. VI. *Notice of some Bones which appear to have belonged to the Dodo, a species of Bird extinct within the last Two Centuries.* Read at the Academy of Sciences, 12th July 1830, by Baron Cuvier.

The Dutch navigators who, in 1598, discovered the Mauritius, saw there a bird of great size and remarkable form; the body was gross and unwieldy, and covered with soft grayish feathers; the wings were small, and provided with feathers resembling those of the ostrich, instead of quills; the rump was also furnished with curly feathers of a yellowish gray colour; the feet were short and strong; the toes four in number, one of which was placed posteriorly. The head was heavy, covered anteriorly with down, and at the superior and posterior parts with short feathers, which formed a sort of hood,—an appearance from which the bird has since received the inappropriate name of *Cygnus cucullatus*. The beak was large, strong, deeply grooved, swelled out, and curved at the point. In 1605, Clusius published a figure of this bird, from a drawing made by a person who accompanied the vessels which discovered the Mauritius. From the description which he has added to this figure, it appears that the stomach always contained stones, like the gizzard of the *Gallinæ*. The flesh was blackish, fat, and very thick on the chest, so that a single bird was sufficient food for twenty-five men; it had a very bad taste, was hard in old birds, and of a disagreeable smell. Nuremberg, after Clusius, described this animal. Bontius also afterwards gave an account of it, with a better figure than Clusius'. His plate was engraven after an oil painting, which subsequently passed into the possession of Sir Hans Sloane, and then of Edwards, who bequeathed it to the British Museum, where it is still preserved.

The Dutch gave this bird the names of *Dronte* and *Dodars*, in reference to its weight. Of *Dodars* other naturalists have made *Dodo*, and Linnæus formed the name *Didus*, which he applied to a genus composed of three species, *Didus ineptus*, *D. solitarius*, and *D. nazarenus*. These three species were established on bad descriptions of the same bird, and every thing leads to the opinion, that the Isles of France and Bourbon have never possessed more than the single species first described by Clusius.

In 1626, Herbert spoke again of the *Drontes;* but it seems that these birds, too clumsy to escape from their pursuers, and too large to hide themselves easily, were completely destroyed shortly after the establishment of Europeans on the Isles of France and Bourbon. For a long time they have never been seen, and some naturalists have even pretended that they never existed, and that this species was formed from erroneous descriptions of auks and penguins. The skin of a dodo is, however, in existence; the British Museum has a foot, and the Ashmolean Museum at Oxford has another foot, with a head in a very bad state. We had long despaired of ever obtaining any other part of the animal, when M. Cuvier made a most unexpected discovery. M. Julien Desjardins, of the Isle of France, having sent home some bones which he had found in this island under beds of lava, and which belonged principally to that great land tortoise, incorrectly named *Testudo indica*, M. Cuvier observed amongst them many bones of a bird, and soon determined that they must belong to the species of which we are speaking. These parts are a cranium, a sternum, and some bones of the wing and leg. The sternum has a prominent crest, which distinguishes it from that of the cassowary or the ostrich, in which we can scarcely discern a median process; its anterior angle is very obtuse,—a character which allies it to the sternum of the *Gallinæ.* The bird to which these bones belonged, is also connected with this family by the form of the cranium. The tarsus has processes corresponding to three fingers and a thumb, as they are figured by Clusius and Edwards. The humerus and fore-arm are short, and show that the animal makes no use of its wings. M. Cuvier came to the conclusion, from considerations founded on the structure of these parts, that the dodo must be classed with the *Gallinæ.*

M. de Blainville remarked, after the termination of the reading of M. Cuvier's memoir, that for three years he had been engaged in attempting to determine to what order of birds the dodo must be referred; he had procured a drawing of the portions of this bird, preserved in the Museum of Oxford, and of the head as represented in the painting from which Clusius' figure had been taken. His conclusions differ from those of M. Cuvier, as he considers the dodo to belong to the vultures; he remarked that this bird has been found in places where there is no grain to serve for its food, and offered the conjecture that it lived principally upon fishes. He thought that the bad quality of the flesh is another proof that it feeds upon living prey rather than upon grain; and he considered that there was no proof that the bones produced by M. Cuvier had really belonged to the dodo, for the prominence of the crest of the sternum indicated an animal provided with powerful pectoral muscles, and it could not be supposed that such muscles would have belonged to a bird that could not fly.

M. Cuvier replied that, without entering into a discussion on the general results which may be drawn from the prominence of the crest of the sternum, in the determination of the genus of a bird, we may rest assured, in the present case, that the dodo was unable to fly, and that it nevertheless possessed very thick pectoral muscles. Its absolute incapacity for flight was attested by all travellers who had visited the Mauritius, and the observations of the same persons inform us how the chest of this bird was covered with muscles.

M. Geoffroy St. Hilaire observed that there was not so much real difference between the two opinions as might be supposed; for the *Gallinæ,* by their structure and some of their habits, are considerably related to the vultures, and it might be admitted that the dodo was placed between them so as to establish the connection.

M. de Blainville, however, on the 30th August last, read to the Academy of Sciences a very detailed memoir on this subject. He then stated his opinion to be that the dodo must be placed amongst the *Palmipeda,* next to the penguin. He supposes that this doubtful bird, which has only been found in the Isle of France, may nevertheless exist in other countries. He thinks, moreover, that the portions of structure which we possess, prove, by their differences, that there are many species of dodo.—*Bull. des Sciences Nat.* xxii. 122.

GEOGRAPHICAL COLLECTIONS.

Hospitals for Animals in India.—Early historians of the countries on this side the Ganges relate, that the Indians maintained regular hospitals for the lower animals, and that there were devotees who, from love of them, voluntarily gave the use of their bodies for a night to nourish the parasitical insects which infest the human frame. This disgusting fact has been authenticated in our days by the inhabitants of Surat; and it is stated that there does not exist a man so robust as to resist above two hours the martyrdom which is consequent on this singular act of devotion. The nature of the hospitals, whose sole object is to receive and support every species of animal without distinction, has also been recently ascertained by Lieutenant Burns, and described by him in a memoir read before the Asiatic Society of London, on the hospital of Surat, which he had visited in all its details.

The hospital founded at Surat by the Banians, contained, in 1823, a great number of animals: there were in particular a quantity of infirm oxen and cows; but diseased sheep, goats, and fowls, had also an asylum there. There was no exception to the admission of species of animals,—all kinds were received, whatever might be their number, or the place whence they came. At the entrance of the establishment is a wooden house 25 feet long, and having a platform raised eight feet from the ground. In this place are kept immense numbers of insects, comprising all the species which are usually found in the most miserable dwellings. The number is so great, that on looking into this hideous receptacle, nothing can be distinguished but one vast moving mass.

Mr. Burns states that similar hospitals exist in all the great towns of the western part of India; and he names, amongst others, the city of Aryar, Cutch, where he saw a hospital of rats, containing 5000 of these animals, fed regularly with meal, obtained by a tax levied upon the inhabitants of the city.

Cultivation of Indigo in India.—A memoir on this subject, communicated to the Agricultural Society of Calcutta by Mr. Alexander, contains some very curious statistical data. It results from the investigations of many creditable persons, who have had it in their power to consult the archives of government, that indigo, the cultivation of which was formerly unknown on the banks of the Ganges, now occupies a surface of 738 square miles on the sides of this river. The agricultural and preparatory operations which it requires, employ two millions and a half of inhabitants, who obtain their livelihood by this labour. The land where it is cultivated, the fertility of which is increased by the annual inundation of the Ganges, is augmented 100 per cent. in value. From an average of many years, its mean produce is estimated at thirty millions of francs. Intemperate weather has a powerful influence over indigo, whence its cultivation has been necessarily abandoned in the West Indies. From official documents, Bengal exported,

In 1820, - -	2,376,000	lbs. of indigo.
1821, - -	1,296,000	do.
1822, - -	1,656,000	do.
1823, - -	2,376,000	do.
1824, - -	2,160,000	do.
1825, - -	2,376,000	do.
1826, - -	3,796,000	do.
1827, - -	4,104,000	do.
1828, - -	3,796,000	do.

It is known that, notwithstanding the variations of produce, the cultivation of indigo has considerably increased in British India, and that it has doubled its amount in the course of the last eight years.—*Le Globe.*

Egyptian Geography.—Mr. Wilkinson, who for many years has carried on his scientific researches in Egypt, has completed an elaborate map of the *Feioom*, and thus supplied what has hitherto remained a desideratum in the delineation of Egypt. The map has been printed from stone, at Cairo, for private circulation among his friends. We hope that this valuable addition to eastern geography, as well as the curious information this gentleman has collected, respecting the mythology and history of the ancient Egyptians, may ultimately be given to the public. Mr. Wilkinson printed some fasciculi of the work at Malta in 1828; but it is to be lamented that Egypt does not afford the requisites for letter-press printing, as it now does for lithography, for which advantage travellers are indebted to the exertions of Messrs. Burton, and some other enterprising Englishmen, who have long made Egypt their abode.—*Athenæum.*

Excursions into Central Africa by Egypt.—The *African Institution* sent a young officer into Egypt in the early part of this year, with a commission to follow the southern bank of the Bahr-el-Abiad, as far as Bornou. French travellers are also gone on the same route. "Happy results, then," says the *Bulletin de la Société de Géographie*, "may be hoped for from travels undertaken with such noble emulation."

Acclimation of Exotic Plants in the Caucasus.—M. Morenas has been sent to Georgia, to attempt to acclimate different plants of southern countries, in the provinces situated beyond the Caucasus, and to improve those which already grow there.—*Revue des deux Mondes.*

Discovery of Farsan Island.—At the entrance of the gulf of Akabu, and near Gisan, Professor Ehrenberg discovered an island, called *Farsan*, which is three days' journey in circumference, and contains three villages, and several harbours for small vessels.—*Report on Travels, &c.*

Population of Columbia.—The secretary of state for the interior, has presented to the Congress a statement of the population of the Columbian republic. On submitting it to the National Assembly, he remarked that, "according to this document, the number of the inhabitants of Columbia amounted to 2,379,888; but that the intendants of departments had intimated that this number was too low, on account of many of the inhabitants having refused to register themselves, through a fear that the object of the census was to levy contributions, or to raise recruits." Owing to this circumstance, the number may be estimated at 2,800,000 souls, not including the independent or savage Indians, 203,835 in number. Hence it results that the entire population of Columbia may be stated at 3,000,000 individuals.—*Bull. de la Soc. de Geog.* xiii. 291.

Exact Measure of a Degree.—Ten thousand rubles (upwards of L.1500 a-year!) have been granted by the Emperor of Russia, for the continuation of the investigations undertaken to obtain the exact measure of the degree. This work, which it is said will last for ten years, is confided to the charge of M. Struve of Dorpat. Two staff-officers, natives of Finland, Messrs. Rosenius and Aberg, are already gone to their country for the purpose of discovering the mathematical points of union between Hochland and Tornea. M. Struve has projected a journey abroad, in furtherance of this great undertaking.—*Ibid*, p. 306.

Scientific Expedition to the northern parts of the Atlantic.—In the early part of this year, M. Mertens announced to the Imperial Academy of St. Petersburgh, that an expedition under the command of Capt. Litke, composed of two frigates and a corvette, was about to depart, by order of the Emperor, to the northern part of the Atlantic Ocean. *Iceland* was to be an object of the scientific investigations of this expedition; and M. Litke proposed to carry on a series of observations on the declination of the magnetic needle, and on the pendulum. M. Mertens remarked that even a limited residence upon this island might be very productive to the collections of the Academy, and particularly to the herbarium, if the Academy would think fit to join to the expedition a naturalist, who might also carry on researches upon the different tribes of *acalepha* and *mollusca* swimming freely in the ocean,—an opportunity which was rarely offered to Russian travellers; and he further offered his services to the Academy, which were accepted with pleasure.

The expectations of M. Mertens have been fully realized in the result of the expedition; and since his return, he has undertaken a series of publications on the collections of natural history which were made during the voyage. He has already begun the first number of his *Fuci*.

De Humboldt's Observations on the Inclination of the Magnetic Needle.—At the sitting of the Academy of Sciences of Paris, on the 28th June last, a memoir by M. de Humboldt was read, on the inclination of the magnetic needle in the north of Asia, accompanied by corresponding observations on the horary variations in Europe. These investigations have been conducted during the author's last journey. He has taken the greatest care in the choice of the places in which he made the observations necessary to appreciate the intensity of magnetic forces. Those which he had conducted in Peru, Mexico, at Tobolsk, on the banks of the Obi, and in many parts of the old world, during the perambulation of 12600 miles, supplied him with comparative data. M. Hansteen, a highly distinguished observer, had very recently traversed almost the same district as the author of this memoir, and thus their observations were mutually checked. M. de Humboldt had not yet learned M. Hansteen's results; but M. Kupfer, who had examined them, found that they agreed generally with those detailed in this memoir. M. de Humboldt, since his return to Berlin, has made daily observations on the horary variations of the compass, in an observatory which does not contain a particle of iron. But daily observations at the moment of maximum and minimum, were not M. de Humboldt's only object in having such an observatory. A series of observations, not less important, has been conducted therein on the successive variations in the twenty-four hours, taken every half hour. The author has also established simultaneous observations in different parts of the globe. He has engaged correspondents in ten or twelve very distant places, between the extremes of which there is not less than 120 degrees of longitude, as from Kasan to Marmoto, in the cordillera of Choco. Observations will also be made in places whence we have hitherto had little hope of obtaining them; for instance, they will be carried on at Pekin, in the house of the Russian missionaries. Through the assiduity of M. de Humboldt, observations will also be made at the bottom of mines; that is to say, in places where the temperature is almost invariable, and consequently where the variation will be beyond the influence of the diurnal changes of temperature which take place at the surface.

Voyage to the Antarctic Sea.—(Extract from a letter from Dr. Dekay, dated New York, May 16th 1830.)—When it was proposed, about four years ago, to fit out an expedition to the South Sea, Mr. Reynolds, one of the principal authors of the project, was directed by the Secretary of the Marine Department, to collect what information he could obtain from the whalers who frequent the southern parts of the Atlantic and Pacific Oceans.

In the report which he gave on this subject, Mr. Reynolds showed that the number of vessels employed in these latitudes in fishing whales or seals, amounts to 200; each ship of 725 tons occupying twenty-nine months in the voyage, and bringing home a cargo of 1700 barrels. The whalers who have penetrated into low southern latitudes are very reserved as to any thing connected with their discoveries; islands have been visited and revisited by many of them a score of years before they have been known to others. Moreover, they will give no information except on the express condition that it shall be subservient to a national expedition.

It is nearly eight months since several circumstances determined them to make a voyage on their own account, and they equipped for this purpose the brigs *Seraph*, Capt. Pendleton, and *Annawan*, Capt. Palmer, and a schooner, which set sail on the 15th October 1829.* These two sailors have passed the greater part of their lives in these seas; and Mr. Palmer gave his name to that tongue of land situated to the south of South Shetland. The Lyceum of Natural History of New York, anxious to contribute to the success of this enterprize, appointed Dr. Eights, one of its members, to accompany the expedition in the capacity of Naturalist, and Mr. Reynolds, above mentioned, also went out with it. In January last they were near Cape Horn, and proposed to advance towards the South Pole during the season.

The report of Mr. Reynolds mentions at least 200 islands, rocks, and reefs, which are not found on our maps, or which are ignorantly given. The following are selected at hazard, and it would be well that they were entered into our best maps.† It may be remarked that none of these places is situated under a low latitude, in consequence of the difficulty of procuring information from the whalers.

Date of Discoveries.	Lat. South.	Longitude W. from Greenwich	Names of the Islands discovered.	Names of the Navigators.	OBSERVATIONS.
1823	11° 48′	164° 47′	Lydra Islands.	Capt. G. Rule.	Uninhabited; wood and fish in abundance.
1824	31° 23′	177° 50′	Reefs.	...	Extending to the N. W. a distance of twelve miles from the *Rocher des Amis.*
1824	26° 30′	Long. E. 141°	Bonin Islands.	Capt. Coffin.	Re-discovered;—a group of six islands,—water and wood. Uninhabited, and no quadrupeds.
1823	59°	Long. W. 91°	...	Capt. Macy.	Abundance of seals.
1824	11° 20′	148° 50′	Philip Islands.	...	Low ground, covered with shrubs; uninhabited.
1826	5° 30′	155° 50′	...	...	Low ground, five miles in extent.
1824	21° 21′	161° 04′	Armstrong.	...	Fertile; well peopled, and abounding in provisions.
1825	26° 32′	103° 59′	...	Capt. Ray.	The nearest land to this place is Easter Island, lat. 27°, long. 109° 46′.
1823	21° 17′	159° 40′	Perotuah.	Captain H. C. Bunker.	Twenty miles in circumference; — about 5000 inhabitants.

* A notice of this expedition will be found in Vol. I. p. 290, of this Journal.

† The loose manner in which maps are got up in this country is disgraceful to those whose names are engraven on them. We hope the Geographical Society of London will give a new impulse to this important branch of geography. Ed.

Mr. Pentland's Researches in Bolivia.—M. Arago laid before the Academy of Sciences, on the 12th July last, the geographical labours of Mr. Pentland in the republic of Bolivia. The author, who has carried on his observations at considerable heights, carefully noted the variations of the chronometer on the mountains, dependent upon the diminution of atmospheric pressure. This important fact had been previously neglected, and the observations of Mr. Pentland will consequently necessitate an alteration in the position given to all the places where he has been.

New Islands in the Pacific.—The Journals of the United States have recently published the following details, which have been furnished by Capt. Daniel Mackenzie, commanding the *Minerva Smith,* in which he made a long voyage, during the years 1828 and 1829.

On the 1st December 1828, Capt. Mackenzie discovered, in the Pacific Ocean, an island which he named *Howland,* situated under 176° 49′ 30″ W. long. (from Greenwich,) and 45 miles from the Equator, north lat. It is about 10 miles in circumference; the soil is low and well wooded, but he could find no anchorage. The island showed no trace of inhabitants, and did not appear to have been visited by any previous navigator; the waters of the coast abound with excellent fish.

The Captain also affirmed that the island called *New Nantucket,* is nothing but a bar or bank of sand, situated 14 miles from the equator, in north latitude, and about 179° 33′ 15″ longitude west of Greenwich.

On the 13th of the same month of December, he discovered that the group of islands known by the name of *King's Mill,* is placed in all the maps 84 miles east of its true position. *Dundas,* marked upon the maps at 9 miles from the equator, south latitude, is, on the contrary, in 9 miles north latitude.

On the 27th February 1829, he perceived another group of islands, entirely covered with wood and cocoa trees. Some natives brought to them 170 cocoa-nuts, which they exchanged for pieces of iron-hoops. These people were entirely naked, and wore tortoise-shell ornaments suspended from their noses. The situation of this group, which is thought to be a continuation of Lord Howe's Islands, was determined, after many observations, to be 4° 24′ south latitude, and 158° 45′ 15″ east longitude, from Greenwich.—*Bull. de la Soc. de Géographie,* xiv. 50.

Negro Slavery. *Journal published by Free Blacks.*—A Journal, entitled the *Watchman and Jamaica Free Press,* has been published for some time in Jamaica. It is conducted by free men of colour; and its object is to maintain publicly the right of the blacks to enjoy all the civil and political privileges of English subjects. This Journal is the organ of the blacks, and when we consider that the population of Jamaica comprises, besides 300,000 slaves, 40,000 free negroes, most of them capable of reading and writing, and whose property is at least as considerable as that of the 13,000 resident whites, we may form an idea of the importance which this publication is calculated to obtain.

Political Rights granted to Men of Colour.—During its last session, the Legislative Assembly of Jamaica resolved to equalize the free negroes and mulattoes with the whites, in respect to electoral privileges and other political rights; except that they are not admissible to the Privy Council and to the Legislative Assembly, which, in the government of that island, corresponds to the English Parliament. The object of the Assembly has doubtless been to prevent a revolution, which would sooner or later have broken out, especially since the publication of the Journal above mentioned.

Emancipation of the Negroes in the Danish Colonies.—The measures ordained by the King of Denmark, have placed the negroes of the Danish West Indies on a footing of equality with Europeans, and their emancipation may be regarded as nearly effected. Marriage is permitted between men of colour and Europeans; they carry on trade and commerce under equal rights with the latter; their best mechanics are men of colour; a great number of them are clerks in the counting-houses, and many even occupy public situations. Amongst others may be named M. Decastro, one of the richest merchants of St. Thomas, and adjutant-governor. The black proprietors of some sugar plantations have European managers in their service. It is attempted also to do away with, by degrees, the right of property over negroes not yet emancipated. When at a sale a negro offers a price for his liberty, it is considered at Santa Cruz as a dishonourable act to ask a higher sum, and many have thus gained their freedom at a very low rate.—*Revue des deux Mondes*, Tom. II.

M. Virlet's Travels in Greece.—M. Virlet, one of the members of the French scientific commission in the Morea, arrived at Smyrna in April last, after having visited Constantinople and its environs, the Troade, and the Thracian isles. During his travels he had gathered a rich harvest of minerals, and made an extensive collection of the fishes of the Bosphorus, as well as of the plants which he had met with; besides which he had a collection of different kinds of pottery, intended for the porcelain manufactory of Sèvres. He was to return directly into the Morea to complete his mission, by visiting the Cyclades and the Sporades. Some interesting geological results, respecting the origin and formation of the Thracian Bosphorus, and of the Straits of Dardanelles, are amongst the advantages to be expected from M. Virlet's travels.—*Courrier de Smyrne*, April 18. 1830.

Dr. Parrot's Expedition to Mount Ararat.—In our first volume, p. 59. we noticed the departure of a scientific expedition from Dorpat, under the direction of Dr. Parrot, and charged with the examination of the country around Mount Ararat. The results of the expedition are not yet fully known; but the following information is contained in a late number of the *Bulletin de la Soc. de Géog.*

After many fruitless attempts, Dr. Parrot arrived at the summit of Ararat, and measured the height of this celebrated mountain. He found it to be 16,200 feet in elevation, which makes it 1500 feet higher than Mont Blanc. Dr. Parrot caused a barometric levelling to be taken by M. Behaghel, one of his companions, of the whole route from Tiflis to Ararat, as well as of that which leads from this city, by Imerethi and Mingrelia, to the Kalch redoubt, on the banks of the Black Sea; but his observations are not yet calculated. This traveller describes the western summit, which is the most elevated part of Ararat, as being a plain of about 150 paces in circumference; eastwards it communicates, by a low plateau, with the other summit, which is not so high; at above 1200 feet of elevation, every thing is covered with ice and snow.

The instruments which Dr. Parrot had with him, consisted of a pendulum apparatus, a magnetic *inclinatorium* of ten inches, barometers, a surveying apparatus, &c. In point of astronomical instruments, the expedition was provided with a Reichenbach's theodolite of eight inches, an Arnold's chronometer, and one of Maynie's, a Dollond telescope of three feet, and a Trongleton's sextant.

Dr. Parrot was accompanied, as we before mentioned, by MM. Behaghel, a mineralogist, Schiemann, a zoologist, and Hehn, a botanist,—all three students in the university of Dorpat.

For three months the travellers were prevented from pursuing the principal object of their expedition, by the plague which prevailed in the district of Erivan. They employed this time in making observations in natural history at Tiflis and in the neighbourhood; and they also made an excursion to the mountains of Kakheti. They terminated their travels at Little Ararat, whose summit they also attained, and whose height they estimated at about 1200 feet French. On their return to Russia, MM. Parrot and Behaghel performed a barometric levelling from Astrakhan, along the Volga, to Tsarytsin, and thence to the Don, and along this river to the new city of Tcherkask.

Rivers of Australia.—"Captain Sturt, Mr. G. Macleay, and a government party, have followed the Murrumbidgee river, which arises in the southern mountains beyond Argyle, about 1000 miles westwards, through a fine pasturable country, until it united with many other waters, and formed a lake of about sixty miles long and forty broad, afterwards emptying into the ocean at Encounter Bay, near Kangaroo Island, lat. 35° 25′ 15″, and long. 139° 40′, a little to the south and westward of the Gulf of St. Vincent. The river, at its junction with the sea, appears to be unfavourable to navigation, except for small craft, and the lake itself is full of sand-banks; but, as the fact is established that nearly all the rivers in Argyll and Bathurst countries are drawn by the dip of the earth to the south-west point, it is only fair or reasonable to conclude that more rivers and convenient harbours will hereafter be found, in the vast body of waters which are formed by the descent of the country between Spencer's Gulf and Port Philip. Here there opens a rich tract of pasturable country, of an extent sufficient to maintain more flocks of sheep than would furnish all the fine wool required for British manufacture, and equal to receive and give bread to all the superabundant population of the parent state. The discovery is of incalculable importance in many points of view,—from the delightful climate forming a medium of transition beween those of Sydney and Van Dieman's Land,—and from the ease with which herds and flocks can be driven to any part of the south-west coast, owing to the facility which rich pasturage and abundance of water give to the removal of stock." —*Extract from a London paper.*

Collection of the Costumes, Ornaments, &c. of the Pacific Islanders.—M. Mertens, of the Academy of Sciences of St. Petersburgh, before mentioned, during his voyage round the world, collected various articles used in the islands of the Pacific. He remarked that the inhabitants make more rapid progress towards civilization than those of the interior of large continents, owing to the English and American whalers frequenting the greater part of these islands, and carrying thither specimens of European art and industry. The former objects of indigenous industry are now only looked upon as curious and rare antiques; and, in the Sandwich Islands, it is now impossible to procure articles which were in constant use at the period of their discovery. In those parts of the world different portions of dress cost as much as 2700 francs, and even at that price it is difficult to procure them. M. Mertens has offered his curious and valuable collection to the Academy of St. Petersburgh; and it is to form a private museum, consisting of the costumes, ornaments, and utensils of savage nations.

Increase of Russian Territory and Population since 1476.

		Sq. Geog. Miles.	Inhabitants.
In 1476.	Ivan III. last Duke of Muscovy, inherited	18,208	6,000,000
In 1505.	he died, leaving	24,238	10,000,000
In 1535.	the first Czar, Vassili IV. died possessor of,	37,217	
In 1584.	Ivan IV. died possessor of,	144,040	12,000,000
In 1598.	Feodor I. died possessor of,	150,414	
In 1645.	Michel Romanof died possessor of,	237,933	
In 1676.	Alexis Romanof died possessor of,	267,116	
In 1682.	Peter the Great inherited	271,371	15,000,000
In 1725.	Peter died, leaving	280,379	20,000,000
In 1740.	The Empress Anne died, leaving	325,567	
In 1762.	Catherine II. inherited	325,609	25,000,000
In 1795.	Catherine died, leaving	336,646	36,000,000
In 1825.	Alexander died, and left to Nicholas I.		60,000,000

Admitting the accuracy of the above table, the Russian empire has acquired *forty millions* of inhabitants in the course of a century.—*Revue des deux Mondes*, i. 458.

Expedition to the Eastern Archipelago.—A naval expedition, under Captain Fitzclarence, will sail for New South Wales about the beginning of the approaching year, with the object of searching for openings, which may be useful to commerce, in the Eastern archipelago.

Sand-bank north of Bermudas.—The brig, Joseph Hume, of Greenock, discovered a bank, whose white sands were seen above water about 387 miles to the north of Bermudas. Its latitude is stated to be 39° N., and long. 64° 20′ W.

Survey of the Coast of South America.—The Adventure and Beagle, Captain King, are returned to this country. These vessels left England on this service in 1826, and have completed the survey from the Gulf of St. George on the Atlantic, to the Gulf of Penas on the Pacific side of the continent, including the archipelago of islands called Terra del Fuego, and those of the S.W. coast. The expedition has been most fortunate in its observations and collections. Capt. King, it is understood, will be sent out again to continue his survey from Cape Horn to the Rio de la Plata.

Mr. Buckingham's proposed Voyage of Circumnavigation.—The indefatigable Buckingham has been coaxing the Parisians to support his new scheme, and appears to be as plausible in French as in English.

We may mention to our readers, who are not yet acquainted with this project, that Mr. Buckingham's stated objects are,

1. To form a collection of documents relative to eastern countries.
2. To diffuse knowledge in all the places which are visited.
3. To open new channels for European manufactures.
4. To discover new articles of commerce with which vessels may be laden on their return.

The interests of science are not, however, to be forgotten. The expedition is intended to be accompanied by an astronomer, an hydrographer, a zoologist, a mineralogist, a chemist, a botanist, an artist, and a librarian, each of whom must procure a hundred subscriptions to entitle him to office, so numerous are the applicants!

Whatever may be our opinion of Mr. Buckingham, we wish well to the enterprize; for science differs from commerce in this respect, that even *charlatanerie* may be turned to account. We trust, however, that the Central Committee will exercise a proper supervision over the appointment of those who are to fill the scientific departments; and that it will be held in recollection that youth and activity, with a due amount of knowledge, and with habits of regularity, are the proper requisites for a traveller, and not the supineness, ignorance, and drunkenness which have characterized some of those who have been nominated to such expeditions, with the main object, we much fear, of keeping science at that level which had been attained by the person to whose recommendation so much weight had been injudiciously given.

Voyage to the Russian Colonies in America; Discovery of an Inhabited Island.—M. Khromtchénks, during his voyage, which has occupied nearly two years, and on his return from which he arrived at Cronstadt in July last, has discovered in 70° 9′ 36″ N. lat. and 177° 15″ E. long. of Greenwich, a small inhabited island, which is not marked on any of the most recent maps. M. Khromtchénks gave it the name of *Lœwendahl*, in honour of his first lieutenant. This traveller has also determined the position of two groups of islands, (of which Kotzebue only spoke from the narrative of an islander,) and he has given a description of them.—*Revue Encyc.* iii. 763.

ZOOLOGICAL COLLECTIONS, INCLUDING COMPARATIVE ANATOMY AND PHYSIOLOGY.

New Species of Mammalia from Northern Africa, described and figured by Dr. Rüppell.—The beautiful work of M. Rüppell, published in parts by the Senkenberg Society of Frankfort, is now nearly terminated. Of the plates, 30 are devoted to the Mammalia, 36 to the Birds, 6 to the Reptiles, 36 to the Fishes, and 12 to the Mollusca and radiated animals. All the individuals described as new are preserved in the Frankfort Museum. The division *Mammalia* contains the following new species :*—

1. *Rhinolophus clivosus* (pl. 18.) *R.* apparatu olfactorio externo clivis gradatìm elatis non dissimili. Fossæ nasali ferro equino membranaceo circumdatæ interpositus scyphus parvulus ; sequitur membrana transversalis concavata, antrorsùm eminens, culmine obtusa, tunc membrana recta, conjungens posteriorem transversariè positam, hastatam. Corporis colore ex fusco cinerascente.—Length of the body, $2\frac{1}{2}$ inches ; of the ears, 8 lines ; of the tail, 1 inch ; of the thumb, $3\frac{1}{2}$ lines ; spread of the wings, 10 inches. Found near Mohila.

2. *Vespertilio Temminckii* (pl. 6, male.) Corpore suprà ex cinereo fuscato, infrà albo.—Length of the whole body, 1 inch, 10 lines ; spread of the wings, 7 inches. M. Rüppell took 7 individuals of this species in the neighbourhood of Dongola.

It is proper to observe here, that the Cheiroptera, figured under the name *V. Temminckii* by Horsfield, belongs to the genus *Nycticejus*, Rafinesque, so that M. Rüppell's name may be retained.

3. *Felis maniculata* (pl. 1, female.) Colore griseo-ochraceo ; genis, collo antico albo, lineis ochraceis duabus cincto ; pedum, metacarpi et metatarsi parte posteriore nigris ; cauda gracili, æquali, ad apicem annulis nigris duobus.—Length from the muzzle to the extremity of the tail, 2 feet, 5 inches ; length of the tail, 9 inches ; height of the shoulders, $9\frac{1}{2}$ inches ; of the haunches, $10\frac{3}{4}$ inches. The individual, from which this description was taken, was an adult female, which was giving suck at the time she was killed ; she was taken near Ambukol, in Nubia. This species, in the opinion of M. Temminck, is probably the original type of the domestic cat. (*Vide* his *Monogr. des Mammif.* p. 128.)

4. *Canis famelicus* (pl. 5, male.) Capite ochraceo ; fascia dorsali castanea ; corpore suprà ex griseo flavescente, infrà ex subflavo albescente ; auriculis permagnis erectis.—Length from the muzzle to the extremity of the tail, 2 feet, 10 inches ; length of the tail alone, 1 foot, 2 inches ; of the head, $5\frac{1}{4}$ inches ; of the ears, 3 inches, 10 lines ; height of the shoulders, $10\frac{1}{2}$ inches; of the haunches, 11 inches, 2 lines. Hab. the deserts of Nubia. It makes burrows, and chases birds and the smaller mammalia. Arabic name, *Sabora.* This species is probably the Chacal, which is so frequently found represented on Egyptian temples and tombs.

5. *Canis variegatus* (pl. 10.) Corpore ochraceo pilis villosis perlongis ad apicem nigerrimis variegato ; auriculis erectis, unicoloribus ochraceis ; cauda breviori ; unguibus crassis obtusis.—Length from the muzzle to the end of the tail, 2 feet, 11 inches ; length of the tail, 10 inches ; of the ears, 2 inches, 10 lines ; height of the shoulders, 1 foot, 2 inches ; of the haunches, 1 foot, 3 inches. This dog has much resemblance to our wolf ; does not burrow ; inhabits Upper Egypt, where it chases birds and the smaller mammalia. It is known to the Arabs by the name *Abou-Schom.*

6. *Canis pallidus* (pl. 11.) Capite, nucha, torque, toto notæo et cauda ex colore stramineo pallide rufescentibus ; regione parotica, gutture, pectore, gastræo albescentibus ; dorso ex albo, nigro et rufescente vario ; cauda ad apicem nigra.

* We have retained the author's descriptions, even in his own Latin.

Length from the muzzle to the end of the tail, 2 feet, 7 inches; length of the tail, 10 inches; of the ears, 4½ inches; height of the shoulders, 9¼ inches; of the haunches, 9 inches, 10 lines. This beautiful fox is perhaps a little larger than the Fennec; it is known in Cordofan and Darfour by the name of *Abou-Hossein;* it burrows, and chases birds and small mammalia during the night. M. Rüppel took three individuals.

7. Psammomys, a new sub-genus of Rodentia, with the following characters: Dentes *primores cestriformes, inferiores compressiusculi, molares obtusi, tritores cemento nigro inducti, suprà infràque pari modo complicati, ità ut in coronâ primi machæres rhombeæ tres, secundi duæ, tertii una promineant.* Rostrum *acutum, anticè compressum, apice obliquè detruncatum; labrum integrum; sacculi buccales nulli.* Auriculæ *mediocres rotundatæ.* Corpus *pilis mollissimis tectum.* Cauda *corpore brevior, pilosa.* Pedes *ambulatorii, anticè digitis quatuor, verruca hallucari, posticè pentadactyli; ungues falculares.*

Dental formula. Incisores $\frac{2}{2}$, molars $\frac{6}{6} = 16$.

The rat which forms the type of this sub-genus, *Psam. obesus* (pl. 22, the external appearance, and pl. 23, the skeleton and dental apparatus,) is only found in the sandy districts of Alexandria and the environs; it burrows holes in the sand; lives in society; seeks its food, which consists of roots, by night; never enters the habitations of men; and apparently hibernates. The length of the body, including the tail, 11 inches; of the tail alone, 5 inches.

8. *Sciurus rutilus* (pl. 24.) Corporis colore suprà rutilo, pilorum hirtorum apicibus albis, infrà et podiis candidè albis; cauda corporis longitudine, disticha; auriculis brevibus, rotundatis. This species, which very much resembles *Sc. setosus* Forster, or *Sc. albovittatus* Desmarest, lives in the eastern part of Abyssinia, where it burrows holes in the earth; it is seen on little shrubs, but as soon as it finds itself perceived, it runs to its subterranean dwelling. According to the natives, it feeds on the buds of trees. Total length, including the tail, 1 foot, 9 lines.

9. *Mus dimidiatus* (pl. 13.) Corpore suprà colore ex stramineo pallidè refuscente; infrà albo; pilis tergi aculeatis.—Length from the muzzle to the root of the tail, 1 foot, 4 inches; length of the tail, 4 inches. Inhabits the environs of Sinaï and Nubia, in cavernous places.

10. *Lepus isabellinus* (pl. 20.) Corpore suprà isabellino, infrà albescente, auriculis nudis, capite longioribus.—Total length, 1 foot, 4 inches; of the head, 3 inches 3 lines; of the ears, 5 inches; of the tail, 2 inches 10 lines. Inhabits the south-west of Ambukol. The Egyptian hare is found in Arabia, in Egypt, and on the coasts of Abyssinia; but this new species is only found in this particular locality.

11. *Antilope addax* (pl. 7, male and female.) Corpore lacteo; capite colore cacaotico, quo collum superinductum; caprona frontali spadicea, cornubus rugarum ambitu contortis, in leve fastigium exacutis, lyratis, jugulo jubato.—Length from the muzzle to the root of the tail, 4 feet 4 inches; length of the horns in a straight line, 2 feet 2½ inches; height of the body, 3 feet; length of the tail, 1 foot. Inhabits the desert, south of Ambukol, as far as the Haraza Oasis. This species is the same as that already described by M. Otto under the name of *A. suturosa,* and by M. Savi as the *A. gibbosa.* It is not the true *Strepsiceros* of Pliny; but it is the species described by Ælian under the name of *Addax.* M. Rüppell found the true *Strepsiceros,* that is to say, the animal described as such by Pallas, on the coasts of Abyssinia.

12. *Antilope Sœmmerringii* (pl. 19, male.) Corpore suprà colore isabellino, pilis quasi sericatis, suturis undique implicatis nitescente; infrà splendidè albo; facie, fronte fuliginosè nigris; tœnia alba superciliari, basi cornu ad rhinarium usque descendente; cornubus annulatis reclinatis, apicibus levibus introrsùm flectis lyratis.—Length from the muzzle to the root of the tail, 4 feet 6½ inches; length of the ears, 6½ inches; of the horns, (measured according to their curvatures,) 1 foot 1 inch; of the tail, 9 inches; height of the shoulders, 2 feet 7 inches;

of the haunches, 2 feet 8½ inches. This antelope was found in the eastern part of Abyssinia.

Antilope montana (pl. 3.) This species, described as new, is nothing else than the *A. scoparia* of Schreber.—*Bull. des Sci. Nat.* xxi. 462.

The new species of *Birds* discovered by Dr. Ruppell in Northern Africa, will be given in our next Number. Ed.

Distribution of the Prussian Elk.—How far the Prussian Elk agrees with, or differs from, the Scandinavian animal of that denomination can probably not be made out in the present state of the science. It may even remain an undecided point for some length of time; for the Prussian elk falls not easily in the way of a scientific traveller: it is, as far as I know, only to be met with in one place, a low swampy tract of land stretching along the eastern shores of the lake called *Curish Haff*, between the *Russ* and the *Gilgue*, the two principal outlets of that river, which is called by the Germans *Memel*, by the Polanders *Niemen*, by the Lithuanians *Niemona*. This tract is for the most part covered with wood, and in this wood the elk finds shelter and food; it goes by the name of the *Forest of Ibenhorst*. The thriving population in the neighbourhood would long ago have destroyed this valuable animal, if the Prussian government had not protected it by laws, almost as severe as the game laws of England, against the avidity of poachers.—*Wittich in Journ. of Roy. Institut.* I. 121.

Notice of the Erinaceus setosus, Lin. (*Centenes setosus*, Desm.)—M. Julien Desjardins lately sent to the Museum of Natural History of Paris, from the Mauritius, six specimens of the tanrec, (called tandk or tandka by the Creoles,) about four inches long. Yellow bands on a brown ground are peculiar to the young animal; fallow is the colour of old age. The specimens sent home were all young, only a few months old. M. Desjardins mentions that it is difficult to procure the old ones, the negroes are so fond of them for food. The tanrec is very prolific, having as many as fifteen, and sometimes eighteen at a birth. It is a singular fact in the natural history of this animal, that it should hibernate from June to November in so warm a climate. M. Desjardins is of opinion that the tanrec comes originally from Madagascar, and that this is the animal which some travellers have noticed as a hog, or a very large rat.—*Ann. des Sci. Nat.* xx. 179.

Two bones peculiar to the Common Hedge-hog (Erinaceus Europæus;) by J. F. Meckel.—In a late number of the *Archiv. für Anat. und Physiologie*, M. Meckel described two little bones which seem to be peculiar to the common hedge-hog. They are situated in the pillars of the diaphragm, at the part where the tendinous portion becomes fleshy, near the middle of the second lumbar vertebra. They are intimately united to the substance of the diaphragm, but less firmly connected with the intervertebral cartilages. They are of a flattened form; their greatest dimensions is from above downwards, that is to say, from the vertebral column towards the belly. Their length is about three lines, and their greatest breadth a line and a half. They are very slender.

These two osseous pieces correspond to the superior part of the oblique orifice, through which the aorta passes into the abdominal cavity, and they closely surround the trunk of the artery. They are found in both sexes; but they have not yet been observed in the mature fœtus. M. Meckel has sought for them in vain in the mole, marten, fox, many species of bat, and the hamster. He is led to consider them as rudiments of a V-shaped bone, or inferior spinous processes, especially as the aorta passes between them.—*Bull. des Sci. Nat.* xxi. 311.

Tympanum of the Three-Toed Sloth.—M. Vander Hoeven has remarked that the tympanum of the three-toed sloth, is not, as in other mammalia, hollow externally, but, on the contrary, swelled out,—a fact which has escaped the best known authors. Sir E. Home mentions an analogous structure in the cetacea.

This conformation connects the sloth with the birds, with which it is also related by the ossification of its costal cartilages, representing the sternal ribs of birds, and perhaps by the great number of its caudal vertebræ. M. Vrolik, who has confirmed the observation of Vander Hoeven in another individual, thinks that he has remarked the tympanum of the *Bradypus didactylus* to be hollow externally. This species is more nearly allied to the other mammalia by the normal number of its cervical vertebræ.—(*Bijdragen tot de Natuurkundige Wetenschappen*, Deel. v. st. 1. p. 93.) *Ann des Sci. Nat.* July 1830.

On the Colouring Matter of the Placenta in the Carnivora.—Surrounding the placenta of the dog, and several others of the Carnivora, there are two circular bands containing a green matter, the nature and use of which has hitherto been doubtful. M. Breschet some time since presented a memoir on this subject to the Philomathic Society of Paris, and in a supplementary paper, recently published, he has treated at length of the chemical constitution of this substance. He has found, by chemical analysis, that there is an identity of composition between this colouring matter and the green colouring matter of the bile, which he advances as an additional proof in favour of the analogy of functions between the placenta and the liver during the intra-uterine life. These two organs, says M. Breschet, appear to form a little circulatory apparatus in the fœtus; and the colouring matter of the placenta, or that of the bile, observed in the blood by many chemists, leads us to suppose that this fluid is necessary to the circulation of the blood, and to the maintenance of the life of the fœtus, by endowing the blood with the requisite properties.—*See the Paper at length, Ann. des Sci. Nat.* xix. 379.

Genito-urinary System of the Axolotl *of Mexico.*—In 1824, Sir Everard Home published an anatomical description of the Axolotl, but with his usual inaccuracy and want of precision; his account of the genito-urinary organs is particularly superficial. M. Rathke having recently had an opportunity of dissecting a male and a female of this species of Batrachia, has put us in possession of more correct details on the genital apparatus and the urinary secretion.

The kidneys of the axolotl resemble those of the tritons and salamanders in form and situation, but they are proportionally smaller. The yellow bodies which accompany the kidneys of the terrestrial salamander, and which are, according to M. Rathke, the rudiments of supra-renal capsules, are altogether wanting in the Axolotl. The uriniferous ducts cannot be seen without the aid of a lens; they are very tortuous, and of equal capacity throughout; they rise from the external edge of the kidney, and pass in a parallel direction towards its internal margin. M. Rathke was not able to discover the ureter, probably on account of its delicate structure, and of the veins and cellular tissue which surround it.

The urinary bladder is small, almost pyriform, and similar to that of the European proteus.

The testicles have the same position and the same relations as in the salamanders; but they differ from those of the *Triton niger* in not being subdivided into many portions. They differ also from those of the *Triton tæniatus* and *T. igneus*, in their form not being oval, but flat and elongated. Moreover, they are larger, *cæt. par.*, than the testicles of the neighbouring reptiles, having most analogy with those of the European proteus.

The *vasa deferentia* have a great resemblance to those of the terrestrial salamander; they have a similar blackish colour.

The anal gland is much more developed than in the salamanders; it only exists in the male.

In the female the ovaries are proportionally larger than in the terrestrial salamander; the *vitellus* is not entirely yellow as in this latter species, but half yellow and half black, as in the frog.

The only difference which exists between the oviduct of the axolotl and that of the salamander is, that in the former this organ has no thickening or swelling in the form of a uterus posteriorly; the oviduct of the salamander, on the other hand, has its parietes uniformly thickened from one end to the other.

From these data we have the general result, that the structure of the genito-urinary organs of the axolotl differs from that of the neighbouring genera, and that in this respect alone it may rank as a distinct genus in the systems of the animal kingdom. (Meckel's *Archiv.*)—*Bull. des Sci. Nat.* xxi. 476.

The Dugong.—The head and tail of a dugong has recently arrived in Edinburgh from Singapore, as a donation from G. Swinton, Esq. to the Royal Society. The thoracic and abdominal organs are on their way in another vessel. We shall thus soon have it in our power to determine the relation between the sex and the development of the tusks, according to the view suggested in a preceding number of this Journal.

It is due to Mr. Swinton that we remark how great a service he has rendered to science, by the trouble he has at various times taken to extend our knowledge, by furnishing us with the means of investigating the structure of rare or unknown animals of Eastern climes.

Hood of the Crested Sea Lion (Phoca cristata.)—M. Rapp is of opinion that the hood which is placed on the forehead of the *Phoca cristata*, and which is susceptible of considerable distention, must be considered as a reservoir of air to supply the wants of the animal whilst it is in search of food beneath the water. This hood, situated before the osseous part of the nasal fossæ, is nothing more than the fleshy portion of the nose highly developed, and so organized as to be capable of great dilatation; it is internally divided into two parts by a membranous partition, which is a continuation of the osseous septum. When the distention of the hood takes place, the external nares, which pierce it anteriorly, are closed by means of proper sphincter muscles, and then the air, driven by the lungs through the posterior nares, fills the hood, and gives it the extraordinary dimensions which it has been seen to possess. (*Meckel's Archiv.*)—*Bull. des Sci. Nat.* xxii. 101.

Original Country of the Golden Pheasant (Phasianus pictus.)—Since the time of Buffon, the golden pheasant has been supposed to come originally from China, but upon what authority is unknown. M. Dureau de la Malle has recently determined the true country to which this beautiful bird belongs, and in which it is even now found in the wild state.

A passage in Pliny (Hist. Nat. x. 67. Tom. I. p. 569. Ed. Hard.) notices this bird by a characteristic feature, which has been overlooked by naturalists, but which cannot be mistaken. The golden pheasant has on each side of the head, beautiful orange-yellow feathers, which curve into a sort of conch or ear, and which are susceptible of voluntary motion. The common pheasant does not possess this ornament. Now Pliny expressly says: "*Phasianæ in Colchis geminas ex plumâ aures submittunt subriguntque.*" The country of the bird is thus fixed. It is Colchis or Mingrelia, wherefrom also we have the common pheasant, whose name is derived from Phasis, the principal river of Colchis.

The assertion of Pliny has been confirmed by M. Gamba, French Consul at Tiflis, who has seen and hunted the golden pheasant in the chain of the Caucasus, where large flocks are found in company with the common pheasant.—*Ann. des Sci. Nat.* xviii. 274.

Sexual characters of the Great Bustard (Otis tarda.)—M. de Rochebrune has remarked that Buffon, and all ornithological writers who have followed him, have been mistaken in supposing that the male of the great bustard is distinguishable by certain peculiar ornaments, such as the moustaches, or tuft of feathers, at the base of the under mandible. That is the case in young individuals; but when the female has arrived at her full growth, at the age of three or four years, she has the same external characters as the male, only somewhat less developed. *Transactions of the Linn. Soc. of Bordeaux,* iv. 169, June 1830.

Winter Plumage of the Larus atricilla.—The winter plumage of the *Larus atricilla, (Mouette a capuchon plombé,)* was unknown to Temminck. From a specimen taken at Trieste, in the winter of 1829, M. Michahelles describes it as follows:—

Front white, some small grayish feathers around the beak; four spots round the eye, the anterior and posterior gray, the inferior and superior white. The upper part of the body, nape, scapulars, and middle wing-coverts of a silvery gray; smallest wing-coverts dusky brown; greatest wing-coverts tipped with white. The first quill-feather (from the extremity) of an uniform blackish-brown; the second to the fifth, of a similar colour, but marked within by a white spot; the sixth to the tenth, brown along the shaft of the feather, and white in the other part. The last two rectrices entirely white, with the exception of a little brown spot near the extremity; the others are also white, but terminated by a bar an inch broad. All below is silvery white.—*Isis,* 1829, No. xii. p. 1269.

Procellaria Leachii, Temminck. *Leach's Petrel.*—When Temminck wrote the description of this species in the second edition of his Manuel, published in 1820, he was aware of ouly *four* specimens in all Europe, and his description was taken from the original British specimen killed by Mr. Bullock at St. Kilda. Since that period several have been killed, or found in a nearly dying state in this country, and its identity, as an occasional visitant to our shores, can no longer be doubted.

On the morning of the 16th November last, another specimen was accidentally discovered by Mr. John Jardine, lying in a very exhausted state on the public road between Glasgow and Carlisle, about three miles north of Jardine Hall. When found it allowed itself to be taken, and soon afterwards died; on examination, one side appeared much bruised, and there can be little doubt that it was driven from its seaward course, and most probably dashed to the ground by the fury of the storm, on the night previous, one of the most violent storms of thunder, wind, and rain, that has for many years visited Dumfries-shire. What follows are the observations that were taken down previous to, and during the process of its preservation:—

Male, plumage rich, uniform grayish-black, lighter on the forehead and throat, and of a browner tinge underneath; feathers on the forehead thick and satiny, very long, and giving a peculiar rise to that part not indicated by the skull; the feathers between the eyes and the bill standing nearly erect, and somewhat rigid, as in the Swifts. Rump-feathers pure white, extending a little way on the side, the shaft of each feather darker; wings beautifully formed for flight; quills much pointed, inner webs very broad, second and third equal and longest, first and fourth equal, the rest gradually decreasing. The longest quills exceed the tail by $\frac{1}{4}$ of an inch, whereas both Temminck and C. L. Bonaparte make them of equal length. Secondaries tipped with clear grayish-white, forming a bar across the wing.

Tail of twelve feathers, black; the two centre ones broad, and of equal length with the under coverts. Those on the outside are edged with gray, and exceed the centre ones by half an inch. Legs and feet brownish black, having no difference of colour in the webs.

Weight, 1 oz. 1 dr.
Length from bill to the exterior tail feather, $7\frac{3}{4}$ inches.
Depth of fork, $\frac{1}{2}$ inch.
Length of outer tail feathers, $2\frac{3}{4}$ inches.
Length of wing from the bend joining the fore-arm to the tip of 2d and 3d quills, $6\frac{3}{8}$ inches.
Length of tarsi 1 inch, equal to that of the outward toe.

Glands above the eyes large. Æsophagus and stomach wide and large, containing the remains of small crustaceæ, and six or seven feathers, as if plucked from the rump.

Cœcal appendages very short and narrow.

Jardine Hall, Nov. 18. 1830. W. J.

Specific Characters of Birds.—M. Bruch remarks that the number of *rectrices* increases with age in certain birds, and consequently that it cannot be safely used in the determination of species. The relative length of the quills may also vary with age: thus, as the bird grows older, the length of the first may increase with respect to the length of the sixth,—an observation made by M. Bruch in the males of the *Falco rufus.*—(*Isis.*) *Bull. des Sci. Nat.* xxii. 121.

Absence of a Stomach in the Genus Euphones.—The want of a stomach is a peculiarity of the genus *Euphones.* After the dilatation which forms the crop, an opaque circle is seen in the place of the *ventriculus succentarius*, which is followed by a little enlargement representing the gizzard, and continuous with the intestinal canal.—(*Friorep's Notizen*, Feb. 1830.) *Bull. des Sci. Nat.* xxii. 121.

Bursa Fabricii of Birds—M. Berthold considers the *Bursa Fabricii* of birds to be analogous to the urinary bladder of mammalia.—*Nov. Act. Acad. Natur. Curos.* xiv. 905.

Peculiarity in the Form of the Turbot, (Pleuronectes maximus.)—M. Schleep has described and figured two turbots, which were taken in the Baltic amongst other individuals of the same species, and which presented such an anomalous appearance, that he was in doubt whether they were of a new species. or whether they were what he is pleased to call mere *lusus naturæ.* They are described as being covered on both sides with long bony elevations irregularly disposed; the dorsal fin commences by a semilunar margin, which rises over the head in the form of a helmet; there is an eye on each side, and the colour is the same on both surfaces. P. 12. V. 6. A. 45. C. 17. D. 60.—*Isis*, 1829, No. x. p. 1049.

New Method of Preserving Fishes; by M. Ricord.

It is not one of the least necessary parts of the education of a traveller, to become acquainted with the best methods of preserving animals for sending home. The want of this knowledge is, however, but too lamentably apparent in the mangled state in which specimens are constantly presented to our museums. It may be said that this is, in a great measure, owing to the nature of the printed directions which are prepared by those who have the audacity to give instructions, without having the slightest practical knowledge of the subject. We are inclined, from our own experience, to consider that this may be one cause of the evil, and shall consequently, from time to time, notice the most efficacious methods of preserving the internal organs, skins, &c. of different animals. If the following process be found to have the promised effect, the slight increase of expense can be of but little moment.—Ed.

For the successful preservation of fishes, and especially of their colours, the animals should be put when alive into strong alcohol, and left in it for six days. As soon as they are dead, the body must be opened, and the intestines emptied by pressure, without separating them from the body. The best way of opening the fish, is by placing it on its back, with the head turned to the side of the operator, and directing the incision from between the pectoral fins obliquely towards the left side of the tail. This method permits of the skin being easily sewed up again, when we wish to prepare it. After this operation, and when the fish has been six days in strong alcohol, the spirits must be changed for alcohol of 18°, in which the fish must be placed for six days longer. Large fishes are then to be laid upon a plate, and entirely covered with salt during eight hours. At the end of this time, the fish must be put in a dry place, exposed to the sun during the day, and free from moisture by night. The salt must then be entirely wiped off, and the fish wrapped in cloths, to prevent the scales from falling off. It is then again to be put into alcohol of 18°, for transportation. The flesh is penetrated with salt, and when it is immersed in alcohol of 18°, which contains much water, the salt is dissolved, and forms an alcoholic solution, which preserves the fish and its colours for a long time, even under the tropics, as M. Ricord proved during his last voyage to Haiti. All these preparations must be made in different casks: that in which the fishes are transported must be tarred externally, and washed in the inside with chlorate of lime, and then with alcohol of 36°, to take up the chlorate, which will otherwise destroy the colours of the fishes. Slips of parchment, marked with the name or number of the fish, are to be attached to the tail with an iron wire. As soon as the fishes are arrived at their destination, they must be put into alcohol of 25°. This mode of preserving fishes is certainly more expensive than the old one, but it is incomparably better.

When the skin alone is wanted, it must be raised from the body in a deep vessel full of alcohol, by which means the scales will not fall off. After this is prepared, each skin should be covered with silk paper, which may be closed by a little paste; the scales are thus prevented from being rubbed off during the voyage. The paper is easily removed by placing the skin for a few minutes in water.

The colour of the eyes should be painted on a paper which contains the number of the fish.—*Froriep's Notizen,* No. 567.—*Bull. des Sci. Nat.* xxii. 156.

Mode of Death of Fishes.—In the stickleback, (*Gasterosteus aculeatus,*) the loche, (*Cobitis barbatula,*) and the minnow, (*Leuciscus phoxinus,*) when full grown, and I suppose arrived at the extremity of age, I have often observed, some days previous to death, the tail extremity to lose its flexibility, and to become covered with a kind of mould, or conferva-like substance, to the height of two or three lines, and that this substance or growth gradually crept along towards the middle of the fish, the rigidity of the parts still increasing till they died. Is this the natural death of fishes?—*James Stark, in Ed. New Phil. Journ.* Oct. 1830. p. 331.

Mr. Stark considers three years to be about the average duration of life in the minnow in confinement.

Chemical researches on the Blood of Fishes.—M. Morin has recently conducted a series of experiments on the blood of the salmon, with the view to determine the nature of its difference from human blood, as a subject of medical jurisprudence. The blood upon which he operated was of a deep red colour, with a violaceous tint, and was like a very thick sirup; it was somewhat gelatinous, and reddened vegetable blue colours. The colouring matter of the blood of fishes, according to M. Morin, cannot be confounded with the principle which colours the blood in the mammalia, especially on account of its solubility in alcohol and ether, and its crimson red colour when separated from the body. We must accordingly admit the colouring matter of the blood of fishes, amongst the distinct proximate principles of animals.

Iron is one of the elements of this colouring matter; besides which there is a fat brown oil, having the odour of the fish; another fatty matter, with a rancid smell, without any acidity, and very soluble in ether; an animal substance possessing the properties of osmazome; acetate of soda, chlorate of sodium, and phosphate of lime; and lastly, an albuminous matter, very soluble in alkalis and acids, resembling mucus in the latter property.

The author concludes that the spots produced on clothes by the blood of fishes, cannot be mistaken for those which are occasioned by the blood of mammalia, from the nature of the colouring matter, and the absence of fibrin.—(*Précis analytique des travaux de l'Académie de Rouen.*) *Bull. des Sciences Nat.* July 1830, p. 131.

Remarkable instances of the subserviency of one Animal to the formation of the habitation of another.

WITHOUT attempting to reason upon the causes of the admirable fitness of things, or seeking to swell the list of final causes by more ridiculous conceits than those which well-intentioned authors have devised, we collect the following facts as remarkable instances of the adaptation of animals to each others' uses.

The *Actinia circineopados*, Otto, (*A. picta*, Risso, *Medusa palliata*, Fabr.,) has an extraordinary mode of life ; it is found fixed upon deserted univalve shells, which are the habitations of a hermit crab ; the margin of the opening of the shell is continued by a long horny greenish-coloured membrane, whereby the cavity of the shell in which the crab lives is enlarged, and to this membrane the Actinea is attached by its base around the orifice of the shell.

Ström (*Beskriv. over fogderiet Söndmör.* S. 164,) gives an imperfect notice of this animal. He remarks that it is attached to the deserted shell of a *Nerita*, which forms the habitation of a hermit-crab. Fabricius (*Reise nach Norwegen*, S. 327.) also describes its peculiar habits, though he erroneously supposed it to be a *Medusa*.

On the west coast of Norway, where Ström and Fabricius made their observations, Rapp found this *Actinia* on the shell of the *Buccinum undatum*, which was inhabited by a hermit-crab. Fabricius also saw it attached to the shell of *Turbo littoreus*, which had been occupied by a hermit-crab. Otto, who has given the best description and figures of the *Actinia carcineopados*, (*Nov. Act. Acad. Cæs. Leop. Carol. Nat. Cur.* II. 288, Pl. xl.) found it often at Naples on different shells of mollusca, which were the habitations of the *Pagurus Bernhardus*.—Rapp, *Uber die Polypen*, p. 58. *Vide* also Bohadsch, *Anim. Marin.* p. 135.

Without being acquainted with the previous observations of the preceding authors, our friend, Dr. Coldstream, has recently, in the Edin. New Phil. Journal, Oct. 1830, given the following account of the habits of another species of *Actinia*, the *A. maculata* of Adams, (Linn. Trans. V. 8. ;) *A. sulcata*, Flem. (Brit. An. 498 ;) and De Blainville, (Dict. des Sciences Nat. lx. 294.)*

" Base fixed to a thin horny expansion attached to the apertures of various dead shells, such as *Trochus cinerarius* and *T. Magus.*† and forming, as it were, an extension of the body-whorl of the shell in a spiral form. Over this, the *Actinea* is spread entirely, and covers also more or less of the shell. Its oral disc is uniformly situated close to the inner lip of the horny case. The aperture of the case is accurately surrounded by its body, the margins of the opposite sides of which meet, and are closely applied to one another at the middle of the outer lip of the aperture, whence they run upwards towards the old shell, where they generally separate again, leaving its apex uncovered.

" The horny membrane to which the *Actinia* is attached, covers, for the most part, nearly the whole external surface of the old shell to which it is fixed, and, from the circumstance of its aperture, is prolonged into a large hollow expansion, resembling in form, and occupying, relatively to the shell, the place of a ventricose body-whorl. Its substance is of uniform thickness throughout its whole extent, of a greenish-brown colour, translucent, having both surfaces irregularly

* Dr. Coldstream, however, remarks that the characters of the species described by him " do not correspond with those assigned to *A. sulcata*, while they agree closely with the description of the *maculata* of Adams. In the *A. sulcata*, the tentacula are greenish, and longer than the body ; in the *A. maculata*, they are white, with a faint streak of brown, and shorter than the body ; the first has the oral disc dentated, the latter has it plain. Lamarck (An. sans Vert. iii. 69,) gives the specific name of *maculata* to a species from the Red Sea, but neither the characters assigned to it, nor the figure in the Encyclopedie, (Pl. 72, f. 10,) correspond with those of our animal.

† Adams found his specimens " surrounding the apertures of deserted shells of *Murex despectus*."

wrinkled transversely. In a recent state it is quite flexible, but when dried it is brittle. It takes fire and burns readily, leaving a very small residuum, which does not effervesce with acids. It is insoluble in boiling water and in alcohol, but dissolves slowly in acids, and in solutions of the alkalies. Its general appearance may be compared to that of the cases of *Tubularia indivisa,* except in point of colour.

"The case thus formed by the old shell and the horny membrane, and covered by the *Actinea,* I have *always* found inhabited by a variety of the hermit-crab (*Pagurus Bernhardus,*) differing from the common one in having the distal extremities of the hands nearly smooth, and the margins of all the legs fringed with hairs. The crab is so imperfectly covered by the case, that the whole anterior half of the thorax remains exposed, even when the animal retires within it as much as possible.

"This curious combination of animals occurred to me several times in Rothesay and Kames Bays, in Bute, either thrown ashore after easterly gales, or drawn in by flounder-nets. Its natural history is perhaps doubtful. Is the horny case secreted by the *Actinea?* Or is it the dead axis of some zoophyte, like that which covers old *Buccina,* (*Alcyonium echinatum,* Fl.) and which I have found forming an extension of the body-whorl of the *Turbo littoreus,* also inhabited by the *Pagurus?*" "It seems to me probable that the horny membrane is produced by the *Actinia;* and that its formation presents a striking instance of the operation of that beautiful law of Nature which makes the habits of one animal subservient to the wants of another."

Another, and perhaps a still more remarkable, case of a similar adaptation is also recorded by Dr. Coldstream, in the *Halichondria suberica,* (Flem. Brit. An. 522.) of which he found two specimens in Rothesay Bay, attached to old shells of *Turritella terebra,* each containing within its mass a spiral cavity of two turns, continuous with that of the shell. The cavity enlarges towards its mouth, so that the outline of the whole mass is conical, and resembles that of some *Buccina.* This cavity was inhabited, in both specimens found, by the common hermit-crab.

"Their history," says Dr. Coldstream, "I presume to be this. The crab takes possession of the *Turritella,* when young; the sponge then attaches itself to the shell, and, as it grows, is forced, by the motions of the crab, to assume a spiral form, with a cavity enlarging towards the mouth, corresponding to the progressive development of its crustaceous inhabitant.

"Montagu, who first described this species, found it generally in the very same circumstances as those I have just described; but he says that, in every specimen which he obtained, the sponge had spread within the aperture of the old shell to which it was attached; and that, in some cases, it seemed to have increased so much internally, notwithstanding the motions of the crab, as to force the latter to remove to another shell (Wern. Mem. ii. 102.) In my specimens, the sponge does not spread within the aperture of the shell.—*Ed. New Phil. Journ.* Oct. 1830, p. 235.

A similar observation had been previously made by M. Rapp, and noticed in the work before quoted, (p. 26.) respecting the *Alcyonium domuncula,* Olivi, (*Zool. Adriatica,* p. 241.) another of the sponges. "I have found this sponge," says M. Rapp, "on the coast of Languedoc, always forming a thick and almost cartilaginous, orange-coloured covering upon worn shells of mollusca, as *Nerita, Cerithium, Murex,* in which a hermit-crab (*Pagurus striatus*) had taken up its abode. This thick mass of sponge forms a continuation of the whorl of the shell, and thus makes up the greater part of the dwelling of the crab."

We think it right to remark that the observations of Dr. Coldstream on the habits of these animals were purely original on his part, and that we consider it to be no detraction from their value that the same facts have fallen under the observation of naturalists in other countries. Indeed we feel ourselves justified in referring to the whole of Dr. Coldstream's paper, entitled "Additions to the Natural History of British Animals," the greater portion of which will be found in our present Number, as an index of what we are to expect from the labours of that gentleman in the Invertebral Kingdom. Ed.

Mode of constructing the tube of the larva of Cryptocephalus and Clythra.—It has been supposed by entomologists that the tube in which the larva of Cryptocephalus and Clythra live, is formed of earth agglutinated together by a secretion exuded by the animal. M. Gené has, however, recently observed that the tube of the larva of the Cryptocephalus is constructed from its excrement, which, on being passed from the anus, is collected by the larva, and worked into the form of the tube by its mandibles. For some time after its formation the tube preserves the green colour of the excrement; but afterwards becomes black. M. Gené conjectures, from analogy, that a similar method is followed by the larva of the Clythra, a neighbouring genus, in the construction of its tubes. And he has also remarked, that the same process is employed by the mother in providing for the preservation of the egg of the young Cryptocephalus. As the egg passes from her body, she completely envelopes it in her own excrement; and the larva, at the proper period, breaking the egg in which it is contained, at the same time ruptures the excrementitious envelope, and thus forms the first part of its tube.—*Ann. des Sci. Nat.* xx. 143.

Hipponoe; a new genus of Annelida, instituted by MM. Audouin and Edwards.—The characters of this genus, the only known species of which was brought home by M. Gaudichaud from Port-Jackson, are as follows:—

Head distinct, and furnished with antennæ; proboscis destitute of jaws; feet composed of a single row; no papillæ, nor dorsal cirri; branchiæ in the form of ramose tufts, or leaves, fixed to the superior base of the feet.

The *Hipponoe Gaudichaudi* is nearly an inch long, and contains about thirty articulations, the first of which (from the head) carries rudimentary branchiæ only, and the last of which are very small; on the middle line of the ventral surface of the body, which is very convex, there is a longitudinal groove, and on each side a row of pores; the dorsal surface is flat, and presents nothing remarkable; the feet are very little protruded.—*Ann. des Sci. Nat.* xx. 156.

New habitat of the Euphrosine myrtosa.—The *Euphrosine*, a genus allied to the *Hipponoe*, above described, in the group *Amphinomæ* of Savigny, was originally discovered in the Red Sea, and had not been found elsewhere, till MM. Audouin and Milne Edwards recently met with it, whilst dredging on the coasts of the deparment of Manche. The species they found was the *E. myrtosa* Lam.; it occurred in abundance.—*Ibid.*

Habitat of Asterias discoidea and A. lævigata.—The country of the *Asterias discoidea* was unknown to M. Lamarck. M. J. Desjardins has found it on the reefs, and the sands near Flacq, in the Mauritius. The *Asterias lævigata* also inhabits these coasts. In this species, M. Desjardins counted 3250 spines on the margins of the rays. Reaumur considered 1520 a great number in the common sea-star.—*Ann. des Sci. Nat.* xx. 177.

On the Anatomical Structure of the Sea-mouse, (Aphrodita aculeata, Lin., Halithea aculeata, Lam.;) by M. G. R. Treviranus.—Many naturalists, and, amongst others, Redi, (*De Animalculis vivis*, p. 281;) Swammerdam, (Bibl. Nat. p. 904;) Gunner, (Schrift. der Drontheimischen Gesellschaft, Part iii. p. 64;) Pallas, (Miscell. Zool. p. 81;) and Home, (Phil. Trans. 1815, p. 260;) have already described the internal structure of the *Aphrodita aculeata.* Nevertheless, M. Treviranus has been able to enrich our knowledge of the anatomy of this Annelida with many new observations.

Under the integuments of the back of the animal, two transparent membranes are found, one external and the other internal. The external membrane, which is covered with little cartilaginous spots, is neither attached to the integument nor to the internal membrane, whence there are two cavities, one between the integument and the external membrane, and another between the latter and the internal membrane. The former cavity communicates with the air by means of a transverse groove in the integument, which has been noticed by Redi, near the anterior extremity of the animal. The internal cavity also communicates with the air by apertures which open alternately in the interstices of the feet.

The external membrane is continuous with the tunic which covers the exterior of the ventral surface. The dorsal integument does not extend below the feet. The internal membrane of the back is continuous with the internal ventral tunic, which is formed of muscular fibres decussating in every direction, and which is entirely distinct from the external ventral tunic, so that there is also a cavity between the two membranes of the lower surface. This cavity also communicates with that formed by the dorsal membranes, whereby the water has a free circulation in the interstices of the double envelope of the animal.

But this general cavity also communicates with the interior of the abdomen by two grooves, opposite the openings which occur between the feet, as above mentioned. The water is thus able to penetrate into the intestinal cavity, and we have an explanation of that which Pallas could not understand, how the ova are transmitted into the interstice of the double envelope, and thence passed from the animal.

Hitherto the generative organs of the Aphroditæ have been unknown. M. Treviranus thinking that he has discovered the ovaries in two series of little bodies, lying in the cavity of the abdomen, along the external margin of each longitudinal ventral muscle; these corpuscles have an obtuse rounded extremity attached to the muscle, and a pointed extremity which is free. Near the blunt extremity there arises a little canal, which is lost in the abdominal cavity. Each corpuscle contains a yellowish fibrous matter.

M. Treviranus is of opinion that the respiration of the *Aphroditæ* is carried on by means of capillary vessels with which the cœcal appendages of the intestinal canal are supplied. And this is the more easily conceived that the water has access to the abdominal cavity as above stated. This view receives additional probability from the *Amphinomæ*, which are nearly related to the *Aphroditæ*, having no capillary vessels on the cœca, whilst they possess external branchiæ, exactly resembling the capillary distribution on the cœca of the *Aphroditæ*. Thus the only distinction between these two genera, in respect of the respiratory apparatus, is, that in one it is external, whilst in the other it is carried on in the abdominal cavity.

The dorsal plates, which have been considered to be the organs of respiration, could not, according to M. Treviranus, perform that function, since they contain no blood-vessels; they are only rudimentary branchiæ.—(*Zeitschrift für Physiologie,* III. Cah. 2. p. 157.) *Bull. des Sci. Nat.* xxi. 165.

The Eyes of Mollusca.—Many physiologists have doubted if the black dots, which are seen on the tentacula of mollusca, are real eyes; and some have even denied that they are used for vision. These doubts may have been occasioned by their having examined snails (*helices*) and terrestrial mollusca, where these organs are only very imperfectly developed; but if they had examined the eyes of the marine carnivorous mollusca, *Buccinum undatum*, or *Fusus despectus*, and more especially some of the larger *Strombi*, they would have found the eye as fully developed as in the cuttle-fish, (*Sepia,*) showing the cornea and the nearly orbicular crystalline lens almost perfectly formed, as may be seen by any person simply cutting the cornea across, and slightly pressing it, when the crystalline lens will protrude. It is curious that Cuvier, in his anatomy of the welk, (*Ann. Mus.*) should have overlooked this fact.—J. E. Gray.

The Animals of Calyptræa, Capulus, and Crepidula.—The anatomical examination made by Mr. Collie, the surgeon of the Blossom, during his voyage round the world, has proved that the animals of these genera are dioicous, like the other pectinibranchous mollusca, and not monoicous, as stated by M. Cuvier in his anatomy of these genera in the *Annales des Museum.* A full account of this discovery will be given in the forthcoming work on the animals discovered in that expedition.—J. E. G.

The Animal of Aspergillum.—At last the question of the position of that curious shell, the watering-pot, has been determined by the discovery of its animal, by Dr. Edward Rüppell, who gave an account of it at the late meeting of the German naturalists and philosophers. He proved the correctness of Lamarck's theory, in placing it with the bivalves, for the animal is exactly similar to that of the *Pholades.* A specimen of the animal is now in the collection of the British Museum, but Dr. Rüppell's description of it is not yet published.—J. E. G.

New Species of Invertebrata, discovered by Dr. Coldstream.

Valkeria, (Flem. Brit. An. 550.); *V. glomerata,* Coldstream. Stem simple, slightly branched, partly creeping, partly erect. Cells ovate, lengthened, with the mouths slightly compressed quadrangularly; scattered over the stem in irregular groups. Before the polype is evolved, the cell is closed at the distal extremity by a conical covering. Polypi with *ten* tentacula, finely ciliated. They extend considerably beyond the mouths of the cells, to the margins of which each is attached by a membrane, which is protruded before the tentacula, when the polype is about to expand itself. When alarmed, it contracts very rapidly.

Found attached to the stems of *Fucus nodosus,* in small pools, at low water, near Leith.

Note.—Notwithstanding the number of the tentacula, I have placed this species in the genus *Valkeria,* on account of its agreement in habit and general character with the *V. uva* and *cuscuta.* Perhaps it ought to form a separate genus.

Synoïcum, (De Blainville, Man. de Malacol. p. 586, a genus in which several of Savigny's genera of compound *Ascidiæ* are united;) *S. rubrum,* Coldstream. Form of general mass various; base, for the most part, cylindrical; summit larger, more or less conical or convex, sometimes divided; height nearly an inch; base yellowish, translucent, somewhat cartilaginous; summit containing the animals imbedded in its substance, and coloured by them of a bright vermilion; animals very numerous in each lobe, and crowded together without any regular arrangement; orifices prominent, with their margins divided into eight or nine short tentacula.

Found in abundance on the north shore of Lamlash Bay, Arran, attached to the sides of boulders, generally under the shelter of fuci.

Ascidia (Lamarck) *rugosa,* Coldstream.—General form somewhat conical, compressed; length upwards of two inches; surface of outer tunic greenish, irregularly wrinkled, rugose, harsh; substance almost cartilaginous, near the base very thick; orifices approximate, large, compressed, slit-like; branchial one terminal. The prolongations of the inner tunic, which unite it to the outer one, are attached nearly half an inch within each of the orifices of the latter; inner tunic whitish, transparent; branchial tube furnished with two layers of muscular fibres; external, transverse; internal, longitudinal; orifices studded with minute red spots arranged irregularly; branchial cavity, extending the whole length of the inner tunic, straight; branchial membrane grayish, reticulated. A fold, projecting into the branchial cavity, and continuous with the membrane lining its walls, is attached along its anal side, from the mouth (which it partly surrounds) towards the opening of the cavity, opposite the position of the anus. It is about one-sixth of an inch in breadth, and has its surface marked with transverse striæ only. The mouth is simple. The stomach and two first turns of the intestine are united together, and surrounded by the liver, which has a spongy structure. Imbedded in its substance are several series of white granular bodies. A large column or rib projects into the cavity of the intestine, on the anal side, along the greater part of its course; its walls are coated with a dark orange-red matter, easily rubbed off. Ovary situated between the middle of the branchial membrane and the mass of the intestines.

The species being rare, I could not procure a sufficient number of specimens to enable me to prosecute farther the examination of its structure; but the details already given are sufficient to indicate its more striking peculiarities, and to point it out as differing, in several particulars, from the species already described.

It occurred in East Lock Tarbet, Argyleshire, adhering to dead branches of some land shrub.—*Ed. New Phil. Journ.* Oct. 1830, p. 240.

BOTANICAL COLLECTIONS.

The Flower of a Plant a mere Leaf.—Linnæus long ago asserted that "the flower of a plant was only a transformation of a leaf," an idea which has been since more fully proved by De Candolle and others. Du Petit-Thouars, from new considerations, has lately endeavoured to render this proposition more complete, by changing it into the following:—That the flower is a transformation of the leaf and annexed leaf-bud; the leaf gives rise to the stamens, the calyx, and corolla when there is one; and the bud gives the fruit, and consequently the seed. It would be tedious to enter into his proof of this, or of another proposition which he derives from it:—that the greater number of flowers is formed of four series or rows of organs, of which the three lower, (at least in the dicotyledones,) are most frequently composed of five leaves; the fourth, which is at the same time the highest, often presents a smaller number of parts. That the quinary number prevails in dicotyledonous, and the ternary in the monocotyledonous plants, is allowed by all botanists, and M. du Petit-Thouars thinks he has discovered the reason, in the manner in which the fascicled vessels or vascular tissue divide on entering the leaf; but too many anomalies occur. He derives also the quinary number from a different view of the subject:—when leaves alternate on a branch, by looking at them along the axis of the branch, they will be observed to be placed spirally, so that the sixth is in the same line with the first, or, in other words, five constitute the spiral, and when these are converted into sepals or petals, we must have a quinary arrangement; but objections to this view may be raised from the circumstance of the petals alternating (unless abortive) with the calycine segments, whereas by his theory we might expect them to be opposite. Again, leaves which are alternately opposite, would have the fifth under the first, or would have a spiral of four, and consequently a calyx and corolla constantly of the same number of parts; but we know in many such the quinary series is as frequent as in plants with alternate leaves.

Turrites alpestris, Schleicher.—Professor Koch has lately gathered this (which is the *Arabis ciliaris*, Willd.) near the baths of Kreuth, and, after a careful examination, has determined it to be a mere hairy variety of the *Arabis ciliata* of Brown. This plant, formerly supposed to have been confined to the Swiss Alps, was met with on the Esquierry, a mountain near Bagnères de Luchon, in 1825, by Mr. Arnott and Mr. Bentham, in a botanical excursion made that year through the Pyrenees. It appears in Mr. Bentham's "Catalogue, &c." as *A. ciliata*, but was afterwards ascertained by Mr. Arnott to be identical with Schleicher's plant. Doubts being thus raised as to its being *A. ciliata*, a specimen was sent to the late Sir J. E. Smith, who decided, as has been done by M. Koch, that it was scarcely a variety of Mr. Brown's plant.

Chenopodeæ.—In the Flora Altaica, a new arrangement is given by M. C. A. Meyer of the plants of this natural order found in the Altai; and as this part of the world contains almost all the genera of the order found elsewhere, the following view, we trust, is not without importance.

SUBORDO I. SPIROLOBEÆ. Semina exalbuminosa. Embryo spiralis. *Trib.* 1. *Anabaseæ.* Flores conformes. Squamulæ hypogynæ cum staminibus alternantes. Semina verticalia. Caulis articulatus. 1. *Brachylepis:* Sepalis inappendiculatis, alis semper destitutis. 2. *Anabasis:* Sepalis demum dorso transverse alatis. *Trib.* 2. *Salsoleæ.* Flores conformes. Squamulæ hypogynæ nullæ. Semina verticalia vel horizontalia. Caulis continuus. *A.* Calyx bibracteatus 3-5 sepalus. Integumenta seminis membranacea. * Semina verticalia. 3. *Halogeton:* Sepalis demum dorso transversim alatis. 4. *Halimocnemis:* Sepalis inappendiculatis. * * Semina horizontalia. 5. *Salsola:* Sepalis demum dorso transversim alatis vel plicatis. *B.* Calyx squamulis minutis subjectus, fissus vel partitus: laciniis sæpe longitudinaliter carinatis. Integumentum seminis exterius crustaceum. 6. *Schanginia:* Seminibus verticalibus, staminibus calyci insertis. 7. *Schoberia:* Seminibus horizontalibus, staminibus receptaculo insertis.—SUBORDO. II. CYCLOLOBEÆ. Semina albuminosa. Embryo periphericus. *Trib.* 3. *Chenopodieæ.* Flores conformes. Squamulæ hypogynæ nullæ. Semina verticalia vel horizontalia. Caulis continuus. *A.* Calyx gamosepalus (plerumque) ebracteatus. * * Semina horizontolia. 8. *Chenopodium:* Laciniis calycinis longitudinaliter carinatis. 9. *Kochia:* Laciniis calycinis demum dorso transversim alatis vel spinosis. * * Semina verticalia. 10. *Camphorosma:* Calyce 4-dentato: dentibus binis oppositis majoribus dorso transversim carinatis. 11. *Blitum:* Calyce 3-5 partito, laciniis æqualibus (plerumque) vix carinatis. *B.* Calyx 5-sepalus bibracteatus; semina verticalia. 12. *Polycnemum.* *Trib.* 4. *Salicorneæ:* Flores spicati conformes. Squamulæ hypogynæ nullæ. Semina verticalia. Caulis articulatus. 13. *Halocnemum:* Floribus squama amenti obtectis trisepalis. 14. *Salicornia:* Floribus nudis, excavationibus rachis immersis, gamosepalis. *Trib.* 5. *Atripliceæ:* Flores diclini. Squamulæ hypogynæ nullæ. Semina verticalia. Caulis continuus. *A.* Radicula adscendente. 15. *Atriplex:* Calyce masculo (rarissime hermaphrodito) 3-partito; femineo compresso gamo-vel-disepalo. *B.* Radicula descendente. 16. *Diotis:* Calyce masculo 4-sepalo; femineo bifido villo involuto. 17. *Ceratocarpus:* Calyce masculo bilobo; femineo tubuloso nudo. 18. *Axyris:* Calyce masculo 3-4 sepalo; femineo 3-sepalo.

Such parts of this system as are taken from the structure, we will allow to be philosophical, although too minute for the common botanist; but upon the vertical or horizontal position of the seed, we feel inclined to put less value. Thus several closely allied species of *Chenopodium* are almost only distinguishable by the position of the seed; but, according to this arrangement, they must be placed in different genera. *C. carinatum, Pumilio, Bonus-henricus,* and *C. rubrum,* are thus thrust into *Blitum,* of which the fleshy calyx is now to form no part of the character. Nor do we much admire the distance at which *Atriplex* is placed from *Chenopodium.*

Mœhringia.—Some specimens of *M. mucosa* have been found to have five sepals, ten stamens, three styles, and a capsule with six valves; and therefore to belong to the genus *Arenaria,* as much as *Tormentilla* does to *Potentilla.* If retained as a separate genus notwithstanding this, M. Koch wishes to unite to it *A. trinervis.* M. F. Meyer has already proved that *A. bavarica* only differs from *M. mucosa* by the somewhat thicker leaves, and perhaps *M. sedoides* is, on the other hand, identical with *A. bavarica.*

Sibbaldia.—From this, as a genus, Bungé has separated the second section of De Candolle, under the name of *Chamærrhodos.* The common *S. procumbens,* however, in cultivation, puts on a very different appearance from what it exhibits on our Alps. In the garden a panicle is protruded much longer than the leaves, and the plant is in almost every respect similar to *Potentilla tridentata* but differing by the small yellow petals.

Peruvian Bark.—Professor De Candolle, in preparing the 4th volume of his *Prodromus*, has had occasion to examine many plants producing this medicine scattered through different herbaria, and has given the general result of his observations to the public. From these we learn that of the genus *Cinchona*, as limited by him, seven species are in use. *Buena* gives three species, though scarcely known in Europe. *Remijia*, a new genus, affords three species used in Brazil. *Exostemma*, a genus from the Antilles, contains fourteen species, most of which are there in use, but the bark, though bitter and tonic, contains apparently no quinine. All are, however, excellent emetics. *Pinkneya pubens* is used as a febrifuge in the United States, of which it is a native. *Hymenodyctyon*, a new genus described by Dr. Wallich, contains four species, but one only, known in East India under the name of *Bundaroo*, is tolerably understood. The *Luculia* of Sweet from East India contains one species, but the properties of its bark are scarcely known. The genus *Danais*, from the Mauritius, has been compared with the *Cinchonas*, but the bark is bitter and astringent, and seems to have little in common with those plants yielding the true medicine of commerce.

Botanical Tours.—M. Agardh in 1827 undertook a tour to Austria and the north of Italy, for the sake of comparing the *Algæ* of the south with those of the north, and he has published a very interesting account of it. He has added several new species, and cleared up many doubtful ones. In the warmest of the baths of Carlsbad he observed one of this tribe of vegetables, which had been successively described as a *Fucus*, an *Ulva*, a *Conferva*, and a *Tremella*; it appears to be an *Oscillatoria*, species of which genus have been found in the tube of the stove of the old Botanic Garden of Edinburgh, and in various hot springs in France.

In an excursion made by Dr. Graham with several of his pupils and some friends, to the Scottish Highlands in August last, the following rare cryptogamic plants, among many others, were collected:

Polytrichum septentrionale, on Ben-y-Bourd, in fine fructification; Dr. Graham. Shoulder of Ben-na-muic-duich, on the descent towards Loch Aven, in fine fructification; Dr. Greville.

Jungermannia Doniana, in fructification, very abundant among the rocks above Loch Aven; Dr. Greville.

J. planifolia, } same station; Dr. Greville.
J. compressa, }

J. trilobata, a small and compact variety,—among the rocks above Loch Aven; Dr. Greville.

Cetraria nivalis, on most of the Braemar mountains; beginning to present itself at an elevation of about 3000 feet.

C. Islandica, not unfrequent in fructification on several mountains.

Cornicularia bicolor, on several mountains around Castleton in Braemar, near the summit; Dr. Greville.

There occurred also a moss, on rocks at the head of Glen Callader, with immature fructification, having the habit of *Trichostomum ellipticum*, but with oblong capsules, an obliquely rostrate lid, and a dimidiate calyptra. It will probably prove to be undescribed, although the genus is at present doubtful.

Amongst the phænogamous plants collected, were *Carex Vahlii*, *Saxifraga cæspitosa*, and perhaps *Caltha radicans*, but of this last there is some doubt, as the plant was not in flower. Mr. Macgillivray has already described, from this trip, what he thinks to be a new species of *Salix*, (*S. Macnabiana*,) but which, by the characters given, seems to be identical with *S. arbutifolia*, referred now by the best botanists (not horticulturists) to *S. Myrsinites:* this genus has been already sufficiently tortured. The same gentleman has also described a species of *Aira*, which he supposes to be perhaps *A. montana;* but his description applies to a common alpine state of *A. cæspitosa*, which in elevated situations has the leaves frequently involute, and the glumes of a shining purplish colour.

In the course of the same month, an excursion was made to Loch Skene, Dumfries-shire, and the mountains in its immediate neighbourhood, by Sir W. Jardine, Bart. and Dr. Greville, when the following, among other plants, were obtained:

Gymnostomum curvirostrum, rocks near the Gray Mare's Tail.
Grimmia Doniana, on loose stones in an abrupt ravine, less than a mile to the westward of Loch Skene.
G. torquata, rocks near the Gray Mare's Tail.
Weissia striata, mountain side above the Gray Mare's Tail.
Hypnum rugulosum, ditto. but very rare.
H. crista-castrensis, near the Gray Mare's Tail, very rare.
Jungermannia spinulosa, *J. heterophylla*, *J. ventricosa?* } Ravines in the neighbourhood.

In the little glens and ravines near the base of these mountains, *Hymenophyllum Wilsoni*, so long taken for *H. Tunbridgense*, is produced in the utmost profusion.

Near Jardine Hall, the Ergot (*Spermœdia clavus*) was observed by Dr. Greville growing from *Dactylis glomerata*.

Dr. Hooker, Mr. Arnott, and Mr. Klotzsch, an able German mycologist, have also made an excursion to the Highlands. *Andræa nivalis*, in fruit, from the summits of the Ben Nevis range; *Goodyeria repens* from the ancient forests of Glenmore; and *Luzula nivalis*, (abundant on the tops of all the Cairngorm mountains,) are among their collections. Many Fungi, of the tribe called *Hymenomycetes*, were gathered and *preserved.* Of these, particularly from Glenmore and Badenoch, several are either new species, or new to this country; and it is to be hoped that an account of them will be given by Dr. Hooker in his cryptogamic continuation of Smith's English Flora.

Colour of the Red Sea.—Professor Ehrenberg has observed that the colour of the Red Sea arises from a minute *Oscillatoria.*—*Report of Travels in Egypt, &c.*

Reproductive Organs of Ferns, (from Lindley's Introduction to the Natural System of Botany, p. 313.)—The organ in Ferns which deserves the most particular attention is the theca, or case that contains the reproductive matter. By many it is named capsule; but as that kind of pericarpium is essentially connected with the power of conveying fertilization from the male apparatus to the ovules, and implies the existence of a certain definite relation between the various parts that it contains, nothing of which kind is found in the theca of Ferns, it is not necessary to insist upon the impropriety of applying such a name to any sporule-case in Cellulares. Easy as it is to show that the theca is not analogous to a capsule, it is far less so to demonstrate with what organs or modifications of organs it really has an analogy. I am not indeed aware that this had been attempted, all botanists seeming to consider it a special organ, until, in the "Outlines of the first Principles of Botany," I ventured to hazard the following theory (par. 533): "The thecæ may be considered minute leaves, having the same gyrate mode of developement as the ordinary leaves of the tribe; their stalk the petiole, the annulus the mid-rib, and the theca itself the lamina, the edges of which are united." I was led to this opinion, first, by the persuasion that there was no special organ in Ferns to perform a function which in flowering plants is executed by modifications of leaves; and, secondly, by the examination of viviparous species. I need not here remark, that observation has shown us that the leaves of Vasculares have the power of producing leaf-buds from their margin or any point of their surface; and the instance I have adduced in Grasses of a monstrous Wheat shows that they can produce flower-buds also. I found in Ferns, which are exceedingly subject to become viviparous, that the young plants often grow from the same places as the thecæ, or from the margin; and I was particularly struck with a viviparous Fern, of which a morsel was given me by Dr. Wallich, where the young plants form little clusters of leaves in the place of sori. Upon examining these young plants, I saw that the more perfect, though minute, fronds were preceded by still more minute primordial leaves or scales, the cellular tissue of which had nearly the same arrangement as the cellules of the theca; and I was most especially struck with the resemblance between the midrib of one of these scales and the annulus of a Polypodium. A view of the thecæ of various annulate Ferns produced a conviction of the truth of the theory I had formed, which I now submit with much deference to the consideration of the botanical world. It is, however, necessary that I should here add what is only implied in the little work from which the foregoing extract is taken, that this explanation applies only to the gyrate Ferns.

Reproductive Organs of Mosses, (from the same work, p. 322.)—"The calyptra may be understood to be a convolute leaf; the operculum another; the peristomium one or more whorls of minute flat leaves; and the theca itself to be the excavated distended apex of the stalk, the cellular substance of which separates in the form of sporules."

It is now time to show upon what evidence and reasoning this hypothesis may be sustained. Every one agrees in describing the calyptra as a membrane arising from between the leaves and the base of the young theca, and as enveloping the latter, but having no organic connection with it: when the stalk of the theca lengthens, no corresponding extension of the parts of the calyptra takes place; so that it must be either ruptured at its apex (as in Jungermannia,) or at the base; and in the latter case it would necessarily be carried up upon the tip of the theca, which it originally enveloped. Now, what can be more reasonable than that such an organ, situated as I have described it to be, should be one of the last convolute leaves of the axis which the theca terminates, bearing the same relation to the latter as the convolute bractea to the flower of Magnolia, or, to speak more precisely still, as the calyptriform bracteæ to the flower of Pileanthus? If the calyptra be anatomically examined, especially in such genera as Tortula and Dicranum, no difference in its tissue and that of the leaves will be observable; and that very common tendency to dehisce on one side only as the diameter of the theca increases, which characterizes the dimidiate calyptra, may not unreasonably be understood to be the separation at the line where the margins of the supposed leaf united; in the mitriform calyptra this separation at a given line does not take place, and the consequence is an irregular laceration of its base. The analogy of the calyptra being of this nature, the next inference would naturally be, that the part it contains is analogous to a flower-bud. Upon this supposition, the external series of parts belonging to this supposed bud would be the operculum; the adhesion of this to the theca, which would answer to the apex of the axis, or to the tube of the calyx of flowering plants, would be analogous to that which obtains in Eucalyptus, or perhaps more exactly to that of Eschscholtzia; but it would remain to determine of how many parts, in a state of cohesion, it was made up. In the paragraph above quoted, it is stated to be one only; but I confess I have no better reason to offer for this than the absence of any trace of division upon its surface or in the substance of its tissue, and also perhaps the apparent identity of nature between it and the calyptra when both are young, in the Tortula and Dicranum genera already cited. With regard to the peristomium, I would beg attention to the following particulars:—The teeth, as they are called, occupy one or more whorls ; they are evidently not mere lacerations of a membrane, because they are in a constant and regular number in each genus, and that number is universally some multiple of 4, as the floral leaves of flowering plants are ordinarly of 3, 4, or 5 ; they have the power of contracting an adhesion with each other by their contiguous margins, as the floral leaves of flowering plants ; they alter their position from being inflexed with their points to the axis, to being recurved with their points turned outwards,—exactly what happens in flowering plants ; the teeth of the inner peristomium often alternate with those of the outer, thus conforming to the law of alternation prevalent in the floral leaves of flowering plants ; and, finally, if we compare the various states of the leaves of Buxbaumia aphylla with the teeth of Mosses, it is impossible not to be struck with the great similarity in the anatomical structure of the two. These are the considerations which have led me to the conclusion, that the calyptra, the operculum, and the teeth of Mosses, are all modified leaves ; and hence that the theca is to be considered more analogous to a flower than to a seed-vessel. With regard to the membrane, or epiphragma, which occasionally closes up the orifice of the theca, it may be considered as formed by the absolute cohesion of the leaves of the peristomium, just as the operculum of Eudesmia is formed by the cohesion of the petals ; and this is confirmed, first, by Calymperes, in which the membrane ultimately separates into teeth, and by the fact that the horizontal membrane exists most perfectly in such genera as Politrichum and Lyellia, in which there is no distinct peristomium. It now remains to explain the internal structure of the theca consistently with the theory that has been advanced of the peristomium, operculum, and calyptra. I consider the theca to be merely the thickened apex of the axis, the sporules to be a partial dissolution of its cellular tissue, and the columella to be the uncontroverted centre. That the end of the axis of plants frequently becomes much more incrassated than the theca of Mosses, requires no illustration for those who are acquainted with the spongy receptacle of Nelumbium, Rubus, and Fragraria, the dilated disk of Ochna, the curious genus Eschscholtzia, or Rosa, or Calycanthus, or, finally, the spadix of Arums. That the tissue is frequently separated by nature for particular purposes, is proved by the production of pollen out of the cellular tissue of an anther, and by the general law of propagation that seems to prevail in flowerless plants, as Ferns, Lichens, Algæ, and Fungi ; the same phenomenon may be therefore expected in Mosses. That the columella should be left in this dissolution of the tissue might be expected, from its being a continuation of the seta or axis of development, the tissue of which is more compact, and of course less liable to separation, than the looser tissue that surrounds it ; this is analogous to the separation of the pollen from the connectivum of most plants, or from parts only of the anther of all those genera which, like Viscum, Ægiceras, or Rafflesia, have what are called cellular anthers ; and to the very common separation of the placenta, or a portion of it, from the dissepiments, as in Bignoniaceæ, Ericeæ, and many others. That it is presumptuous in me, who lay no claim to reputation as a Cryptogamic botanist, to offer any opinion upon plants I have only occasionally studied, I am fully sensible ; but I hope for the indulgence of the skilful Cryptogamist, in consideration of this having been the first attempt to call his attention to the inquiry.

Botanical Collections of M. Saltzmann in Brazil.—M. Saltzmann, known for his collections of plants in the South of France, Spain, Corsica, and Algiers, has returned from the coast of Brazil with new riches. Some of the species which he has gathered, have been described by M. A. St. Hilaire and by M. Martius, but most of them are new. M. De Candolle has already described a number of these plants belonging to the families *Rubiaceæ* and *Valerianæ*, in the 4th Vol. of his *Prodromus.*

GEOLOGICAL COLLECTIONS.

Instructions for the Collection of Geological Specimens ; (issued by the Geological Society.)

1. THE Geological Society begs to impress upon the minds of all collectors, that the chief objects of their research should be specimens of all those rocks, marls, or clays, which contain shells, plants, or any sort of petrifaction.

2. The petrifactions should, if possible, be kept united with portions of the rock, sand, or clay, in which they are found ; it being more desirable that the mass should be examined carefully when brought to England, than that any separation of the shells should be attempted at the time of their collection. This injunction, however, does not apply to those cases in which the shells fall readily from their surrounding matrix ; but, in this event, great care must be taken of the petrifactions, by rolling them in paper, or some soft material.

3. If several varieties of stone are seen in the same cliff or quarry, and particularly if they contain any petrifactions, specimens of each should be taken, and numbered according to their order of succession ; marking the uppermost No. 1., and thence descending with Nos. 2, 3, &c., making as correct an estimate as time will permit, of the thickness of the beds. None of these specimens need be more than 3 in. square, and one and a half or two thick.

4. If the rocks are stratified, that is, divided into beds, state whether they are horizontal, inclined, or twisted. If inclined, observe pretty nearly at what angle, and to what point of the compass they dip ; if twisted, a sketch, however slight, is desirable.—N.B. The true dip can seldom be ascertained without examining the beds on more sides than one.

5. One kind of rock is occasionally seen to cross and cut through the beds of another. In such a case, observe whether the beds are in the same plane on each side of the intruding rock ; if not, mark the extent of the disturbance, and also, if there be any difference in the nature of the stone of which the beds are composed, at those points where they touch the intruding rock. Take specimens from the junction, and make a sketch of it.

6. Where there are wells, get a list of the beds sunk through in digging them ; specifying the thickness of each stratum in its order, from the surface downwards.

7. In volcanic districts, procure a list of the volcanoes now or recently in action, and of those which are extinct ; stating their position, their distance from the sea or any great lake ; the extent, nature, and, if possible, the age, of particular streams of lava, or the relative age of different streams : also, whether the lava currents conform to the valleys, or are seen at different heights above the present rivers : and also if any gravel beds be discoverable beneath the streams of lava.

8. Note the names of all places known to contain coal, bitumen, salt, alabaster, metallic ores, or any valuable minerals, specifying their extent, and the nature of the rocks in which they occur ; but do not bring away large quantities of iron ore, spar, salt, &c.

9. In cases of coal-pits, specimens of the coal itself and of the beds passed through to obtain it, (especially when plants have been found,) will be valuable. State whether limestone, iron ore, or springs of bitumen, are found near the coal ; and if the limestone contains shells, collect abundance of them.

10. Make particular inquiries whether, in digging gravel-pits, or beds of surface clay, mud, and sand, the workmen are in the habit of finding any bones of quadrupeds ; and obtain as many of them as possible, selecting particularly teeth and vertebræ.

11. Search also for bones in cracks of rocks, and in caverns. In the latter, the lowest pits or hollows are most likely to contain bones ; and if the solid rock

be covered with a crust of spar or marl, break through it, and dig out any bones, horns, or pebbles from beneath.

12. Observe if the surface of the country be strewed over with large blocks of stone; remark whether these blocks are angular or rounded, and whether they are of the same or a different nature from the stratum on which they are laid. If the latter, endeavour to trace them to their native bed. Note the different heights at which gravel is found, and whether or not it is composed of the same rocks as the adjoining country.

13. Nautical collectors are requested to separate and preserve any shells or corals which may be brought up, either with the lead or the anchor; noting the depth and the locality.

14. On coasts where there is a considerable ebb tide, and where the shore consists of rocks or clay containing fossils, some of the best of these petrifactions may be looked for, by breaking up with a pick-axe the shelving beds exposed at low water.

15. In making sections, or memorandums, distinguish well upon the coast, between masses which have simply slipped and fallen away, and the real cliff itself.

16. When drift wood is met with at sea, collect pieces of it: note the longitude and latitude, the distance from the nearest land, and the direction of the current by which it has been borne. Examine well the state of the floating mass, and see whether any roots or leaves be attached to it.

17. Every specimen should be labelled on the spot, or as soon after collection as possible, and then rolled in strong paper, or any soft material, to protect its edges.

18. A heavy hammer to break off the specimens from the rock, and a smaller one to trim them into shape, are indispensable. If the larger hammer have a pick at one end, it will be found very useful in digging up and flaking off those thin shaly beds which usually contain the best preserved shells, &c. A chisel or two are also desirable.

19. The recommendation expressed in the instruction No. 1. may be repeated:—That it should be a general maxim with geological collectors to direct their principal attention to the procuring of fossil organic remains, both animal and vegetable. These are always of value when brought from distant countries, especially when their localities are carefully marked; but when the rocks contain no petrifactions, very small specimens are sufficient.

*** All boxes to be addressed to W. Lonsdale, Esq. Curator, Geological Society, Somerset House, London.

Apartments of the Geological Society, Somerset House,
London, February 19. 1830.

Fossil Tree discovered at Craigleith Quarry near Edinburgh.—Some years ago a magnificent fossil tree occurred in Craigleith Quarry near Edinburgh, which has been particularly described in a work on the internal structure of fossil vegetables, lately published by Mr. Witham of Lartington, and noticed in our Analyses. This tree he has referred to the Gymnospermous phanerogamic tribe, or *Coniferæ.* About two hundred yards distant from the locality of Mr. Witham's fossil tree, another has just been exposed, at a depth of about sixty feet from the surface. The former tree lay in the direction of the strata, but this is obliquely inclined. The portion of it which is exposed is perfectly straight, compressed so as to present an elliptical section, with a kind of transverse *bourrelet* or prominence, at intervals of two or three feet. Its greatest diameter is about two and a half feet; but as only about twenty feet of it have been laid bare, the diameter of the lower portion must be much greater. There is no appearance of branches, and in the present state of matters, it is very difficult to say what may be the genus or order of the plant. The exterior is carbonized, and the black appearance of the fossil has a remarkable effect as contrasted with the light-coloured sandstone in which it occurs. Its internal structure, as seen through the microscope, resembles that of the *Coniferæ*.

Fossil Bones discovered near Ryde, Isle of Wight.—Mr. S. P. Pratt of Bath, has, during the summer, discovered near Ryde, in the Isle of Wight, several fossil bones of mammalia and reptiles, thus bringing additional proofs of the analogy that exists between these beds and those of Paris. Amongst the bones there is a very ample under jaw of a ruminant animal allied to the genus *Moschus;* but which differs from any of the recent species by the great width of the coronary process. There are also teeth of *Anoplotherium* and *Paælotherium,* the bones of two species of Chelonian reptiles, and the vertebra of a fish. They will be described at the next meeting of the Geological Society.—J. E. Gray.

New method of examining the structure of Fossil Vegetables, (described by Mr. Nicol in Witham's Observations on Fossil Vegetables, p. 45, *et seqq.*)—Let a thin slice be cut off from the fossil wood, in a direction perpendicular to the length of its fibres. The slice thus obtained must be ground perfectly flat, and then polished. The polished surface is to be cemented to a piece of plate or mirror glass, a little larger than itself, and this may be done by means of Canada balsam. A thin layer of that substance must be applied to the polished surface of the slice, and also to one side of the glass. The slice and the glass are now to be laid on any thin plate of metal, as a common fire-shovel, and gradually heated over a slow fire, with a view to concentrate the balsam. In performing this operation, it will be requisite to prevent the heat from becoming so great as to throw the balsam into a state of ebullition; for, if air-bubbles be once formed in it, it will be difficult to remove them, and if they are not removed, they will prevent the complete adhesion of the two surfaces when applied to each other. The heat of the shovel should never become so great that the fingers may not be held in contact with it, without inconvenience, for a few seconds. With every precaution, some few air-bubbles will sometimes make their appearance, but these may be removed by a small piece of wood tapering to a point. When the balsam is thought to be sufficiently concentrated, and all air-bubbles completely removed, the slice and the glass may be taken from the shovel, and applied to each other. A slight degree of pressure will be necessary to expel the superabundant balsam, and this will be facilitated by gently sliding the one on the other. By this kind of motion, any air that might have got entangled in the balsam, when the surfaces were brought into contact, will also be removed.

When the whole is cooled down to the temperature of the air, and the balsam becomes solid, that part of the balsam adhering to the surface of the glass surrounding the slice should be removed by the point of a pen-knife; and it may be right to remark, that, in this operation, it will at once be seen whether the balsam has undergone the requisite concentration. If, for instance, it has entirely lost its sectility, and starts off in flakes before the knife, it will be found that the slice and the glass will cohere so firmly, that, in the subsequent grinding, there will be no risk of their separating from each other. If the balsam has not been sufficiently concentrated, it will slide before the knife, and, in that case, the two bodies will not adhere with sufficient firmness. A very few trials, however, will enable any one to conduct the process with success; and it may be right to add, that, if the layer of balsam applied to the two surfaces be not too thick, its due concentration may be accomplished in four or five minutes, provided the application of the heat be duly regulated.

The slice must now be ground down to that degree of thinness which will permit its structure to be seen by the help of a microscope. To facilitate this part of the grinding, the lapidary will find it advantageous to fix the glass in a groove made in a small piece of wood, of which half inch thick deal will answer the purpose. The groove in the wood should be a little less deep than the thickness of the glass, and the wood itself need not project more than half an inch beyond each side of the glass.

A lapidary, by attending to the above directions, will find no difficulty in reducing any piece of petrified wood to that degree of thinness sufficient to render its structure visible; and any one, even without the aid of the mechanism employed by the lapidary, may accomplish that object by attending to the following directions :—

The position of the fibres of the wood having been ascertained, let a thin piece be chipped off by a blow of a hammer, in a direction perpendicular to the length of the fibres. Let the chip thus obtained be cemented to any small bit of wood by common lapidaries' cement (a compound of 1 part bees' wax, 1 part pitch, 4 parts resin, 16 parts of a mixture of brick-dust and whitening,) to enable the operator to hold it firmly while the grinding is going on. That side of the chip which approaches nearest to a perpendicular to the length of the fibres, must be ground flat, by giving it a rapid circular motion with the hand, on a piece of sheet-lead lying horizontally on a table, and supplied with a little emery, size No. 1., moistened with water. When the emery ceases to act, the muddy matter remaining may be removed, and a fresh portion of emery applied; and this must be repeated until the surface of the chip has become perfectly flat. The sheet of lead must then be removed, and a piece of flat sheet-copper substituted, and the surface of the chip ground as smooth as may be, by flower of emery, freed from its coarser parts. The surface may then be polished by friction with crocus or rotten-stone, on a transverse section of any soft wood.

When the polishing is finished, the chip must be detached from the wood to which it was cemented, and the polished surface cemented by Canada balsam to a piece of plate-glass, in the manner above described, and then ground thin, and polished as before.

Connexion of Diseases with the Rock Formations of a Country.—In March last, M. de Caumont laid before the Linnæan Society of Normandy, some remarks on the influence possessed by the geological nature of the surface on the production of certain diseases.

Amongst a great many of the communes of Calvados, in France, near to each other, and exposed to the same climatic influences, there is one which is particularly liable to fever. Nearly the whole of these communes are situated upon *lias* and *red marl*, and some other clayey formations, which retain at the surface a humidity favourable for the formation of fogs. On the contrary, the communes situated on rocks having a loose texture, and which permit the rain water to escape more easily, such as the *great oolite*, *chalk*,, &c., or which do not present any beds capable of arresting the course of the water, as *granite*, and certain *slates*, appear less liable to fevers. It results from these general considerations, that the soil, by its greater or less hygroscopic quality, may have an effect on the state of health, by favouring more or less the development of certain diseases. M. de Caumont does not regard this observation as new, but communicates it with the view of ascertaining in what proportions (every thing being equal), the fevers and other maladies are developed in the principal geological regions of Calvados; for example in that of granite, slate, limestone, clay, &c.—*Journal de Géologie*, No. I., p. 102.

Fossil Floras.—Brongniart imagines that his several fossil floras are entirely different from each other. He supposes that a general marine inundation has always separated these floras from each other; consequently he is obliged to maintain that there are no vegetables, or only marine plants, in the deposits of rocks that separate his four periods. This opinion is advocated by some geologists, but rejected by others. Boué says, in the *Journal de Géologie*, t. i. p. 179, *Note*, " M. Voltz and I reply, that, in proceeding from what is known, it is in the nature of things that the arenaceous deposits or continental alluvium should contain only land plants, and that the opposite should be the case with the calcareous deposits, with the exception of the modern fresh water deposits, since they are strictly marine deposits, and partly mechanical, partly chemical. Hence the absence of vegetable deposits in the limestone, &c. does not by any means prove that the vegetation of the globe was destroyed during the period when these formations took place. On the contrary, this vegetation ought to exist in a more flourishing condition during a period when no revolution occurred to destroy it; which period of repose is indicated by the want of arenaceous deposits. If cataclysms had taken place, we should have found traces of them in these strata. The more or less considerable differences observed between the vegetation of the different deposits of land plants, may depend upon the intermediate ones being wanting, or more probably on the moments of repose in the transport of the alluvium. The climates changed during the periods of the formations, although arenaceous or sandstone deposits did not take place, and this change is well indicated by a comparison of the fossil animal remains of two neighbouring epochs, —a comparison which shows the striking relations between the changes in the flora and the fauna of different periods. Hence we conclude that there has been a gradual succession of creations, according as the circumstances proper for vegetable and animal life were modified on the surface of the earth; and, admitting local debacles, we do not see any proof of one or more cataclysms which could at once have destroyed the vegetation of the whole earth."

Boué on the Relative Age of the Secondary Deposits in the Alps and Carpathians.—Boué, in the first and second numbers of the Journal de Géologie, has published a very interesting account of the secondary formations of the Alps and Carpathians, in which we observe he differs from Messrs. Murchison and Sedgwick, as to the nature and geognostical situation of a particular deposit, viz. that of Gossau. Boué, in our opinion, demonstrates that the Gossau deposit *lies below chalk*, while Murchison and Sedgwick affirm, on less extensive and less accurate observation, and on rather loose reasoning, that it *rests upon chalk.—Professor Jameson.—New Phil. Journ.*, Oct. 1830.

MINERALOGY.—*Pinguite*, an earthy mineral, found at Wolkenstein in the Erzgebirge, and at Sühl in Thuringia, is described by M. Breithaupt as a new species. Its name is derived from its greasy appearance. It is not unlike green iron-earth. Its hardness is equal to 1.; its sp. gr. 2.315. It is found in veins of heavy spar which traverse the gneiss.—*Schweigger's Journ.*

Monazite.—M. Breithaupt has given this name to a mineral which is found in the neighbourhood of Miask in Siberia, in zircon-granite. It has a vitreous lustre, and a brick-red or reddish-brown colour; it is translucid on the margins. Its crystals are rhomboidal prisms. Its hardness = 6; sp. gr. = 4.93. Not yet analyzed.—*Ibid.*

Prunnerite.—The violet-blue mineral found along with Apophyllite, in the island of Hestoe, one of the Faroës, and hitherto arranged as a variety of cuboidal calcareous spar, is considered by Esmark to be a new species, on account of its form and the large proportion of silica it contains. He has named it *Prunnerite*, in honour of Prunner, the naturalist of Cagliari, in Sardinia.

Bromine and *Iodine* have been discovered by M. Kastner in the waters of the Baltic, at Swinemunde.

NOTICES AND ANALYSES OF NEW BOOKS AND PAPERS.

1. Narrative of Discovery and Adventure in the Polar Seas and Regions; with Illustrations of their Climate, Geology, and Natural History; and an account of the Whale Fishery. By PROFESSOR LESLIE, PROFESSOR JAMESON, and HUGH MURRAY, Esq. F.R.S.E.

2. Narrative of Discovery and Adventure in Africa, from the Earliest Ages to the Present Time, with Illustrations of the Geology, Mineralogy, and Zoology. By PROFESSOR JAMESON, JAMES WILSON, Esq. F.R.S.E. and HUGH MURRAY, Esq. F.R.S.E.

These volumes form the first two numbers of the EDINBURGH CABINET LIBRARY, a work which we welcome as a treasure from the house of Oliver and Boyd. The undertaking is extremely hazardous, and the liberal mode in which it is commenced, peculiarly dangerous; but if we may judge from the support which its publishers have met with, and the creditable way in which their work is ushered before the public, we think that they cannot fail eventually to meet with the due reward. We feel the more interest in the success of this LIBRARY, that it has a certain relationship to our own JOURNAL, in the subjects of which it treats; and, if our recommendation can do it any service, we give it freely and to the full extent.

The Narrative of the Northern Voyages, in No. 1. is from the pen of Mr Hugh Murray, known for his volumes on the History of Discovery in Africa, in Asia, and in America. Professor Leslie treats of the climate, and this is by far the best part of the book; and Professor Jameson gives a rather meagre outline of all that is known of the Geognosy of the northern regions. The latter part, however, being the least popular, is perhaps the best spared. The Chapter on Natural History is not worthy of the volume. The account of the Whale Fishery is particularly *apropos*, since the public attention has been more directly drawn to it by the recent disasters. Fourteen wood-cuts illustrate this Number.

The second Number consists of 512 beautifully printed pages, and contains numerous engravings on wood, by Branston. Besides an interesting historical narrative, presenting a view of the progress of discovery, and of the moral and political state of the African tribes; it contains a long chapter on mineralogy and geology, by Professor Jameson, and three chapters on the natural history of quadrupeds, birds, reptiles, fishes, mollusca, insects, &c. of the African continent, by Mr Wilson.

Of these volumes we shall only farther say, that at the price of *five shillings* each, we hold them to be the cheapest books ever published in Scotland.

ILLUSTRATIONS OF ZOOLOGY, being Representations of new, rare, or otherwise remarkable subjects of the Animal Kingdom. Drawn and Coloured after Nature, with descriptive Letter-Press. By JAMES WILSON, F.R.S.E. M.W.S. &c. No. IX. Imperial Quarto. W. Blackwood, Edinburgh; T. Cadell, London.

This Number (which contains Title page, Index, &c.) completes the first volume of Mr Wilson's Illustrations. It consists of coloured representations of the fore and hind feet of the great orang-outang of Sumatra, of the death and capture of which so striking an account was given, some time ago, by Dr Clarke Abel. Models of these and other parts of that gigantic animal, executed with all the accuracy which distinguishes the works of Eastern art, having been transmitted to the Royal Society of Edinburgh, by George Swinton, Esq. Secretary to the Indian Government, our Author, with the permission of the Council of that learned body, has conferred a service on the science of Natural History, by extending a knowledge of so extraordinary a species, through the medium of his ample plates. These are engraved and coloured with the usual accuracy, and exhibit the exact dimensions of life.

The great auk, (*alca impennis,*) one of the rarest and most remarkable of the British birds, is also figured in this Number, from a specimen obtained by Mr Bullock, in Papa Westra, and now preserved in the British Museum.

The 36th, or concluding plate, is devoted to a new species of Cone Shell, (*conus Nicolii,*) of magnificent size for an example of that genus.

Illustrations of British Ornithology. Second Series. Water Birds. No. IX. By P. J. Selby, Esq.

We have been favoured with an opportunity of inspecting as many of the plates of this, the last Number but one, as are at present completed; and have it in our power to promise the subscribers an equally beautiful fasciculus with any of the former. The plates we have seen, contain Bewick's swan (the size of the plate;) the buff-breasted sandpiper; the knot (in three different states of plumage;) the velvet scoter (male and female;) the gray lapwing (summer and winter plumage;) and the smew (male and female.)

The Birds of America; from Drawings made in the United States and its Territories. By John James Audubon, Esq. F.R.S. F.L.S. &c. Citizen of the United States. No. XIX.

This fasciculus of one of the most splendid works ever published in Britain, contains,—blue-eyed yellow warbler (*sylvia æstiva;*) bay-winged bunting, male (*fringilla graminea,*) with *cactus opuntia;* sea-side finch (*fringilla maritima,*) with *rosa carolina;* pigeon-hawk (*falco columbarius,*) with *juglans porcina.* The critic will observe in the engravings, that, though they are better than some of the former ones, there is still a hardness where a dark shade comes upon any light—which might be avoided: it makes some of the lines look as if they were cut out, and pasted on.

Illustrations of Ornithology. By Sir William Jardine, Bart. and P. J. Selby, Esq. No. VII.

We have seen the 7th fasciculus of this elegant work, the completing number of the second volume. It contains, *halcyon Macleayii; platycercus pileatus; Ptilonorhynchus nuchalis; columba Smithii; picus Magellanicus; larus hematorhynchus; ortyx Douglasii; platycercus Stanleyii; eurystomus gularis;* and *squatarola rubecola.* From a notice appended to this number, we learn, that in future Mr Swainson is to be a regular co-operator in the work.

On the Development of the Vascular System in the Fœtus of Vertebrated Animals. By ALLEN THOMSON, M.D. &c. (To be continued.)—*Edinb. New Phil. Journal, Oct.* 1830. Pp. 295.

This first part of an Essay, which was the subject of the Author's inaugural dissertation on taking the degree of Doctor of Medicine in the University of Edinburgh, contains a detailed account of the discoveries of Pander, Baer, Serres, Rolando, Prevost, and Dumas, Rathke, Meckel, &c. on the changes of the germinal membrane, and the development of the heart, in the vertebrata. Much interesting information may be obtained from this paper by those who are unacquainted with the German language; and it derives additional value from the observations of the writers referred to, having been repeated and compared by the assiduous author.

An Account of two newly discovered Muscles for compressing the Dorsal Vein of the Penis, in Man and other Animals, and also of a similar provision for compressing the Veins of the Chameleon's Tongue. By JOHN HOUSTON, M.R.I.A. &c. Pp. 25. —*Dublin Hospital Report*, V. 458.

We really wish that anatomists and others would save our time and their own, by being a little more concise in their descriptions, when they take it into their heads that they have made a discovery.

Mr Houston states, that the late Mr Shekleton, his predecessor in the office of Curator of the Museum of the Royal College of Surgeons in Ireland, in dissecting the penis of a dog, "*discovered* two muscles connected with the venæ dorsales, and admirably adapted for making such compression on these vessels as to obstruct the current of blood in their canal."* And Mr H., pursuing the idea, has since found them in several other animals; and, "by persevering in his search for them, and by a variety of dissections, at length, on the 15th July, 1830," he even discovered them in the human subject! From this fortunate circumstance, Mr Houston considers himself entitled to put forward, with an air of novelty, the speculation, that the use of this pair of muscles is to contribute to the erection of the penis, by obstructing the current of blood in the dorsal veins; and he goes so far as to give them the theoretical name of *compressores venæ dorsalis penis.*

We can hardly believe that Mr Shekleton, who was an anatomist, could have supposed that he was the discoverer of these muscles in the dog, after the accurate descriptions of them given by Douglas, (*Myographiæ Comp. Spec.* 1775, p. 57,) as a digastric muscle, under the name of *transversalis*, and by Monro, (*Treatise on Comp. Anat.* 1783, p. 54,) as the *transversales penis:* not to mention the *Anat. Comp.* of Cuvier, in which they are stated to exist in the bears, the raccoon, the dog, &c. (Vol. V. p. 102,) though Mr H. says they are only "cursorily alluded to;" nor to refer to the doubtful descriptions of Blasius and

* Each muscle arises from the inferior and posterior part of the ramus of the pubes, and by a few fibres from the crus penis, and is inserted with its fellow into a tendon between the symphysis pubis and the penis. A transverse slit in the tendon admits of the passage of the dorsal vein of the penis, the arteries and nerves being separated from the vein by a fibrous partition. — ED.

others. As to the supposed use of this muscle in the dog, Monro remarks, it " may assist in keeping the penis distended in time of copulation;" and Douglas ascribes to it the same office. Cuvier, however, (and, in our opinion, with more apparent accuracy,) suggests, that "in the green monkey, (*Simia Sabœa*, Lin.) in which it has *no middle tendon*, it may serve to compress the dorsal vein." Is the muscle of the marsupial mammary gland in the kanguroo *tendinous?* and is not the inferior vena cava *protected from pressure* by a tendon?

We have ourselves occupied considerable time in seeking for this muscle in the human body, but, perhaps owing to the subjects we have examined not being sufficiently robust, it has as yet escaped our observation. At all events, traces of it do not appear to be very constant in man, and whatever may be its use in the lower animals, we see little evidence at present for supposing, that the erection of the penis in man is connected in any degree with Mr Houston's " newly discovered" muscle.

The author farther considers, that the establishment of his opinion, as to the use of this muscle, " might perhaps justify the inference, that in every case of the kind," (as in the nipples of the mammæ, the wattles of the cock, &c.) " though our senses cannot discover it, the accumulation of fluid may, in some way, be directed by *mechanical agency*." We may take this opportunity of intimating to anatomists, for the purpose of preventing anticipation, that we hope shortly to be able to demonstrate certain muscles of the cheeks, by means of which young ladies and gentlemen blush. But did it occur to Mr Houston to calculate how long muscular contraction usually continues? We fear that his two experiments of ligatures round the veins and round the artery of a dog, prove nothing to the purpose.

The author conjectures, that the internal cerato-maxillary muscles, described by him, in the chameleon, (Trans. Royal Irish Acad. 1828, and Ed. New Phil. Journ. Apr. 1829,) have a similar influence in producing the distension of the erectile portion of the tongue,—a structure which he beautifully displayed in a plate accompanying his memoir. Mr Houston's illustrations are excellent.

Mémoires du Museum, &c. Memoirs of the Museum of Natural History, Vol. XIX. part 2. Paris. 1830.

The present Part contains the following papers:—

1. *Lyonet.* On the Anatomy of different species of Insects, 3d article.
2. *Jussieu.* Note on *Oncostemum*, a new genus of *Ardisiaceæ*.
3. *Cordier.* Note on subterranean temperature in the United States.
4. *Laugier.* Analysis of magnesiferous carbonate of lime from Spezzia, in the Appenines.

Mémoires presentés par divers Savans, &c. Memoirs presented by learned Foreigners to the Royal Academy of Sciences of the Institute of France. Section, Mathematical and Physical Sciences. Vol. II. 1830.

This volume is entirely occupied by an elaborate memoir, by M. Robineau des Voidy, on the *Myodaria* Des Void., a family of dipterous insects, corresponding to nearly the whole of the *Muscidæ* of Latr. and Lamarck.

The Magazine of Natural History; conducted by J. C. LOUDON, F.L.G. and Z.S., &c. Published every two months, price 3s. 6d. No. XVI. Nov. 1830.

We are pleased to observe that the editor of this periodical, in concluding his third volume, has determined upon giving up a portion of that trifling which has hitherto, for the most part, absorbed his pages; and we do not hesitate to say, that if he will but dare to exercise a little judgment in the selection of matter, we feel assured that this work may contribute more than any similar production to the promotion of the study of Natural History in Great Britain. The principal papers in the present Number are a "Description of the Great Bustard of India, with notices of some other India Bustards;" "Observations on the British willow wrens;" Yarrell's "Additions to British Fishes;" Professor Henslow on the specific identity of *anagallis arvensis*, and *cærulea;*" Rev. L. Jenyns' "Remarks on the winter of 1829-30;" and Ainsworth's "Notes on the Pyrenees," which, by the way, the editor seems to have copied almost *verbatim* from vol. ii. p. 204, *et seq.* of this Journal, where Mr Ainsworth's paper was originally published. We have no objection to Mr Loudon appreciating the value of an excellent essay, but we believe it is customary to acknowledge the source from which such long papers have been obtained.

Additions to the British Fauna; Class, Fishes. By WILLIAM YARRELL, Esq. F.L.S. Z.S. &c.—*Mag. of Nat. Hist.* III. 521.

Three distinct species of three-spined sticklebacks have been constantly confounded under the name *Gasterosteus aculeatus* of Linnæus. MM. Cuvier and Valenciennes have distinguished them in the 4th vol. of the *Hist. Nat. des Poissons*, p. 481, &c. by the names *G. trachurus*, (in which the scales extend throughout the whole length of the side;) *G. semiarmatus*, (whose lateral scales extend no farther backward than the line of the vent;) and *G. leiurus*, (in which the lateral scales extend no farther than the ends of the rays of the pectoral fin.) The fin-rays, and the disposition of the teeth, also differ in the three species, but the general colours are the same.

MM. Cuvier and Valenciennes are, however, somewhat doubtful as to the *specific* distinction of *G. aculeatus* and *G. semiarmatus;* but Mr Yarrell has succeeded in taking both young and old of all three species in the Thames near Woolwich; and he states, that they are all common in our rivers, though the *G. aculeatus* is most abundant.

Why is not the engraver instructed to follow the drawings more carefully in executing the wood-cuts? We are sure Mr Yarrel did not delineate the fin-rays so inaccurately as they are represented in the cuts.

Note sur le Systême nerveux des Crustacés. Notice respecting the Nervous System of the Crustacea. By Messrs AUDOUIN and M. EDWARDS.—*Ann. des Sciences Nat.* XX. 181.

The authors have arrived at the general conclusion, that the nervous system of the crustacea is originally composed of two chains of medullary knots, or ganglia, equal in number to the locomotive or other appendages; and that all the modifications which are met with, either at the different periods of incubation, or in different species, depend for the most part upon the more or less complete approximation of these ganglia, occurring in two directions, longitudinally and transversely.

It will be observed, that this view is in accordance with the principle of M. Serres, who considers *tendency to centralization* to be one of the laws of organization.

Sur les Individus privés de sexe, &c. On the Neutrals of the order Hymenoptera, particularly of the genus *apis.* By M. Treviranus.—*Zeitschrift für Physiologie.* III. 220.

The principal object of this paper is to oppose the opinion first advanced by Schirach, and afterwards developed by the two Hubers—that the working bees are females with abortive or imperfectly developed generative organs. The peculiarities of structure, M. Treviramus remarks, are so great that they cannot possibly be the result of influences acting after birth, such as sparing or improper food. He considers these peculiarities to be indubitably original.

Novæ Observationes de Entozoïs. Original Observations on the Entozoa. By F. C. H. Creplin, with 4to plates. 8vo. Pp. 134. Berlin, 1829.

This little work contains many detailed observations on intestinal worms, and a multitude of new species.

Recueil de Figures, &c. Collection of Figures of Intestinal Worms. By F. G. Van Lidth de Jeude, Professor in the University of Utrecht. Atlas fol. Leyden, 1829.

The work of M. Lidth is an important acquisition to helminthologists; it is a collection of lithographic plates, with explanatory text in French. The figures are all copied from Goeze, Schœffer, Blumenbach, Zeder, Rudolphi, Cuvier, Bremser, Dugès, Bauer, Jurine, and Mehlis. One or more species of each genus is figured, of the natural size, and magnified when requisite; the important organs are represented separately; the anatomy of the different worms is given after the researches of MM. J. Cloquet, Mehlis, Jurine, and Dugès. The characters of the orders, genera, and species, figured in the Atlas, are described in detail. The author adopts the five orders of intestinal worms established by M. Rudolphi, and adds a sixth under the name of *anthostoma,* formed of *cestoidea* and *cystica,* Rud. *Bull. des Sci. Nat.* xxi. 186.

Plantæ Asiaticæ Rariores; or, Descriptions and Figures of a select number of unpublished East Indian Plants. By N. Wallich, M.D. F.R.S. &c. No. IV. Folio. London. Treuttel and Würtz. 1830.

The present number terminates the first volume of this truly splendid work,—a monument alike of the science of its estimable author, and of the munificent patronage of the Directors of the East India Company. The number contains, in addition to the usual collection of figures, an interesting preface, and a list of the subscribers.

A report has reached us, that the ensuing spring has been fixed upon as the period of Dr Wallich's departure; but we trust that, if it be practicable, some change will be made in this arrangement. Without attributing undue importance to matters of science, we consider it most desirable that this eminent individual should be permitted to remain, to complete an undertaking which, in fact, reflects as much credit upon the East India Company as upon the author himself.

An Introduction to the Natural System of Botany; or, a Systematic View of the Organization, Natural Affinities, and Geographical Distribution of the whole Vegetable Kingdom; together with the uses of the most important species, in Medicine, the Arts, and Rural or Domestic Economy. By John Lindley, F.R.S. L.S. &c. Professor of Botany in the University of London. 1 vol. 8vo. Pp. 374. London. Longman & Co. 1830.

In accordance with the plan on which we have arranged the New Series of this Journal, we do not profess to give a systematic review of any scientific work; being convinced that such an article could only be admitted into a monthly periodical like ours, to the exclusion of matter more generally interesting and instructive. Professor Lindley must, therefore, not conclude that, because we devote small space to the notice of the volume before us, we are ignorant of its value.

The object which the Professor has proposed to himself, is sufficiently explained in the title-page: but we beg our readers to understand, that the result of his labours is not intended to be—as some have imagined—a technical introduction to botany, but to the *Natural System.* It presupposes in the student, an acquaintance with the ordinary language of botanical science, and some knowledge of the laws of vegetable organization.

The plan adopted (to use the author's own words) is this:—"To every collection of orders, whether called class, division, subdivision, tribe, section, or otherwise, such remarks upon the value of the characters assigned to it are prefixed, as the personal experience of the author, or that of others, shews them to deserve. To every order the NAME is given which is most generally adopted, or which appears most unexceptionable, with its SYNONYMES, a citation of a few authorities connected with each, and their date; so that, from these quotations, the reader will learn at what period the order was first noticed, and also in what works he is to look for farther information upon it. To this succeeds the DIAGNOSIS, which comprehends the distinctive characters of the order, reduced to their briefest form, and its most remarkable features, without reference to exceptions. The latter are adverted to, in what are called ANOMALIES. Then follows the ESSENTIAL CHARACTER; a brief description of the order, and all its most important particulars. This is succeeded by a paragraph styled AFFINITIES, in which are discussed the relations which the order bears to others, and the most remarkable circumstances connected with its structure, in case it exhibits any particular instance of anomalous organization. GEOGRAPHY points out the distribution of the genera and species over the surface of the globe; and the head PROPERTIES comprehends all that is certainly known of the use of the species in medicine, the arts, domestic or rural economy, and so forth. A few genera are finally named, as EXAMPLES of each order."

It will be at once seen, from the above extract, that Professor Lindley's book is one which has long been a desideratum in the English language: we may, indeed, go farther, for we are not aware of *any* work on the Natural System equally comprehensive, methodical, and complete. We trust that it will pass immediately into the hands of the botanical students in all our universities; and that it will be the means of removing much of the (perhaps ignorant) prejudice, which has certainly existed in this country against the Natural Method. Let us not, however, be misunderstood: we give to all systems their due credit—*fiat justitia, ruat cœlum.*

Before we take leave of our excellent author, we desire to direct the attention of botanists, in an especial manner, to most ingenious and novel views respecting the reproductive organs of ferns and mosses, which will be found extracted in our Botanical Collections. Not altogether uninitiated in the mysteries of cryptogamic lore, we believe that the hypotheses now suggested by him will throw new light upon the analogies of plants, and give a new turn to inquiries concerning the mode of reproduction in the more simple forms of vegetable existence.

Loudon's Hortus Britannicus; a Catalogue of all the Plants indigenous, cultivated in, or introduced to Britain, &c. &c. 1 vol. 8vo. London, Longman and Co. 1830.

With other useful catalogues of plants cultivated in this country before us, it would be no slight praise to say, that the present publication stands decidedly at the head of its class. We cannot, however, content ourselves with this general approbation; for the work is not, in fact, a mere catalogue, but combines much that will be found interesting to the general, and even to the exclusively British botanist. The main portion of the volume is occupied by the Linnean arrangement, in which (to adopt the words of the title page) nearly 30,000 species are enumerated, with the systematic name and authority, accentuation, derivation of generic names, literal English of specific names, synonymes, systematic and English, of both genera and species, habit, habitation in the garden, indigenous habitation, popular character, height, time of flowering, colour of the flower, mode of propagation, soil, native country, year of introduction, and reference to figures; preceded by an introduction to the Linnean system. All this, the work of Mr George Don, with the single exception of assistance from Dr Greville in the cryptogamia, is honestly given, and admirably and clearly condensed. The remainder of the volume, a space of fifty-three pages, is devoted to a brief introduction to the Natural System, followed by the Jussieuean arrangement of nearly 4,000 genera, with short, but very useful and interesting notices of each order. This part of the work is founded upon the Account of the Natural System, contributed by Professor Lindley to the Encyclopædia of Plants. We can conscientiously recommend the book as not only the best of the kind ever offered to the public, but as containing more information than the nature of the work would lead any individual to anticipate.

Botanicon Gallicum. By De Candolle and Duby. Part II. Pp. 545—1068. Paris, 1830.

This forms the second part of the above work. The first contains the phanerogamous plants and ferns. This commences with the *musci*, and contains all the other cryptogamia of France, or about 4000 species. It is consequently the fullest, as it is the best catalogue, with specific characters, hitherto published, of the plants of that country. In the Fungi, the authors appear to have followed the system of Brongniart, which is unquestionably the most philosophical. To this tribe, indeed, much attention has been paid: in the genus *Agaricus*, 401 species, and in the *Sphæria*, upwards of 300, are described. The work is in Latin, and contains a complete Clavis Analytica of all the orders and genera in the two parts, forming an appendix of fifty-eight pages. We recommend this work to every botanist in our own country, particularly to every cryptogamist, as most of the species may be supposed common to both France and Great Britain.

Synoptical Table of British Organic Remains. By SAMUEL WOODWARD. 8vo. Pp. 50. with one plate. London, 1830.

The object of the author, in the publication of this little treatise, is to give an enumeration of all the species of animals or vegetables, the remains of which have been found in the strata of the British Isles. The intimations are distributed under four heads:—1. Class, family, genus, and species. 2. Reference. 3. Strata. 4. Localities. We regret that his mode of grouping the strata is so little influenced by zoological considerations, and that he has confined his references under each species to one author. By the latter practice, he has frequently overlooked priority of discovery, and suffered himself to attach more importance to a coloured figure than to accurate nomenclature. As an abridged view of the state of geology in reference to a knowledge of our extraneous fossils, the work will prove useful to the student; and we trust that its author will continue to devote his attention to the subject.

Observations on Fossil Vegetables, accompanied by representations of their internal structure, as seen through the microscope. By HENRY WITHAM, Esq. of Lartington, Fellow of the Geological Society of London, &c. &c. Blackwood, Edinburgh, 1831. 4to. with six plates.

It is only when works of this kind fall under our attention that we have to regret the restriction placed upon our remarks, by the narrow limits afforded in our plan of Analyses. We may, however, concentrate our opinion in the single expression, that this volume reflects the highest credit, both upon Mr Witham, the author, and Mr Macgillivray, the illustrator. The subject of the work will be sufficiently gathered from the title. The engravings, from drawings by Mr Macgillivray, are gems, and display all that minute accuracy which so eminently distinguishes the productions of his pencil. Of the method of prosecuting the examination of the internal structure of fossil plants, an account will be found in our Geological Collections. A new field is thus opened for the discrimination of fossil vegetables; and it cannot fail to reward the labour of the inquirer. As to the execution of the work, we must say, that its sterling merits can only be appreciated by a studied inspection, and cannot be increased by any remarks of ours. In the text will be found incorporated, two previous papers of the author, on vegetable organic remains, a subject which he has studied with great success. Geologists have to offer to Mr Witham their acknowledgments for the treat he has afforded them.

NOTICES AND PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Meeting of German Naturalists.—The Annual Meeting of German Naturalists and Physicians commenced on Saturday, the 21st of September last, Hamburgh being the seat of the assembly. It does not appear to have been so successful as those of former years, although several interesting subjects were introduced by the members. Amongst others, Professor Wendt of Breslau explained, in detail, his theory of animal magnetism; Professor Willbrandt of Giessen opposed the generally-received opinion that the flux and reflux of the sea depend upon lunar influence; and Professor Pfaff read a memoir on the nature and uses of *Coffee*, in which he stated that he had found a pure bitter principle, and an aromatic acid in the berry, specimens of which he laid before the meeting.

The Emperor of Austria having expressed a wish that the next meeting should be held in Vienna, it was so determined. The President appointed for the next year is Jacquin, Professor of Chemistry and Botany in that university, assisted by M. Littrow, Director of the Imperial Observatory, as Secretary.

On Wednesday the members made an excursion to Heligoland, in a steamboat hired for the purpose.

The public sittings terminated on Saturday the 28th; and on the following day, upwards of 400 members explored the banks of the Elbe, and paid a visit to the beautiful nursery-grounds of Messrs. Booth, at Flottbeck.

Of our countrymen who were present, we have only as yet heard of Dr. Traill of Liverpool, and our *collaborateur*, Mr. Johnston, from whose pen we hope to give some interesting details in our next.* Dr. Brewster was often asked for, as well as Drs. Duncan and Greville. Agardh was there, and Fischer from Petersburgh; Lichtenstein, Oersted, Berzelius, Magnus, and Mitscherlich. The unsettled state of various parts of Germany kept many away, though even from the centre of the disturbances there were Marx of Brunswick, and Moll of Utrecht. Numberless zoologists and physicians were also present. On the table lay books in almost all languages, even to a Polish work on Zoology, which nobody could read but the two Warsaw men who brought it.

Banff Institution for Science, Literature, and the Arts, &c.—We regret that our limited space will not permit us to avail ourselves of the interesting remarks on this Institution, contributed by a correspondent on whose communications we shall always place the highest value. The Banff Institution (formed in 1828) is of an original and most praiseworthy character, as may gathered from the following extract from the regulations of the society:—

"Law XXII. For the Discovery and Encouragement of Native Genius and Talent.—It shall be the endeavour of the Institution to discover and encourage Native Genius and Talent, particularly within the County of Banff, but not exclusively; as it shall be in the power of any Resident Member to propose to the favourable notice of the Institution any individual so distinguished belonging to his district. In all cases, where the encouragement of the Institution is desired, which may be notified in a written application to any Member, the Council, to whom the application must be transmitted, shall, in the first place, examine the Applicant, and report the result thereof to the next General Meeting. The Candidate shall then appear, (if the report be favourable,) in order that the Members may have an opportunity of satisfying themselves regarding his particular genius and talent. If the case be considered deserving of attention, the Council shall then order a certificate and recommendation, under the seal of the Institution, to

* There was great disappointment expressed at so few of the scientific men of Edinburgh being present at the meeting; the proximity of Hamburgh to this city having been expected to form a great inducement to their joining the assembly.

be delivered to the Applicant, stating his qualifications: and it shall be the object of the Institution, by means of recommendation and otherwise, to procure the applicant every facility for prosecuting such studies as may be necessary to develope and perfect his particular talent. And, as the mere gift of money may lead to abuse, and prove an incitement to mercenary views, it is appointed that no money, from the funds of the Institution, shall be given to the Applicant: but if any be voted, it shall be applied under the controul of the Council, for such purposes as shall be deemed most proper for the improvement of the Applicant, viz.: the Fees of College, of Teachers, purchase of Books, Instruments, &c. It shall, however, be the object of the Members to procure such Donations amongst themselves and their friends, as may be requisite for the other wants of the Applicant; who, on obtaining the Certificate already mentioned, shall have free access, at all convenient hours, to the Museum and Library, and to the General Meetings of the Institution; and his name shall be enrolled in a Book, to be kept for that special purpose."

The "Report," with a copy of which we have been favoured, is concisely and elegantly drawn up, and enumerates Literature, Local Antiquities, Geology, Natural History, Meteorological Notices, Astronomy, &c. among the subjects which have already been discussed at the monthly meetings.

The Society is forming a museum, which, were we to augur any thing from the rank, talent, and assiduity of the members, and the genius and extensive knowledge of the curator, Mr. Christie, (the discoverer of the singular ichthyolites at Gamery,) will soon be worthy of the town, and add another to the many interesting objects with which it already gratifies the stranger.

The Scientific Societies have not yet fairly commenced their winter session. In Edinburgh they have not recovered from the drowsiness consequent on the convivial meetings which usually precede their labours.

LONDON.

Geographical Society of London.—8th November 1830.—The Society met for the first time, the Right Honourable Viscount Goderich, the President, in the Chair, and his Lordship delivered a short introductory address. It stated that he felt it unnecessary to explain what the objects of this Society were, for that was already most ably and distinctly done in its Prospectus; but he would observe that these objects were at once useful and noble. They were useful, inasmuch as every class of society would benefit by that enlarged knowledge of the manners of our own and other countries at which the Society aims;—and they were noble, inasmuch as the pursuits they patronised were calculated to arouse and exercise some of the noblest faculties of the mind—the love of enterprize—the readiness which meets and overcomes difficulty and danger—the powers of observation which make opportunities as they occur valuable; and though last not least, the attachment to strict veracity in narrative, without which all other advantages are worse than useless, but for which he was proud and happy to say, English travellers are, for the most part, pre-eminently distinguished. The Society then met, conscious of the worth of its pursuits, but besides, these pursuits had already received and were still receiving the sanction of all that was most distinguished for rank and talent in the country; and this, too, would add to the gratification—his most gracious Majesty King William, had taken it under his especial patronage and protection, had given it the title of a Royal Society, and had bestowed on it a royal donation of Fifty Guineas annually, as a premium for the encouragement of Geographical Science and Discovery; and the names in the List of Subscribers were a proof of the estimation in which it was elsewhere held. As to himself, he eagerly accepted the distinction which had been offered to him, of being the first President of such an Association, and would feel it both a duty and a pleasure to discharge its functions to the best of his ability. To the talents of the able council by which he was surrounded, he would chearfully add his own time and best exertions, and had no doubt that the Society would fully redeem the promise which its institution held out to the public.

The Minntes of all preceding Meetings of Council were then read, in order to put the Society in possession of whatever had as yet passed in the management of its affairs; and among these subjects thus brought under its notice, was a correspondence relating to a very minute Map of the World, preserved in Hereford Cathedral, which the Canons had offered, through Mr. Biddulph, the Society's Treasurer, to forward to London for examination, an offer which had been accepted. In the meantime, Mr. Britton, a Member of Council, laid before the Society three Drawings of it, with some account of the original, partly drawn up by the late Richard Gough, Esq., from memoranda and sketches, made by the late John Center, for which the Society's thanks were voted to him.

A List of the Presents as yet made to the Society's Library was then read, and thanks ordered to be returned to the respective donors. Adjourned.

Royal Society.—18th November. Many donations, presented during the recess, were laid before the Meeting.

A paper was read on the manufacture of water cement, by Lieutenant Colonel Pasley, Royal Artillery.

Also, an account of Lieutenant Drummond's process of procuring an intense light from a small ball of lime, by placiug it at the junction of oxygen and hydrogen gas.

Captain Kater on the difference produced in any linear measure by being inserted in iron bars of different thickness.

Account of a newly discovered Pyrometer, by Mr. Daniell.

A paper on the nature of negative and imaginary quantities, by the President.

At the close of the Meeting, Mr. Davies Gilbert announced his intention of retiring from the Chair on St. Andrew's day.

Linnæan Society.—2d November. The first Meeting of the Society for the winter session. Part of a paper was read by John Hogg, A.M., on the classical plants of Sicily.

16th November. The continuation of Mr. Hogg's paper was read. Also, a paper by Lieutenant Bowler, communicated by the Asiatic Society, on a particular species of palm, (*Hyphœne coriacea* Gært.) found in the Government of Madras.

Geological Society.—5th November. Many donations presented during the recess were laid before the Society.

A paper, by Mr. Yates, on alluvial deposits, was read.

The *Athenæum* state that the Geological Society wish the proceedings of their meetings not to be made public. What is the meaning of this? The *result* is that we are unable to continue our reports.

Zoological Society.—November 4th. Opening meeting of the winter session. Donations, of great value, received during the recess, were laid before the Society; among others, an orang-outang and a wombat.

Horticultural Society of London.—November 2d. *Read,* 1. a report upon the effect of planting certain tender exotic plants in the open air at Bristol, by W. P. Taunton, Esq.

2. A report from the garden of the Society, upon the effect of the stock upon fruit trees, by Mr. Robert Thompson.

3. An account of a new kind of protecting frame to be used in forcing asparagus, sea-kale, &c., in the open ground, by Mr. John Dick of Ballindean, near Perth.

MISCELLANEOUS INTELLIGENCE.

Edinburgh University.—The Royal Commission for visiting the Scottish Universities has now given in its report, and is consequently dissolved. We look anxiously for the judgment which may be passed upon those flagrant malpractices which we have already exposed, and evidence of which will thus be brought before the country.

Lectures on Comparative Anatomy.—A course of lectures on the comparative anatomy and physiology of the Mammalia, (founded on the course of M. de Blainville,) is being delivered in Edinburgh this winter by Mr. T. W. Jones, a gentleman whose minute and extensive knowledge of anatomy eminently qualifies him for the task.

Multum in parvo.—On the 25th March 1829, notice was given that in the course of the ensuing Session of the Wernerian Society, Professor Jameson would read *an Essay,* to be entitled, " Man traced from the monadal to the perfect state, and contrasted in the different stages of his growth with various tribes of animals, from the zoophyte to the orang outang." The scientific world wait on the tip-toe of anxious expectation.

Zoological Society of Dublin.—A zoological society has recently been formed in Dublin, on the plan of the London Society.

Papal persecution of Science.—An English gentleman, recently returned from the continent, informs us that in March last he entered the papal territories at Civita Vecchia with a collection of plants gathered in the neighbourhood of Perpignan, Thoulouse, &c. in the Bas Pyrenees, and that the myrmidons of an ignorant and superstitious High Priest immediately seized and confiscated his little herbarium, as illegal goods, and militant against the Papal power.

Veterinary Art in Austria.—In the German provinces belonging to the crown of Austria, the government has made several appointments of veterinary surgeons, (there styled " physicians,") and granted them an annual allowance of fifty pounds. These appointments are by preference bestowed on individuals who have studied and been examined, or have graduated at the Veterinary Institution in Vienna,—have filled the office of teacher, and have been bred in that school. The government appoints the place where they are to exercise their functions.—*Athenæum.*

Museum of the Andersonian University of Glasgow.—The managers of Anderson's University have purchased the entire ornithological collection of Joseph Sabine, Esq. F.R.S. consisting of upwards of two thousand specimens. We understand that the collection of arctic birds is unrivalled, and what is of greater consequence, the British collection is perhaps the finest ever formed. The splendid hall which is to contain the Museum, is rapidly approaching to completion.

LITERARY NOTICES.

The Americans have this year commenced the publication of an Almanack on the plan of the British Almanack of the Society for the diffusion of Useful Knowledge. The first vol. is full of valuable statistical information.

Arboretum Britannicum; or the description, history, nature, country, habitation, uses, cultivation, botanical figures and characteristic outlines of all the trees and shrubs which will endure the open air in Great Britain, is preparing for publication by competent persons, under the guidance and inspection of that able and indefatigable horticulturist, Mr. Loudon. Besides botanical figures of the principal species, skeleton outlines will be given of the general shape and character of the trees at different ages.

M. Cloquet has just finished his great work, "Anatomie de l'Homme," with lithographic figures, in 50 folio numbers, containing 350 plates.

A new edition of Montagu's Ornithological Dictionary, with additions and numerous illustrative wood-cuts, is about to be published at a price that will place it within the reach of every class of readers. This dictionary has for years been so scarce, that a copy has been known to produce Five Pounds.

C. L. Bonaparte has in the press the 4th volume of his continuation of Wilson, after which he discontinues the work, being now, we believe, resident in Europe. It will be carried on by American naturalists.

The first volume of Mr. Audubon's Birds of America will be completed in January, with a title-page, &c. His descriptions will be published in Edinburgh about the same time, forming a large 8vo. volume.

Sir W. Jardine has in the press an edition, in three volumes, of Wilson's American Ornithology, with Bonaparte's continuation. A Biographical Memoir of Wilson, from original sources, will be added by the Editor, and the work will be enriched by upwards of 100 coloured engravings, and by copious notes.—Mr. Swainson is translating Azara's Birds of Paraguay, to be published of the same size, and as a companion to this edition of Wilson.

Mr Swainson has in the press an Encyclopædia of Zoology, with plates.

An edition of Wilson's American Ornithology is about to be published by Constable and Co. under the superintendence of Professor Jameson and Captain Thomas Brown,—the former for the letter-press, which is to appear in Constable's Miscellany, and the latter for the illustrations, which are to be published in demy folio. "This edition will be increased in value ? by *numerous additions and improvements* by Professor Jameson."

Captain Thomas Brown has also in preparation Illustrations of Lepidopterous Insects, with coloured wood-cuts, to be published by Constable & Co.

Professor Fiske has translated Leonhard's *Agenda Geognostica* into English, under the title of "Help-book for Travelling Geologists," &c. In a second edition of the original, De Leonhard intends to abbreviate some details, and make several additions and corrections.

Dr. Dracke has commenced a Physico-medical Journal at Cincinnati.

M. Klipstein of Darmstadt has recently published a new work on the Copper-schist of Zechstein.

Major de Zieten has in preparation a work on the Fossils of Wurtemberg, with many plates.

Our correspondent, Mr. Bushnan, is engaged on a Medico-botanical work.

Professor Alison, of the Edinburgh University, this month publishes a Text-book on Physiology.

Synopsis Reptilium. Part I. Containing the Tortoises and Crocodiles. By John E. Gray, F.G.S. &c. 8vo. Pp. 66.—Illustrations of the Natural History of China; by J. E. Gray, M.R.S.L. &c.; will be published in the course of this year, and contain figures of a new genus of Mammalia, several new species of Birds, and new genera of Fishes of that interesting country.

French Works on Entomology.

Latreille is occupied upon a Popular Introduction to Entomology, to form three thick 8vo. volumes, the first of which is now printing. He is preparing a work upon the Natural Classification of the Weevils, (Curculionidæ.)

De Jean's fifth volume of the "Species général of Coleoptera" is printing, and will be published in about two months: it contains the family Bembidiidæ, and the supplemental Cicindelidæ and Carabidæ. His Iconography of the European Coleoptera is proceeding.

Audouin is occupied upon a General Introduction to the Anatomical, Physiological, &c. Systems of the Linnean Insects, to form five thick 8vo. volumes. He is also engaged upon various interesting memoirs upon the natural history of insects, which will appear in the Annals of Natural Sciences, of which he is one of the editors.

Boisduval continues his work upon the North American Lepidoptera, of which objects he has reared at Paris many splendid specimens. He is preparing a General Species of Lepidoptera, to be illustrated with figures of the larvæ and details of the genera. The first part, containing the butterflies and hawk-moths, will be immediately published. He is also engaged in describing the insects collected during one of the late national French voyages: some of the plates, in 4to, are already engraved.

Guerin continues the beautiful iconography of the Animal Kingdom of Cuvier. Some of the forthcoming plates, especially that on the lamellicorn beetles, are very interesting, and filled with generic details. He continues his very useful Magazine of Entomology, and is also occupied upon the entomological portion of Captain Duperrey's national voyage. The plates of this work will be of the highest value to the student, from the immense number of details.

Gory is preparing (in conjunction with Percheron) a monograph upon the Cetoniadæ. All the species and the generic characters are to be figured. The drawings, by Guerin, already executed, are very beautiful. To appear in parts.

Percheron is engaged on the preceding work; also on a work upon the Hemiptera, Homoptera, Orthoptera, and Neuroptera. His drawings are very accurate and interesting, since he has been occupied upon the natural history of his objects.

Lefebvre is occupied upon a work on the Cimicidæ, the drawings by Guerin.

Dupont is preparing a work, with figures, upon the new species of beetles contained in his splendid collection.

Saint-Fargeau is writing a general history of the Hymenoptera.

Serville is proceeding with the "Faune Française."

Duponchel continues his beautiful description of the French moths.

Carcel is at present making a natural history tour through Turkey, Arabia, Egypt, &c. He is preparing a work upon the minute Hymenoptera.

Brebisson is also engaged upon a similar work.—*J. O. Westwood, in Mag. of Nat. Hist.* Nov. 1830.

NEW FOREIGN PUBLICATIONS.

Zoology.

Mulsant, Lettres à Julie sur l'Entomologie, Tom. I. 8vo. 12s.

Guerin, Magasin d'Entomologie, ou déscriptions et figures d'Insects inédits ou non encore figurés. Livr. I. and II., 8vo. each 2s. 6d.

Guerin, Magasin de Conchyliologie, on the same plan. Livr. I. and II. 8vo. each 2s. 6d.

Cuvier et Valenciennes, Hist. Nat. des Poissons. Tom. V. VI., 8vo.

Philippi, R. A. Orthoptera Berolinensis, acced. Tab. II. coloratæ, 4to. Berlin, 2s. 6d.

Berendt, Dr. die Insekten in Bermstein. 1st Heft, 4to. Dantzig, 3s,

Botany.

Lavy, Etat général des végétaux originaires, ou moyen pour juger, même de son cabinet, de la salubrité de l'atmosphère, de la fertilité du sol, et de la propriété des habitans dans toutes les localités de l'univers. 8vo. 7s. 6d.

Jacquin, Essai sur la culture, la nomenclature, et la classification des Dahlia. 8vo. 2s.

Humboldt et Bonpland Voyage. Sixième partie. Botanique. Revision des Graminées. Liv. XVI. à XIX. each L.2, 8s.

De Candolle, Collection de Mémoires pour servir à l'histoire du regne végétal; VI. Mem. sur la famille de Loranthacées. 12 plates. 4to. 12s.—De Candolle Prodromus Systematis Naturalis Regni vegetabilis. Part IV. 8vo. 17s.

Bischof, D. Handbuch der Botanischen Terminologie und Systemkunde, 1ste Hälfte. Mit 21 tafeln. 4to. Nürnberg. 12s. 6d.—Bischof, D. de vera vasorum Plantarum Spiralium structura, 8vo. Bonn. 3s.

Rudolphi, Fr. Systema orbis Vegetabilium, 8vo. Greifswald. 2s.

Lindenberg, Dr. Synopsis Hepaticarum Europæarum, cum. II. tab. 4to. Bonn. 6s.

Martius, Dr. Amœnitates Botanicæ Monacenses, 1st and 2d lief. 4to. Frankfort, each 7s. 6d.

Reliquiæ Haenkeanæ, seu descriptiones et icones Plantarum quas in America collegit Dr. Haenke. Fasc. IV. V. cum Tab. xii. Fol. Prag. L.1, 17s. 6d.

Gaudin, J. Flora Helvetica, Vol. V. and VI. 8vo. Zurich. L.1, 10s.

Roth, Dr. Manuale Botanicum. Fasc. II. 16mo. Leipzig. 7s.

Geology and Mineralogy, &c.

Kobell, Fr. Von, Charakteristik der Mineralien, 1st abthlg. 8vo. Nürnb. 7s.

Naumann, Dr. Lehrbuch der reinen und angewandten Krystallographie, 1 bd. 8vo. Leipzig, 17s. 6d.

Hoffman, Fr. Uebersicht der orographischen und geognostichen Verhältnisse vom nordwestlichen Deutschland, 2 abthlg. 8vo. Leipzig. 20s.

Becker, W. Ueber die Flötzgeberge in sudlichen Polen. 8vo. Freyburg. 4s.

Bergman, Dr. Chemische untersuchungen der mineralien des Bleiberges in Rhein-Preussen. 12mo. Bonn. 5s.

W. Cartwright, Printer, Edinburgh.

Fig. 2.

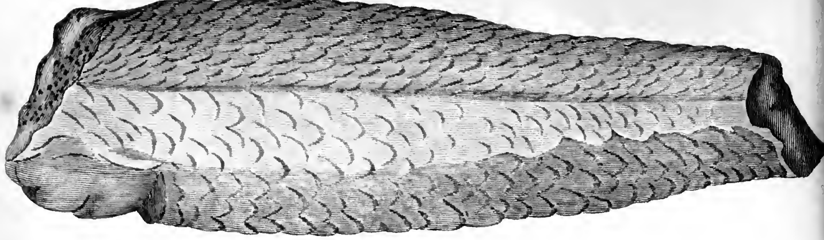


Fig. 1.

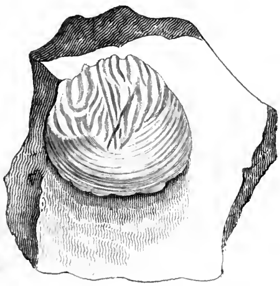


Fig. 3.

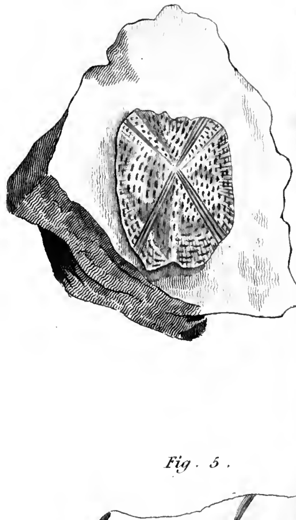


Fig. 4.

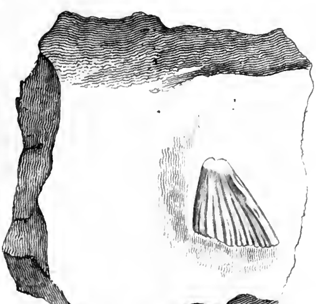
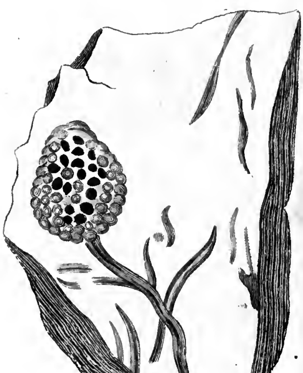


Fig. 5.



Lizars Sculp^{t}

THE

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NATURAL AND GEOGRAPHICAL SCIENCE.

FEBRUARY, 1831.

ORIGINAL ARTICLES.

ART. I. *On the occurrence of the Scales of Vertebrated Animals in the Old Red Sandstone of Fifeshire, (with a Plate.)* By the REV. DR FLEMING.*

THE country between the two firths of the Forth and Tay, considered in a geological point of view, exhibits two well marked groups of rocks, separated from each other by an intervening bed of limestone. The rocks situate above the limestone consist of the ordinary members of the independent coal formation, such as coal, bituminous shale, slate clay, clay ironstone, sandstone, and limestone, to which may be added greenstone, trap-tuff, and basalt with olivine. This series of the *coal metals* may be viewed as a *lacustrine* deposit, with occasionally interposed thin beds of *marine* limestone, containing the same organic remains as the fundamental rock, or carboniferous limestone, a stratum better known among our southern neighbours under the designation of mountain limestone. This carboniferous limestone abounds with the organisms of radiated, molluscous, and even vertebrated animals.

The rocks which occur below the great bed of carboniferous limestone, admit of distribution into the four following provisional groups, enumerated in a descending series, viz. yellow sandstone, amygdaloid, gray sandstone, and red sandstone.

1. *Yellow Sandstone.*

This rock, which is of very considerable thickness, is of a light ochrey colour in its upper beds, but, towards the lower part of the

* Read before the Wernerian Society, 1st May, 1830.

formation, it becomes brownish red, and includes strata of slate clay and conglomerate. On the surface of the strata, in these lower beds, circular spots, some of them nearly a foot in diameter, may be readily perceived by their pale yellow colour, contrasted with the dark red of the surrounding rock. These spots, however, are not, as may at first be supposed, mere superficial films, but derive their circular form from a coloured sphere to which they belong. This sphere is not to be distinguished from the rest of the bed by any difference in mechanical structure, but merely by the absence of much of that oxide of iron with which the other portion of the mass is charged. The circumference of this coloured sphere is usually well defined, and at its centre may always be observed matter of a darker colour, in some cases disposed in concentric layers, in others of calcareous and crystalline matter, the remains, probably, of some vegetable or animal organism, the decomposition of which exercised a limited influence on the colouring matter of the surrounding rock. In some cases, I have observed these spheres slightly compressed at opposite sides, in a direction parallel with the plane of stratification, the result, without doubt, of the subsidence, or contraction of the mass, after the central matter, or nucleus, had ceased to exercise its influence.

In general, this bed of yellow sandstone is covered directly by the carboniferous limestone; but, in some instances, as at Wemyss-hall Hill, the bed of greenstone, which usually occurs in the series of the coal metals, considerably above the carboniferous limestone, and forms the summits of the eminences near the extremity of the coal field, overlaps the intervening beds, and comes directly into contact with the yellow sandstone.

In many parts of this rock, extensive quarries have long furnished excellent materials for building. Some of the *seams* afford a very durable stone, easily shaped by the chisel, and feebly acted on by the atmosphere.

At the lowest part of this yellow sandstone, a thin bed of compact limestone occurs, but nowhere, within the county of Fife, of any considerable extent. It may be observed at Craigfoody, in the parish of Dairsie, and at Newton, to the north of Auchtermuchty. It appears to be destitute of organic remains; and, instead of the black flint which occasionally abounds in the carboniferous limestone, it presents irregular patches of red jasper. It appears to be similar in its character to that which is denominated *cornstone* by several English geologists. This yellow sandstone occupies the bottom of the valley of Stratheden, and a considerable portion of the acclivity of the hills which form its southern boundary, from the Lomonds to St Andrews.

2. *Amygdaloid.*

This rock is less regularly stratified than the sandstone. The strata are thick, and variously curved. The upper portions of this mass, or those nearest the sandstone, frequently present a brecciated structure. Throughout the rock, but chiefly towards the lower parts, thin interrupted layers of *sedimentary matter*, in the form of slate clay, and slaty sandstone, often of considerable hardness, may frequently be observed, conformable in dip with the more perfectly developed sedimentary rocks above and below the amygdaloidal mass. It seems highly probable from such appearances, that while volcanic matter was furnishing materials for a subaqueous amygdaloid, in successive portions, the water was likewise, from time to time, depositing its mud, resembling, in many respects, that with which it had previously been forming the inferior sandstone, to be afterwards considered.

The amygdaloid contains irregular beds of porphyry, claystone, compact felspar, greenstone, and clinkstone. The latter rock furnishes excellent compact durable materials for building, and frequently assumes the prismatic form. It readily splits with the hammer, in the direction of the dip, and in this manner exhibits its laminated structure. The latter character, however, is displayed with greater distinctness in those portions of the rock which have been long acted on by the weather, and in which the parallel layers are so numerous and well marked, as to leave no room to doubt its sedimentary origin. Some, perhaps, would, even in the face of such evidence, pronounce it a *lava*, while I am convinced that it is altered slate clay. This bed of amygdaloid, with its subordinate materials, constitutes the range of the Ochils, rising towards their western extremity, at Bencleugh, to the height of 2450 feet above the sea.

3. *Gray Sandstone.*

This rock seems originally to have been derived from the decomposition of clay-slate, and mica-slate. In its upper part, it appears in the form of slate clay, in which the layers are of considerable thickness, and usually receives the denomination of *calmstone*. In the lower portions of the series, where the sandstone occurs, the beds are of considerable thickness, and furnish excellent materials for building. In some cases the sandstone is thin, slaty, and has been employed for roofing. The whole abounds in mica. This deposit seems to be identical with the *Arbroath pavement*, and with the inferior sandstone of Mr Lyell's Section of Forfarshire, published in the Transactions of the Geological Society of London, Vol. II. second series, Pl. 10. There is equally little reason to doubt its identity with the schists of Caithness, described by Professor Sedgewick, Geological Transactions, Vol. III. second series, Pl. 14.

4. *Old Red Sandstone.*

This rock exhibits the usual beds of sandstone and conglomerate.

Towards its upper part a limestone occurs, nearly similar to the one which has been mentioned as existing at the lower part of the yellow sandstone. The gray and red sandstones occur on the south bank of the estuary of the Tay, in the valley of Strathern, and in the northern acclivity of the Ochils.

The whole of the rocks thus briefly noticed have a westerly direction and a southerly dip in the county of Fife, but a dip in the opposite direction on the north side of the estuary of the Tay in Perthshire. The axis of elevation by which the whole of these beds in Fife, and even unto Stirling, have acquired a southerly dip, runs in the direction of the present estuary of the Tay and Strathern, pointing to that district in Scotland which, even at present, is frequently visited by earthquakes. The west Lomond constitutes the culminating point of the coal metals. It rises with its cap of trap to the height of 1721 feet above the level of the sea.

The strata underneath the coal metals are traversed, in the direction of the dip, by dykes of greenstone and compact felspar, and in their line of stretch by one dyke of greenstone of an interesting character. It intersects the inferior sandstone, amygdaloid, and clinkstone. It is vertical, and varies frequently in breadth from ten to twenty feet and upwards. I have satisfied myself of it continuously throughout a space of about six miles, and there are indications of its continuance to double that extent. I am in the habit of calling it the *Great Flisk Dyke*, as it intersects the parish in a part of its course.

The above cursory sketch of the strata of this district is not designed as a history of the geology of the district,—a task which I trust shortly to be able to accomplish,—but to enable the reader to form a more accurate notion of the position of the bodies now to be noticed. The divisions likewise which have been introduced, mark, indeed, the order of superposition, and on this account have a local value; but, when viewed in the great scale, they are to be considered merely as expressing the inferior members of the carboniferous epoch, usually included under the term *old red sandstone*.

The organic remains which occur in this series of rocks present several circumstances of considerable interest. In the upper portion of the series, which has been denominated *yellow sandstone*, the remains of plants are occasionally to be met with, especially the *phytolithus verrucosus* of Martin, so universally distributed among the beds in connection with the coal above the carboniferous limestone.

In the summer of 1827 I obtained from Drumdryan quarry, to the south of Cupar, situate in the higher strata of yellow sandstone, certain organisms, which I readily referred to the scales of vertebrated animals, probably those of a fish. The largest (see Pl. II. fig. 1.) was one inch and one-tenth in length, about one inch and two-tenths in breadth, and not exceeding the fiftieth of an inch in thickness. The part which, when in its natural position, had been imbedded in the cuticle, is comparatively smooth, exhibiting, however, in a very distinct manner, the semicircularly parallel layers of growth, with obsolete diverging striæ, giving to the surface, when under a lens, a reticulated aspect. The part naturally exposed is marked with longitudinal, waved, rounded, anastomosing ridges, which are smooth and glossy. The whole of the inside of the scale is smooth, though exhibiting with tolerable distinctness the layers of growth. The form and structure of the object indicated plainly enough that it had been a scale, a conclusion confirmed by the detection of the phosphate of lime in its composition. At this period I inserted a short notice of the occurrence of these scales in our provincial newspaper, the Fife Herald, for the purpose of attracting the attention of the workmen, and others in the neighbourhood, in order to secure the preservation of any other specimens which might occur.

Nearly a year after these scales had been discovered, not only in the upper, but even in some of the lower beds of the yellow sandstone, I was informed that *oyster shells* had been found in a quarry in the old red sandstone at Clashbinnie, near Errol, in Perthshire, and that specimens were in the possession of a gentleman in Perth. Interested in the intelligence, I lost no time in visiting Perth, and was gratified to find, that the supposed oyster shells were in fact similar to those which I had ascertained to occur in a higher part of the series. The scales were, however, of a larger size, some of them exceeding three inches in length and one-eighth of an inch in thickness. Upon my visit to the quarry I found the scales, as in the yellow sandstone, most abundant in those parts of the rock which exhibited a brecciated aspect. Many patches, a foot in length, full of scales, have occurred; but as yet no entire impression of a fish has been obtained. One specimen, however, at present in the museum of the Antiquarian Society of Perth, and found by Mr Spence, (see Pl. II. fig. 2,) is evidently the relic of a fish, and probably identical with the *dipterus macropygopterus* of Professor Sedgewick and Mr Murchison, from the Caithness beds. (Geol. Trans. III. 2d ser. p. 143, Tab. XV. f. 1, 2, 3.) The specimen is about seven inches long, two inches deep, and from seven to eight-tenths in thickness. The scales above the lateral line are indistinct,—those towards the belly appear to have been larger, and kept apart by the intervention of the surrounding matter. This part, in separating from the rock, has acquired a very uneven surface. The whole is indeed very indistinct, as no definite form of scale can be perceived. Though both sides of the fish are preserved, no traces of fins or vertebræ remain. The interior appears somewhat cellular.

Another scale, differing from those already noticed, (see Pl. II. fig. 3,) is about an inch and a quarter in length, and an inch in breadth. In external appearance, it bears a very close resemblance to some of the scales on the common sturgeon, and may, with some probability, be referred to an extinct species of the genus *Acipenser*.

The organism represented at Pl. II. fig. 4, seems to be a fragment of an external osseous process, or tooth.

Immediately after these supposed oysters from Errol were known to be scales, a notice of their occurrence was inserted in one of the Perth newspapers; but the author of the notice, not being aware of the difference in superposition, assigned to the Clashbinnie beds the same relation to the carboniferous limestone, which had been stated as existing in reference to the yellow sandstone, my notice having been employed as a guide. A similar intimation, with the same error, derived from the source alluded to, with the additional one of stating Clashbinnie quarry as in Forfarshire, made its appearance in the Edinburgh Journal of Science for January, 1829, p. 184.

In the gray sandstone, which, as has been stated, occupies an intermediate position between the yellow and red sandstones, the remains of vegetable organisms occur, though sparingly. These appear to have belonged to gramineous plants. In a quarry at Parkhill, near Newburgh, these remains occupy the surface of the strata, and are accompanied by relics I have not met with elsewhere. These occur in the form of circular flat patches, not equalling an inch in diameter, and composed of numerous smaller contiguous circular pieces, (see Pl. II. fig. 5.) These bodies are not unlike what might be expected to result from a compressed berry, such as the bramble or the rasp. As these bodies, however, are found, as represented in the figure, adjacent to the narrow leaves of gramineous vegetables, and chiefly in slate clay, (originally *lacustrine silt,)* it is probable that they constituted the conglobate panicles of extinct species of the genus *Juncus* or *Sparzanium*. The Rev. Mr Muir, of St Vigeans, has since detected similar organisms in the Arbroath pavement beds.

The existence of the remains of vertebrated animals in the strata connected with the rocks beneath the independent coal formation in this district, is a fact of some importance to those who propose to investigate the progress of animal life, as exhibited by the organisms which the strata contain. The facts illustrative of the vegetable relics which the strata noticed above contain, warrant, in connection with other circumstances, the conclusion, that the series of rocks in this district, usually known to geologists under the denomination, *old red sandstone*, is a *fresh water formation*, covered by a bed of *marine* carboniferous limestone. The strata above this limestone, as already stated, constituting the *coal metals*, are of lacustrine origin; but they include many subordinate beds of marine limestone.

Manse of Flisk, 2d April, 1830.

ART. II. *Observations on the early departure of some species of* Sylviadæ, *or Warblers, during the last Summer.* By P. J. Selby, F.R.S.E. F.L.S. F.G.S. &c.

Having, for several years past, directed my attention to the migratory movements of the feathered race, as connected with their economy, and noted, with some degree of accuracy, the stated periods of arrival and departure of our various periodical visitants, and, more particularly, of such as are appropriately called summer birds of passage, I discovered, with no inconsiderable surprise, during the course of my observations this last season, that several species of *sylviadæ*, or warblers, prematurely deserted their summer haunts, and quitted the northern districts of the island, at least two months before the time they usually leave us, to commence their equatorial migration, or departure for warmer winter quarters. The cause of so striking a deviation, at variance with any previous observations, I can only attribute to the effects produced upon their delicate and sensitive constitutions by a season unusually wet and cold, during a period of peculiar importance, as regards the functions and economy of these interesting creatures, as well as a deficiency of food, the result of the like inclemency of the weather. But, as a brief detail of the facts, as they offered themselves to my notice, may not be unacceptable to those who find amusement from, or are engaged in similar pursuits, I shall proceed to give them as they occurred. Towards the regular period, when the majority of our summer visitants are first seen in the northern districts of the kingdom, viz. between the 25th of April and 5th of May, I did not, this last spring, observe any deficiency in the usual proportions of the various species which are known to extend their polar migrations to this latitude. Of this I could form a pretty accurate opinion, from the numbers seen dispersed in our woods, groves, and hedges, as well as by the frequency of the songs and peculiar note-calls of each individual variety. Shortly after the arrival of the females, which does not take place, in many instances, till a week or ten days after the first appearance of the other sex, they commenced nidification, and, towards the middle of May, several nests were found containing eggs. Almost immediately afterwards, a series of wet weather ensued, which continued, with little or no intermission, and with scarce an intervening gleam of sunshine, till after the 10th of July, the fall of rain at times being particularly heavy, and attended with frequent storms of thunder and lightning. It was observed, during June, that the young of several species, particularly of such as build an open, flimsy nest, as the blackcap, pettychaps, &c. and which is generally placed in situations affording little protection from the weather, were all drowned, or perished; and where they contained eggs, these were cold and deserted, the parent birds being unable to cover or sit upon them under circumstances so unpropitious. Notwithstanding the premature destruction of each succeeding nest, these attempts at reproduction were persisted in till the time when that ardour which irresistibly impels them to the fulfilment of this important law of nature had nearly expired, and was about to be succeeded by the exhausting effects of another equally imperative law to which they are subject, viz. the moult, or general renewal of plumage, which takes place soon after the necessary duties attendant upon reproduction have ceased.

July had now commenced; and, up to this time, I had noticed the usual species about the grounds. I restrict my observation to old birds, as very few young of any kind had hitherto appeared; the weather still continued very wet, and the rain fell in greater quantities during the first week of this month, than it had done during any period of the preceding, and all our burns and rivulets were swollen to an unusual size. About the 10th, I first observed the sudden deficiency in the number of our visitants, and was surprised, on walking through the woods and other usual places of resort, to find them deserted and abandoned by almost the whole of their lovely and interesting inhabitants. I was led, in consequence, to extend my observations, and found the same result in all the surrounding district; and having, in my correspondence with Sir William Jardine, mentioned the fact, and directed his attention towards it, I afterwards learned from him, that the same cause appeared to have operated equally in Dumfries-shire. Towards the beginning of August, and long before the usual time of departure of our warblers, I made an excursion into Scotland, by way of the Trosachs, Dunkeld, Dalmally, and Inveraray, situations where I had frequently before seen all the usual varieties of the *sylviadæ* which visit the north; and in all these parts I found a similar desertion—the only species visible, and that in numbers comparatively few, being the *Sylvia trochilus*, (willow wren,) some stragglers of which were also left sparingly dispersed in my own grounds, and other parts in Northumberland, till the usual period of departure. The species which came more particularly under my observation, and which appeared to yield to these unusual circumstances of the season, were the *Curruca atricapilla*, (blackcap warbler;) *Curruca hortensis* (pettychaps warbler;) *Curruca cinerea*, (white-throat warbler;) *Sylvia sibilatrix*, (wood wren;) and *Sylvia trochilus*, (willow wren;) but, as I observed before, the desertion of the last named species was not so general as of the others. With respect to other migratory species, it would appear, that some of them were not affected in an equal degree, as I remarked that individuals of *Salicaria phragmitis*, (sedge warbler,) were visible in their appropriate localities till nearly the usual period of departure; nor have I been able satisfactorily to ascertain how far to the south of this district the same cause was in active operation. It must not be forgotten, that the past season has been equally unpropitious for the development and increase of the insect tribe; and the deficiency of lepidopterous, as well as other insects, must have struck every one who pays any attention to these details of nature. This failure in a department of nature so essential to the economy of most of the *sylviadæ*, and which constitutes the principal food of the particular species I have enumerated, combined with the coldness and ungenial nature of the weather, at a time when they were about to undergo the debilitating effects of a moult, appears to me the proximate cause of their early departure: for, so long as that ardour existed which influences and supports them during the season of reproduction, they contrived to brave the inclemency of the weather, and remained stationary in those situations they had first selected, instinctively impelled to fulfil a great and imperious call; but, that at an end, they immediately yielded to circumstances, or, rather, by another instinctive feeling, were driven to seek, in a more southern latitude, that congeniality of climate and food necessary to their wellbeing at that particular juncture, and which, in a season so unusual, appears to have failed them in those latitudes where, under usual circumstances, they had been accustomed to remain till the middle of September, or beginning of October.

I may add, that the season was not only fatal to the eggs and broods of the few species I have named, but affected, in a greater or less degree, every kind of bird. The rare occurrence of the young of all our well known songsters, and the solitary aspect of our gardens and orchards, at a period when they used to exhibit a scene of life, activity, and joy, cannot have escaped the notice of the observant pupil of nature; nor will the sportsman be slow in deploring, or giving his testimony to the universal lack of feathered game.

ART. III.—Baron Cuvier's *Lectures on the History of the Natural Sciences.*—(continued from p. 26.)

On the Luxury of the Romans.

We have seen that the Roman writers, at the time of the republic, had spoken very little of natural history. Those who flourished during the empire treated of it more fully; but the works they have left us on this subject contain few original remarks. They are, indeed, little else than mere compilations; a circumstance which appears the more strange, that few people have had better opportunities for observation.

At the earliest period of the republic, in addition to the institutions in general being unfavourable to every kind of study, the prevailing simplicity of manners was particularly opposed to the progress of natural history,—a science of luxury, extensive, and incapable of being prosecuted without much previous preparation. For, as the relations among the beings of which it treats cannot be established without comparing a great number of individuals, in commerce, which collects the productions of foreign countries, natural history finds a powerful support. Now, the Romans were for a long time not a commercial people. By their first treaty with the Carthaginians, they engaged not to go beyond the straits which separate Sicily from Africa. Some time after, A.U.C. 405, they gave up their trade with Sardinia and the coast of Africa altogether. It was not ignorance, but policy, that induced the government to discountenance commerce, which they did for the purpose of preventing the introduction of luxury. Rome had no silver currency until the year 472 of its foundation, or 268 before Christ. At the period of the last Macedonian war, a senator was degraded for having ten pounds of silver plate. It was at the termination of this war, at the triumph of Paulus Emilius, that gold plate was seen for the first time. But luxury soon followed victory, and individual voluptuousness was carried to the highest pitch of extravagance. We shall speak of it in as far as it regards natural history. The luxury of the table, for example, brought to Rome many strange animals, several of which had nothing else to recommend them than their extreme rarity and excessive price. The luxury of their clothing, also, deserves attention, as it has relation to precious stones and dyes; that of buildings, on account of the marbles brought from different parts of Italy, Greece, and even Gaul; and that of their furniture, from the valuable woods made use of.

During the period of the second Punic War, Fulvius Hirpinus first made parks for confining quadrupeds. These parks were called *leporaria,* because three kinds of hares (the common hare, the original Spanish rabbit, and the variegated or Alpine hare, a species which is now almost entirely destroyed,) were reared in them. Almost all the native beasts of our forests, and the wild sheep or mouflon, were likewise brought up there. These animals were almost domesticated, and were accustomed to come together at a certain signal. One day, during an entertainment given by Hortensius, in one of his parks, at the sound of a trumpet, stags, goats, and wild boars, were seen running up and collecting round his tent, not without causing dismay to some of his guests. Servius Rullus was the first who served up an entire wild boar at table. Antony, during his triumvirate, displayed eight of these animals at once. The Romans considered the gray dormouse—a little animal which dwells in the woods and in the holes of oak trees—as a great delicacy. They reared them in the parks, lodged them in jars of earthenware of a particular form, and fattened them with acorns and chestnuts.

Lenius Strabo, of Brundusium, contrived aviaries for confining those birds destined for the table which could not be kept within the walls of a poultry yard. It was he, says Pliny, who taught us to confine those animals whose abode was the sky. Alexander had introduced peacocks into Greece, where they were looked upon merely as objects of curiosity. Hortensius was the first who served up one at a feast, which he gave on his appointment to the office of augur. These birds soon multiplied, and Ptolemy Physcon was astonished at the great number of them he found at Rome. Aufidius Lucro made an income of about £600 a-year by fattening peacocks, which formed a part of all the grand entertainments: it was the truffled turkey of those days. Hirtius Pansa, who had the ill luck to give an entertainment where this indispensable dish did not appear, was looked upon as a niggard, a man without taste, and was ever after held in small esteem by gourmands. Thrushes and pigeons were bred in the aviaries; and it appears that people had then the same fancies as at present,—certain varieties were much sought after. Varro says, that a couple of pigeons brought 2000 sesterces, about £19 of our money. Geese were crammed in the same way as at present to enlarge their livers; but this was a dish too easily obtained, and those who wished to distinguish themselves invented new kinds of meat. They dressed the brains of ostriches and the tongues of flamingos,—they imported wild geese from Phrygia, cranes from Melos, and pheasants from Colchis.

In the article of fishes, luxury went even farther than in birds and quadrupeds. At one period of the republic, the eating of fish was considered as a shameful degree of delicacy. But this severity of manners disappeared on the introduction of riches; and Cato complained that in his time they paid higher for a fish than for an ox. However, even at that time, Gallonius was publicly accused in the senate, and almost deprived of his rank, in consequence of the luxury of his table, at which he had sturgeons served up. The inventor of fish ponds was Lucinius Muræna. It is from this circumstance that the surname of his family was derived. Hortensius followed his example, and went still farther. In a short time they were not contented with fresh water fish, but got salt water ponds, where they bred sea-trouts, soles, John-dories, and shell-fish of different kinds. Lucullus, in order to let in sea water into one of these reservoirs, had a mountain cut through, for which extravagance he was deservedly called *Xerxes Togatus.* At his death there were so many fish in all his ponds, that Cato of Utica, who was trustee on the succession, having ordered them to be sold, received for them about £37,500. The fish ponds of Irrius were sold at the same price. Cæsar, wishing on a particular occasion to give a feast to the Roman people, applied to Irrius for some lampreys, who refused to sell them to him, but agreed to lend him six thousand, according to Pliny's account,—two thousand according to Varro. The object then was who should be most foolish about lampreys. Hortensius had some of which he took more care than of his slaves; but these were not for eating; for, what were used at table were bought at the market. It is said that he wept at the death of one of these fishes. The orator Crassus, on a similar occurrence, went still farther, for he put on mourning. His colleague, Domitius reproached him for it in the senate. But all this was nothing compared to what Vedius Pollio did, who more than once gave his lampreys living men to devour.

Other fishes were equally the object of inconceivable extravagance. The *acipenser* generally sold for more than a thousand drachmæ; it was never laid on the table without being preceded by the sound of trumpets. The *acipenser* was not, it would appear, the common sturgeon, but the sterlet,—a small species, with a pointed snout, caught in the rivers which fall into the Black Sea. The mullet, or roach of Provence, called in Paris *sur-mulet*, was also sold excessively high. A mullet, weighing four pounds, sold for £37, another for £60. Three together, in the reign of Tiberius, brought £240. They even brought these fish alive to the dining-room, by canals of salt water, which passed under the table. The fact is undoubted, and is attested by the invectives of Seneca.

Snails were also the particular objects of attention. The same Fulvius Hirpinus who invented parks for quadrupeds, also contrived parks for snails; and, as these animals could not be kept in by enclosures, the place where they were preserved was surrounded by water. Earthenware jars were prepared for them, and they were fattened with mulled wine and flowers. Pliny says that there were some which weighed as much as twenty-five pounds. They were certainly not Italian snails which grew to such a size; but we know that they were also brought from foreign countries, as Africa, Illyria, &c.

The method of making oyster-beds was first shewn by Sergius Aurata, who, like Lucinius, derived his surname from a fish (the John-dory.) The reservoirs of the Lucrine lake had, for a long time, the reputation of producing the best oysters; next to them were those of Brundusium. At last, refinement was carried farther, and oysters were brought from Brundusium, to be fed in the Lucrine lake.

Fruits, it would seem, were then in less esteem than they have been since. The only new fruit introduced at that time was the cherry, which Lucullus brought from Cerasus, a town in Asia Minor, 69 years before Christ.

Luxury in perfumes was excessive, and drew to Rome the most valuable aromatics of the East. Luxury in clothing was not less extravagant; it made known purple, pearls, and precious stones. At one time, there was a complete mania about opals, and one individual let himself be prosecuted rather than give up to Sylla a very beautiful opal, which the dictator wished to have.

Fashion also extended her empire to furniture, and certain kinds of wood sold at enormous prices. For some time the *citrus* obtained the preference. The tree so called was not the citrus of Theophrastus, the orange tree of our time, but seems to have been a species of *thuya* brought from Cyrenaica. It was not the trunk only that was employed, but also certain knots which grow near the roots. When they succeeded in getting pieces of a large size, they sold them at very high prices. Cethegus paid for a table 1,400,000 sesterces; even Seneca himself, notwithstanding his invectives against luxury, had one which cost an enormous sum. These pieces were distinguished according to their colours, and by the manner in which they were veined. Ebony was also employed; this was brought, for the first time, into Italy by Pompey, after his victories over the pirates.

A great deal of marble was used in building. It was brought from the most remote countries, and there were even several, the quarries of which are now unknown; thus, the marbles designated by the names of *vert antique, rouge antique*, are so called, because they are only met with in ancient buildings. It was while seeking for some of these fragments amongst some ruins, that Pompeii was discovered.

If, from individual luxury, we turn our attention to that which was displayed at the public feasts, we find still more reason to be astonished. One would scarcely venture to repeat the accounts contained in ancient authors; and yet the general accordance, in their several narratives, the circumstance of their having been eye-witnesses of that which they describe, and the improbability of their advancing statements opposed to the knowledge of all their contemporaries, forbid us from charging them with exaggeration. Messrs Beckmann, Mongez, and Cuvier, have made very extensive inquiries concerning the animals which it was the custom to exhibit or slay in the circus; inquiries which are by no means to be regarded as mere objects of curiosity. It is important to the naturalist, for several reasons, to know the period of the discovery of these animals, the countries of which they were natives, and the number which was taken. Without these data, for example, we might often mistake the bones of foreign quadrupeds for true fossil remains, and thus mistake transported soil for regular formations.

Curius Dentatus first exhibited foreign animals at Rome, in the year 273 before Christ. It will be remembered that elephants were introduced into Greece during the conquest of Alexander. Aristotle saw them, and wrote much better accounts of them than those which Buffon has since written. These elephants, and some others, sent afterwards, came into the possession of Pyrrhus, king of Macedonia, who took them from Demetrius Poliorcetes. On the defeat of Pyrrhus, by the Romans, four of his war elephants fell into the power of the conquerors, and after having been led in the triumphal procession of Curius, were slain before the people. Four-and-twenty years later, Metellus, having gained a great victory over the Carthaginians, captured one hundred and forty-two elephants, which were all killed with arrows in the circus; and so prodigal were they of their elephants, that they seem not even to have made use of their tusks. It has been supposed, that in the time of Curius Dentatus, it was a stroke of policy to put to death some of these animals, to lessen the fear which they had at first excited. There were not, however, the same reasons for the second massacre; but, doubtless, the Romans could not be desirous of introducing elephants into their armies, and thus of altering tactics whose excellence they had proved. As little would they be disposed to present them to the allied kings, from an apprehension of adding too much to their power. Sixty-five years after the triumph of Metellus, in the year 186 before Christ, Marcus Fulvius, to absolve himself from a vow which he had made in the Ætolian war, exhibited panthers and lions. These animals might have come from Africa, or, perhaps, from Asia Minor, where, at this period, they were still found.

A taste for these spectacles being apparent in the people, Scipio Nasica and Publius Lentulus exhibited many elephants, forty bears, and fifty-three panthers. Quintus Scævola shewed several lions fighting with men. Sylla exhibited more than a hundred male lions. In the year 58 before Christ, Æmilius Scaurus, during his ædileship, distinguished himself, not only by the number of his animals, but still more by shewing many which had never before been seen in Rome. At these spectacles the first hippopotamus was seen. There were also five living crocodiles, five hundred panthers, and what appeared more strange, the bones of the animal to which it was said that Andromeda had been exposed. These bones had been brought from the town of Joppa (Jaffa) on the coast of Palestine. There were among them vertebræ a foot and a half long, and a bone not less than six-and-thirty feet in length, probably the lower jaw of a whale. In the year 55 before Christ, Pompey, at the opening of his theatre, exhibited a lynx, a cephus from Ethiopia, (a species of ape,) a single-horned rhinoceros, twenty elephants fighting with men, four hundred and ten panthers, and six hundred lions, whereof three hundred and fifteen had manes. All the sovereigns of Europe could not now produce such a number. Cicero, who was present at these games, speaks of them with great disdain, and says, that the people at last took pity on the elephants. In the year 48 before Christ, Antony exhibited lions harnessed to a chariot; it was the first time these animals had been so employed, but they were not the first that had been tamed. A Carthaginian, named Hanno, had a lion which followed him through the city like a dog; but his trouble was ill rewarded, for his countrymen banished him, thinking that a man who could tame a ferocious beast, must possess some secret power, by means of which he might, perhaps, subdue themselves. In the year 46 before Christ, Cæsar shewed, in an amphitheatre, covered over with a purple awning, four hundred lions with manes, several wild bulls fighting with men, and twenty elephants, which were attacked by five hundred foot soldiers. On the evening of his triumph, he returned home preceded by elephants bearing torches.

We may imagine the unbounded riches of the men who could afford such spectacles,—the eagerness of allied kings to humour them,—the prodigious number of men employed by them in obtaining the animals exhibited to the people. Nor is it less astonishing that they were able to procure such a number of wild beasts. And yet the Romans of the republic were afterwards surpassed by the Emperors in this kind of magnificence. From an inscription in honour of Augustus, found at Ancyra, we learn, that this prince caused three thousand five hundred wild beasts to be slain before the people. On one occasion, he had water brought into the circus of Flaminius, and shewed thirty-six living crocodiles, which were then torn to pieces by wild beasts. Two hundred and sixty-eight lions were killed at this entertainment. There was, besides, a serpent fifty cubits long, an African python, and a royal tiger, confined in a cage, the first that had been seen in Rome. Augustus, before he became emperor, on the occasion of his triumph over Cleopatra, had a reindeer and a hippopotamus slain in the circus. Germanicus, at his triumph over the Germans, brought out elephants which had been taught to dance. Caligula gave four hundred bears and four hundred panthers to be killed. Claudius, at the dedication of the Pantheon, displayed four royal tigers: a mosaic pavement, which has lasted till our time, represents these animals of their natural size. The same emperor, being apprized that a whale was stranded in the harbour of Ostia, repaired thither, and attacked the animal with his galleys. It is probable that this was a large species of dolphin, the *orca*. Galba exhibited an elephant which walked on a tight rope to the top of the theatre, with a Roman horseman on his back. These elephants were taught when young, being born in Rome. Ælian mentions this distinctly, in speaking of the elephants of Germanicus. Mr Corse has shewn, in opposition to the opinion of Buffon, that, with certain precautions, elephants will breed in a state of domestication. But the fact was known in Italy from the time of Columella.

This profusion continued during the first four centuries of the Roman empire. Titus, at the dedication of the Thermæ, exhibited nine thousand animals, and a number of cranes fighting. Domitian gave hunts by torch-light, where the two-horned rhinoceros was seen—an animal which Sparmann only discovered about sixty years ago, though it is engraven on the medals of Domitian. In these games, a woman was seen fighting with a lion; an elephant, after having trampled to death a bull, went and knelt before the emperor; a royal tiger killed a lion; and the aurochs dragged chariots. Martial has devoted a whole book to the description of Domitian's games; and naturalists will find many curious hints in his epigrams.

Trajan, after his victory over Deceballus, King of Parthia, gave entertainments which lasted twenty-three days. According to Dio Cassius, eleven thousand animals were slaughtered at them. Adrian also exhibited a vast number of animals; but the accounts of historians are much less interesting than a mosaic executed by order of that emperor. On this precious relic, which was discovered at Palestrina, the ancient Præneste, the animals of Egypt and Ethiopia are figured, with their names written under each. The lower part represents the inundation of the Nile. The forms of the ibis, the crocodile, and the hippopotamus, are given with great exactness; but the hippopotamus is very ill described by the Roman naturalists, who have done nothing else than copy the passage in Herodotus. On the upper part of the mosaic, we see, among the mountains of Ethiopia, the giraffe, under the name of *nabis;* apes, and various reptiles; in all, thirty animals, easily recognized, and whose nomenclature is thus determined.

Antoninus, the successor of Adrian, conforming to the established custom, likewise exhibited games, in which were crocodiles, hippopotamuses, strepsiceroses, (Nubian antelopes,) and hyænas, different from those described by Agatarchis.

Marcus Aurelius abhorred such spectacles; but his son, Commodus, resumed them eagerly: with his own hand he slew a tiger, a hippopotamus, and an elephant. He let loose in the circus a great number of ostriches, and, as they ran about, shot off their heads, with crescent-shaped blades fixed on the points of arrows. Herodian, who relates the fact, says, that the birds, after being decapitated, continued running about for some time: the experiment has been successfully repeated on ducks. Septimius Severus, in the tenth year of his reign, during the *fêtes* on the marriage of Caracalla, let four hundred animals out of a machine, amongst which were some wild asses, and bisons. At the marriage of Heliogabalus, there were chariots drawn by all kinds of wild beasts.

The most expensive and most curious collections of animals were those of the Gordians. The first emperor of this name, in one day, exposed to view a thousand panthers. Probus, one of their successors, had trees planted in the circus, and more than a thousand ostriches, and a countless throng of different animals, were seen running about in this artificial forest.

So long as the Roman empire existed in the west, similar exhibitions were continued; and, in spite of the prohibitions of Constantine, there were some even under Christian emperors. Theodosius gave a fight of animals in the circus; and even Justinian exhibited in the amphitheatre twenty lions and thirty panthers.

Such sights, continued uninterruptedly for more than four hundred years, must have afforded the Roman naturalists opportunities of making numerous observations on the form, habits, and organization of foreign animals; yet science received little from their labours. It seems, that the animals, once killed, were applied to no farther use; which is proved by the fact, that all the writers of the first, second, and third centuries of the Christian era, who have treated on this subject, have borrowed every thing they say from Greek authors, who lived before the Roman conquest. Pliny himself is a mere compiler.

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[illegible] the successors of Augustus, conforming to the [illegible] likewise exhibited games, in which were [illegible] potamuses, strepsiceroses, [illegible] not from those described by Agatharchides.

[illegible] Aurelius abhorred such spectacles [illegible] his son [illegible] resumed them eagerly, with his own hand he slew [illegible] hippopotamus and elephants. [illegible] these in the circus [illegible] a number of ostriches, and as they ran about, shot off their heads with crescent-shaped blades fixed on the points of arrows [illegible] who relates the fact, says, that the birds, after being decapitated, continued running about for some time: the experiment has been successfully repeated on ducks. [illegible] Severus [illegible] tenth year of his reign, during the fêtes on the [illegible] seven hundred animals out of [illegible] machine, among [illegible] bears [illegible] asses, and bisons. At the marriage [illegible] Elagabalus, there were chariots drawn by all kinds of wild beasts [illegible] the most expensive and most curious collections of animals [illegible] those of the Gordians. The first emperor of this name [illegible] day, exposed to view a thousand panthers. Probus, one [illegible] successors, had trees planted in the circus, and [illegible] a thousand ostriches, and a countless throng of different [illegible] were seen running about in the artificial forest.

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[illegible] sight [illegible] summer [illegible] the Roman [illegible] the [illegible] received [illegible]

Cratopus bicolor.

ART. IV. *Description of* Cratopus bicolor, *a new species among the* Merulidæ, *from Southern Africa.* By SIR WILLIAM JARDINE, F.R.S.E. F.L.S. M.W.S. F.Z.S. &c. *With a plate.*

Fam. *Merulidæ,* VIG. — Sub-fam. *Crateropodinæ,* SWAINS.
Genus *Cratopus,* SWAINS.
Cratopus bicolor, JARD. — Black and White Cratopus.
C. corpore albo, remigibus, secondariis, caudaque nigris.

THE genus Cratopus has been formed, by Mr Swainson, for the reception of some of the Merulidæ previously ranged in other genera, and is the typical form of one of the sub-families of that gentleman's arrangement of the group. In the second volume of the Northern Zoology, now nearly completed, will be found a beautiful analysis of this family, particularly the North American forms, fully detailing the affinities; this species, with many others, was submitted to the inspection of Mr Swainson, and it was at once set down as an aberrant form of the genus.

The general appearance of these birds is, — a strong, somewhat curved, bill; loose plumage, considerably elongated on the backs, like the puff-backed shrikes, (*malaconoti,*) or the American bush-shrikes, (*thamnophili;*) the wings rather short and rounded, the tail long and graduated, and the tarsi and feet strong. Mr Swainson remarks — "It appears that most of the typical species principally live in the vicinity of water, among reeds: their notes are particularly loud, harsh, and grating; and, in these retreats, they keep up a perpetual monotonous babbling. Some, however, possess much more harmony, but nearly all appear to frequent only low trees and shrubs. Their geographic range is almost limited to the warm latitudes of the old world."* The colours are different shades of brown and black; the present species, however, is remarkably distinct in the pure black and white of the plumage. It exhibits the scaly form of the feathers which is found on the head and neck of many of them, and the secondaries and tail retain the curious waved form of the shafts, giving the appearance of bars upon the webs, in different lights. The feathers on the rump are also of considerable length. The following is a description of the only two specimens I have ever seen. They were both received, among a very large and valuable collection of skins, from Dr Smith, the superintendant of the South African Museum. The one is now before me, the other is in the Collection of Mr Selby. The only notice accompanying the skins was, "They are said to be gregarious," and I am ignorant of what particular district of South Africa they are natives. The length is ten inches and three-fourths. The bill black, somewhat more curved than usual, running into *pomatorhinus.* The quills, secondaries, bastard pinion, and tail, deep brownish black; the rest of the plumage very clear white. The wings are rather more pointed than in the true types, and the tail scarcely so long in proportion.

* *Northern Zool.* ii. 157.

GEOGRAPHICAL COLLECTIONS.

Royal Geographical Society.—We observe with satisfaction an intimation in the *Literary Gazette* of 15th of last month, that it is the intention of the Royal Geographical Society, instead of publishing exclusively its own transactions, to edit a *Journal of Geographical Science*, in which will be included, with the papers of the Society, reviews and analyses of geographical works, whether published at home or abroad, and translated extracts from foreign journals.

It might at first view appear that a degree of rivalry must necessarily arise from the institution of a work which so closely imitates the plan of the *Edinburgh Journal of Natural and Geographical Science*. But we assure our readers that it is quite the contrary. Few would conceive the difficulty that we have experienced in collecting that body of information, which we can, with some confidence, refer to in our *Geographical Collections*, so listless are the publications of this country with respect to geographical information, and so meagre are the details to be found in the English language. We hail, then, the prospect of a new source of intelligence; and we trust that our readers will rely upon our activity in giving them an early analysis of all the new facts which it contains. The greatest part of our *Geographical Collections* has hitherto been drawn from *continental* publications: we may expect now to be able to join with the knowledge obtained from this source, all that London can offer worthy of record.—Ed.

Determination of several Positions in the Mediterranean.—In the *Connaissance des Temps* for 1830, we find the following corrections of the positions of places in the Mediterranean, established by M. P. Daussy, in a memoir founded on the observations made by M. Noüet in Egypt, during the French expedition in 1798, those of M. Rüppell in 1822, and the hydrographical works of Messrs Gauthier and Smith.

The first position determined by M. Daussy is that of Cairo. From a repetition of the calculations of M. Noüet, and a comparison of them with those obtained at Marseilles, by the observation of the same stars at the same instant of time, as well as with those of M. Rüppell, a correction of 4′ 30″ is found necessary in the longitude of Cairo, which is thus fixed at 1 h. 55′ 35″ of time = 28° 53′ 58″ (from the meridian of Paris,) instead of 1 h. 55′ 52″ as previously given in the *Connaissance des Temps*. And as all the positions of Upper Egypt are founded upon that of Cairo, the same correction must be applied to them.

The longitude of Alexandria is found to be 1 h. 50′ 10″ 33 in time, and 27° 32′ 35″ in degrees, instead of 1 h. 50′ 20″ = 27° 35′.

Rhodes, instead of being 1 h. 43′ 30″ = 25° 52′ 36″, ought to be 1 h. 43 35″ 30 = 25° 53′ 49″ 5.

The island of Cyprus should be 2 h. 5′ 9″ = 31° 17′ 15″, instead of 2 h. 5′ 22″ = 31° 20′ 30″.

Messina, instead of 0 h. 52′ 57″ = 13° 14′ 27″, should be 0 h. 52′ 58″ = 13° 14′ 30″.

Lastly, Spezzia, instead of being 0 h. 30′ 5″ = 7° 31′ 12″, should be 0 h. 30′ 4″ 8.

The importance of these corrections to navigation is obvious.

Discovery of America by the Scandinavians.—Professor Rafn, secretary of the Royal Society of Northern Antiquaries, is now occupied with a Latin translation of ancient manuscripts in the Islandic tongue, which prove, as he conceives, that the inhabitants of the north of Europe visited the northern coasts of the New World long before Christopher Columbus.

"The fact of the travels of the ancient Scandinavians in America seems to be demonstrated by the discovery, in 1824, on the west coasts of Greenland, of a Runic stone, found in 73° N. lat. This stone bore an inscription, which has been thus translated:—Erling Sigvalson et Biorne Hordeson et Endride Addon, on Saturday before *Gagnday* (25th April) raised this mass of stone, and cleared this place, in the year 1135."—*Bull. de la Soc. de Geog.* No. 88.

Danish Expedition to the East Coast of Greenland.

[We are indebted to that admirable hebdomadary, the *Athenæum,* for the following notice, the substance of a highly interesting letter from Admiral Zhartmanns, the Danish hydrographer at Copenhagen, read before the Royal Geographical Society in November last.]

Attempts have been made, at various times, to discover the ancient colony of Icelanders, who, according to history, accompanied Edric Randa, a Norwegian, about the close of the tenth century, from that island to the eastern coast of Greenland. These attempts, in consequence of the barriers of ice on the coast, have hitherto proved ineffectual; but hopes still remained of the colony being discovered, as it is supposed to have been established on a part of this coast which is scarcely known. Accounts of it had been regularly received from the time of its first formation, through a period of nearly four hundred years, down to the commencement of the fifteenth century, since which it has never been more heard of, and all attempts to gain intelligence of it have proved abortive. His present majesty, the King of Denmark, has been induced to send an expedition once more in search of the colony, with the object of either bringing the remains of it to light, or setting the question of its existence finally at rest.

Captain Graah, a scientific officer of the Danish royal navy, was intrusted with this service; and twelve Greenlanders, an interpreter, a botanist, and a Danish sailor, were to accompany him. He was directed to proceed in Greenland boats, as affording the easiest means of getting along the coast. In March, 1829, the expedition left Nemortalik, near Cape Farewell, (an island on which is a Danish establishment,) but had not proceeded far, when Captain Graah found so much delay was occasioned by the ice, that he determined on sending back all but a few Greenlanders, sufficient for his own boat, and to proceed alone. This was accordingly done in the following June, and he continued his voyage in a single boat.

Thus relieved, Captain Graah was enabled to make his way along the coast with more celerity, as far as the latitude of 65° 18′ N. On arriving here, the vast quantity of ice, and the enormous icebergs he met with, rendered it impossible for him to proceed farther; and, in consequence of the lateness of the season, he was induced to return and seek for winter quarters to the southward. Having regained the latitude of 63° 22′ N., the party found good winter quarters, where they remained from October 1829, to the following April. In this month Captain Graah, with his party, again set out for the northward, intending, if possible, to reach the latitude of 66° N. in the course of the summer, before he returned to his winter quarters at Nemortalik, the point from which he had at first started. The accounts of this second journey have not been received; but the supposed situation of the old colony was passed over in the first, without any traces of it being found.* Captain Graah also constructed a chart of the coast along which he passed; and it differs very

* We were somewhat startled on reading the following statement respecting the result of Captain Graah's expedition, introduced into the last number of the *Edinburgh New Philosophical Journal*:—"*The expedition found there* (i. e. on the east coast of Greenland) *the descendants of the primitive colonists, who still profess Christianity. Their language is that of the Norwegians of the tenth century!*" It is dangerous to be positive in matters of this kind; but we have some misgivings as to the source of this information.—ED.

considerably from that of Arrowsmith, the best hitherto published.* It is also remarkable, that he found no large inlets corresponding with Eriesfiord, or Bredefiord; and his description of the whole coast differs widely from the former accounts of it.

It is therefore supposed, that the colony on the eastern coast never existed, or some traces of it would certainly have been met with, which, in opposition to a host of authorities, was asserted by M. Eggers, in a work published by him in 1792. The whole of the country, or rather so much as is known of it, is divided by a chain of mountains extending in a north and south direction. The colony of the ancient Scandinavians, formerly established on the western coast, is supposed to have been destroyed in wars with the Esquimaux Indians, as the ruins of their buildings were found by Hans Eggede in 1721, when it was re-colonized by the Greenland Company of Bergen, in Norway. But Captain Graah found a thin population scattered about between the latitudes of 60° and 65° N., whose features partook little of the Esquimaux tribe. These people had a form of head, and a general appearance in their person, similar to that of northern Europeans. He found them to be of a middling stature; the women and children of fair complexion, and sometimes with brown hair—features which go far to prove their descent from the old Icelanders. On the other hand, they appeared totally ignorant on this subject, and being to the northward of latitude 63° never saw an European before, nor had they ever heard of the Danish settlement to the southward. Although Captain Graah found them to be totally ignorant of the Christian religion, he states them to be the mildest and most inoffensive race of people he had ever met with.

Corrected Latitude of Oaxaca, Mexico.—We are favoured with the following correction of the latitude of the city of Oaxaca, transmitted to the Royal Geographical Society by a gentleman long resident in Mexico.

"The city of Oaxaca is usually laid down in 16° 50′ N. latitude. Its real latitude, by a mean of a great many meridional observations of the sun, and some altitudes of fixed stars, is 17° 3′ 48″ 3 N. The observations were taken in a house a little south of the cathedral."

Blunt's Chart of Long Island Sound, surveyed in the years 1828, 1829, and 1830.—(From Silliman's *American Journal,* October, 1830.)—The Messrs Blunt, (of New York,) father and sons, may be considered as benefactors to their country. While our government, though drawing the main portion of its revenues from commerce, has done comparatively little towards determining the character of our coast, these gentlemen have come forward, and, at great expense, as well as labour, endeavoured to supply the desideratum. The harbours of Portland, Portsmouth, Newburyport, Squam, Newport, New York, Georgetown, Charleston, and Savannah; the Bahama Bank, and adjoining quays; the Nantucket Shoal, &c. have been surveyed, either wholly or in part, at their expense. Information of other places has been industriously sought, from the manuscripts of the navy department, or wherever else it was to be found, and the result has been books and charts, which are of invaluable service on our stormy and dangerous coast. We notice these labours with the more earnestness, as they seem not to have been sufficiently appreciated by the public: their worth is felt among scenes of appalling interest, but these scenes are far removed from our eye; the persons also who feel it, share too little in our sympathy. The additional security given to our coasting voyages may be inferred from the fact, that, since the commencement of the efforts of these gentlemen, insurance on vessels in

* Since the above notice was in the press, we have received a copy of Captain Graah's Map, which, with an extract from his Journal, we purpose giving in an ensuing Number. —Ed.

this trade has been reduced one-half, and, in some cases, even still more than this.

The chart of Long Island Sound, we are informed, is from trigonometrical surveys, by a theodolite and azimuth instrument. The base was measured on Greenwich point, and the triangulation was carried on by means of signals on both sides of the Sound. A line of verification on Gardiner's Island shewed an accuracy in the operation sufficient for the nicest practical purposes. The soundings are full, and were determined by means of angles observed with the sextant, depending in no case on the compass, according to the method first used by Dalrymple, and afterwards systematized by Beautemps Beaupré. The chart is six feet eight inches in length, and, in neatness of execution, will compare with the best foreign charts.

We alluded above to what our government has done, or, rather, what it has not done, on this subject. Why is it, that, with a commerce inferior to that of no nation on the globe, with a coast extensive, stormy, abounding in shoals, fringed with numberless inlets, and swept by strong and singular currents,—why has government done so little towards ascertaining and helping us to guard against these dangers? We have public vessels enough, and there are now more than a hundred officers on shore, fit, or in a state easily to be fitted for this duty, and earnestly desiring release from the ennui of doing nothing. The English have their survey-ships in almost every sea; their sounding leads have been dropped in almost every furlong of the Mediterranean; France has done much also; even Spain has her whole coast delineated on a set of most beautiful and accurate charts: on this subject, what has our government done?—P. 163.

Geographical position of Yénisséïsk, in Siberia.—In a note communicated to the Academy of Sciences of Petersburg, M. Hansteen gives the position of Yénisséïsk, one of the most considerable towns of Siberia, situated 3519 miles from Moscow, and 4044 from Petersburg. Its longitude has been found, by direct observation, to be 109° 50′ 34″ E. of Ferro, and lat. 58° 27′ 19″. Its population in 1829, was 5726.—*Revue Encyc.* III. 487.

Canals in Russia.—Three new canals were commenced in Russia in 1825, and are in considerable progress. One, called *the Canal of the Vindava*, to join this river to the Niemen; another between the Niemen and Vistula; and the third between the Volga and the Moskwa.—*Revue Encyc.*

St Lawrence Survey.—It is not generally known that the magnetic variation in the river St Lawrence is very erroneously stated in our charts. This circumstance, added to the great inaccuracy of the charts themselves, and the severity of the climate, has been the cause of the numerous shipwrecks which have occurred there. That the variation is wrongly given, may be easily accounted for, by having been handed down from the original observations of Major Holland about sixty years ago, faithfully preserved by his follower Des Barres, and as vigorously maintained by modern chart-makers. Unfortunately, as Columbus first found out, magnetic variation, as its name implies, is of a fickle nature, and quietly follows its own secret and mysterious laws. Since Major Holland's survey, it has undergone a change of about half a point, and at Quebec is now 13½°; at Bic Island 17½°; at Cape Chat 21°; at the Bay of Seven Islands 23½°; and at the west point of Anticosti 24° westerly. The sudden and rapid change in it also between Quebec and Anticosti, in a distance of 350 miles, is another source of mischief to our traders, who, heedless of its importance, are mostly heedless of its extent. When overtaken by bad weather, and they lose sight of the land, a wrong course is in consequence adopted, which proves fatal to their ships. There is no chart of the river St Lawrence that can be of real service to its navigation; and in consequence the annual loss of property is great, and not unfrequently that of lives also. To remedy this evil, which was daily gaining importance, Commander W. H. Bayfield, R. N. was directed by his present Majesty, when Lord High Admiral, to make a careful survey of this river, which should answer all the purposes of navigation throughout its extensive reefs and channels. This survey has since then been proceeding, and a plan of the harbour of Quebec, made by Commander Bayfield, has been published. His charts of the river are looked for with much anxiety by the provincial government of Quebec, who are only waiting for their appearance, to pass a law for regulating the examination of pilots for the river, touching their necessary qualification. The erection of three new light-houses, in different parts of the river, has been already ordered, at the suggestion of Commander Bayfield, which will materially contribute to the safety of its navigation.—*Athenæum.*

Intelligence of Captain Ross, R. N.—Two accounts of the progress of Captain Ross's exploratory voyage have reached us. We give them as communicated to us. According to one account, Captain Ross was met with in Baffin's Bay in August 1829, where, having suffered damage during hard weather, he fortunately was enabled, from the wreck of a Greenland ship, to refit. He afterwards steered northward, and has not since been heard of. The other account represents our adventurous commander and his brave crew as having been forced back to Lively Bay, in Baffin's Bay, where they spent last winter.—*Ed. New Phil. Journ.* Jan. 1831.

Notice of Dr Parrot's Ascent of Mount Ararat.—(Extracted from a letter from Dr Parrot, dated *Convent of St Gregory*, 28th September, 1829.)

"I hasten to inform you, that we have at last accomplished the complete ascent of Ararat. The third attempt was made on the 25th of this month; in which I was accompanied by the young deacon of the convent St Gregory, Abojan, five peasants, and two Russian soldiers. We arrived at the summit on the 27th, at 3 P. M. Our difficulties were great; much, perhaps the whole, of our success is owing to the ardour of the two soldiers and one of the five peasants, the other four being unable to follow us. From the first step which we made on the frozen snow, to the summit, we were obliged to cut steps with hatchets for secure footing,—a precaution which was still more necessary on our descent; for the prospect, extending from this height over an immense surface of glittering ice, intersected with deep and dark precipices, was really imposing, even to those who were accustomed to such enterprizes. The time was most favourable to us; we passed the night in midst of the hoar-frost, in an atmosphere so tranquil and serene, that I scarcely felt the cold, which, however, is extremely keen at these heights. The moon was a careful guide for our uncertain steps on the icy cone, when, after the sun had disappeared, we were still above the region of perpetual snow. The barometer at the summit stood at 180,7‴, at a temperature of 3° 5 cent.; which gives about 2,700 toises for the elevation above the level of the sea. The line of perpetual snow is at about 2,000 toises,—an extraordinary height for the latitude of 39° 45′, according to the maps; but attributable, probably, to Ararat being an entirely isolated mountain, whose climate is consequently not cooled by other contiguous elevations above this line.*

"Ararat is composed on every side, from the line of snow for a distance of about twelve French leagues, of nothing but lava, without even any other volcanic productions; so that it must be regarded as one of the largest

* "At Casbeck, (in 43 deg. lat.), the line of perpetual snow commences at 1,647 toises. According to the law of the squares of the cosines of latitudes, the line of snow on Ararat ought to be above 1,822 toises high, and consequently 158 toises less than the true height. M. Parrot being at the top of Ararat seventeen days after he left Casbeck, (which is 3¼ degrees from Ararat,) he must have been on the summit of the two mountains precisely at the same relative season."

volcanos, and with this peculiarity, that it is at a distance of 80 leagues from the Black Sea and the Caspian, and must consequently be looked upon as a mediterranean volcano."—*Revue Encyc. XLVII.* 226.

The Sikkim Mountains.—From the favourable account received of a place called Dargeeling, situated not more than 350 miles from Calcutta, on one of the numerous ramifications of the Sinchul mountains, the Indian government directed Captain Herbert to proceed to the spot, and ascertain how far it might be advisable to establish a sanatarium there; and from his report we extract such particulars as seem to us of general interest. It is situated, he observes, at an elevation of nearly nine thousand feet; and, as it is calculated in India that the temperature of the air falls, as you ascend, at the rate of about 1° in 300 feet, it is therefore inferred, that, as Dargeeling is 7218 feet above Calcutta, the mean temperature is 24° below it—still lower indeed from the higher latitude and a northern aspect. Dargeeling has the advantage over Simla, Landour, and Almorah, in a sufficient supply of perfectly sweet and wholesome water—in the quantity of even ground for building on; and, as to rides and walks, no place has a fairer field than Dargeeling. The mountain of Sinchul, on which it is situated, is well wooded; but, in point of natural scenery, Dargeeling must yield to Simla, though it needs not fear a comparison with Almorah. As for materials for building, a very good stone (gneiss) is found there, and abundance of timber for roofing and other purposes is at hand. In the first instance, however, Captain Herbert suggests, that the example of the people of the country should be followed, who construct their houses of bamboos, (which are at hand,) and mats formed of a small reed, which grows in great luxuriance on the Sinchul ridge. The mountaineers of these regions, called Lepchas, are of Tartar origin. They are an able-bodied race of men, short, square, thick-set, and muscular. They are free from the trammels of caste, and are cheerful, frank, and full of curiosity—bold, yet not presuming in address, with a native simplicity of manner and feeling that must render them favourites with Europeans.—*Athenæum—Cal. Gov. Gazette.*

Captain King's Expedition.—Several brief accounts of Captain King's expedition to South America have appeared in the public prints; but, the sources from which they have been obtained being unknown to us, we consider it better to delay any notice of this interesting survey till we have some authenticated documents before us.

Swan River Colony.—We are disposed to hope the best of this colony; but the accounts are rare, and dubious, even from its friends; and, after it has been thought necessary, in our lower house of Parliament, to inquire whether government intended to abandon the colony, there appear to be some grounds for fear. We shall, however, suspend any remarks until we are in possession of certain information. It has been insinuated to us by a person who has been at the colony, but upon whose unsupported evidence we would be cautious in relying, that the whole enterprize was *a job.* If it should so turn out, woe to Mr Governor Stirling! Even ambition may not deal thus with human life. It is true that, on the field of glory, millions may be slain at the nod of power; but men driven by over-population, or led by the influence of seductive promises and wrought-up expectations, to sell their all and abandon their native land, are not, with impunity, to be drawn off to distant places, where the common necessaries of life, and the means of procuring them, are wanting, and where they may be finally left to linger on the spot, or compelled to return to their deserted homes, the wrecks of what they were.

Danger in the Carimata Passage.—Lavender's Shoal was discovered on 17th May, 1830, by Captain T. Lavender, of the ship *Roman*, bound from Canton to New York. He passed it at 2 P. M. bearing east about a quarter of a mile distant, in soundings from twenty to twenty-six fathoms. It was found to extend about three quarters of a mile north and south, but it is not more than 200 yards in breadth, having breakers along the eastern side, where the depth did not appear to exceed two or three feet. When the Cirencester sand-bank was visible from the fore-yard, bearing about N. by W. to N. by W. ½ W., the shoal bore S. by W. two or three miles, and it is situated in lat. 3° 25½′ S.; long. 109° 2′ E.—*Asiatic Journal.*

Mr Holman, the Blind Traveller.—This gentleman, after visiting Ceylon, Madras, and other parts of India, where he experienced the utmost attention, left Calcutta, (where he remained only a few days, during which Lord William Bentinck treated him with great courtesy and kindness,) in August, for China. On his return from China, he proposes to visit New South Wales, and to continue his travels for two years longer.—*Ibid.*

Rocks off the Island of Ascension.—The corporation of the Trinity House have issued a notice, dated on the 3d September, respecting the rocks off the Island of Ascension, which have been found, by a late actual survey, to bear as follows, viz.:—At the 12 feet rock, Tartar stairs bear by compass S. E. ½ E. distant a quarter of a mile. At the 15 feet rock, Tartar stairs bear by compass E. S. E. distant nearly half a mile; a large coppered buoy is now placed on the N. W. point of the reef, which extends from the foot of the fort along shore to S. W. bay. No ship should go within the buoy, or come nearer to the reef than ten fathoms water, owing to the very long swell which breaks the whole way to the shore.—*Ibid.*

Messrs Cowie and Green's Papers.—It is gratifying to learn that there is every likelihood of the papers of Messrs Cowie and Green, the gentlemen who perished during an expedition to Delagoa Bay, in Southern Africa, in 1828–9, being eventually published. The MSS. abound with details of natural history as well as geography.

Route from India by Egypt.—Mr Waghorn has returned from India. This enterprizing officer has ascertained that the route by Trieste, Alexandria, and the Red Sea, to Bombay, is, with certain precautions, perfectly practicable; and that the navigation of the Red Sea presents no danger nor difficulty.—*Asiatic Journal.*

Botanic Gardens, Petersburg.—M. Louis Riedel, the botanist attached to the scientific expedition of M. Langsdorff to Brazil, has brought home from Rio-Janeiro upwards of one thousand living plants; some of them are very rare; and many are not to be found in any other botanical collection in Europe.—*Revue Encyc.* Nov. 1830.

Varna.—M. Teplakoff, who has been employed on archæological investigations in Bulgaria, under the auspices of the Russian government, asserts that he has obtained indisputable proof that Varna is the site of the ancient Odessos; and he conjectures that the present citadel formed its acropolis.

ZOOLOGICAL COLLECTIONS,

INCLUDING COMPARATIVE ANATOMY AND PHYSIOLOGY.

Notice of the Urus, or Wild Ox of Lithuania. (Bos Urus.)—Dr von Jarocki read to the Zoological section of the Meeting of Naturalists at Hamburgh, in September last, a communication on the urus, or wild ox of Lithuania, (*Bos urus*, Gm.) A remnant of these animals, which appear to have at one period existed in many parts of Europe, is still preserved in a wild state in the forest of Bialowiza in Poland, under the special protection of the Russian emperor, in which situation the author, who is professor of Zoology in the University of Warsaw, has had opportunities of observing them, and of collecting various facts respecting their habits and mode of life, of which we give the following:—

The wild oxen of the forest of Bialowiza live in herds, except a few of the older ones, which wander about singly. Though they have never been tamed, they are not so shy but that they may be approached within a moderate distance, when care is taken to advance towards them from the windward side. Each herd keeps constantly to the same district of forest, near to some river or stream, so that each of the twelve foresters, who have charge of the wood, knows the herds that belong to his district. The number of oxen in every herd is ascertained in the beginning of winter, by observing their feet-tracks on the new fallen snow, as they pass between the wood and the store of hay, which forms their winter provender. The whole number, as thus estimated, is at present about 711, of which 48 are calves of last year. The cows scarcely bring forth above once in three years: the calves are produced in May, and are suckled nearly a whole year. They continue to grow for six years, and may live till forty. The urus feeds on various grasses, and on the leaves and bark of young trees and brushwood, especially the willow, poplar, ash, and birch. In autumn they also browse on heath, and the lichens which cover the bark of trees. The rutting season commences in August, and lasts a fortnight; about which time they are fat and sleek, and unusually sportive. Their most common sport consists in thrusting their horns into the ground, near a young tree, and ploughing round it till they root it up. It is from this circumstance, in the author's opinion, that the horns are almost always more or less torn, or otherwise injured at the points. Horses and domestic cattle scent the urus afar off, and immediately give signs of great dread and aversion.

Dr von Jarocki coincides with the most eminent zoologists of the present day in considering the Urus, a distinct species from the common ox. He has given the distinctive characters at some length, but they do not materially differ from those assigned by other naturalists. The name of the animal in the Polish language is Zubr, pronounced Suber, but in some districts, it is also called Tur, which circumstance appears to have so far misled the Baron von Heberstein, who visited Poland in the sixteenth century, that he described two animals, in place of one, to correspond to these two different names, and thus caused no small embarrassment to later writers. The German name of the animal is Auerochs. According to Gesner and Cuvier, it is the same as the Bonasus of Aristotle, which animal was an inhabitant of Paconia, or that part of ancient Macedonia, now called Bulgaria, which is still the native country of the Auerochs. Writers posterior to the time of Aristotle mention two sorts of wild oxen, under the names of the Urus and the Bison, the latter being distinguished by its mane, the urus by the great size of its horns. It is not improbable that the Bison mentioned by Seneca and Pliny was the Bonasus of Aristotle, and the Zubr and Auerochs of the moderns, while the Urus of these writers seems to be now extinct as a wild animal, but was perhaps the original of our present domestic cattle.* Fossil bones are found, nearly resembling those of the common ox, which Cuvier conceives may have belonged to animals of the original race; and it is worthy of remark, that the word *Ur* signifies a bull in the present dialect of several of the Swiss cantons.—DR VON JAROCKI, *Zubr oder der lithuanische Auerochs.* Hamburgh, 1830, with 2 plates.

Hermaphrodism.—Two hermaphrodite goats have lately been subjected to the examination of scientific men.

1. There was dissected at Naples, by order of the King, the generative system of a goat, which presented, below the orifice of the anus, an oval opening, which terminated on a level with the origin of a penis, furnished with a well-formed prepuce. The animal had such a vehement salacity, as a female, that, when it was not satisfied by the ordinary intercourse with the male, it introduced its own penis, curved across the opening, into the vulva. The aperture of the vulva and orifice of the ureters terminated in a common canal, placed between the anus and the penis, and of a diameter sufficient to receive the male organ during sexual connection. The vagina exhibited the usual rugæ. The uterus was completely developed, but its opening was entirely obliterated. The fallopian tubes were wanting. The cavity of the uterus contained a whitish tumour, the product of follicular secretion, perhaps owing to the constant state of erythism in which the animal continued. The two testicles gave origin each to a vas deferens, which adhered to the lateral walls of the vagina, and terminated, near its origin, in the vesiculæ seminales, which had an external opening. The ovaries had attained a complete development. (*Brevi cenni su di un neutro capra,* Pamphlet in 8vo, Napoli.) —*Archives generales,* xxiv. 146.

2. At a meeting of the Academy of Sciences of Paris, on the 9th August last, M. Geoff. St Hilaire communicated a case of true hermaphrodism observed in a goat at the Jardin du Roi. Almost all the reported cases of hermaphrodites, he observed, are, in reality, nothing but males or females, whose generative organs present some anomalies liable to produce an illusion at the first glance. But the present instance was of a different character. The external organs of generation were plainly those of a female, whilst the reproductive or internal organs were male.

The memoirs of the academy of Dijon contain a description of a perfectly similar case observed in a man, who died in 1767, at the age of seventeen. It was an observation made by M. Maret, father of the Duke of Bassano. Hermaphrodism in the vertebrata, however, is exceedingly rare.

In the case of the goat, hermaphrodism was perfect as to anatomy, but not as to function. The functions of generation did not exist; certain parts and certain dispositions in the two kinds of apparatus, necessary for accomplishing this function, were wanting. Thus, there were ligamentous testicular cords, not giving passage to any secretion, and in place of an uterus, a vaginal cul-de-sac, which was physiologically useless.

The theoretical deduction which M. St Hilaire drew from these two last facts, was that the external organs of generation are independent of the internal organs.—*Ann. des Sci. Nat.* Sept. 1830.

Birds of the Himalaya Mountains.—In another part of the present Number, we have noticed the first Fasciculus of Gould's Century of Birds from the Himalaya Mountains, regretting the delay in the publication of the

* Bojanus, however, is of a different opinion. (*De uro nostrate,* &c. Nova Acta Acad. Nat. Cur. xiii. 411.)

descriptive letter-press belonging to each plate. We are now, however, able to give the specific descriptions of those which are contained in the first Part, as well as of several which will follow, from a very full report of the proceedings of the Zoological Society, in the *Annals of Philosophy* for last month.

At a meeting of the Committee of Science of the Zoological Society, on the 9th November last, Mr Vigors, having called the attention of the committee to the expedition with which these birds were made known,—the specimens themselves not having been more than two months in England, while representations of many of them were already within that short space of time brought before the public,—proceeded to make some remarks upon the geographical distribution of the species. He particularly pointed out the identity of a large proportion of their forms with those of Northern Europe; observing that the elevation of their native mountains placed them on an equality in point of climate with the birds of more northern latitudes. At the same time he added, that many of the forms peculiar to Southern Asia and the Indian Archipelago, were found intermingled with those of the northern regions. Among the forms similar to the European, he particularized three species of *Jays*, the two first of which exhibited a striking affinity in their markings to our well-known British bird. They were named and characterized as follows:—

Garrulus lanceolatus. Garr. vinaceo-badius; capite subcristato, gulâ, jugulo, alisque atris; collo anteriori albo lanceolato; pteromatibus remigibusque cæruleo fasciatis, illis albo terminatis; caudâ cæruleâ, nigro fasciatâ, fasciâ latâ apicali albo terminatâ notatâ. (*Figured in* No. I.)

Garrulus bispecularis. Garr. pallidè badius, uropygio crissoque albis; maculâ latâ postrictali, caudâ, pteromatibus, remigibusque atris; his duabus cæruleo fasciatis.

Garrulus striatus. Garr. pallidè brunneus, subtus pallidior; corporis supra subtusque plumis in medio albo longitudinaliter striatis; cristâ verticali, remigibus, rectricibusque unicoloribus.

This latter species was observed to deviate in general colour and markings from the European species, although according in form; and in the former characters to exhibit a manifest approach to the *Nutcrackers,* or the genus *Nucifraga* of Brisson.

A new species of this latter European form was also observed in the collection; a second species being thus added to a group which had hitherto been supposed to have been limited to one. In the shape of the bill, which was somewhat shorter and stouter at the base than in the European species, it indicated an approach to the *Jays.* Its characters were as follow:—

Nucifraga hemispila. Nuc. castaneo-brunnea; capite subtus, collo anteriori, dorso, pectoreque albo maculatis; capite summo, alis, rectricibusque intensè brunneis; his, duabus mediis exceptis, ad apicem latè albis.

The two following species of *Woodpecker,* which approached in size and colouring most closely to the European *green Woodpecker,* were also described.

Picus occipitalis. Mas. Pic. viridis, uropygio lutescenti; fronte coccineo; vertice, strigâ latâ occipitali ad nucham extendente, alterâque utrinque sub oculos postrictali, atris; remigibus rectricibusque fusco atris, harum duabus mediis pallido-fusco striatis, illis externè albo maculatis; gulâ genisque canis.

Fœm. Fronte atrâ albo lineatâ.

Picus squamatus. Pic. supra viridis, uropygio sublutescenti; gulâ juguloque viridi-canis; capite coccineo; strigâ superoculari, alterâ suboculari, abdomineque viridi-albis, hoc atro squamato; strigâ superciliari alterâque utrinque mentali atris; remigibus rectricibusque fusco-atris, illis externè, his utrinque albo maculatis.

A species of *Hawfinch*, according accurately with the characters of that northern form, was also described:—

Coccothraustes icterioïdes. Mas. Cocc. capite, jugulo, dorso medio, alis, femorum tectricibus, caudâque atris; nuchâ, uropygio, corporeque subtus luteis. (*Figured in* No. I.)

Fœm. Olivaceo-cana, uropygio abdomineque lutescentibus; remigibus rectricibusque atris.

As also a small *Owl*, very nearly allied to the *Noctua passerina* and *Tengmalmi* of Europe:—

Noctua cuculoïdes. Noct. brunneo-fusca; capite, dorso, tectricibus alarum, corporeque subtus albo graciliter fasciatis; remigibus externè albo maculatis; rectricibus utrinque fasciis albis quinque notatis; gulâ albâ. (*Figured in* No. I.)

Among the forms peculiar to India, was observed a second species of the singular group which contains the *Horned Pheasant*, or the *Meleagris Satyra* of Linnæus, and which has been lately separated by M. Cuvier, under the name of *Tragopan*. Its specific characters are:—

Tragopan Hastingsii. Trag. dorso brunneo-fusco undulato, abdomine intensè rubro, amborum plumis ad apicem nigris in medio albo guttatis; cristâ crissoque atris, illâ ad apicem coccineâ, hoc albo maculato; collo posteriori coccineo; thorace aurantio; regione circumoculari nudâ, carunculisque pendentibus luteis; caudâ atrâ, lutescenti-albo undulatâ. (*Figured in* No. I.)

A species of true *Pheasant*, which seems to have been indicated by former writers from incomplete descriptions or drawings, but never to have been accurately characterized, was also exhibited and named.

Phasianus albo-cristatus. Mas. Phas. supra ater, viridi nitore splendens; dorso imo albo-fasciato; cristæ plumis albis, elongatis, deorsim recumbentibus, basi subfuscis; remigibus corporeque inferiori fuscis; pectoris plumis lanceolatis albescentibus.

Fœm. Corpore supra cristâque breviori fuscescenti-brunneis; abdomine pallidiore; gulâ, plumarumque corporis apicibus et rhachibus albescentibus; rectricibus lateralibus atris, mediis brunneis albescenti undulatis.

A third species was likewise added from the collection to the group of *Enicurus* of M. Temminck, which has hitherto been considered as limited in range to the Indian Archipelago. The following are its characters:—

Enicurus maculatus. En. capite, collo, dorso superiori, pectore, ptilis, remigibus secundariis, caudâque intensè atris; frontis notâ latâ, maculis confertis nuchæ et sparsis dorsi, pteromatibus, dorso imo, abdomine, rectricibus lateralibus, mediarumque apicibus albis; remigibus primariis fuscis; rostro nigro; pedibus albescentibus.

Staturâ *En. specioso* æqualis.

Colymbus glacialis.—About the beginning of May last, a specimen of the great northern Diver was killed in Upper Engadin, Canton of Grisons, Switzerland. It weighed seven pounds. This bird sometimes removes to great distances during winter.—*Rev. Encyc.* Sept. 1830.

Larus Hæmatorynchus, Vig. (Zool. Journ.) Jard. and Selby, (Illustr. Ornith.)—Dr Traill of Liverpool has communicated, through our coadjutor, Mr Johnston, his opinion that the *Larus hæmatorynchus* of Jardine and Selby's Illustrations is merely a better representation of the bird previously figured and described by himself in the fourth volume of the Memoirs of the Wernerian Society, for 1821–22, under the name of *Scoresby's gull.* The species appear to be very closely allied, if not identical. The specimens belonging to the Zoological Society have more white on the scapulars and secondaries, and are rather less in size; but to judge from Dr Traill's description, these are the only differences. If the specimens be ultimately proved to be alike, the species should stand in our systems as *Larus Scoresbii*, Traill,—with the other names as synonymes. Dr Traill's specimen was brought home in a vessel from New South Shetland; those of the Zoological Society came from the Straits of Magellan.—W. J.

Asiatic Snipe.—It has been generally supposed, that the common snipe is found distributed over the whole world; but the more minute attention which has lately been paid to the characters of birds has proved the American snipe to be a distinct species, and Prince Charles Bonaparte has named it *Scolopax Wilsonii.* Having lately had an opportunity of examining the bird which the writers on the natural history of India have called the snipe (*Scolopax gallinago*, Horsf. and Raffles, *Lin. Trans.* xiii.) I find it to be equally distinct from the European and American ones. It agrees with the European bird in every character of colour and dimensions, but the tail has, besides its common tail-feathers, a series of small linear rigid incurved false tail-feathers on each side of the under part, very distinct from the other feathers by their form and rigidity. I propose to call this the Asiatic Snipe, or *Scolopax Horsfieldii*, after the accurate describer of Javanese birds. It is scattered over the continent of India, and is found also in Java, and at Canton, in China.—J. E. Gray, 1st Nov. 1830.

South African Zoology.—(Extract from a letter from Dr Andrew Smith, to N. A. Vigors, Esq.)—"*Cape Town, 8th September*, 1830.—I am sure you will be pleased to learn that I have discovered another species of *Macroscelides*, as well as a new one of *Erinaceus*; and three species of the genus *Otis*, together with one of *Brachypteryx*. The descriptions of these I hope to be able to forward to you in the course of three weeks or a month. The first is designated in our Museum, *Macroscelides rupestris*; the second, *Erinaceus Capensis*; the third, fourth, and fifth, *Otis Vigorsii*, *Ot. ferox*, and *Ot. Afraoïdes*; the sixth, *Brachypteryx Horsfieldii.* The first was found by myself on the mountains near to the mouth of the Orange river, and the circumstance of its always residing among rocks, together with the difference in its colouring, readily pointed it out as being of a distinct species. As to the colour, the most marked distinction consists in the Cape species having a large tawny rufous or chestnut blotch on the nape and back of the neck. The second, *Erinaceus Capensis*, exhibits considerable affinity to the European species, yet betrays such marked peculiarities as to warrant its being considered as really different from it. The third, *Otis Vigorsii*, inhabits the most dry and barren situations in the south of Africa, and is known among the colonists by the name of *Karor Koran*. The prevailing colour above is a light tawny or reddish yellow, and below tawny gray, passing into dirty white on the belly. The back is variegated by numerous violet blotches or reflections, as well as by whitish spots, and the under parts by transverse narrow zigzag black lines. The fourth is above principally tawny yellow, and below dull bluish gray: it is found in the country toward Latakoo. The fifth is met with on the flats near the Orange river, and is called the *Bushman Koran.* With the exception of a great portion of the quill feathers being white, it resembles much the common *Koran* of the colony, the *Otis Afra.* The sixth is met with in high rocky situations, and agrees in most respects with the generic character of *Brachypteryx*, as described by Dr Horsfield."—*Ann. of Phil.* Jan. 1831.

Caille des Isles Malouines, Buff. (*Perdix Falklandica*, Lath.)—*a species of Coturnix.*—At a meeting of the Zoological Society in November last, Mr Vigors stated, that Captain P. P. King, R. N. had pointed out to him, amongst his collection lately brought home from the Straits of Magellan, specimens of a bird which he made no doubt was the same as the *Caille des*

Isles Malouines of M. Buffon, figured in the "Planches Enluminées" [No. 222,] and which was subsequently named *Perdix Falklandica* by Dr Latham. This bird has been added to the genus *Ortyx* by modern authors, but erroneously; as the structure of the wing, in which consists the chief difference between the *Ortyx* of America and the genus *Coturnix* or the *Quails* of the Old World, associates the Magellanic bird more closely with the latter group, than with the birds of its own continent.—*Ibid.*

The red-knobbed Curassow, (Crax Yarrellii.)—In the last number (XIV) of "the Gardens and Menagerie of the Zoological Society delineated," Mr Bennett describes what he considers to be a new species of curassow, under the above specific denomination, the propriety of which will, as he states, "be at once recognized by those who are familiar with Mr Yarrell's extensive and valuable researches into the structure of the organs of voice of birds in general, which have embraced a striking example of this particular group." The *Crax Yarrellii* is nearly equal, in size, to the crested curassow, and, consequently, somewhat inferior to the globose species; but exactly agrees with both those birds in the colouring of its plumage, which is entirely of a deep glossy black, with the exception of the under surface of the body behind the legs, and the posterior part of the legs themselves, where the feathers are pure white. Its crest, too, is, in all respects, similar to that of the more common birds. But its cere, instead of being yellow, as in those species, is deep crimson, surmounted by an elevated prominence much inferior in size to that of the globose curassow, and enlarged beneath, on either side of the lower mandible, by a peculiar gibbous projection, which is not met with in any other species. The space, too, between the eyes and the base of the bill is occupied by a line of feathers, leaving the naked skin surrounding the eyes of the same deep black with the plumage of the head, from which it is hardly to be distinguished. This species appears to be nearly allied to that described by M. Temminck, under the name of *Crax carunculata,* from Brazil, but differs from it in the upper mandible being less deep, in the possession of the knob-like elevation, which is entirely wanting in the *C. carunculata,* and in the cere, though enlarged beneath the lower mandible, bearing no resemblance to a wattle.

The specimen upon which this species is founded, Mr Bennett believes to have been brought home, by Lieutenant Maw, from South America; it is now in the gardens of the Zoological Society.

Notes on the arterial system of Birds.—Dr Barkow, in his anatomico-physiological researches on the arterial system of birds, rectifies an error of MM. Meckel and Nitzsch, who have described the two common carotid arteries of the common bittern (*Ardea stellaris*) as uniting into a single trunk. The two vessels are entirely distinct, and only appear to unite, because the one, in passing behind the other, adheres very intimately to it.

M. Bauer has remarked, that, in some birds, the termination of the occipital artery anastomoses with the extremity of the vertebral; and Dr Barkow has found this disposition in all the birds he has injected. Tiedemann is, therefore, inaccurate in saying that the vertebral artery has the same termination in birds as in man.

Birds have not an internal maxillary artery like the mammalia; the place of this artery being supplied by branches of the external and internal carotids, and the facial, all of which sometimes unite to form the maxillary plexus, described by Bauer, as met with in the goose and duck, (*Anas.*)

In the storks, (*Ciconiæ,*) the anterior mesenteric artery only goes to that part of the small intestines where the diverticulum is situated, which would make it appear that it originally represents the omphalo-mesenteric artery. Dr Barkow has also assured himself of the existence of anastomosing arches, denied by Tiedemann.

Although many varieties are met with in the distribution of the arteries in birds, it may be stated, in general, that they occur less frequently than in the mammalia. M. Cuvier, in his *Anatomie Comparée,* has insisted upon the following differences as essentially distinguishing birds from mammalia: —

1st, The division of the aorta into three principal branches, almost immediately at its origin.

2d, The division of the aorta at its abdominal extremity, where it has no proper hypogastric and external iliac branches.

3d, The arteries of the posterior (or abdominal) extremities do not pass from a single branch analogous to the external iliac of mammalia; but from two arteries, which are detached successively from the aorta, at a great distance from each other, and pass from the pelvis by two separate apertures.

4th, The absence of palmar and plantar arches.

According to Dr Barkow, however, the 2d and 4th differences are untenable, because there are mammalia in which the abdominal aorta does not divide into internal and external iliacs, and because there are birds which have a true plantar arch.

But another difference, which might be added to those enumerated by M. Cuvier, is, that the aorta passes before the right bronchus in birds, to become the descending aorta, whilst in mammalia it passes before the left bronchus. — (*Meckel's Archiv.*) *Bull. des Sci. Nat.* xxii. 104.

British Reptiles. — The natter-jack is admitted into the British Fauna on the authority of a specimen said to have been taken on Putney Common, by the late Sir Joseph Banks. Pennant's figure is copied from Roesel. It is curious that no other English naturalist appears to have noticed the species, for it is very common on many of the heaths in the south of England. More than a hundred might be caught on a summer's evening on Blackheath, Kent. I have often seen it on Clapham and Putney Commons; and some of my friends have found it in Cambridgeshire. It is well represented by Roesel, whose figure has been copied by every succeeding author. It is to be immediately distinguished from all the other *Ranæ* by the yellow dorsal line, and the red warts with which the body is thickly covered. Its croak is very peculiar.

On the other hand, the edible Frog (*Rana esculenta,*) has been admitted into every work on British zoology, without the slightest hesitation; and Dr Fleming, in his compilation, observes, that it is "not so common as the preceding," (*i. e.* as the common frog, *R. temporaria;*) but, after the most careful search, I have never been able to find it, or to get any account of it from my friends. I have lately had an opportunity of observing the species on the Continent, and of bringing some living specimens to London, and I am perfectly satisfied that it is a distinct species. I am afraid, however, that this species must be erased from our Fauna; probably a variety of *R. temporaria* has been taken for it. Indeed, the specific character given for *R. esculenta,* in most Linnæan authors, is equally, if not more, applicable to that species. — J. E. Gray.

Figure of the Pupil in Snakes. — Having lately kept the various species of European snakes alive for some time, to observe the difference of colour that they undergo during their growth, I was much struck by observing that all the snakes (*Colubri,*) have orbicular central pupils, owing to the iris contracting circularly; while the adders or vipers (*Viperæ,*) have a linear perpendicular pupil, extending right across the eye; and, on examining such other poisonous serpents as I could find alive in London, I observed that they had the same conformation of the pupil as the *Viperæ.* — J. E. G.

Ehrenberg's Researches on the Infusoria.—At a meeting of the Academy of Sciences of Paris, in October last, Baron Humboldt gave a brief notice of a work just published in German by his fellow traveller, M. Ehrenberg, entitled "The Organization, Classification, and Geographical Distribution of the *Infusoria* in Africa and the north of Asia." "The number of species," M. de Humboldt remarked, "which were observed during the course of our travels between the Caspian Sea, the Ural, and the Altaï, amount to 113, of which eight belong to new genera. By feeding these gelatinous and translucid beings with indigo and carmine, M. Ehrenberg has been able to colour their mouth, stomachs, and the extremity of their alimentary canal, and by thus painting them, as it were, internally, in red and blue, to detect the extreme complication of their organs. In examining the eight plates in Ehrenberg's work, a single glance will show the astonishing complexity of these beings, many of which, however, do not exceed 1-2000th of a line in length. The author employed a Chevallier microscope, and generally a magnifying power of 80 diameters. He now publishes the results of ten years' observations, the accuracy of which is increased by his long use of the microscope and micrometer in examining the structure of the *mollusca* of the Red Sea. The smallest, and what have been considered the most simple *Infusoria*, are all provided with a mouth and organs of nutrition, and sometimes from thirty to forty stomachs. They all seize their prey, and feed on solid substances. In the *monas-termo*, which is only 1-1500th of a line long, we may distinguish four stomachs, a mouth, and ciliæ surrounding the mouth. The *Vorticellæ*, *Leucophræ*, and the *Paramæcia*, have a more complicated structure. The number of eyes varies in the *Rotiferæ*, in the genera *Euglena* and *Eosphora*. But what most attracts the attention of those who occupy themselves with microscopic anatomy, is the complication of the muscular and nervous systems, of the mouth furnished with cartilaginous teeth, and of the organs of nutrition and generation in the *Hydatina senta*, (*Vorticella senta*, Müller,) as presented in the eighth plate of this work. The Academy will doubtless condescend to examine the anatomical portion of this memoir, and the classification of the *Infusoria*, according to their internal organization, especially the parallelism of the *nuda* and *loricata*, (naked, and covered with shields,) which characterizes the whole of this class. M. Ehrenberg discusses the genera which have been established upon other principles, and finds, that individuals of the same species, in different degrees of distension, according to the absence or presence of food in their interior, have been described as distinct genera. He has often observed the *Infusoria* pass out from the ova, and no direct observation has led him to admit either a spontaneous generation, or an agglomeration of *Infusoria*, to form the rudiments of vegetables and animals. He thinks that all the *Infusoria* move about during life, and separately seek their food. Of the 113 species observed and described during the course of our travels, 31 species belong to Europe, and 82 to Asia; but of the species collected in Asia, two-thirds are also observed in central Europe. The *Kolpoda cucullus* seems to be the most generally distributed; M. Ehrenberg found it from Mount Sinaï to Dongola, near Berlin, at St Petersburg, in the north of the Ural, and at the foot of the Altaï. In the mines of Siberia, (Soimonofskoi and Schlangenberg), three species of *monad* were found, and again the *Kolpoda cucullus*, at a depth of 56 fathoms, in places entirely deprived of light. The *Infusoria*, in their structure, form two natural classes of animals, inhabiting the sea and the land. Some species are found, which (like *cryptogamiæ*) are identical under the most opposite latitudes; they appear to vary, according to the climates, more from Europe to Dongola, than from east to west, from Berlin to the Altaï. The salt waters of the Asiatic steps present no very peculiar forms. The dew, examined with the greatest care, in the midst of the deserts of Africa, afforded no *Infusoria*, whilst eight species swarm in the pits of the oasis of Jupiter Ammon."

The investigations made on the *Infusoria*, during M. de Humboldt's last journey, extend over more than 50° of longitude and 14° of latitude.—*Ann. des Sciences Nat.* Oct. 1830.

Heart of the Biphoræ.—M. de Freminville, amongst other observations made during a voyage along the coasts of Africa and Brazil, has ascertained that the organ in the *Biphoræ*, which M. Cuvier supposes to be a heart, is perceptibly endowed with systolic and diastolic movements; and that this heart is attached to a long vascular canal, divided transversely into numerous chambers by little membranes, which undergo an alternating and perpetual motion. M. de Freminville conjectures that this organ, which is analogous to a structure observed in some *Medusæ*, and other *Radiata*, may belong to the respiratory system.—*Ibid.* Sept. 1830.

Notice of a species of aggregated Medusa.—M. Sors, a naturalist of Bergen in Norway, in the 1st Fasciculus of a series of observations on the natural history of marine animals, describes a very small species of *Medusa*, remarkable for being composed of many individuals joined together in a common mass, similar to the *Biphoræ*.—*Ibid.*

Extracts from the Analysis of the proceedings of the Academy of Sciences during the year 1826; *by* Baron Cuvier. Paris, 1830. (Continued from Vol. II. p. 458.)

Zoology (*continued.*)—*MM. Quoy and Gaymard on a new and remarkable tribe of Zoophytes.*—In a very interesting memoir, addressed to the Academy, MM. Quoy and Gaymard describe an almost entirely new tribe of zoophytes, every species of which contains individuals of two forms, always connected in pairs, and partly inserted into each other. M. Bory St Vincent has already described, in a summary way, one of these animals; and M. Cuvier has arranged it in his *Regne Animal*, under the name *Diphyes*. They are as transparent as glass, and their body is more or less pyramidal or prismatic. That one which is received into the other by its extremity, and which may be called the anterior animal, is composed of a cavity, situated nearly in its axis, open anteriorly, and provided at its orifice with some fleshy processes, and a canal formed along one of its sides by two projecting folds of its surface. The individual which receives its fellow has three cavities; one to receive the extremity; another open, like that of the anterior animal, with fleshy points or tentacula at its orifice; and from the third a kind of *chapelet* passes across the second into the canal of the anterior animal, from which it hangs. This *chapelet*, seen through the microscope, is composed of an irregular number of small fleshy suckers, and of filaments carrying globules, which may be considered as ova. In the species where it is most developed, the stem of the *chapelet* traverses a multitude of small membranous cups, and from each of which depend a sucker and an oviferous filament. These animals may be separated from each other without loss of life, and they do not attempt to reunite. It may be remarked, that the posterior one retains its vitality for a long time.

The forms of the two bodies, and their relative size, characterize the species. In that which M. Bory discovered, (the *Diphyes*,) the two individuals are pyramidal, and differ little in size. In another, which MM. Quoy and Gaymard name *Calpa*, the anterior animal is the largest, and in the form of a five-sided pyramid; the other is very small, and almost cubic. In a third, named *Abyla*, the anterior animal is a three-sided pyramid; the posterior is smaller, and cup-shaped. The fourth, which is named *Nacella*, has its anterior animal in the form of a cone or an obtuse-angled pyramid; the posterior, which differs little from the former in size, may be compared to a slipper with a forked heel. The fifth, named *Enneagonia*, has the anterior animal smaller than the other, of a nearly globular form, its orifice surrounded by nine little points: the posterior is also globular, but larger. In the last, which is named *Cuboidea*, the anterior animal is very small, and almost cylindrical; and the posterior much larger and cubical.

This genus of zoophytes belongs to the same family as the *Physaliæ* and *Rhizophoræ*; but it presents peculiar physiological difficulties. Why is this constant union of two individuals only, and of two different forms? Is it sexual? or are these only parts of the same animal, whose organic connexion has been overlooked on account of its extreme delicacy? Future observations will some day solve these problems.

M. Bory St Vincent on the Psychodiairia.—In our analysis for 1822, we gave an abstract of the views of M. Bory St Vincent on those microscopic bodies, which, according to his opinion, sometimes resemble vegetables, and at others exhibit the properties, and especially the voluntary motions of animals; and, in 1824, we quoted an observation of M. Gaillon, which appeared to have reference to the same order of facts. Since that time M. Bory has gone much farther, and has established a sort of separate kingdom, which he names *Psychodiairia*, and which connects certain animal properties with the properties of vegetables. He defines it, vegetating beings, which have, in addition to the properties of the plant, a sense sufficient for the introduction of a certain portion of animality, but not the complete animality which results from intellect, added to instinct. Under this class he comprehends not only the *arthrodieæ*, upon which his first observations were conducted, but the fresh water polypes, and all vegetables which have a sort of animated inflorescence, more or less resembling the *polypi*, as the *sertuleriæ*, &c.; or which have a sensible bark or crust, as the *gorgoniæ*; or, lastly, which exhibit what he calls an active matter, as seen by him in his *arthrodieæ*. He divides it into *ichnozoairia phytozoairia* and *lithozoairia*. The first are not fixed, the second have a horny or cellular vegetation, the third are stony; and each order is subdivided, according as it has or has not *hydras*, that is to say, animated expansions analogous to the *polypi*.—*Mem. de l'Acad. Roy. des Sciences de l'Institut de France.* Tom. IX. 1830.

Notice of the known species of Nebalia, Leach.—[In a former number of this Journal, (Vol. II. p. 73,) a notice was given of the third fasciculus of Thompson's Zoological Researches, in which, as well as in his former parts, though we cannot approve of the unnecessary whine with which the author interlards his descriptions, there is very much new and interesting information, accompanied by useful illustrative figures. We take this opportunity of again alluding to this little work, as we understand the publication of the next fasciculus is delayed, until the names of 150 subscribers be given in to the author. We have ourselves taken the work from the beginning, and shall certainly continue to do so; and we trust that all those who can appreciate the excellence of these studies, and the disinterested way in which Mr Thompson pursues them, will contribute their mite. Each number, on an average, contains about 30 pages of letter press, and 3 or 4 plates, at so low a price as 3s. 6d. The memoirs contained in the first three fasciculi are as follows:—

1. On the metamorphosis of the *Crustacea*, and on *Zoœe*, exposing their singular structure, and demonstrating that they are not, as has been supposed, a peculiar genus, but the larva of *Crustacea*.
2. On the genus *Mysis*, or opossum shrimp.
3. On the luminosity of the ocean, with descriptions of some remarkable species of luminous animals, (*Pyrosoma pigmæa* and *Sapphirine indicator*,) and particularly of the four new genera, *Nocticula, Cynthia, Lucifer*, and *Podopsis*, of the *Shizopodæ*.

— Addenda to Memoir I.

4. On the *Cirripedes* or Barnacles; demonstrating their deceptive character; the extraordinary metamorphosis they undergo, and the class of animals to which they indisputably belong.

— Addendum on *Nebalia.*

In extracting this latter article, it must not be supposed that we wish to give a specimen of the work; for the avowed object of the author was merely to report what has been already communicated, as to the structure and habits of these anomalous and little known *Crustacea,* in the hope of attracting naturalists to the examination of so interesting a genus. We shall recur to the author's discoveries.—Ed.]

The best informed naturalists have associated Nebalia with the Shizopodæ, from the circumstance of having their members cleft or divided into two branches, and their appearing to have a pair of pedunculated eyes; when, however, we are aware of all the anomalies which affect the limbs and visual organs in the crustacea, we shall not be apt to attach much importance to characters derived from parts liable to such extraordinary deviations, when they are not at the same time accompanied by some approximation in the general form and structure to the rest of the animals of the group; this is by no means the case with Nebalia, which in every other respect is an animal *sui generis,* but certainly bears a greater degree of affinity to the larvæ of the Balani than to any other. Its antennæ, no doubt, constitute one difference, while its eyes and tail are *exserted* beyond the boundary of the corslet,—differences which we might be prepared to expect in the larvæ of the various genera of the Balani. Indeed, since the discovery announced in the preceding memoir,* it is difficult to dismiss a suspicion that Nebalia may be the larva of some one of those types; and, in particular, of Coronula; the larvæ of this genus must of necessity possess useful eyes, and a more powerful and perfect natatory apparatus, in order to perceive and pursue the cetaceous animals (whales) upon which they finally fix themselves.

We must not, however, shut our eyes to the facts furnished by Otho Fabricius, in regard to the breeding of Nebalia, which, if not deceptive, completely annul any such idea, and shew it to be a peculiar genus, most nearly related to the larvæ of the Balani, to which it will thence bear the same relation as Mysis to the Decapodous Macroura.

The first animal of the present type was discovered by Otho Fabricius, and published with a figure in his Fauna Groëlandica, under the title of Cancer bipes, p. 256, No. 223, f. 2, which figure has been copied by Herbst in his work on Crabs, &c. Pl. XXIV. f. 7. Montagu more lately detected, on the south coast of Devon, the individual figured in the Linnæan Transactions, vol. XI. t. 2, f. 5; and, still more recently, Dr Leach, the founder of this genus, has furnished us with a third, to which he assigns as a habitation, the European Ocean.—*Zool. Misc.* vol. I, p. 100, t. 44.

All these, Dr Leach, Desmarets, and some other naturalists, consider as identical, or of the same species; and, as the former gentleman, from his more intimate knowledge of the accuracy and discriminating powers of his friend Montagu, is of this opinion, it would be presumptuous in us to dispute the propriety of this decision. Mons. Lamarck, not swayed by this consideration, very properly considers the Nebalia of Fabricius and Leach different from that of Montagu. The differences, however, are principally such as might be supposed to arise from the latter using magnifiers of higher power, and bringing to the examination a greater or less degree of skill and scientific knowledge: thus his figure has all its members and tail fringed with hairs, and the styles of the tail annulate.

To observe animals of this small size and concealed character by simple inspection, will not exactly answer the purposes of natural science as at present

* On the metamorphosis of the Cirripedes, or barnacles.

pursued; we must scrutinize, analyse, and dissect, in order to determine the number, use, and structure of the various members.

Dr Leach being the founder of this genus, the first crustaceologist in Europe, and of the most scrupulous exactness, we must naturally attach the greatest importance to the figure and description of Nebalia which we have from his hands, bearing in mind that the parts of the mouth remain to be dissected and made known.

Description of the Nebalia.—The cephalo-thoracic *clypeus*, enclosing the body of the animal, is large, sub-compressed, and ovalish in its lateral contour.

The movable *rostrum* or beak, which is one of the most remarkable characters of Nebalia, is taper, carinated above, and vaulted beneath.

The *eyes* are rather small, and situated at the sides of the beak; they are compound, placed on short footstalks, and movable.

The *antennæ*, which arise on each side from above the eyes, consist of a single pair, each ending in two pluri-articulate setæ.

The *anterior pair of feet* are long and simple, serving for prehension, (and are probably armed with microscopic hooks?)

The posterior or *natatory feet* consist of five pair, having their ultimate divisions bifid and fringed.

The abdominal portion is composed of four or five joints, and ends in a furcate tail, the two taper styles of which end in setæ.

The Nebalia Herbstii of Dr Leach attains to the length of three-fourths of an inch, and is of a pale red or greenish colour, (grayish, Leach,) with black eyes, and inhabits sandy shores about Greenland, and particularly the mouths of rivers, but is rare. According to Dr Leach, it is also found in the European Ocean. The female, Fabricius says, carries her ova all winter, which begin to develope themselves in April; the young appear in May, are extremely active, *adhere* to the mother, which has then but little life. In swimming, they turn on the back, and use their hinder feet, and when they rest, *fix themselves by the anterior pair!*

The Nebalia Montagui, which Montagu describes under the title of Monoculus rostratus, is only half the size of the former species, viz. three-eighths of an inch; is of a pale yellow colour, with a darker longitudinal line along each side; inhabits the south coast of Devon. The fore feet, he adds, are usually motionless and brought down under the body; and that the antennæ, as well as the natatory feet, are continually in movement when the animal swims.

I beg to repeat, that we know these little animals too imperfectly, and that they present a field for future observers, who may happen to be so fortunate as to meet with them. We must see them reversed; the organs of the mouth and members developed and magnified, which, in an animal of such size, cannot be considered as a very difficult task, when we contemplate what has been performed on many of the smaller Monoculi not one-third part so large as the smaller Nebalia. In addition, it would be desirable to know whether they are really *perfect* animals, or only larvæ, determinable by keeping some of the full-grown ones in sea water, frequently renewed, or by the actual discovery of females provided with ova.

Description of a fragment of an unknown Molluscum, supposed to be the Animal of the Nautilus pompilius, Linn. By MM. Quoy and Gaymard.

We found in the Moluccas, near the Island of Celebes, a portion of an animal, above eighteen inches long, and of a proportionate breadth, evidently belonging to the Cephalopodous mollusca, and which we suspected to be a fragment of *Nautilus pompilius*. It had a large coloured portion, which would be the envelope of the shell, and two cylinders with suckers, being a part of the arms which surround the mouth of the animals of this family; unfortunately, the mouth was destroyed. The two cylindrical tentacula were broken, but what remained of them was in good preservation; they were provided with extremely delicate soft suckers, yielding under the least pressure, and indicating little utility as organs of prehension. The tentacula upon which they were placed were hollow, and contained a nerve and another cord, which, no doubt, was the central vessel. The tentacula must have been long, if they terminate like those of most cephalopoda. At a distance from each other of from an inch to an inch and a half, they were connected by reticulated muscular fibres.

The posterior portion of this fragment was curved in the form of a tail. All the lower part was of a bluish white, and composed of reticulated parenchyma, exceedingly soft and delicate in many points, but more firm in others. The upper part was covered with reddish markings, formed of closely approximated spots of the same colour. These irregular markings were owing to the many ruptures which the skin had undergone; in the entire state, the animal would be uniformly red above, as was observable in some parts. The tentacula and suckers were also of a reddish colour.

The parenchyma of this molluscum is the same as that of the *Pterotracheæ* and *Carinariæ*. It swells itself out easily with sea water, and, on emitting it, becomes reduced to a fifth or sixth of its natural size.

If this animal be really a *Nautilus*, its inferior degree of consistency and delicacy, and the small portion which is lodged in the shell, would explain the difficulty of finding it entire, and the necessity of its inhabiting the depths of the sea, where the water is always tranquil; for the least agitation of the waves, and the contact of the smallest body, would immediately involve its destruction.

The specimen is deposited in the Jardin du Roi.—*Ann. des Sci. Nat.* August, 1830.

Remarks on a supposed spontaneous motion of the Blood. By W. Sharpey, M.D. &c. (In a letter to the Editor.)

Dear Sir,—At the meeting of naturalists in Heidelberg, in 1829, (see report of their proceedings in Oken's Isis for May, June, and July, 1830,) Professor Lichtenstein gave an account of some observations made in his presence by Dr Czermack of Vienna, from which it was inferred, that the globules of the blood, in several of the inferior tribes of animals, possessed a power of spontaneous motion, independent of their connection with the living textures. Although the report of these observations is very brief, and, consequently, leaves some degree of uncertainty in regard to several circumstances connected with them, yet I would venture to make them the subject of a few remarks, as there are some facts of which the observers seem not to have been aware, a due consideration of which should, I think, lead us to question the justness of their conclusions.

That the blood is endowed with a power of spontaneous motion, is an opinion entertained by several eminent physiologists of Germany,* by some on hypothetical grounds, by others as the result of direct observation. Among the latter is the elder Treviranus: † he describes two motions observed in blood recently drawn from the vessels; one is a circular or whirling motion, which either takes place at particular points in the drop of blood, or affects the whole globules of which the drop consists. It lasts only a few seconds after the blood is drawn, and is visible only with a lens of high magnifying power. When the blood coagulates, the second motion commences: this, which was previously described by Heidmann, ‡ consists in sudden contrac-

* Kielmeyer, Treviranus, Kreyssig, Carus, Doellinger, &c.
† Biologie, Band iv. p. 654. ‡ Gilbert's Annalen der Physik, b. 17, p. 1.

tions and dilatations of the coagulum, sometimes very much resembling the contractions of a muscle. As these motions appear to take place independently of any extrinsic agency, they were supposed to depend on some faculty of spontaneous motion in the globules, which was believed to contribute materially to advance the blood through the capillary vessels.

Dr Czermack has observed a peculiar motion of the blood-globules exterior to the vessels in some of the lower tribes of animals, such as Mollusca, Crustacea, &c. but in none so distinctly as in the proteus, and larva of the salamander; in which last animal, he shewed the phenomenon to Professor Lichtenstein. One of the vessels of the gills of the larva of *Salamandra atra* was cut through, and the blood received on the object-glass of the microscope; the globules were then seen to move round, sometimes in circles, at other times in ellipses; at a few points, an irregular motion forward and backward was observed. This phenomenon lasted some minutes, and, in the opinion of those who witnessed it, could be ascribed neither to physical attraction and repulsion, nor to the presence of infusory animalcules. It was visible only in full-blooded and lively specimens, in which the gills had attained a certain degree of perfection. Dr Czermack ascribes the non-appearance of this supposed spontaneous motion within the blood-vessels to the influence of the nervous system.

In reference, generally, to these observations on the blood, I must confess I have never been able to perceive a motion in that fluid, which could, on any ground, be considered as spontaneous; and with regard to the phenomena observed by Dr Czermack, I am much disposed to think that they must be referred to a very different cause from what he assigns, viz. to a peculiar property in the skin of the animals in which he made his observations, of the existence of which property Dr C. seems not to have been aware. In a paper published in the Edinburgh Medical Journal, for July 1830, and extracted into your Journal, (Vol. II. p. 334,) I have shewn, that, in the larva of the frog and salamander, the mollusca, and other inferior tribes of aquatic animals, the external covering of the body generally, but especially of the respiratory organs, possesses the power of impelling the water contiguous to it in a determinate direction along the surface, by which means a constant current is kept up, and the blood exposed to the influence of successive portions of the surrounding element; this peculiar provision effecting, in those creatures, the same purpose as the respiratory muscles in more perfect animals. The property, to which the production of currents is owing, remains a considerable time in parts which have been detached from the rest of the body, especially in portions of the gills. Now, Dr Czermack observed the phenomena, described by him, chiefly in animals in which the property alluded to exists; and from the manner in which the observation is stated to have been made on the larva of the *Salamandra atra,* as well as from some more or less direct expressions used by the narrator, it seems to me very probable, that the supposed spontaneous motion of the blood-globules had been observed in the vicinity of the gills, and had been occasioned by the before mentioned influence, exerted by these organs on the surrounding fluid, and on small bodies floating in it. If, in fact, a portion of the external gills be cut off from the larva of the frog or salamander, and brought under the microscope, the globules of blood which have escaped at the cut part will be seen to be moved about in a manner not unlike that described by Dr C.; for though the respiratory currents run in one direction from the root of the gill to the points of the branches, yet, as they change their direction at the points, and turn off to a side, many of the globules are carried back, so as to come again within reach of the current, and are thus continually hurried round with a circular or elliptical motion. But if I be right in inferring, that the motion observed by Dr Czermack was of this sort, it is obviously incorrect to ascribe it, as he has done, to a power of spontaneous motion in the globules, which are entirely passive, and whose motion differs in no material respect from that of any other small bodies brought near to the gill; and had Dr C. known of the remarkable property of the skin, or external covering, so often alluded to, I think it reasonable to presume he would himself have been of this opinion, and would, at the same time, have been saved the necessity of assigning such a strange reason to account for the blood-globules not exhibiting their spontaneous motion within the vessels.

I shall close these remarks by observing, that an analogous appearance, noticed long ago, by Dr Stephen Hales,* in the common mussel, led that philosopher to form an opinion not very different from that of Dr Czermack. He observed, that the globules of blood which escaped on cutting the gills of that animal were attracted to, and repelled from, the cut edge of the gill, and attributed the phenomenon to electricity, with which he conceived the globules were charged. But he did not know of the influence of the gills, which, in the mussel, as well as in all the branchiferous mollusca which I have hitherto examined, with only one exception, possess a property similar to that which I have already stated to exist in the larva of the frog and salamander.—I am, &c. W. Sharpey.

January 18, 1831.

Source of Animal Heat.—Dr Reynaud, from a series of researches on the temperature of the human body, detailed in the *Annales des Sciences Naturelles*, vol. xx. p. 43 *et seq.* has arrived at the following conclusions:—

Animal heat is neither derived from any special source, nor resident in any particular part, nor emitted by any peculiar mechanism.

The oxygen absorbed during the act of respiration, all kinds of food, imbibition of the fluids which constantly come in contact with the body, (for M. Pouillet shews that every solid body becomes heated immediately on being moistened with any liquid,) the friction of the locomotive organs, and, perhaps, principally the particular electrical state of the bodies, which enter into the organism, at the time of their different combinations, are the sources or the causes to which the development of animal heat must be attributed.

All the organs, and all the assimilations, are the sources from which it is incessantly given off.

The nervous influence, indispensable to the performance of every function, is the direct cause of its continual emission.

As to *frigoricity*, or the frigorific faculty which we possess, the cutaneous and pulmonary transpirations are its true seat, as is proved by the case of the reapers of Pennsylvania, related by Franklin, and as Dr Reynaud frequently observed on himself during his long travels in hot climates. Often when spent with thirst and a burning heat, he has felt himself deliciously refreshed after having drank small portions of warm liquids, having a temperature even equal to that of the body; and this refreshed feeling, he remarks, was entirely to be attributed to the matter furnished to his transpirations by those draughts.

The heat of man is nearly the same, whatever may be his age, his temperature, his type, or the race to which he belongs; and whatever may be the nature of his food, as the comparative researches of Dr John Davy prove, from the Priests of Buddha, the Hindoos, eaters of rice, and the Vedas, who live entirely on animal food.

The temperature of the air respired has very little influence over the temperature of the body, since, in Dr Reynaud's experiments, the greatest difference was 1°.05 in the individual in whom the greatest modifications occurred, and the greatest mean difference was only 0°.68 for 18°73 of elevation in the atmospheric temperature.

* Statical Essays, 2d. edit. vol. ii. p. 93.

BOTANICAL COLLECTIONS.

Erica Mediterranea.—Mr James Townsend Mackay, curator of the College botanic garden at Dublin, having made a botanical excursion to the mountainous district of Cunnemara, during the past autumn, was fortunate enough to find Erica Mediterranea "growing in prodigious abundance." This is the most important addition which has of late years been made to the Irish flora. The plant has long been cultivated in the gardens of the curious. It withstands our Scottish winters in the open border with difficulty, and only in sheltered situations, or near the sea-shore. It was regarded as being indigenous only to the countries bordering on the Mediterranean, and to Portugal; and certainly British botanists little expected to be able to claim it as a native of the sister island.—*Ed. New Phil. Journal,* Dec. 1830.

Iris tuberosa.—Mr Drummond, the curator of the botanical garden of Cork, some years ago discovered this plant in the neighbourhood of Cork, at about an hour's walk from the town. It is said to grow in an old hedge bank, composed of very dry soil, and in this situation produces flowers freely, which it does rarely in gardens. "It will perhaps be thought by some that the iris was not really a native, but merely the accidental outcast of a garden. This, however, does not appear probable, as the plant is by no means common—I may say it is rare—in gardens; nor does it seem likely that it should have been planted in this spot by some who wished to naturalize it."—*Rev. Mr Bree, in Mag. Nat. Hist.* Jan. 1831.

Elatine Hydropiper.—The plant figured under this name in English botany having been long since proved to be *E. hexandra,* this was discarded from the flora; but it has lately been discovered by Mr Bowman on the southeast side of Llyn Coron, near Abberffraw in Anglesey, forming matted tufts, four to six inches wide, both on the sandy margin of the lake, and in the shallow water immediately contiguous.

Culture of Exotic Vegetables in South Africa.—Mr J. Bowie is publishing in the South African Quarterly Journal a list of such exotic plants as are adapted for the soil and climate of South Africa. This is accompanied with notes on their uses, and mode of cultivation in that country. Among those he recommends are, the *Ulex Europæus,* for the feeding of horses, kine, and sheep; *Cytisus scoparius,* for several purposes; *Sambucus niger; Buxus sempervivens; Ligustrum vulgare; Pinus sylvestris; Pinus strobus; Pinus pinea; Fraxinus excelsior; Alnus glutinosa; Myrtus communis; Laurus nobilis; Olea Europæa,* which Mr Bowie recommends to be grafted on the *O. capensis; Cinnamomum camphora; Quercus robur; Cytisus laburnum; Mangifera Indica; Psidium pyriferum;* all the *Citri,* or orange genus; *Camellia Thea,* or tea plant; *Ribes rubrum; Uva crispa,* and *grossularia.*

Rice Paper.—In 1820, M. Vallot endeavoured to demonstrate in the Mémoires de l'Académie de Dijon, (p. 187,) that this was the product of the Tong-t-sao or *Calamus petræus* of Loureiro. Dr Hooker, in 1829, proved that it, or, at least, something with similar properties, is obtained from slicing the pith of the *Spola,* or *Æschynomena paludosa,* Roxb. Some other botanists suspect, that perhaps from neither is the true rice paper obtained; it is a subject well worth the attention of those who have correspondents in China.

Lewisia rediviva.—This singular plant, first described by Pursh, from the herbarium of Lewis, has, till lately, been involved in great obscurity. Nuttall placed it among the Crassulaceæ; but afterwards De Candolle, in his memoir on that family, judging from the descriptions, suspected it to belong to the Berberideæ! Dr Hooker has at length given a very able account of it, and has most correctly referred it to the Portulaceæ. The roots are gathered in great quantities by several of the tribes who inhabit the country skirting the sub-alpine regions of the Rocky Mountains, on the west side, and are known among those who use the Spokan tribes, by the name of *spatulum.* The mode of using them is simply to boil them in water, when they form a substance similar to *salep,* or boiled *arrow root.* Owing to their highly nutritive quality, these roots are admirably calculated for carrying on long journeys, two or three ounces per day being sufficient for a man, even while undergoing great fatigue.—*Hooker's Botanical Miscellany.*

Anagallis cærulea.—Professor Henslow, having received some specimens and seeds of *Anagallis cærulea* from Yorkshire, raised from the latter a dozen plants, nine of which had blue flowers, and three red. Hence, it would seem, that in future, *A. cærulea* must be regarded as a variety of *A. arvensis.* But whatever be the cause which disposes the petals of this species to assume a blue colour, this likewise disposes them to become notched or toothed at the margin, as Dr Hooker has universally observed them to be. From this and other considerations, Professor Henslow seems to think the following to be a law in botany,—That if a change takes place in one of the organs of a plant, a simultaneous change may be expected in some or all of the other organs, considered to be modifications of the same organs: thus, considering the calyx and corolla to be modifications of the leaf, when we see the leaf of the cowslip differing from that of the primrose, one need not be surprised to find that the calyx and corolla should differ also, though these plants be not distinct species, but only varieties, as had been long suspected, but which Professor Henslow has also satisfactorily proved to be the case.—*Mag. of Nat. Hist.* Nov. 1830.

Hybrid Azaleas.—Mr Gowan at Highclere, the seat of the Earl of Carnarvon, has of late years raised many new sorts of American azaleas, by means of cross impregnation, chiefly between the high-coloured and late-flowering varieties. For mother plants, the different fine varieties of *A. coccinea* were selected, *major, minor,* and *rubescens,* the anthers of which very seldom produce pollen. The two former were dusted for several successive mornings with the pollen of a late flowering *A. pontica.* Many pods swelled, and produced perfect seed. The pods were gathered at the approach of winter, kept in a drawer for some weeks, and sown in the beginning of January. Of these, about 400 seedlings were raised. The *rubescens* was impregnated with the pollen of *A. calendulacea,* or Lee's *triumphans,* and about 100 seedlings were raised. Of the first mentioned 400 seedlings, three-fourths closely resembled the male parent, *A. pontica,* in foliage, inflorescence, and general habit: some were very beautiful, and highly fragrant. The remaining fourth part resembled the female parent in habit, but the foliage was rather on a larger scale. The colours of the blossoms were very rich—various tints of crimson, vivid pink, or scarlet; and most of these will form beautiful acquisitions to our shrubbery borders. —*Ed. New Phil. Journ.* Jan. 1831. The botanist cannot but regret these attempts to involve his science in confusion. But horticulturists might certainly give an index of their Promethean labours, by applying to the new being, a name compounded of those of the two individuals from which it has been unnaturally formed.

Reproductive organs of Mosses.—At page 58 of this volume, an extract is given from Mr Lindley's Introduction to the Natural System, in connection with a notice of this work, from the pen of a correspondent. We take this opportunity to state, that so far as the author's theory extends to the calyptra, operculum, and peristome, he may be correct; but to renew the hypothesis of Richard, and suppose "that the cellular substance of the interior of the theca separates in the form of sporules," is what few now can agree to. In the Wernerian Society's Memoirs, vol. IV. p. 114, the true structure of the columella and the interior of the theca was pointed out; but owing to the impossibility of reconciling such a structure with any theory, future botanists have made no reference to it. Within the theca, and attached to its sides and base by a cellular pulp, intermingled with very slender filaments, is placed a membrane, which forms a complete lining: proceeding from the stoma, or mouth, downward, it is continued to the base, when it is reflected upward, forming a central column, till on a level with the mouth of the theca. This part has been generally denominated a columella, and is very different from the placenta in cotyledonous plants, to which it has been sometimes compared. A bag is thus formed between the columella and that part of the same organ which lines the theca, in which the sporules are situated. The whole is closed by a very subtile membranous expansion, stretching between the summit of the lining and the columella, which, (although in *Gymnostomum* it is often of a stronger texture,) by the maturing of the theca, and separation of the operculum, lacerates, and, in most instances, becomes evanescent. On the open apex of the columella is fixed another membrane, more or less of a conical form, and of a somewhat different texture and colour, which, by age, often shrinks to the appearance of a mere lid to its orifice. Sometimes it is more rigid, (as in *Splachnum*, *Tayloria*, and *Gymnostomum Donianum*,) and is then not unfrequently called an exserted columella. It also in some cases adheres closely to the summit of the interior of the operculum, (as in *Gymnostomum Heimii*, and *Hypnum dendroides*,) which it raises or depresses according to the degree of dryness or humidity to which it is exposed. It is this part which is the stigma of Palisot de Beauvois, but which may be more appropriately termed the *opercular membrane.*

Erythræa Chilensis,—belonging to the *Gentianeæ*, is the "Cachen-Laguen" of Chili: the *Chironia Chilensis*, Willd. (*Cachen*, Feuill. Chil. 2. t. 35,) but which is a true *Erythræa*. The calyx, corolla, and stamens follow the quinary arrangement. The nearest to it, as Kunth remarks, is his *E. Quitensis*, only differing by the parts being in fours: but we do not consider that a distinct species. Though it be much used medicinally in Peru, Humboldt never saw it wild there; but it was cultivated in the plains of Chillo, the inhabitants of which may have originally brought it from Chili, where it is undoubtedly a native. The circumstance of only four stamens instead of five being observed in the Peruvian specimens, is not, we conceive, sufficiently constant for a specific definition: we cannot, therefore, agree with Sprengel, who has, on that account, placed it in *Exacum*, without attending to other more important characters. The Peruvian name, too, is a corruption of the Chilian one, which ought to be written as above, the word "Laguen" meaning merely a plant; while the particular name of the present one, in he Indian language, is "Cachen."—*Bot. of Captain Beechey's Voyage.*

Orchideæ.—The botanical world has all along given the credit to Mr Brown for first having thrown light on the structure of these plants. How, then, are we to understand the following extract?—"But long before the publication of any rational explanation of the structure of the Orchis tribe, while botanists were in utter darkness upon the subject, it had been most fully investigated by a gentleman unrivalled for the perfection of his microscopical analyses, the beauty of his drawings, and the admirable skill with which he follows nature in her most secret workings, and, let me add, which is a still rarer quality, the generous disinterestedness with which he communicates to his friends the result of his patient and silent labours. I have sketches before me by Mr Bauer, executed from 1794 to 1807, in which not only all that has been published since that period is shewn in the most distinct and satisfactory manner, but in which much more is represented than botanists are even now aware of." Lindley, *Introd. to Nat. Orders*, p. 262. Now, all know that Brown and Mr Bauer were intimately acquainted; and the inference to be derived from the above is, that Brown was indebted for his discoveries to Bauer without acknowledgment. Fortunately, however, Brown's fair fame stands too high to be injured by such insinuations; but, at the same time, it is to be hoped that he will not let a passage of the kind be recorded against him to future ages without communicating to the public the full and sufficient antidote, which we, in common with many others, know that he can give.

New Plant added to the British Flora. — In our former notice of the Cryptogamic plants, collected during an excursion to the mountains of Braemar, in August 1829, by Dr Graham and a party of his friends and pupils, we omitted to record the discovery of a very beautiful moss—the *Weissia elongata* of Hornschuck. This was found among the rocks at the head of Loch Caliader by Dr Greville.

Mudarine, a new vegetable principle. — The root of the Mudar or Mudhar plant, the *Calotropis Mudarii*, Hamilton, belonging to the *Asclepiadeæ*, is well known in the East as a powerful medicine. Recent investigations into the nature of the root have led Dr Duncan, professor of Materia Medica in this University, to the discovery of a peculiar principle, which he has named *Mudarine*, and a full account of which will be published in the next volume of the Transactions of the Royal Society of Edinburgh.

The most remarkable peculiarity of *Mudarine* is, that its solubility in water diminishes as the temperature increases. A concentrated solution, which is perfectly transparent and fluid at 50°, has its transparency diminished, and gelatinizes at a little above 70°. On being allowed to cool, the jelly melts, (if the expression may be used,) and regains its former fluidity. If the temperature be raised considerably above 70°, the jelly contracts and separates from a liquid. It has now lost its power of resuming its liquid state on reduction of temperature.

This new principle is obtained by macerating the powder of the Mudar-root in cold rectified spirit, and drawing off the alcohol by distillation. On cooling, a white granular resin separates from the residuary liquor, which is now a nearly pure solution of *Mudarine*.

Botany of South Africa.—(Extracted from the Annual Report of the South African Institution, 1830.)—In the botanical department, our exertions have had peculiarly a reference to practical results, and herein are we likely to derive benefit immediately and directly from the communications made by one of our members, in regard to the culture of exotics. We have also, under his direction, to a certain extent, rendered local botany a subject of useful and practical attention, by furnishing an outline of a local flora, which may afterwards be filled up in its details. From circumstances affecting the vote for medals, it has appeared to the council that they would best fulfil your design by expressing their approbation, in this way, of the useful course of notices commenced by Mr Bowie, and they have with this view voted to him one of the two medals given by the institution. But it is an important question, whether the association ought not to contemplate wider efforts in regard to this branch of its pursuits. If we should not be able to advance our establishments beyond

quite in

their present amount, still much which we wish to know may be confidently expected from the zeal of such members as have the means of assisting us. There are many experiments in the culture of different vegetable productions, which those who have opportunity are constantly making, and it cannot be doubted that any which the institution suggest or desire to engage in, will be aided and attended to by proprietors of farms or gardens; and thus may the cultivation of native plants, and the introduction of useful exotics, be encouraged and extended. But the association may aim at the higher and more useful object of having an experimental and systematic garden of its own. The council have the pleasure of announcing that the co-operation of its patron may be relied on for the attainment of this most desired object, and that the requisite accommodation as to ground and water may be obtained on the most favourable circumstances. Considering the interest generally felt in this matter, and the extensive gratuitous aid which would undoubtedly be received from members and others, the council do not see any great obstacle in making a beneficial commencement. The funds of the institution would even now admit of the dedication of a small sum to the purpose; and we have the prospect of being able to afford, annually, as much as, with the zealous co-operation of our members, would preserve it in order. It is conceived, therefore, that, by adopting a scale proportioned to our means, and trusting to the perseverance and liberality of our members, a very useful, though it may not be a very imposing establishment, may be attained. We have evidence that such an institution was commenced here before, and that at all times different governors were in the habit of planting in the government gardens any curious plants which they had procured; and, as they had greater opportunities of making such acquisitions than others, the grounds generally included, as they do now, a considerable variety of interesting objects. Several, however, which formerly existed there, seem to have disappeared, from their having been no systematic agency for attending to them. In earlier periods, as was to be expected, the government took an active share in the measures necessary for introducing and establishing many of the important species now cultivated, and it is evident that this object, necessary to the improvement of the colony, must have been much facilitated by the opportune receptacle prepared for them in the gardens. The institution may be assured that little else is required but such a receptacle, which for its preparation, security, and maintenance, might require a considerable original and continued effort; but eventually, as is detailed in a communication read at the commencement of our sittings, every other requisite would pour in from the donations of many who are anxious to have such means of rendering their acquisitions useful, and from the exchanges which we should have ample opportunities of effecting. The council would, therefore, eagerly anticipate such exertions from the institution, and such aid from those who are inclined to favour the scheme, as may lead to the early formation of an efficient fund for it, and to the ultimate establishment of a repository, so much beyond all other collections of nature's grand and lovely efforts, as there every object stands where it loves most to display its peculiar beauty, and each is to be contemplated, not, as in other repositories, in unnatural dislocation and repose, but glowing in the beautiful animation of life's progress and development.— *South African Quarterly Journal, No. III.* July, 1830. Want of room prevents us from making any observations on the praiseworthy institution to which the above report relates. We cannot, however, prevent ourselves from here remarking, that its members are most zealous in their exertions to extend the knowledge of the natural history of the interesting country in which it is their good fortune to be placed, and much may be expected from their labours.—*Ed.*

GEOLOGICAL COLLECTIONS.

Fossil Canis of the size of the Fox.—Only one species of canis has yet been met with in a fossil state, which appears decidedly distinct from all living species. Among the bones of the mastodon, rhinoceros, and the gigantic tapir, found at Avaray, near Beaujency, M. Cuvier recognized two teeth which had belonged to an animal of the genus canis, twice as large as the wolf, the largest of the genus now known to exist. These are the only decided evidence we yet have of the former existence of now extinct species.

Rosenmuller, Fischer, Goldfuss, and Buckland, have described fossil bones of this genus as large as the wolf, found in Germany and in England; and Cuvier has also described similar bones from the Cave of Gaylenreuth. Messrs Croiset and Jobert have given plates and measurements of fossil remains of a species as large as the fox, without, however, being able to give any evidence that they differ from similar bones of well known species now existing. There are, indeed, no specific differences in the bones of this genus, if we take in the several species of animals of the same size and shape. The distinguishing characters of living species are drawn from the colour of the skin, the manners, habitudes, &c. Messrs Croiset and Jobert, therefore, conclude in the following terms:—"There, then, is another fossil animal, which it is impossible to distinguish from its congeners of the present epoch. But it is proper to remark, that osteological characters do not furnish of themselves sufficient data for separating living species, which are, nevertheless, very distinct; and that thus there might be as great a difference between this ancient fox and the existing species, as are found to obtain at present between well characterized species: between the common fox, for example, and the black fox of America, or even the jackal of India."

On hypothetical reasoning such as this, it is obvious, that little dependence is to be placed in estimating the value of a theory, which professes to account for remarkable appearances on the earth's surface; and we must carefully discriminate evidence, before we give implicit sanction to any theory, however ingenious or generally received.

Coprolites.—Mons. Boué has found, in the black bituminous limestone of the inferior deposits of the Jura limestone, at Seefeld, in the Tyrolese Alps, coprolites, having a striking resemblance to Prof. Buckland's figures in the Geological Transactions. They are in the same bed with the fishes and marine plants.—*Journ. de Geologie*, ii. 107. This locality seems to correspond with that of Clifton, near Bristol, the only place where he had met with them in formations older than the Lias.

Amber beneath Transition Limestone.—Messrs Engelhart and Ulprecht of Dorpat have found, under the limestone of Esthonia, which contains trilobites and orthoceratites, a sandstone, which, besides oxide of iron, contains grains of a mineral which they consider to be *amber.*—*Journ. de Geol.* iii. 392. This is probably not real amber, but a true mineral deposit, resembling the variety of mineral resin described by Mr Johnston. —*Vide infra*, p. 128.

Height of the Peak of Teneriffe.—The height of the Peak, according to Captain Pearce's barometrical observations, is 12,326 feet. Its height was considered by Humboldt to be 12,358 feet, the mean between his observations and those of De Borda and another. The hypothenusal distance, from the base to the summit, was reckoned, by Captain Pearce, to be about eight miles.

Coal Formation of the United States.—There are four distinct coal formasion in the United States: 1*st*, The genuine anthracite, or glance coal, found in the transition argillite, as at Worcester, (Mass.) Newport, (R. I.); also in small quantities in the north and south range of argillite, along the bed and banks of the river Hudson: 2*d*, Coal destitute of bitumen, usually called anthracite, but differing greatly in its character from the anthracite found in argillite. It may be called *anasphaltic coal.* This is embraced in a slate rock, being the lowest of the lower secondary series of rocks. This coal formation is equivalent to the greatest coal measures of Europe. But there is always bitumen, in a greater or less proportion, though the proportion is often exceedingly small. The principal American localities of this coal, hitherto discovered, are in the state of Pennsylvania; as at Carbondale, Lehigh, Lackawaxen, Wilkesbarre, &c.: 3*d*, The proper bituminous coal; as at Tioga, Lycoming, &c. This coal is embraced in a slate rock, which is the lowest of the series of upper secondary rocks: 4*th*, Lignite coal, which is found in a very extensive stratum in the state of New Jersey, along the south shore of the Bay of Amboy.—Prof. Eaton, in *Trans. of the Albany Institute*, June, 1830.

Claims to Priority in the Advancement of Geological Theories.—The Editors of the *Journal de Geologie* have given, in their fourth number, an account of a curious little work, in which one of the earliest approaches was made towards the true theory of disturbed strata, and in which the author demonstrates his views by the aid of figures. The author is Nicholas Stenon, and the treatise, entitled "De Solido intra Solidum naturaliter Contento," was published at Florence in 1669, and translated into English in 1671.

At the outset, the author says clearly, "that the beds of shells are nothing else than deposits from the waters of the sea, and that, by observing the number of layers of these sediments, we may discover how often the sea has been disturbed in each place, by the mixture of foreign matters." He demonstrates the absurdity which had been committed before, and which has been renewed since his time, of rejecting the opinions of the ancients on the existence of fossil marine debris, in regarding them as the freaks of Nature. In the three articles on horizontal beds, the mountains, and the streams which flow from them, there are ideas quite in accordance with received opinions. Thus he mentions the difference of age that exists between a rock, containing fragments of another, and a formation in which such fragments are not found. He says positively, that "the disturbed beds have been deposited horizontally. The frequent interruptions in beds, precipices, valleys, caverns, &c. are due to the action of fire, or to the motion of waters. The change of the position of horizontal beds has been caused by a violent convulsion, produced by the sudden inflammation of subterranean vapours, or by the sudden weakening of a great neighbouring mass. The effect of these violent shocks is to dissipate into dust the earthy matter, and to divide the more solid stony matter into fragments. [Do not these words contain an explanation of the formation of many arenaceous deposits?] Horizontal beds might be disturbed by the spontaneous weakening of the higher deposits, which, not being sufficiently supported, bend under their own weight, and take different inclined positions, while those consisting of matter of a high degree of tenacity, bend into arches. These changes of position explain the inequalities of our globe, the mountains, the valleys, the reservoirs of superior waters, the elevated plains, and the low countries." Further on he concludes, "that the mountains which we see at present have not existed from the beginning,—that some of them are merely the production of igneous eruptions,—and that they have different directions on the earth's surface. The mountains thus framed might also give passage to aëriform fluids, dilated by the heat, as well as to fetid exhalations, and to mineral springs of various temperatures. In his article on shells, he distinguishes between calcined shells, petrified fossils, and impressions of shells. He speaks also of animal remains, of crystals of diamond, of marcassites, &c. In fine, in his article on the changes which have taken place on the surface of Tuscany, he demonstrates by figures, that the tertiary formation—a horizontal marine deposit—is more recent than the valleys in which it has been deposited."

This work is a new proof that, if the present age is fertile in ingenious views and theories, we ought to be very circumspect in our claims to priority of ideas, which we are naturally too often inclined to claim for ourselves or our friends, without having sufficiently examined the annals of the science.—*Journ. de Geol.* iv. 385.

Discovery of Fossil Bones in Australia.—Mr Barrow communicated to a late meeting of the Royal Geographical Society, the discovery of a great quantity of fossil bones of quadrupeds, of very large size, in Wellington Valley, near the Blue Mountains. At present there are no large quadrupeds in New Holland. If this island be postdiluvian with respect to what is called the general deluge, as has been supposed, there seems, from these circumstances, to be evidence of its having since experienced a local flood.

Fossil Shells on the Snowy Mountains of Thibet.—At a meeting of the Asiatic Society of Calcutta, on 5th May last, extracts from Mr Gerard's letters, relative to the fossil shells collected by him in his late tour over the snowy mountains of the Thibet frontier, were read. The loftiest altitude at which he picked up some of them, was on the crest of a pass, elevated 17,000 feet: and here also were fragments of rocks, bearing the impression of shells, which must have been detached from the contiguous peaks rising far above the elevated level. Generally, however, the rocks formed of these shells are at an altitude of 16,000 feet, *and one cliff was a mile in perpendicular height above the nearest level.* Mr Gerard farther states, "Just before crossing the boundary of Ludak into Bussalier, I was exceedingly gratified by the discovery of a bed of fossil oysters, clinging to the rock as if they had been alive." In whatever point of view we are to consider the subject, it is sublime to think of millions of organic remains lying at such an extraordinary altitude, and of vast cliffs of rocks formed out of them, frowning over the illimitable and desolate waters, where the ocean once rolled.—*Asiatic Register.*

Galena.—*Calamine.*—Mons. Boué states, that galena and calamine are found in the Alpine limestone (Calcaire Alpin) of Germany, both in the masses which are above, and in those which lie below the salt.—*Ibid.* p. 302.

Phosphates of Iron and Manganese—Huraulite—Hetepozite.—M. Du Frenoy has published a new analysis of these lately discovered minerals, differing in some respects from the previous analysis of Vauquelin. These analyses we subjoin, in connection with that of the common phosphate of iron and manganese, made formerly by Berzelius, by which means the difference of constitution of the three minerals will be distinctly seen:—

	Common Phosphate.	Huraulite.	Hetepozite.
Phosphoric acid, -	32.8	38	41.77
Protoxide of iron, -	31.9	11.1	34.89
Protoxide of manganese,	32.6	32.85	17.57
Phosphate of lime, -	3.2		
Water, - - - - -		18	4.4
	100.5	99.95	98.63

These new minerals, like the common phosphate, are found in the granite at Limoges. The hetepozite is found only in lamellar masses, having three distinct cleavages, giving for the primitive form an oblique rhomboidal prism of 100 or 101 degrees. The huraulite has been found in small rhomboidal prisms, with an inclined termination, joined together laterally like the crystals of stilbite. It is reddish yellow, transparent; has a glassy fracture, but exhibits no cleavage; scratches carbonate of lime, but is scratched by steel, and has a specific gravity of 2.27. Before the blowpipe it fuses, gives off water, and leaves a black button, having the metallic lustre. The primitive form is an oblique rhomboid of 62° 30′ and 117° 30′.

The details of the analyses are given in the *An. de Mines,* VII. p. 139.

Analysis of Brewsterite.—Mr Connell has published an analysis of Brewsterite from Strontian, in the last number of the *Ed. New Phil. Journal.* He has found it to be composed as follows:—

	Connell.			*Retzius.*
Silica	53.666		...	57.285
Alumina	17.492		...	17.011
Strontia	8.325	15.074	Soda	7.764
Baryta	6.749		Lime	
Lime	1.346			
Oxide of Iron	.292			
Water	12.584		...	17.872
	100.454			99.932

From which he deduces the formula $\frac{Sr}{B} S^2 + 4 A S^3 + 6$ aq. The formula deduced by Retzius, from the results he obtained, as stated in the second column, was $\frac{C}{N} S^3 + 4 A S^3 + 8$ aq.

We have to object to this analysis, *first,* That it was made on a portion of the mineral, only partly crystallized; *second,* That requisite care does not seem to have been taken in determining the amount of water, of which Mr Connell is himself so far in uncertainty, that he says, only, "that if nothing but crystals were analysed, the proportion might be still greater, though *it is not likely* that it would be so great as shewn by Berzelius' formula;" and, *thirdly,* We have to object that Mr Connell has not given us *numerical* details of the results of his different analytical steps. If this be thought necessary from chemists of established name, that their results may be proved, how much more from young men, who have yet a name to acquire!

New variety of Mineral Resin.—Mr Johnston has described a variety of mineral resin, having much the appearance of amber, found in an old lead mine in Northumberland, in the neighbourhood of a trap vein, imbedded in solid brown spar, and carbonate of lime, as if it formed part of the solid rock. It has the following properties:—

"*Colour.* Externally, red of various shades, black, and sometimes pale yellow, approaching to the colour of amber. Internally, red, or brownish-red, except in the yellow varieties, and by transmitted light of a brilliant deep red colour. It yields to the knife, but is hard, brittle, and has a bright glassy small conchoidal fracture. The fragments are transparent, and the fractured surfaces exhibit a pale greenish tinge, (an opalescence) which becomes more decided after the lapse of a few weeks; the transparency at the same time diminishing in a slight degree.

"The specific gravity varies from 1.16 to 1.54 in the dark-red varieties.

"In the flame of a candle it takes fire, burns afterwards of itself with considerable smoke, and an aromatic, slightly empyreumatic, odour, leaving a small coaly residuum.

"On the sand bath, in a close tube, it gives off a small quantity of a transparent, colourless, and highly volatile naphtha, having a peculiar odour, resembling that of some kinds of strong cheese. Heated to 400°, it does not melt, but assumes a bright black colour, though, when broken into fragments, it still transmits a rich red light. Over a spirit lamp it fuses, gives off a colourless naphtha, a red empyreumatic oil, and leaves much charcoal.

It is insoluble in water, and is very slightly acted on by alcohol or ether. By hot concentrated nitric acid it is slowly, but entirely dissolved.

"When rubbed, it exhibits strong negative electricity.

"Dr Brewster informs me, that, like amber, it has no crystalline structure." Brewster's *Journ. of Science, New Series,* No. VII. p. 122.

NOTICES AND ANALYSES OF NEW BOOKS AND PAPERS.

Histoire Générale des Voyages, &c. General History of Voyages and Travels, arranged and completed to the present day. By C. A. Walckenaer. Tom. XVIII. XIX. Paris, 1830.

The 17th vol. of this valuable work was noticed in a former Number of this Journal, (Vol. II. p. 154.) We have since received vols. 18 and 19, the contents of which are as follows:—

Vol. 18. contains the continuation of Lichtenstein's Travels in the Cape of Good Hope in 1804, and the excursion of General Janssens to the Hippopotamus river. Next follows M. Lichtenstein's Journey to Zwollendam, and his other travels in 1805, in the country of the Bosjesmans, &c. The rest of the volume is occupied, 1st, by the narrative of two Moravian Missions amongst the Hottentots, from 1736 to 1801; and, 2d, by the travels of the Rev. J. Campbell in the interior of the colony, to Guadendal and Bethelsdorp, in 1812 and 1813, and to Graaf-regnett, Lattakou, and the country of the Griguas and the Namaguas, in 1813 and 1814.

Vol. 19. contains the series of travels in South Africa, and particularly in the Cape, and along the coast from Cape Negro to Cape Corrientes. The volume commences with the travels of M. Latrobe in 1815. Then follows an account of a second journey of the missionary Campbell; which is succeeded by the narrative of J. Philip, and an extract from the journal of the Missionaries.

To commend this most interesting work, would now be mere supererogation.

A New Gazetteer of Scotland, by Robert Chambers, author of "the Picture of Scotland," "Traditions of Edinburgh," &c. and William Chambers, author of "the Book of Scotland.' Parts I. and II. 8vo. Ireland, junior. Edinburgh, 1830-1.

A good gazetteer of the present state of Scotland is much wanted; and, though the undertaking is most laborious, and fraught with peculiar difficulties, we consider that, in the names of the Messrs Chambers, we have a guarantee that this work will supply the desideratum. Where, however, the facts to be collected are so extremely local, there must of necessity be many imperfections in the details; but, from an examination of the two parts before us, we have no doubt that this gazetteer will be found to be as accurate as the nature of the subject will admit; and being, in a certain measure, a national work, we strongly recommend it to support.

It would be well if, during the progress of publication of the parts, the authors would solicit from persons possessed of local information, any corrections or additions which may be considered necessary, and arrange them in a supplemental number at the end of the volume. The plan of publication is as follows:—

"I. The work will be published in monthly parts, price Two Shillings each, containing ninety-six pages of letter-press.

"II. Each part will be embellished by a highly finished engraving on steel, exhibiting a view of one of the principal cities of Scotland.—Two views will occasionally be given in a part.

"III. The whole will be completed in ten parts, and will form a large and handsome volume, beautifully printed, and stereotyped, in double columns, on a new type."

Illustrations of Indian Zoology; or, Coloured Plates of New, or hitherto unfigured Indian Animals, from the Collection of General Hardwicke. Selected and arranged by JOHN E. GRAY, Esq. F.G.S. F.L.S., &c. Nos. III. & IV.

The frequent mention of General Hardwicke's drawings in works of natural history, and the fact, that a great proportion of the descriptions of Indian species in Dr Latham's General History of birds has been taken from these drawings, are alone sufficient to render faithful copies of much consequence. The plates embrace every branch of Zoology, and are taken from drawings by native artists, made from living or fresh specimens of the objects represented. In some instances the attitudes of the animals and birds are stiff; but a strict adherence to the copies is preferable to any attempt to alter what has already been the authority of many naturalists. They are drawn upon stone, or engraved, as the particular style may suit the subject. The fishes are principally engraved by Swaine, already known as the artist employed in Hamilton's Fishes of the Ganges, and Dr Horsfield's beautiful Plates of *Annulosa Javanica.*

No. III. contains Erinaceus collaris; Mydaus collaris, Gray,—the skull, and dentition; Dysopes murinus, from Bengal; Pica Sinensis, India; Phasianus purpureus, (Ph. erythrophthalmus, Raffles?); Hyla maculata and Rana Bengalensis, Bengal; Scyllum maculatum, India, and Scyllum ornatum from China; Clupea affinis, Penang; Balitora Brucei, and maculata, Gray; Cyprinus Gotyla, Mountain stream, India; and Ammonites Nepaulensis, A. Wallichii, A. tenuistriata, all from Sulgranees, Nepaul.

In No. IV. the plates are Antilope cervicapra, in different states; Perdix Hardwickii, Gray; Perdix olivacea, Lath.; Caprimulgus Indicus and Asiaticus, Lath; Pica vagabunga, Calcutta; Anas Girra, male and female; Trionyx ocellatus, India, from Dr Buchanan Hamilton's drawings; Emys Baska; Cyprinus Hamiltonii, Gray, and C. Goha, Hamilton, both of natural size; Sygnathus Carce, Hamilton; S. fasciatus, from Ambryna; S. Hardwickii, India; S. Deokhata, Hamilton, Salt water Lakes, Bengal. The plates are very carelessly lettered.

A Prodromus Faunæ Indicæ is announced by Mr Gray, as a synoptical text to the Illustrations of Indian Zoology. It will be completed in four royal 8vo parts. Part I. will contain the Mammalia.

A Century of Birds hitherto Unfigured, from the Himalaya Mountains. By JOHN GOULD, A.L.S. No. I. Imperial Folio. London.

We have received the first Number of this work, alike creditable to the talents and the industry of the author. Since the institution of the Zoological Society of London, Mr Gould has had the active charge of preparing and keeping the collection; and, having privately come into possession of a collection of birds, from the generally unexplored district of the Himalaya, he has shewn his zeal for ornithology in making the more interesting species known to the public. The descriptions are to be supplied separately, by N. A. Vigors, Esq. secretary to the society, whose ornithological knowledge will be a guarantee for correctness. We cannot help wishing, however, that the descriptive letter-press had accompanied each plate. The plates are drawn by Mrs Gould, and are indeed very fair specimens of lithography. She is yet a young artist; but a strict attention to nature will soon remedy any little defects. We would recommend a little more artist-like feeling in the stumps or branches, and a slight wash of colour, the want of which makes them appear rather unfinished. We do not like the abrupt termination of the branch in Noctua cuculoïdes. The plates should be numbered for reference.

The first number contains—1. Garrulus lanceolatus; 2. Tragopan Hastingsii, coming into the group with Phasianus satyrus, Temm.; 3. Coccothraustes icterioïdes, M. and F.; and, 4. Noctua cuculoïdes.

Illustrations of the Family of the *Psittacidæ* or Parrots. By E. Lear. Nos. I. II. Imperial Folio. Ackerman, London.

This work was undertaken, by a young artist, at the suggestion of Mr Vigors, with the view of supplying a continuation to the "Histoire des Perroquets" of Le Vaillant. It is published in monthly numbers of three or four plates each. The plates are lithographic, and in drawing and attitude generally good. In some, the feathering is rather hard and wiry, and we should like to see a little more force displayed in the grasping powers of the feet. The first of these remarks will apply, as an example of what we mean, to the tail of Platycercus Stanleyii, and to the wing of Palæornis columboïdes; and the latter to the feet of Psittacus badiceps and Plyctolophus sulphureur. The plates should also be numbered for reference; and we cannot too much regret the want of descriptive letter-press.

The species figured are, 1. Platycercus Stanleyii, Vig.; 2. Plat. pileatus, Jard. and Selb; 3. Palæornis torquatus, a yellow variety; a similar one may have given rise to Latham's Jonquil parrakeet, Paleorn. Columboïdes, described as a new species by M. Vigors, in the XVIII. number of the Zoological Journal. The following are its characters:—Bitorquatus dorso, abdomineque, imis alis, caudaque supra viridibus; capite, pectore, dorso abdomineque summis plumbescenti-canis; torque collari superiore gracili, gulaque nigris: torque inferiore lata, fronte, regioneque circumoculari cærulescenti-viridibus. Magnitudo Palæornis Alexandri. The specimen is alive in the collection of the Zoological Society.

Next follow; 4. Psittacus badiceps; 5. Psittacula Swinderniana, (Psittacus, Swindernianus, Kuhl;) and 6. Plyctolophus sulphureus.

The colouring is very good and clean, but we could wish a little less gum were used.

Temminck, Planches Coloriées, Livraisons LXXXIII–LXXXVI.

Ornithologists will regret to learn, that the authors of this desirable work have resolved, for the present at least, to suspend its publication. We have just received the four last Livraisons up to No. 86, and believe that it will only be continued for one or two numbers.—Livraison 86 contains the first part of a very valuable Tableau Méthodique, or Index, containing M. Temminck's systematic arrangement of both his own Planches Coloriés, and the Pl. Enluminées of Buffon, of which the present work was intended as a sequel. The index is contained in six different columns, and shews at once the species contained in both works, with their Latin synonymes, nearly as adopted by modern naturalists. The first columns contain the orders and genera, (a *Cadre Systématique;*) 2*d*, The number of the Pl. Enlum.; 3*d*, Number of Pl. Col.; 4*th*, The name written on the plates; 5*th*, The name adopted in the systems, where either Buffon or Temminck may have been mistaken in their nomenclature; and 6*th*, The Latin synonymes.

Plate 489. *Falco-leucopterus*, Temm. Inhabits Eastern Asia, and discovered by Dr Van Seibold.—M. Temminck remarks, that it will form the passage from the True Eagles, with feathered tarsi, to the Sea Eagles. The tarsi of the present species are feathered for half their length; and the other parts, to judge from the plate, are intermediate modifications of form. The forehead, the upper half of the wings, the pinion to the greater coverts, the thighs, belly, and tail are pure white, the rest of the plumage brownish black.

Plate 490. *Mycropogon margaritatus.* Temm, Also figured by M. Rüppell, tab. 20.—Temminck has formed from this and five other species, all found in the old world, his genus *Mycropogon*, and gives his usual nominal monograph of the species. We dislike the way in which the monographs are given in this otherwise useful work. The species is only named if a new one, and the native country mentioned, as if every one, on the receipt of some fresh collection, were, through ornithological instinct, to know the species from a *local habitation and a name.* It answers very well for a general view, where the species have been figured or described, and these references are always given, but in the other case it is worse than useless.—*Mycropogon fuliginosus*, Temm. Nov. spec. from the west coast of Borneo, is also described under this plate. The length, about five inches and a half; upper parts, dull amber brown; throat, and fore part of the neck, ferruginous; belly, yellowish white, tinged on the flanks with brown.

Plates 491 and 492. Perroquet Huet. and P. Prêtre. Two beautiful species. The description deferred.

Plate 493. *Phasianus versicolor*, female. Male figured in a former livraison. No description of female.

Plate 494. Head and neck of *Cathartes Gryphus*, Temm., the Condor, of the natural size and colours, taken from a living specimen in the royal menagerie at Paris.

Plate 495. *Falco regalis*, Temm. " Cette grande espèce du nord de l'Amérique est absolument modelée sur les formes de notre autour d'Europe, si ce n'est que les dimensions chez celle du présent article sont d'un tiers plus fortes. Nous ne connaissons pas encore les états différens de l'âge, et de la mue de ce bel oiseau, donné ici sur l'examen d'un sujet *unique*, revêtu de la livrée parfaite de l'état adulte."

Such is the commencement of M. Temminck's description of this species; and we cannot help thinking, that the name he has adopted has been rather premature. He acknowledges the examination of a single specimen only; and a slight difference in size, with a little feathering on the tarsi, is scarcely a sufficient specific distinction.

The length of M. Temminck's specimen is two feet one inch.

Plate 496. *Falco exilis*, from South Africa, and about the size of our common sparrow hawk. The colours of the upper parts, also, nearly agree with our species, but the under parts differ entirely, being without either bars or longitudinal streaks. The throat and belly are pure white; the cheeks, breast, belly, and thighs, uniform ferruginous.

Plate 497. *Turdus amaurotis*, Temm. Sent from Japan, by Seibold; length about 9½ inches; upper parts bluish gray, with the centre of the feathers on the head and neck of a lighter shade; a rather broad curved streak of rich brown passes from the eye over the auriculars, and upon the sides of the neck; wings, brownish;

vent, white; reddish on the flank. This species will not range with the true thrushes.

Plate 498. *Turdus melanotis*, Temm. The subject of this plate is from Mexico, and has been now figured from its resemblance to the former in plumage; about eight inches in length; of a uniform dark tint, and having a band of the same colour covering the auriculars.

Plate 499. *Ocypterus sanguinolentus*, Temm. male. Length about seven inches eight lines. The plumage is entirely black, with the exception of a part of the feathers composing the bastard pinion, and the centre of the belly, which are rich crimson. Very common in Java, and found also in Sumatra and Borneo. We cannot reconcile this with the characters of Cuvier's *Ocypterus*, taking *O. leucorhynchus* as the type. To this description is added a monograph of six species; all of which, with the exception of the present, are figured in a monograph on the genus by M. Valenciennes in the 6th vol. of the *Mémoires du Museum*.

Plate 500, contains three beautiful finches, 1. *Fringilla leuconota*, Temm. Upper parts and breast, entirely blackish brown, with the exception of a white band crossing the centre of the back; belly and vent, pure white; from Bengal; 4 in. long. 2. *Fringilla nisoria*, Temm. Upper parts and breast, reddish brown; belly and vent, white, with numerous brown and black bars; Java; 3 in. 9 lines. 3. *Fringilla Majanoides*, Temm. Head, cheeks, and back of the neck, pure white; fore part of the neck, breast, centre of the belly, and under tail coverts, deep black; the other parts of plumage, reddish brown; Java; 3 in. 5 or 6 lines.

Plate 501. *Picus leucogaster*, Temm. from Java. Under this plate is also given the description of another Javanese and Sumatran species, *Picus dimidiatus*, Temm. resembling considerably the green woodpecker of Europe in size and colours.

Plates 502 and 503. Two beautiful pigeons, the first, *Columba denisea*, Temm. from Chili, and coming under that division which has the tarsi partly feathered; the second, *Columba janthina*, Temm. from Japan, where it is said to be common.

Plate 504. *Larus melanorhynchus*, Temm. from Chili, about the size of Larus Sabini, the colours somewhat the same in shade and distribution; the tail, even; the tarsi and feet, red.

Plate 505. *Vanellus cuculatus*, Temm. From the islands of Timor and Java. One of that long-legged form which runs into Pluvianus, and furnished with spurs to the shoulders, and wattled cheeks.

Plate 506. *Pitta granatina.* This very beautiful species was discovered by M. Diord on the west coast of Borneo. The upper parts are rich purple; the crown, passing to the occiput, the belly and vent, deep crimson; the region of the eyes, bluish black, terminating upon the auriculars in pale blue. A monograph of the genus is also given, containing eleven species, divided into two sections. I. Those belonging to the Old World, eight in number. From these the author has with propriety omitted the two species figured in former numbers of the work under the titles of *P. thoracica* and *P. glaucina.* II. Those inhabiting the New World, containing, 1*st*, Roi des fourmilers, Buff. plate 702, and forming the type of Vieil Grallaria; 2*d*, Beffroi de Cayenne, Buff. plate 706; and, 3*d*, A new species from Brazil, under the title of Breve Mouchette, *Pitta macularia*, Temm. We are not sure that any of this last section will come under our ideas of the genuine *Pittæ*,—they may, however, stand as the representing form in the New World.

The letter-press of the 86th livraison is deferred. The plates are as follows:—

Plate 507. Lophophore resplendissant, male.
508. Martinet pêcheur, lazule.
509. Bec en fourreau, blanc.
510. Falcinelle coureur, plum. parfait.
511. Ibis chalcoptere.
512. Verdin barbe blue. *V. icterocephalus.*

These two species were described in a former number under the generic title *Phylornis,* (the Genus *Chloropsis* of Jardine and Selby.) W. J.

Birds of America; from Drawings made in the United States and its territories. By John James Audubon, Esq. F.R.S. F.L.S. &c. Citizen of the United States. No. XX.

The concluding fasciculus of the first volume of this magnificent work contains Columbia jay, (Garrulus ultramarinus,) male and female. Mottled owl, (strix asio,) adult and young, with Pinus inops. Marsh wren, (Troglodytes palustris,) male and female, with the nest. Cow bunting, (Icterus peconis;) male and female: typical of the genus Dolyconix, Sw. Green-blue, or white-bellied swallow, (Hirundo bicolor.) There is no title page delivered with this number, which will be necessary before the volume can be bound.

Note.—Mr Audubon is preparing engravings of the most celebrated American naturalists, to accompany this work: that of Alexander Wilson, from an original painting, is already far advanced, by an American artist.

Robert Brown's *Vermischte Botanische Schriften, &c.* Robert Brown's Miscellaneous Botanical Works, translated into German, and accompanied by annotations. By Dr C. G. Nees von Esenbeck, in connection with several friends. Vol. 4th, with five lithographic plates. Nürnberg, 1830.

The editorial labours of the learned Professor C. G. Nees von Esenbeck, terminate, as far as the present undertaking is concerned, with this volume. He has brought down the account of the works of our eminent countryman, Mr Robert Brown, to the present time, concluding with the article on active molecules. In order, however, to give additional interest to that subject, the editor has added minute details of the observations of M. Adolphe Brongniart, and of Dr F. J. F. Meyen. The reader will, in fact, find a full and well digested account of this curious subject, to which we have several times adverted, illustrated by descriptions of various other natural phenomena which appear to throw light upon it.

Icones Filicum. By W. J. Hooker, LL.D. &c. and R. K. Greville, LL.D. &c. Fasciculus 10. Treuttel and Würtz, Lond.

The tenth number of this work has just appeared, among which we perceive several very interesting plants, particularly some from the rich collection of the East India Company. When, however, we consider that two numbers more will complete the work, we cannot help regretting that the word *potissimum* in the title page had not been omitted, and that none now appeared but those that were entirely new or involved in great obscurity,—instead, therefore, of *Asplenium cuneatum,* (t. 189,) *Adiantum obliquum,* (t. 190,) *Cœnopteris* *rhizophylla*, (t. 193,) and, above all, of the well known *Lindsæa microphylla*, (t. 194,) the public might have expected some more of the less known treasures with which they are sure Dr Hooker's rich herbarium is well stored.

Plantæ Asiaticæ rariores. By N. WALLICH, M. and Ph. D., &c. No. V. Treuttel and Würtz, London.

We are glad, notwithstanding the absurd rumours in circulation, that this work goes on as usual; indeed, we cannot see that the Hon. East India Company can permit its being put a stop to, which must be the case if Dr Wallich, the only person capable of carrying it on, were ordered to return to the East before it be finished, or before the distribution of the collection under his care in Frith Street be accomplished. There is no one who has the honour of being acquainted with the amiable author, but must wish him every success in the two great undertakings he has on hand,—undertakings which confer the highest honour on the liberality of the Company.

The present is the first number of the second volume: it contains many splendid figures; but we could almost have dispensed with that of the white-flowered variety of *Rhododendrum arboreum*, (t. 123,) being a mere variety of an already well-known plant. Bentham here finishes his synopsis of the genera and species of Indian *Labiatæ*.

Supplement to English Botany. No. XVI. 8vo. London.

Although we do not hold ourselves bound to notice the periodical publications on botany, yet we may allude to them occasionally, either when we find any thing worth praise or deserving censure. In the present number of the Supplement to English Botany, we find a confusion we little expected under the article *Elatine*,—Mr Bowman there mistaking the hilum and chalaza, two parts so perfectly distinct, that in some, nay in most plants, they are at opposite extremities of the seed. The hilum is external, the chalaza internal; and when these are at different ends of the seed, they are, as in *Elatine*, connected by the raphe: it is not the chalaza, but the hilum and podosperm that is operculiform. As the position of the raphe assists in indicating that of the seed, so the seed in *E. hydropiper* is pendulous; but in the annexed character of *E. hexandra*, we suspect some mistake both in the description and figure: to us the seeds do not appear ascending; but as we suspect the raphe lies on the side of the seed away from the placenta, they are resupinate, and consequently pendulous.

The Botany of Capt. Beechey's Voyage. No. I. By Dr HOOKER and G. A. W. ARNOTT, Esq. Colburn and Bentley. London, 1831.

This number, consisting of 48 pages, and 10 plates, contains nearly all the Chilian plants found in the voyage. To render the work more complete, the descriptions of other allied plants from the same country are occasionally added. It would appear that the authors intend to take each country visited, by itself: the natural arrangement is followed. *Cordia decandra*, (t. 10,) appears a splendid plant, and well worthy of introduction into our gardens.

Mikroskopische Untersuchungen, &c. Microscopical Researches on Mr Robert Brown's Discovery of Living Molecules, indestructible even by fire, and distributed through all bodies; and on the generation of Monads. By Dr C. Aug. Sigm. Schultze. 4to. Carlsruhe and Fribourg.

The subject of "active molecules," our readers will remember, has already been discussed at some length in a former volume of this Journal (Vol. I. p. 193. See also *Additional Notices*, I. 229, and II. 384.) The author of the work before us (who seems not to have been aware of Mr Brown's disavowal of the opinion that these particles are endowed with vitality) has arrived at very different results from those of our celebrated botanist.

1*st*, He considers that the motion of the molecules is not spontaneous, but depends either upon the evaporation of fluid, imbibition, or the solution of the particles. If they are immersed in a liquid which evaporates slowly, as oil, for example, the motion ceases; whilst, on the other hand, it is much more rapid in alcohol and ether. From an attentive observation of these motions, M. Schultze has distinguished three kinds, which he refers to three different causes: The first, ascent and descent, is produced by evaporation: the second, oscillation, similar to the supination and pronation of the hand, is owing to the successive imbibition of the molecules: and the third, rotation, to their solution in the fluid.

2*d*, Mr Robert Brown had advanced the opinion, that the molecules which he had observed in the pollen of plants are the same as the elementary particles which compose all the organs of animals and vegetables, and correspond to those described by Buffon, Needham, Wrisberg, Müller, and Milne Edwards. M. Schultze opposes this proposition, as it respects organic molecules. These differ in form and size in different animals and in different organs. As to Mr Brown's supposition that he has discovered molecules constituting the elementary parts of inorganic bodies, it appears to M. Schultze that they are a more artificial product, and may be procured of any given size by a certain degree of pulverization.

Discours sur les Révolutions, &c. Cuvier's Theory of the Earth, 6th French edition, revised and enlarged. Paris, 1830. Edmond d'Ocagne. 8vo. Pp. 408, and six plates.

In this new edition of the *Theory of the Earth*, M. Cuvier has availed himself of the notes which have been added by the English and German translators, and has added the results of his own researches since the publication of the first volume of the *Ossemens Fossiles*, of which this treatise formed the Introduction. It is the intention of M. Cuvier to enlarge upon the subject of this volume in a supplement to his great work, wherein he will discuss the more recent geological hypotheses.

Memorie della Reale Accademia, &c. Transactions of the Royal Academy of Sciences of Turin. Vol. XXXIII. 4to. pp. 735, with 24 plates.

The following Memoirs, appertaining to natural history, are contained in this volume:—

The second part of M. Losana's investigations on microscopic animalcules. After having described those whose form varies, (*polymorpha*,) the author passes to those which undergo no change of form, (*monomorpha*.) He distributes them under nine genera, four of which are described in this volume; their species amount to 180.

M. Aloyse Colla gives a notice of the plants which have flowered in his garden at Rivoli in 1826, accompanied by figures of those which he considers the newest or most interesting.

M. Re pays a tribute to the memory of Bellardi, by publishing under the title *Reliquiæ Bellardianæ*, the botanical notes which this venerable man was unable to arrange for the *Flore Piémontaise.*

Dr Cantu describes a mine of compact violet carbonate of manganese, discovered in the valley of Lanzo. As this species is almost entirely free from iron, it will be found very useful for glass-houses and chemical laboratories.

Professor Borson contributes a notice of some fossils of the Tarentaise. His object is to bring new proofs in support of the opinion of M. Brochant de Villiers, who regards this district as of the transition series.

The Magazine of Natural History; conducted by J. C. Loudon, F.L.G. and Z.S. &c. No. XVII. Jan. 1831.

This Number is much below the average, and contains nothing remarkable in a scientific point of view. In passing, we may suggest, that the editor would do a great service to his readers, were he to divide his work into two parts: collecting together the information which would be serviceable to the student of science, and thereby saving him the disagreeable labour of travelling through those popular lucubrations, the perusal of which can afford little gratification except to their authors.

We may take this opportunity to remark, that since the publication of our last Number, we have received a letter from Mr Loudon, in which, as well as by two notices in his *Magazine*, he explains the circumstance of his having published Mr Ainsworth's "Notes on the Pyrenees," without acknowledgment, some time after their appearance in this *Journal.* He states, that Mr Ainsworth had communicated to him the MS. so long since as April, 1829; and that, having only seen the first two Numbers of this Journal, he was not aware that the paper had been already published, when he inserted it in his Magazine in November last. We are sorry to have given Mr Loudon so much trouble, because we really did not attach any particular importance to the matter, and only noticed it as an apparent breach of custom. We have, however, much pleasure in entirely withdrawing the insinuation that the paper was originally obtained from our pages; though, at the same time, we cannot refrain from remarking, that Mr Loudon would in future do well to keep a stricter eye on the natural history periodicals, at least of his own country, lest he fall again into a similar blunder. As far as we are concerned, we shall have much pleasure in transmitting to him our Numbers regularly as they appear, to facilitate his useful labours.

Transactions of the Albany Institute. Vol. I. No. IV. for June, 1830.

The present Number contains the following papers: — An Account of a Man who lived on Water fifty-three days, by James M'Naughton. —Monograph of the Cones of the United States, by Professor Jacob Green, with a plate. — Observations on the Coal Formation of the States of New York and Pennsylvania, by Professor Eaton. — On the *Dalia* of the United States, by Professor Green.— Address before the Lyceum of Nat. Hist. of the Institute, by Dr T. R. Beck. — Note respecting the *Ranunculus lacustris*, by Dr Lewis C. Beck, and Jones B. Tracey, with a plate.—Reclamation of Salamanders, in a Letter to Baron Cuvier, by Jacob Green. — History of the Institute, with an abstract of its proceedings.

NOTICES AND PROCEEDINGS OF SCIENTIFIC SOCIETIES.

EDINBURGH.

Royal Society.—December 6, 1830. At this, the first meeting of the session 1830–1, Dr Hibbert read an essay on the volcanic district, bounded by the rivers Nette and Brohl, on the Lower Rhine. A list of various donations, presented to the Society during the recess, was afterwards read by the Secretary.

December 20. Dr Duncan read a paper on Mudar, and on its active principle Mudarine, which he illustrated by a series of experiments performed before the Society. (Vide p. 123, *supra.*)

There was also read an essay, giving an account of the improved method of distilling, by exposing the mash, in shomers, to the action of steam, illustrated by a series of diagrams; by Mr Stein.

January 3, 1831. Dr Christison read a communication from Dr Duncan, of experiments performed by a gentleman to relieve a supposed aneurism of the pulmonary artery, by the injection of air into the chest. The tube and bladder, by which the air was injected, were exhibited to the Society.

A communication was also read from Dr Berry, giving a detailed account of the monsoons of the Indian peninsula. The reading of the latter part of the communication was delayed till next meeting.

Wernerian Society.—December 11, 1830. The Society commenced its winter meetings. Dr Scot of Corstorphine, read a paper "On the Giants mentioned in the Bible." Mr James Wilson read a paper "On the Great Orang-Outang of Sumatra," being a part of the Number of the *Illustrations of Zoology*, just published. Professor Jameson read some extracts from letters of his correspondents, amongst which was one from Mr Mouatt Cameron, relative to the probable progress of Captain Ross in his Arctic voyage.

January 22, 1831. The meetings of the Society were interrupted till this day. Mr Audubon read an account of the white-headed eagle, *Falco leucocephalus*, and exhibited his splendid work to the Society. Dr Scot read a paper on the Quail of the Scriptures.

Professor Jameson communicated a very important letter, of a recent date, from a settler at the Swan River colony, to a gentleman in Edinburgh, which fully confirmed our forebodings as to the disastrous state of the colony. We shall not, however, at present give any report of this letter, as, from its importance to the country, it will no doubt be immediately made public in its entire state. We can only say, that if some measures be not promptly taken to facilitate the return or removal of the unfortunate persons who have been so grossly deluded, and if there be not a rigid inquiry set on foot as to the original Report by which so many have been misled, a most culpable negligence will be exhibited on the part of those in whose hands the power is vested. The gentleman by whom this letter was written was already on the point of leaving the colony; and many others who have the means, are gradually withdrawing from the settlement to Hobart Town, or New South Wales.

LONDON.

Royal Geographical Society.—*November* 22, 1830.—G. B. Greenough, Esq. in the chair. The Society were informed that the ancient map of the world, mentioned in our last report, had been received from Hereford Cathedral, and was deposited in the room of the Society. A letter from Admiral Zhartmanns, the Danish hydrographer at Copenhagen, was next read, giving an account of Captain Graah's expedition in search of the reported colony on the east coast of Greenland. (Vide *Geographical Collections*, p. 99, *supra.*) The various donations to the Society were then enumerated, amongst which were the Transactions of the Asiatic Society, presented by that body: also, a new edition of the latest charts published by the East India Company, presented by them; and an elaborate work on the antiquities of Athens, by the publishers. An interesting paper on Australia, compiled by Mr Barrow, and an account of its botanical productions, by Mr Robert Brown, were then read; and the meeting adjourned.

December 13. John Barrow, Esq. in the chair. Numerous donations were presented to the Society's Library. A letter addressed to the Society by Dr Holland, was read, in which he recommended that all objects worthy of research for English travellers should be pointed out by the Society, in order that their attention might be directed to information which was wanted, and the time and labour saved, which had been too often thrown away in doing again what had been done before; that travellers might communicate with the Society on this subject, before setting out on their travels. The proposition of Dr Holland was perfectly acquiesced in by the Society; and a book had been opened in the Society's rooms, in which all persons, whether members or not, were invited to insert the names of any parts of the world which, in their opinion, afforded subjects for investigation.

A communication was then read, from Captain Vidal to Mr Barrow, on the subject of his search for Aitkin's Rock, which had been supposed to exist near the N.W. coast of Ireland, but of which he was unable to find any trace.

The remainder of the evening was occupied in reading an account of a journey to the Peak of Teneriffe, being the subject of a letter to J. Barrow, Esq. from the late Captain Pearce, R. N.

January 10.—Mr Greenough, Vice-President, in the chair. The donations to the Society's library were announced, consisting principally of maps:—a map of ancient and modern Italy, by Finlay, shewing the tracks of Hannibal; the Atlantic Ocean, by Mr Purdy, with the most recent discoveries; a map of Fredonia, or the United States, from Mr Laurie, and a chart of the Straits of Gibraltar, by Reiner, shewing the direction and limits of the currents; Cassini's large map of France, in one hundred and seventy-five sheets, with a continuation of the Netherlands by Ferrara, in twenty-five sheets, from Sir T. Phillips.

A paper, communicated by Captain W. H. Smyth, R.N. on the geographical position of the Columbretes, was read. The Secretary then read an extract which he had made from the log-book of the ship Layton, communicated by her master, Mr J. Hurst. Notices of these papers will be given in our next Number.

The following gentlemen were proposed for admission into the Society: Edward Winterbottom, Esq., Captain Charles Chaplin, of Addiscombe, William Westall, Esq., Captain Robert Melville Grindley, and Hunter Gordon, Esq.

Royal Society.—*Nov.* 25. Discussions which would disgrace the council meetings of the London University, characterized this meeting.* After the turmoil had somewhat subsided, a paper by Dr E. Davy, of Dublin, was read, on the electro-chemical method of discovering metallic poisons.

Nov. 30.—A meeting took place this day, according to the charter, for the election of a President. Mr Davies Gilbert delivered the annual address. He then read the order for the election of officers. His Royal Highness the Duke of Sussex was elected President.

Dec. 9.—His Royal Highness the Duke of Sussex took the chair. The customary address of the retiring president, (in this instance, Davies Gilbert, Esq.) on the occasion, was read. A paper by Professor Barlow, on fluid object-glasses for telescopes, was then read. And on the conclusion of this paper, the Royal President addressed the members. This being the first occasion on which he had appeared before them in his present capacity, he begged to return them his thanks, and to assure them he was sensible of the honour he had received in having been elected as their President. It would be his endeavour to fulfil the duties of his office to the utmost of his power. If he failed, it must be attributed rather to his own weakness, than to a disregard for the promotion of science; but, supported by his council, he hoped to succeed; and he requested not only their aid, but that of the whole Society. He assured the members, that it would be equally his care to watch over the labours of any single one of them, as over the welfare of the Society in general. He then informed the members, that on every Wednesday, his residence, after its present repair was completed, would be open to receive them, alternately, in the morning at breakfast, between the hours of eleven and one, and in the evening, where he hoped to see them; and that they would always meet with that courtesy from him, which it would afford him the greatest satisfaction to shew them.

At this meeting the two royal medals were awarded,—one to Dr Brewster, for his important researches on the Polarization of Light,—the other to M. Balard, of Montpelier, for his discovery of brome or bromine. The Copley medal was not awarded.

The new council consists of Peter Barlow, Esq., John Barrow, Esq., W. Cavendish, Esq., Sir Astley Cooper, Bart., Henry Ellis, Esq., M. Faraday, Esq., Col. G. Fitzclarence, Davies Gilbert, Esq. M. P., Capt. H. Kater, V. P., Robert Viscount Melville, K. T., Rt. Hon. Sir G. Murray, G. C. B., Rev. G. Peacock, M. A., Rt. Hon. Sir R. Peel, Bart., A. P. W. Philip, M. D., John Pond, Esq., G. Rennie, Esq., N. A. Vigors, Esq., J. W. Lubbock, Esq., Treasurer; P. M. Roget, M. D. and J. G. Children, Esq. Secretaries.

Dec. 16.—Read, a paper by J. W. Lubbock, Esq., entitled "Researches in Physical Astronomy."

Dec. 23.—A paper by W. A. Cadell, Esq. was read, on the hour lines of the ancients, arising from a discovery of the outlines of a dial on the Elgin marbles, in the British museum.—Adjourned to 13th Jan.

Geological Society.—The secretary of this society having been directed by the council to make public the proceedings of the Society, we are enabled to resume our reports.

* The occasion of the late insurrections and riotings in the Royal Society may be learnt by the perusal of the following works, to which, as we trust that the temporary disunion is now permanently replaced by one common effort for the advancement of the scientific character of the nation, we shall make no further allusion.

1. *Reflections on the Decline of Science in England, and on some of its causes.* By Charles Babbage, Esq., *reviewed in Vol. II. p.* 349, *of this* Journal.

2. *Review of the above,* reported to be written by Dr Brewster. *Quarterly Review.* Vol. LIII. p. 305.

3. *Charges against the President and Councils of the Royal Society.* By Sir James South.

4. *Science without a Head; or, the Royal Society dissected.* By one of the 687 F.R.S.—SSS. —besides many letters in the London Newspapers.

November 17. The concluding part of the Rev. Mr Yates' paper on the formation of alluvial deposits, was read.

Remarks on the existence of the Anoplotherium and Palæotherium in the lower fresh-water formation at Binstead, near Ryde, Isle of Wight, by S. P. Pratt, Esq. F. G. S., &c.

December 1. An explanatory sketch of a geological map of Moravia, and the west of Hungary, by Dr A. Boué.

An original "manuscript" Map of all the Districts described in the Memoir of Dr Boué, was presented by M. von Lill von Lilienbach, who, amongst other novelties, has discovered two cones of trachyte, near the mercury mines, in the Carpathian sandstone of Krosciensko.

December 15. An explanatory sketch of a geological map of Transylvania, by Dr A. Boué.

A memoir on the astronomical causes which may influence geological phenomena, by J. F. W. Herschell, Esq. F. G. S.

Among the donations laid upon the table was a large collection of bones of the elephant, rhinoceros, ox, and horse, presented by William Hobson, Esq. F. G. S., and found in his brick fields at Kingsland.

Mr Sturtz, from the Hartz, presented to the Society some models, illustrative of the effects produced on veins by nearly vertical dislocation.

January 5. A paper was read "on the general structure of the Lake Mountains of the north of England, and on the great dislocation by which they have been separated from the neighbouring chains;" by the Rev. Adam Sedgewick.

Among the donations exhibited, was a collection of specimens from the western coasts of Australia, presented by Peter Cunningham, Esq.

Linnæan Society.—Dec. 7. A. B. Lambert, Esq. in the chair. The Secretary read a paper on the plant which yields the *Gum Ammoniacum,* by Mr. David Don. It is remarkable that this plant, and its locality, should have remained so long unknown. Dioscorides and Pliny considered it as a species of *Agasyllis,* and believed it to be a native of Libya. Lieutenant-Colonel Wright, on his way to Europe from India, overland, obtained both plants and seed in the north of Persia. Mr Don suggests, that for A*m*moniacum or A*r*moniacum, as it is sometimes written, we should read Arm*e*niacum, since the plant is now proved to exist in Armenia; and as its characters are new, he proposes the generic name *Dorema.*

Dec. 21. Robert Brown, Esq. V. P. in the chair. A portion of Mr Hogg's interesting paper on the classical plants of Sicily, was read in continuation.

FOREIGN.

Meeting of German Naturalists at Hamburgh.—The following is an abstract of the proceedings of the section of zoology, zootomy, anatomy and physiology, at the meeting of German naturalists in September last. We shall, from time to time, notice the several papers at greater length, as occasion offers. The number of members of this section was 52.

The section formed itself on the 18th of September, and agreed to elect a different president for each sitting, and a permanent secretary. Professor Leuckart, from Heidelberg, was chosen secretary; and Professor Fischer, of Moscow, president of the first sitting.

First Sitting.—20th September. After a short introductory address by the president, Dr Meyer of Offenbach read a paper on the deficiencies in most of the drawings and descriptions of birds, and distributed among the members drawings of the *Otis hubara.* Dr von Nordmann, from Abo, distributed some proof impressions, intended for his monograph of the genus *Emberiza*. Dr Mehlis, from Clausthal, spoke concerning a supposed new genus of Mouse found in the Hartz, and described the internal organization of different intestinal worms. Professor Jacobson, of Copenhagen, made some remarks on the kidney. Röding of Hamburgh exhibited a *foetus* of the *Halmaturus giganteus*, on which several members made remarks. Professor Oken, of Munich, exhibited a portion of Wagler's work on the *Amphibia*, which gave rise to a discussion on the fossil *Pterodactylus*. Professor Tiedemann, of Heidelberg, exhibited a living *Scolopendra morsitans* from Brazil, and Professor Fischer, his work on the *Oryctography of the Government of Moscow*, 1830. Counsellor Schleep, from Sleswig, was appointed president for the ensuing sitting.

Second Sitting.—21st September. The secretary made several communications. Dr Bergman, from Hildesheim, exhibited drawings explanatory of the internal structure of the human brain. Dr Wiedeman, of Kiel, exhibited drawings of the species of the genus *Mydas*, and distributed copies of his treatise on the genus *Achias*. Professor Jarocki, of Warsaw, read a paper on the Aurochs, (Bos Urus.) (See p. 105, *supra*.) Counsellor Schleep made some remarks on the position of the eyes in the *Pleuronectes*. Professor Tiedemann detailed the result of his observations on the regeneration of nerves. Dr von Chamisso, from Berlin, gave an account of the investigations of Ehrenberg, on the organization of the *Infusoria*. (See p. 112, *supra*.) Dr Hineman, of Brunswick, exhibited several anatomical preparations in wax. Professor Oken exhibited some plates from Agassiz' work on fishes. Professor Jacobson was named president of the third sitting.

Third Sitting.—22d September. Dr Zincken Sommer, from Brunswick, read a treatise on the "advantage of feeding the caterpillar or the silkworm with twigs instead of leaves, as usually practised." Professor Huschke, from Jena, spoke on the mode of development of the eye and ear in the chick, and other animals of the higher classes. Professor Otto, from Breslau, made some remarks on malformations of the brain and head, and exhibited drawings of some rare malformations in the mammalia; at the same time he gave some notices on the anatomy of the genus *Pseudopus*. Professor Jacobson spoke concerning the so called *egg* in the gills of the Anodon, which he considered to be a parasitical animal. (This matter caused considerable discussion, in which Mr Gray of London took a large part, being rather difficult to convince. We believe, however, that he at length gave in to the general persuasion that Dr Jacobson was right.) Dr Traill of Liverpool was named president for the following sitting.

This last notice, we believe, is not quite correct, though it so stands in the report of the secretary. Mr Gray, as coming from London, was named, but owing to a mistake concerning the place of meeting, he did not arrive till at least half an hour after the business had commenced. In his absence, therefore, Dr Traill was requested to take the chair, which he retained.

Want of room obliges us to defer the remaining three days' proceedings, till our next Number.

Imperial Society of Naturalists of Moscow.—The Imperial Society of Naturalists of Moscow receives annually 10,000 rubles from the Emperor's private purse. From this sum there are paid out 3000 rubles for travels in Russia itself, for the purposes of natural history; 300 rubles for the publication of the works treating of these travels; 1850 rubles for painters and engravers; 800 rubles for preserving the specimens; 400 rubles for ordinary expenses, and 650 for extraordinary expenses. The Society was founded in 1805, by its present director, M. Fischer; it has published seven volumes of memoirs; and since the commencement of 1829, it has printed a bulletin of its proceedings. (Friorep's Notizen.) *Bull. des. Sci. Nat. July*, 1830.

MISCELLANEOUS INTELLIGENCE.

The Emperor of Russia has presented a magnificent vase of *Aventurine* to Baron Humboldt. The Aventurine, a kind of Quartz, has hitherto been found only in Siberia.

New University in New York.—It is in view to establish an institution in New York on the plan of the London University.

Tiflis, Georgia.—In 1829, the population amounted to 17,000. There are at the present time three journals published there, in three different languages, the Russian, Georgian, and Persian.

Swan River.—A newspaper, "in manuscript," was established on the 18th of February last, in Freemantle, on the Swan River; the editor is a Mr John Gardiner, formerly of London.

A literary, zoological, and botanical institution, is about to be formed for Surrey.

His Majesty has graciously signified it his pleasure to become the patron of the Linnæan and of the Astronomical Societies.

M. Bory St Vincent, has collected many materials for a history of exotic ferns, and especially for the elucidation of their synonymy. He is in hopes of having it in his power shortly to prosecute new researches on the ferns of tropical countries, after which he will commence the publication of this work. He is now engaged in preparing the account of his travels in the Morea, of which he himself superintends the maps, plans, the cryptogamy, and the vertebrated animals.—*From a Correspondent.*

King's College, London.—Mr Rennie, the author of *Insect Architecture*, and *Conversations on Geology*, has been appointed Professor of Natural History and Zoology in King's College.

The *Zoological Society of London* have very handsomely voted some of the duplicates arising from his Majesty's munificent donation of the Sandpit-Gate collection, to the Zoological Society of Dublin, recently established.

Lectures on Geology.—A course of lectures on geology, adapted to a juvenile auditory, is now in progress, by Mr Webster, at the Royal Institution of London.

Davy Monument.—The Geological Society of Cornwall, originally established by Dr Paris, has resolved to erect a monument of granite upon the highest hill in the country, to commemorate the splendid scientific attainments of their countryman, Sir Humphrey Davy.

The Society also intends to reward their founder by the presentation of a handsome service of plate, manufactured from silver dug from their native mines, for the admirable manner in which he has executed the Life of Davy.

LITERARY NOTICES.

There are preparing for press, from the MSS. of the late Major Rennell, a Memoir on the General Currents of the Atlantic Ocean, accompanied by a series of charts, shewing their force and direction; and also a work on the ancient and modern geography of certain parts of Asia, with 12 maps.

Professor Leonhard has now in the press a work on Basaltic or Trap Rocks, which will appear in 2 vols. 8vo. with numerous sections and maps. It will be published in the course of the present year.

Professor M'Culloch is preparing for publication a Theoretical and Practical Dictionary of Common and Commercial Navigation, in one large volume.

MM. *Zwich* and *Schill's* Account of a Journey from Serapta to several Calmuc Hordes of the Astrachan Government, is nearly ready.

Letters to a Young Naturalist, by Dr Drummond, of Belfast, are nearly ready for publication. The great object of these letters is the recommendation of the study of natural history.

A Scientific Annual, in which natural history will form a prominent feature, is in preparation by W. M. Higgins, F. G. S. of Witham.

A Gardening and Naturalist's Annual, edited by Mrs Loudon, will appear about November, 1831, and will be continued annually.

The second part of the 1st Vol. of the Transactions of the Northumberland and Newcastle Natural History Society will be published forthwith.

We understand that the edition of Wilson's American Ornithology, published in Constable's Miscellany, will also contain Bonaparte's Continuation, and that the first volume will appear in March next.

LIST OF NEW BOOKS.

Maycock's *Flora Barbadensis,* pp. 446, 1830. Experimental Inquiry into the Number and Properties of the Primary Colours, and the Source of Colour in the Prism. By Walter Crum, Esq. Lond. and Glasg. 1830. Dr Paris' Life of Sir Humphrey Davy, 4to. Herschell's Preliminary Discourse on the Study of Natural Philosophy. (Lardner's Cyclopædia.) Transactions of the Plymouth Institution. The South African Quarterly Journal. No. III. Price 3s. A Topographical and Statistical Description of the British Dominions in North America, including Observations on Land Planting and Emigration, &c.; by Colonel Bouchette. Picken's Travels and Researches of Eminent English Missionaries. Parts I. and II. of a translation from the German, of the Anatomical Atlas of Dr M. J. Weber of Bonn. Burrow's Elements of Conchology; besides the several works noticed in former parts of this Number.

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THE

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OF

NATURAL AND GEOGRAPHICAL SCIENCE.

MARCH, 1831.

ORIGINAL ARTICLES.

ART. I.—*An Account of the Habits of the American Goshawk,* (Falco palumbarius, Wils.) By J. J. Audubon, Esq. F. R. S. F. L. S. &c. (In a letter to Sir William Jardine, Bart.)

Dear Sir,—As you have expressed a desire to obtain from me some account of the habits of the American Goshawk, the *Falco palumbarius* of Wilson, with the view of ascertaining whether or not that bird is identical with the European goshawk, the *Falco palumbarius* of Linnæus and others, I have pleasure in gratifying your wishes, and hope that the following statement may prove, what, in my opinion, is fact, that the *Autour royal* (*Falco regalis*) of Temminck's *Planches coloriées* is only an indifferent figure of the goshawk, drawn, however, from a beautiful specimen of an adult male, which I saw in Philadelphia, in 1824, in the possession of my friend, M. Lesueur, and subsequently in the museum of Paris, to which it was sent by that well-known naturalist.

The American goshawk is always a rare bird in the United States, making its appearance in the middle districts, about the beginning of September, when it comes from more northern latitudes. It migrates farther southward according to the severity of the season, and, during hard winters, is found as far south as Louisiana, but more usually, on such occasions, in the lower parts of Kentucky, and the state of Indiana. I have shot several individuals of this species in all the parts above mentioned, and, in 1829, I shot a young male, of which I drew a figure, in the month of September, in the Great Pine Forest, in Pennsylvania.

The flight of the goshawk is extremely rapid, strong, and protracted, although not performed at a remarkable height, excepting on certain rare occasions. It usually glides within a few yards of the ground, or of the tops of the lower bushes, moving with a speed equalled only by that of its relative, my *Falco Stanleii.* The motions of its wings, at this time, resemble those of a common pigeon in the act of making its escape from a hawk which pursues it. While thus rapidly following its course, the goshawk suddenly checks its career to fall on its prey and secure it, or to alter its course in pursuit of the object of its search, either to the right or left, or upwards, after the fugitive. Should a flock of wild pigeons (*Columba migratoria*) pass, he immediately gives chase, soon overtakes them, and, forcing his way into the very centre of the flock, excites the utmost terror. The next moment he is seen wending his way with a pigeon in his grasp, and diving towards the depth of the forest to feed upon his victim.

The same mode is employed by the goshawk in securing wild ducks, on one of which I have several times surprised it feeding. On alighting with a duck, it turns the breast of the dead bird upwards, and plucks off the feathers with as much neatness as the peregrine falcon is wont to do.

On some rare occasions, the goshawk rises to a considerable height in the air, by means of small circles, which it performs by alternate short sailings and repeated flappings of its wings, and, with a precipitation equal to that of the peregrine, falls upon its prey with unerring aim, strikes it, and flies off with it to some sequestered spot, to devour it in security.

Some of these birds breed in the more northern parts of the United States, and now and then a nest is found in the State of New York, and even in the mountainous parts of Pennsylvania. I examined one which I found placed in a pine-tree, growing among the precipitous rocks which form the eastern bank of the Niagara River, a few miles below the great cataract. It was formed of sticks, briers, and dry rank weeds. The eggs were laid upon a few large feathers. They were four in number, of a light greenish-white colour, large, much rounded, and somewhat granulated. The nest so resembled that of the great horned owl (*Strix Virginiana*,) that I at first took it for one of that bird. The female was sitting, and was shot by me in the course of the same day. The goshawk, when perched, stands more erect than most species, and frequently shakes its long tail sidewise.

I subjoin a description of the adult male, the adult female, and of a young male, shot in September.

Adult Male.—Bill short, nearly as deep as broad at the base, the tip trigonal, very acute, and decurved; upper mandible, with the dorsal outline, convex from the base, the ridge rounded, the sides convex, the edges acute, overlapping, and slightly festooned; lower mandible a little deflected towards the tip, which is broadly rounded. Head large; neck short; body robust. Legs longish, the tibia long, the tarsus rounded, anteriorly scutellate, scaly on the sides; toes rather long, stout, scutellate above, scaly on the sides, tubercular and scabrous beneath, the fore toes with a slight web at the base; claws roundish curved, extremely acute.

Plumage, compact. Wings reaching to the middle of the tail, the fourth quill longest, the first and eighth equal. Tail long, nearly even, of twelve broad feathers. Tarsus feathered more than one third down.

Bill black, light blue at the base; cere greenish yellow; eyebrow greenish blue; iris reddish orange; feet ochre yellow. The general colour of the upper parts is dark ash gray; the upper part of the head, and the ear-coverts are grayish black; a broad line of white over each eye; a central line on each feather black, as is the case with those of the neck and back; under parts grayish white; the sides and abdomen tinged with brown; fore neck longitudinally streaked with a blackish colour; the breast, sides, and belly, transversely barred with blackish gray, and longitudinally lined with black; tail with five broad bands of brownish black, the terminal band much broader; the extreme tips whitish.

Length, 24 inches; extent of wings, 47; weight, $2\frac{1}{2}$ lb.

Adult Female.—The female agrees with the male in every particular of the above description, but is somewhat larger.

Young Male.—Bill as in the adult; iris light yellow; feet greenish yellow. The general colour of the upper parts is light reddish brown, largely spotted with brownish black. On the upper part of the head, the margins of the feathers are brownish red, and the black predominates; a broad band of white over each eye; quills lightish brown, barred with a darker colour; tail brownish gray, banded with brownish black; ear-coverts brownish, streaked with black, as is the throat; fore neck and breast pale reddish brown, the former marked with small oblong spots of dark brown, the latter with large ovate, acuminate spots of a deeper tint; the shafts black; upper tibial feathers barred, the rest with oblong spots, which, with the shafts, are brownish black; the short tarsal feathers similarly spotted.

Length, $21\frac{1}{2}$ inches; extent of wings, 46.

From the above short descriptions of the American goshawk, it will be seen, that it does not differ in any essential respect from the European bird of the same name. I am, dear sir, yours respectfully,

John J. Audubon.

Edinburgh, February, 1831.

ART. II.—*Description of two new Species of Marine Algæ.* By ROBERT KAYE GREVILLE, LL.D. F.R.S.E. F.L.S. &c.; *with a Plate.*

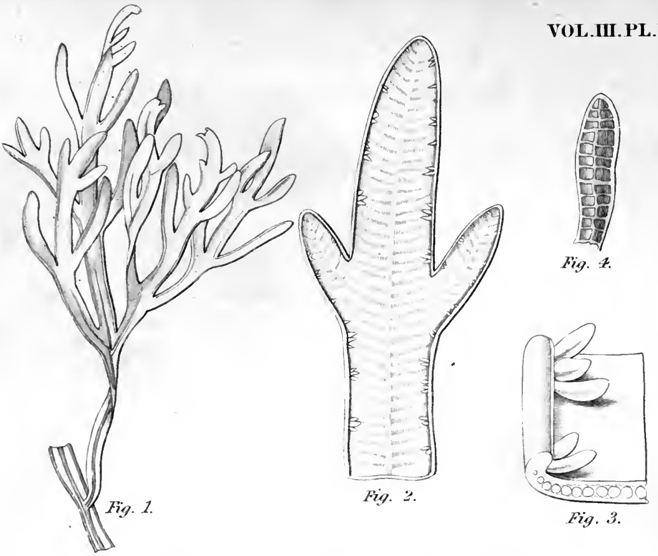
IN the formation of various genera, proposed in my work on the *Algæ* of the British Islands, I have ventured to deviate from the rule laid down by my excellent friend Agardh, and some other algologists,—that the fructification shall constitute the primary distinction. As plants are grouped together in order to facilitate the labours of the botanist, it follows, that the greater the resemblance between the individuals composing families and genera, the more will such an object be fulfilled. Characters ought therefore to be selected, which are not only constant, but, if possible, conspicuous, and of easy application. In regard to the organs of fructification, I agree entirely with Professor Lindley, who observes, in his admirable work—the *Introduction to the Natural System of Botany*—that they " are only entitled to a superior degree of consideration, when found by experience to be less liable to variation than those of vegetation." Now it is well known to the cryptogamic botanist, that he cannot always draw his best characters from the organs of fructification; and that, even when he does so, situation is often taken into account, as in the genera *Hypnum* and *Bryum* among mosses. The form of the sorus is considered of importance among ferns; and in some cases, where the habit is very peculiar, that circumstance is considered as nearly sufficient of itself to establish a genus. The lower we descend in the scale of vegetation, the more variable do we find the organs of fructification to become, and the characters we derive from them can hardly be considered, in many cases at least, analogous with those taken from the same organs in dicotyledonous and monocotyledonous plants. Besides, any remarkable and at the same time permanent difference in the vegetating medium, will naturally produce a new series of phenomena, some of which may be of great importance. Under such circumstances, vegetation may be found worthy of taking a prominent part in the diagnosis of genera: and colour also, of comparatively trifling value in other cases, may be sufficient, among the marine algæ, to distinguish, not only between families, but between genera.

PHYLLOPHORA, GREV.—*Alg. Brit.* p. lvi.

P. obtusa; fronde subcartilaginea, palmata, segmentis apice rotundatis, margine integerrimo, capsulis sphæricis in foliolis stipitatis, disco frondis coacervatis.

Hab. At the Cape of Good Hope. Bowie.

Root, a hard disk. *Stems*, somewhat tufted, a few lines to an inch in length, which soon expand into *fronds*, six to nine inches long or more, divided in a palmate manner; the segments nearly



Rytiphlaea canaliculata, Grev.

Phyllophora obtusa, Grev.

Edinr. Journal of Natural & Geographical Science New Series.

R.K.G. delint. Swan Sculpt

an inch in width, even and entire at the margin, rounded at the extremity. The frond is furnished, at the base, with an obscure midrib, which soon disappears. Towards the extremity, and from the disk of the primary frond, arise one or more others, which are supported upon a very short stem, so that the entire plant is sometimes composed of three series, the second and third being proliferous. *Fructification,* spherical capsules, produced in clusters on the disk of the frond, and supported on little foliaceous processes. *Seeds,* minute, irregular, angular; escaping by a pore at the summit of the capsule. *Substance,* thin, but rather rigid and cartilaginous. *Colour,* a fine purplish, somewhat transparent, but dull red; which soon fades, and leaves the plant of a yellowish white.

Pl. 4. *fig.* 1.—The extremity of one of the main divisions of the frond. 2. Portion of a frond, with clusters of capsules; natural size. 3. Foliaceous processes which support the capsules. 4. A capsule divided. 5. Seeds; magnified.

This extremely beautiful alga, which was recently communicated to me by Mr Bowie, the collector of objects in natural history at the Cape of Good Hope, appears to be undescribed, and to belong very satisfactorily to my genus *Phyllophora.* As in the other species, the frond is extended by new shoots from the surface of the old one; the stem which, in the form of an obscure nerve, passes into the lower part of the frond, soon entirely disappears; and the fructification is situated on minute foliaceous processes. In regard to its general outline, this species is extremely similar to my *Rhodomenia palmata,* (Halymenia palmata, Ag.)

Rytiphlæa,—Ag.

R. canaliculata; fronde cartilaginea, transversim dense striata, costata, bi-tripinnata, pinnis linearibus, canaliculatis.

Hab. On the coast of Swan River Settlement, New Holland. Fraser.

Root, a cartilaginous disk, throwing out a few short fibres. *Frond,* tufted, and bushy, seven or eight inches long, much branched, the principal branches twice or thrice pinnate, furnished with a stout midrib, which disappears towards the extremity. *Pinnæ,* linear, about two lines wide, somewhat narrower at their insertion, obtuse at the apex, mostly opposite and spreading, the margins rigidly incurved, so as to render the whole frond channeled. Besides the distichous branches or pinnæ, there are others which arise from the midrib on each surface of the lower part of the frond. The transverse striæ are very conspicuous under a small magnifier, when the plant is in a dry state—far less so when moist. *Fructification,* unknown, unless minute clusters of lanceolate processes, arising from the incurved margin, be regarded as such. *Substance,* thick and cartilaginous, very rigid when dry. *Colour,* a dull deep red, changing to black on exsiccation.

Pl. 4. *fig.* 1.—A portion of the frond of *Rytiphlœa canaliculata,* natural size. 2. A portion of one of the pinnæ. 3. A portion of the margin, with the lanceolate processes. 4. One of the processes removed; magnified.

Much uncertainty exists in regard to the true limits of the genera *Amansia* and *Rytiphlœa,* and, therefore, I cannot speak with any degree of confidence of the generic relations of the present plant. Indeed, in the absence of fructification, it is only the mode of ramification, and the striated frond, which induces me to refer it to this place; for it is by no means improbable that it may be found eventually to form the type of a new genus. The substance is much thicker than that of any species of *Rytiphlœa* and *Amansia* I am acquainted with; the canaliculate frond, too, is very remarkable.

ART. III.—*Sketch of the Progress of Geographical Discovery during the past year,* (addressed to the General Assembly of the Geographical Society of Paris, 10th Dec. 1830.) By M. Jouannin, General Secretary of the Central Commission.*

Gentlemen,—We have arrived at the termination of a year which will be memorable in the history of nations. The great events which have marked its course, present a character of which it does not belong to me to speak before an assembly, whose concern is with facts of a different nature from those supplied by politics; though they, at the same time, must have their share of consideration. But, whilst I forbid myself from entering upon the stormy field of politics, which absorbs universal attention at the present day, I cannot avoid saying, that this general occupation of the public mind has probably affected the proceedings of our society; at which, indeed, no one can be surprised. And I may add, that less fortunate than my three predecessors,† in the account which I have to give of those proceedings, which always require your approbation and encouragement, I shall have to traverse a more limited and less fruitful field.

* We presume that no apology will be requisite to our readers for the introduction of this detailed account of the progress of geographical discovery, to the exclusion of other papers of individual interest. There are portions of this Report, however, which, being entirely connected with the history of the Geographical Society of Paris, it may be thought might have been passed over with advantage; but we have been anxious to preserve the whole, if it be only to shew how prominent a place this Society occupies amongst the promoters of geographical science in Europe. And we trust that the amount of interesting information contained in the following pages will operate as an excuse for the occasional bursts of national vanity which the author appears to have been unable to control.—Ed.

† MM. Malte-Brun, Roux de Rochelle, and De Larenaudière, who have so ably traced the route to be followed by their successors.

General Notice of the present state of the Geographical Society.—I have not to speak to you of any modification in the laws of our society. Eight years of an existence, honoured by the most distinguished support, and very recently (August 15, 1830,) confirmed by the august protection of a Prince, who, before the voice of France had named him the "king of a free people," had already signified his approval of your labours;—these eight years, I say, have allowed of all the improvements being made in the regulations which experience has successively suggested. However, if the results do not yet answer your wishes,—if we have not yet commenced to collect materials which may sooner or later be employed in the preparation of an indispensable work,—I speak of a *true and conscientious Geographical Dictionary*, which is wanted by the civilized world,—we would hope that the instructions lately addressed to our correspondents in the different parts of the globe, will direct their attention towards our important design; and that the leisure of the numerous members of this society* will be devoted to the accomplishment of this work. But such happy results can only be expected, when the disquiet, which at present harasses the social body, giving place to the security afforded by the establishment of peace, shall no longer turn the mind from that progressive movement, which has, for some years, so successfully extended the limits of useful knowledge.

The idea which presided at the foundation of the Geographical Society, is itself but a corollary of this proper direction of the mind. It tends to associate the illustrious men of all countries, admitting them to its bosom, and leading them, by this fraternal bond, to communicate, from all points of the earth, their projects, their observations, and their discoveries. This society, of which Paris is the centre, and which is the elder brother of a young and splendid rival, recently established on the banks of the Thames, cannot behold, without a lively satisfaction, coadjutors of a royal race assisting by their endeavours the advancement of its labours; and it is rejoiced to number amongst its correspondents a prince who will eventually inherit one of the most ancient crowns of the North.†

Our relations with the learned societies and academies of the old and new world, are not diminished; they continue to be reciprocally useful. In exchange for the memoirs and other publications of the society, their transactions enrich our library; and we thus, in our turn, obtain important information on countries distant from France. The banks of the Ganges, of the Delaware, and the St Lawrence, as well as those of the Thames, the Spree, and the Neva, Copenhagen and Turin, Mexico and the Havannah, contribute to form this bond of intellectual union; and, when we consider these marks of good will amongst learned

* From its foundation to the present day, the Geographical Society of Paris has enrolled the names of 650 members on its list.

† Prince Christian Frederick of Denmark.

men, and even amongst the mass of the people, we may throw off the fear, that the hatred and antipathies which once seemed to take pleasure in national distinctions, will for ever continue their fatal influence, and arrest the generous progress of true civilization.

An act which you performed in the month of March last, and which was eminently dictated by a spirit of justice, of which our country has often set the example, is a striking and glorious proof of my remark. You have done honour to the modest perseverance and final success of efforts, for a long time useless, in one of our countrymen, who, *the first to return from Timbuctoo,* is able to say, that he has seen with his own eyes, the central mart of Africa, with all the traces of the demi-civilization of the middle age. But, at the same time, you have offered to the manes of Major Laing a tribute of regret, without taking notice of the clamours raised by a pitiable jealousy, against the fortunate rival of the courageous English traveller, who had preceded him at Timbuctoo; and you have thus again proved, in the eyes of Europe, the nobleness and generosity of your sentiments.

You have regretted, at the same meeting, that you have only accorded to Captain Dumont d'Urville an incomplete testimony of your esteem for his labours during the voyage, from which he has brought us some melancholy relics of a shipwreck, which will never be forgotten. Entirely occupied at present with the publication of his work, M. d'Urville, when he again takes a share in the duties of the central commission, will soon give us occasion to speak of him with merited eulogiums.

I must not forget, gentlemen, to tell you, that the prize relative to a journey in ancient Babylonia and Chaldea has been withdrawn from competition, after having appeared for many years in the programmes of the Society. A memoir, however, has been sent in, and was laid before the committee of the *concours;* but as it did not come under the conditions, it was necessarily given up.

The prize offered for a *description of the monuments of Palenqua* is suspended till the year 1833. M. Baradère, who, during his stay in Mexico, formed a rich collection of Mexican antiquities, was a candidate. But the society, not finding the solution of the question proposed by them, in the drawings and manuscripts of M. Baradère, can, at this time, only make honourable mention of the researches of this traveller.

On the proposition of M. Jomard, a new prize has been offered, which will be adjudged to the best memoir on the *Origin of the Asiatic Negroes.* This question, difficult to be solved by the French, seems, in some degree, to belong peculiarly to the present masters of India; they alone appear to be in a situation favourable for the execution of this investigation, and for the collection of such documents as may throw light on a subject of this nature.

The society has reserved, for competition, two prizes for discoveries in Africa; a prize for travels in Caramania; a prize for travels in Guiana; and several prizes for the geography of France.

The third volume of the Memoirs of the Society was published at the beginning of the year. It contains very detailed researches, the result of the long continued labours of M. Bruguières, on the *Orography of Europe.* This excellent work fully justifies, by its geographical importance, the determination of the society to be at the expense of its publication.

The fourth volume is composed of different historical and geographical works, amongst others, of a translation of *Jordanus,* by Baron Coquebert de Montbret. We trust that the scientific world will soon possess it.

The fifth volume will contain a translation of the *Geography of Edrisi,* by M. A. Jaubert, whose absence for two years in the Ottoman empire, in the service of France, will sufficiently explain the delay which this publication has experienced.

The society has not neglected to maintain its connections with the French and foreign travellers, who visit the different countries of the globe, and who are anxious to seek for, and accept its patronage. It follows their path with an earnest solicitude; and I am now about to detain you, for a short time, with the relation of their efforts to render themselves worthy of your honourable encouragement.

Africa, so near to us, but whose interior was so little known, has for some time past been an object of more general attention than formerly. The political movements, which for more than thirty years have led so many Europeans to the land of Egypt, now under the influence of a foreign civilization, imposed by a hand, which it is difficult to characterize; the recent expedition, which has transported the conquerors of Algiers to the foot of the Atlas; the numerous, and frequently unfortunate attempts to penetrate into the heart of those latitudes, which have hitherto been represented upon our best maps but as vast deserts; and, lastly, the restlessness which agitates our times, and the noble ambition of attaching one's name to something new, and to the glory of having overcome obstacles which are unknown in countries where the European has established his customs and his laws;—all these circumstances suffice to explain the preference which our travellers give to the exploration of Africa. We shall, therefore, commence with Africa, in our review of their labours.

Africa.

The Geographical Society has, with pleasure, observed a Frenchman (M. Douville) directing his steps towards Portuguese Africa; and has received a letter from him, dated Rio Janeiro, June 1, 1830. A short time after his return from Angola, this traveller announced that he was in possession of many curious documents connected with this country, which he appeared to have surveyed in the character of a philosopher, an artist, and an observer of manners. We are exceedingly anxious to have him amongst us, and this wish will, no doubt, soon be accomplished, if his health permit him to return to his country.

The African Society of London has sent travellers to Egypt, with the commission to follow the course of the Bahr-el-Abiad as far as Bornou. Frenchmen have also gone in the same direction, and it is to be hoped that the most successful results will arise from this concurrence.

On the other hand, M. Lander, one of the companions of Captain Clapperton during his last journey, is gone with his brother to Badagry, on the coast of Guinea. They will explore the course of the great river of Central Africa, especially towards the point where it is pretended that the river takes a southern direction, to empty its waters into the Gulf of Guinea.

Mr Cooper Rose has ably and faithfully painted the manners and scenery of those parts of Southern Africa which he has visited. His journey entitles him to the esteem of a public eager for all that is exact and true.

Geographical science is indebted to Captain Owen for the best works which have yet appeared on the eastern and western coasts of Africa. His maps have rectified the laying down of the banks so fruitful in shipwrecks, and where civilization is extending under the protection of the present possessors of the Cape of Good Hope.

The conquest of the capital of Algiers by our troops has brought this State into great notice; and numerous publications would have been supplied to the desires of the public, had not the important occurrences which have recently called our attention to other matters, caused us for a time to forget this conquest, and absorbed the attention of the whole world. We may, however, hope that the year 1831 will not pass away without bringing to light a portion of those documents which must, doubtless, have been prepared at the leisure of several very able men, independently of those which are already possessed, and are still being collected, by a government friendly to science, and a protector of her works.

America.

This continent has also been traversed in different directions by many travellers. I shall first mention one of our countrymen, M. Dessalines d'Orbigny, who has visited Patagonia, and those American tribes where the nomadic life of the Arab is found in perfection, with all their disdainful fierceness, their passion for independence, and their hatred of the manners and religion of strangers. M. d'Orbigny has lived amongst three races of natives occupying the vast and barren district between Rio de Plata and Terra Magellanica. He has also collected entirely new details on natural history, and on the language of the Araucanas, the Puelches, and the Patagonians.

Messrs Hardy and Thompson were engaged, during their excursions in Mexico and Guatemala, in adding to our previous information with regard to the soil and inhabitants of these new republics. M. Franck, introduced to you some time ago by M. Poinsett, one of your most esteemed correspondents, has also recently brought to Paris numerous drawings which he collected during a residence of several years in Mexico, and an account of which will shortly be laid before the society.

MM. Yosy, Lhotski, Le Prieur, and d'Acosta, to whom the central commission has presented instruments and instructions, are on their road to visit several parts of the New World. We have every reason to believe that these travellers will not neglect any thing which can make the time they devote to the advancement of geography profitable to that science.

I may besides mention the labours of Mr Pentland in the Republic of Bolivia; those now being carried on in California by Dr Coulter, an excellent English naturalist, who, provided with good instruments, himself a good astronomer, and full of ardour, will certainly deduce useful results from his voyage, which he has undertaken solely for the interest of science.

M. Henri Ternaux, a member of this society, has returned a short time ago from America, and will soon give you an account of all that he has observed in the countries through which he has passed.

We owe to his Royal Highness Prince Christian Frederick of Denmark, the communication of the journal of Captain Graah of the royal navy, employed by the Danish government in exploring the east coast of Greenland.* This extract leads us to expect, that, at his return from so perilous a duty crowned with success, M. Graah will have reached, in this third attempt, the most northern point of that coast of iron and ice, where, it is said, he has even found human inhabitants. Let us hope, gentlemen, that this intrepid navigator, when returned safe and sound to his country, may receive testimony of the esteem due to so much devotion, and that he may publish the materials which he shall have collected, in order to extend our knowledge of the geography of those northern lands.

Western Asia.

The Ottoman empire, which the colossus of the North threatened with total destruction in 1828 and 1829, continues still to attract into the vast provinces under her sway a great number of travellers, desirous perhaps of being witnesses of a great catastrophe, which the events of the last four months, and those to which we still look forward, may put off for an indefinite period. I shall say little to you of Mr M'Farlane, the author of two volumes, which in reality tell us nothing new, and in which there predominates a narrow spirit and inveterate prejudices

* See our last Number, p. 99, and Geographical Collections, *infra*.

against every thing that is not born or used in Great Britain. I call your attention with more pleasure to several of our countrymen who have set out, during the course of this year, to explore Asia Minor, Syria, and Greece, which for nine years has been endeavouring to extricate itself from its ruins, and to assume a situation among civilized nations. M. Michaud, the author of the *History of the Crusades*, accompanied by two geographical engineers, (MM. Caillié and Stamaty,) and M. Carcel, a naturalist, has, notwithstanding his age and weak state of health, gone to visit the places where the greatest achievements of the middle age were performed, and where the contest of the Christians and Mussulmans, after having caused unheard-of evils to the contemporary people, had nevertheless the effect of restoring the arts and sciences in Europe, at that time in a state of barbarism. To the names I have just mentioned, must be added those of MM. Fontanier, Guys, Vidal, Botta, Pallegoix, Gourmelen, Le Turc, a Belgian, Raifé, and Royer, who are at present travelling in different countries of Asia, and are provided with instructions from the society. We also hope that the members of the scientific commission sent to the Morea in 1828 will bring their tribute of discovery. Already some of them, MM. Puillon Boblaye, and Peytier, M. Gauthier d'Arc, vice-consul attached to the French mission in Greece, and recently nominated member of the central commission, have addressed to the society interesting details of their excursions.

We shall soon be indebted to this commission and its director, Colonel Bory de Saint Vincent, for a good map of the countries which are to compose the new Greek state. M. Bory de Saint Vincent and his collaborateurs have not confined themselves to researches in antiquities or natural history,—the geographical and topographical part of their labours will have claims to our special attention.

Russia in Asia, China, Polynesia.

Every scientific person is acquainted with the recent successes of the most illustrious of modern travellers, Baron Alexander de Humboldt, who is still residing in our capital. Accompanied by MM. Rose and Ehrenberg, and under the high protection of the Emperor Nicolas, M. de Humboldt has found, in the northern climate of Asia, subject to the grandson of Catherine, every facility for exploring the Ural, and eastern Siberia. I shall not dwell on a subject with which the daily journals have entertained their readers, and which has occupied, during their sittings, the academies of Petersburg, and Berlin, and the Institute of France, confident in the predilection of M. de Humboldt for our glorious country.

MM. Ledebour, Meyer, and Bunge, had preceded M. de Humboldt in Siberia. Their travels have furnished us with precious information, as have also those of MM. Hoffmann and

Helmerssen in the south of the Ural mountains, and of MM. Erman, Hansteen, and Dowe, intrusted with a magnetic expedition in the same countries.

We have yet to mention M. Dobell, author of *Travels in Kamtchatka and Siberia,* who had been previously for some years in China. There are some interesting observations in his works concerning that vast empire, which has frequently been an object of attention with the Asiatic Society of Paris, not only in a philological, but also under a geographical point of view.

I had almost forgotten to mention M. Parrot, who has visited Mount Ararat, and whose observations have been published in several scientific works.*

I now come to the consideration of the voyages of circumnavigation; and, without recurring to those of MM. Freycinet, Duperrey, and Dumont d'Urville, who are occupied in publishing the accounts of their labours, and who have found in the public approbation the recompense of their fatigues, I shall only remark, that France has at present no navigator employed on a mission similar to that which these officers have accomplished. M. Mathieu, captain of a frigate, was, however, intended for an expedition of this nature, when the attack of Algiers was resolved on. The services of France called him before that place, and he was compelled to give up the navigation of distant seas to face dangers of another kind.

But among the foreigners navigating the vast seas which separate the American continent from Asia and New Holland, and in which exist thousands and thousands of groups of islands, a great number of which have as yet been but partially visited by Europeans, and which Mr Ellis has endeavoured to make better known by his researches into the natural history, mythology, traditions, and manners, of the native inhabitants, I shall mention Captain Litke, who has made many observations in the Carolines, and discovered several unknown islands; and Captain Kolff, a Dutchman, who has traversed the southern archipelago of the Moluccas, and the southwest coast of New Guinea. We may also hope to obtain valuable information from the American navigators, who, although much devoted to their commercial speculations, do not, however, neglect scientific researches. We owe the same eulogy to two Frenchmen, Captain Darlue of Marseilles, who, after having sailed along the coasts of South America, touched at the Sandwich Isles, and traversed the Marians and the Chinese archipelago; and M. Dussumier of Bordeaux, member of the Society, who, in a voyage to Cochin China, made numerous collections in natural history, since presented to the Museum of Paris, and who, at the same time, appears to have collected useful geographical information.

It still remains for me, gentlemen, to call your attention to a project worthy of the consideration of the scientific world, and

* *Vide* Numbers I. and II. of our New Series.

of which the author, whose recent departure has deprived us of seeing him in this assembly, has submitted the vast plan to your central commission. You will immediately perceive, that I allude to Mr Buckingham, a most indefatigable traveller, in the prime of life, and who, after having explored a great part of the globe, wishes to make a voyage round the world, which is to last five years at the least. This interesting navigator, whom numerous auditors have heard speak in public on new subjects, with a facility so rare in a foreign language, has found in M. Dumont d'Urville a conscientious and enlightened judge of his project, which at once embraces the interests of science and of civilization, and the advantages of commerce so essentially important to England.

It is not necessary for me to speak here of M. d'Urville's report in detail, nor of the plan, with the examination of which he was intrusted. The monthly bulletin of the Society will supersede an analysis of these observations, otherwise too complete and extensive to be presented in an abridged form in this report.*

It still remains for me, gentlemen, to recapitulate to you briefly the labours of the central commission, to which several among you have privately devoted yourselves. First, we should address our thanks to those members and correspondents who have furnished us with useful documents; amongst whom I may be allowed here to mention the communications of Mr Warden, on America; of M. Jomard, on Africa; of M. Bianchi, on the East; of M. Cadet of Metz, on the Voyages to the North Pole; and the reports of MM. Brué, Coraboeuf, Coquebert-Montbret, Girard, d'Urville, and Théologue.

Among the individual labours of the members of the society, it is my duty to mention the beautiful maps of Colonel Lapie, (Egypt and Arabia Petrea, and the States of Barbary;) he is engaged at present in the publication of a map of the Roman empire, in which he has traced the itineraries of Antoninus and of Peutinger. He is also continuing the publication of his *Universal Atlas*, but the late events have retarded its execution.

The expedition to Algiers has elicited useful works from several of our coadjutors. Independently of what we have received from Colonel Lapie on that part of Africa, I may mention the map of M. Barbié du Bocage, and the plans and lithographs which M. Bianchi has added to the translation of the *Essays of Shaler*, a work eminently useful at the period of its publication, (the departure of the expedition in May and June last,) and justly esteemed the best which we yet possess, on the regency of Algiers. M. Bianchi, on the return of a mission, in the prosecution of which he nearly perished, laboured diligently at this work, and has, in some degree, made it complete, by giving to the public an interesting relation of the mission, in which he accompanied Admiral de la

* M. d'Urville is favourable to Mr Buckingham's project. — Ed.

Bretonnière, and of the insult offered by the Algerines to the vessel La Provence, in August, 1829. M. Bianchi has deposited in the society, a second edition of his plan of Algiers, and its fortifications and environs, with the numerous improvements and changes already effected or projected by the French, since the conquest. Our colleague is indebted to Captain Gibou for these corrections.*

During the year 1830, the geodesic operations for the new map of France have been continued on several parts of the kingdom, with the same degree of exactness which the corps of geographical engineers has extended to every thing belonging to the execution of that great enterprize, which will really be the topographical masterpiece of our time. The first sheets, which will soon be published, completely justify our praises.

It is known, that the geodesic operations carried on in the Pyrenees by one of our colleagues, (Lieutenant-Colonel Corabœuf,) have established, with much precision, the difference in the level of the ocean and of the Mediterranean. The results of these trigonometrical measurements, afterwards subjected to the calculation of probabilities, shew that the two seas affect the same level, contrary to the conjectures which seem to have hitherto prevailed.

In the course of last October, one of the vice-presidents of the central commission, Colonel Bonne, was engaged in the astronomical verification of the western part of the arc of the parallel which is already measured from Brest, as far as Bude, in Hungary, and will be extended to the river Volga and to the Ural. This is the most extensive operation of the kind which has yet been undertaken; for the extent of the arc exceeds 50 degrees. France ought to claim a fair share in this glorious enterprize, the continuation of which she has prolonged, after foreign governments had relinquished it. The execution of the new map of France will thus add new and important information to what we already possess on the figure of the earth.

I fear I encroach on your time, gentlemen; but I cannot neglect to render justice to M. Dufour, a new member of the central commission, and author of an Atlas, executed with taste, and accompanied with a well written text, which will very advantageously supersede those heretofore put into the hands of young students. M. Denaix pursues with zeal and perseverance the continuation of his *Essais de Géographie Méthodique*; M. Brué, whose health has been for years declining, has never omitted taking part in the sittings of the central commission, and has not yet given up his labours, although he has at present remitted the publication of the results. I shall also mention M. Balbi, who is diligently engaged in statistics and geography;

* In a short time, M. Bianchi will publish his *French and Turkish Dictionary, for the use of Navigators, Merchants, and other travellers in the Levant.* This work, which was much wanted, will be of real service to orientalists and travellers.

Baron Walckenaer, who continues the publication of his *Histoire Générale des Voyages;* M. de la Renaudière, who is diligently working at his *Géographie,* and who furnishes for the *Annales des Voyages,* in conjunction with his scientific friend, M. Eyriès, one of our most honourable collaborateurs, a valuable collection of articles, translated from foreign languages, or the fruits of their own researches; and, lastly, M. Rifaud, whose zeal you have often appreciated, and M. Bald, the Irish engineer, who superintends with so much care the engraving of his beautiful *Atlas of Ireland,* intrusted to our colleague, M. Tardieu.*

Such is the sketch, in which I fear I have underrated, but in every case quite involuntarily, the title which our fellow-labourers have acquired to your esteem. It would be unjust not to mention the names of several foreign members and correspondents. The bulletins of the society repeat them so often, that you will remember them all with pleasure, and several of whom you will remember to have seen among you. The Chevalier d'Abrahamson, a Dane, full of love for his country, and for all the sciences which may enlighten man; M. Rafn, who enriches our library with all the literary productions which he thinks worthy the attention of the society; Baron Hammer, one of our most learned correspondents, so well acquainted with Eastern affairs, that all his labours are for the advantage of history and literature; MM. Berghauss and Reinganum, of Berlin; M. Graberg de Hemsö, of Florence; the Barons de Capellen and de Derfelden, of Utrecht; Messrs Stanhope, Franklin, and Captain Sabine, of London: and in America, General Bernard, M. Poinsett, already mentioned, and Messrs Mease, Tanner, and Woodbridge.

I have now finished my task, gentlemen; and in begging you still to give me your attention for a few moments, I shall employ that favour in calling to your remembrance the distinguished members we have lost during the course of the past year; and, first, I shall mention the name of Baron Fourrier, perpetual secretary of the Academy of Sciences, whose eulogy has been pronounced by our honourable colleagues, MM. Girard and Jomard. Count d'Hauterive, after having so long pursued a diplomatic career, died the day after that on which the calamitous ordinances plunged our fine country in a kind of stupor, soon, however, to be substituted for a terrible réveille! I shall add to these two names, illustrious in the sciences and in public affairs, that of a good man, of a wise and moderate administrator, who knew how to govern an ardent population,—I speak of M. le Comte de Villeneuve, who died prefect of Bouches-du-Rhône, after an administration of fifteen years.

(Signed) J. M. Jouannin.

* The events in Belgium made us fear lest M. Van der Maelen had suspended the publication of his *Atlas of Europe,* the first eight numbers of which have already appeared; but a letter, addressed to the society, the 23d December, 1830, is accompanied by five new numbers, (No. 9, to No. 13.) We are anxious to repair this involuntary neglect. (8th January, 1831.)

GEOGRAPHICAL COLLECTIONS.

Captain Graah's Expedition to the East Coast of Greenland. — In our last Number, (p. 99.) we gave a general notice of the result of Captain Graah's expedition in search of the colony of Icelanders, supposed to have been established, at an early period, on the east coast of Greenland. We are now able to give some additional information, from Captain Graah's Journal, respecting the inhabitants met with during his perilous undertaking.

The principal object of this expedition was accomplished in 1829; for, having passed the latitude attributed to the ancient Icelandic colony, without having found the smallest trace, or the most insignificant ruin, even in places which must necessarily have been inhabited, had the country ever been occupied by a domiciliated people, and without having found among the natives either traditions or traces of the religion, language, or manners of the ancient Christians, it appears evident to M. Graah, that the ancient colony was not situated to the east of Statenhuk, but in the country south-west of Greenland, which at present constitutes the establishment of Julianashaab—an opinion advanced forty years ago, by M. Eggers, in a work crowned by the Royal Academy of Sciences of Copenhagen.

The only thing which can tend to confirm the ancient opinion as to the situation of this colony, is the physical character of the men met with by M. Graah, this race appearing to have very little analogy with the Esquimaux; but, on the contrary, approaching much to the Scandinavians. They have neither the flat head, nor the small and broad body, nor the flabbiness of the Esquimaux; but they are, for the most part, above the middle size. The form of the head, and contour of the figure, are similar to those of Europeans; the body, rather thin than fat, is sinewy and well formed, without being weak; they are also more active and robust than the natives of the west coast. The colour of the skin, in the women and children, is as fair as in Europeans; and they have frequently brown hair, which is never found in the other Greenlanders. Some of the men allow the mustaches to grow, others tattoo their arms; and all the women tattoo their own arms, hands, and chin. As they are exposed to the greatest misery, and very frequently to famine, they seldom live beyond fifty years: they state that the population is decreasing; and, between the latitudes of 60° and 65°, M. Graah found not more than about five or six hundred inhabitants. The population appeared less considerable on the southern part of the coast, as many of the inhabitants had gone to establish themselves at Frederickshaal, a new Moravian mission near Cape Statenhuk. These missionaries collect the natives about them, which undoubtedly facilitates their instruction and conversion; but, on the other hand, during years of scarcity, they are much exposed to famine, which then causes most frightful ravages. In the Danish missions and establishments, they leave the natives at liberty to pursue their erratic mode of life, without losing sight of the object of the mission.

M. Graah only expresses himself superficially as to their religious opinions; indeed a more perfect acquaintance with their language would be necessary to enable him to speak positively; it however appears, that, like the other Greenlanders, they adore two beings, a good and a bad genius: they have, like them also, sorcerers, (*angekoks,*) but who appear to exercise less influence over them; and what they do exercise will probably diminish still more, as M. Graah saw the children amusing themselves with mocking at them. The moral character of this people is good; they do not seem to know vice; and, in their domestic relations, the gentleness of the men, the submission of the women, and the obedience of the children, as well as their mutual love and confidence, make us forget that they are pagans. In the isolated state in which M. Graah found them, there was nothing but fidelity, hospitality, good nature, and kindness in these children of nature; which enabled him to overcome the many obstacles which nature presented to the accomplishment of his object. For thirteen months, he lost only one hatchet, which, indeed, he believes to have been left somewhere; and his letters and journals have been brought to us by a Greenlander, who carried them from Nugarbik to Nemortalik. Polygamy is not very common among them; they do not change their wives, and their morals appear irreproachable. The husbands neither beat nor dispute with their wives, and were never seen looking ill naturedly at them.

Although M. Graah possessed things which pleased them very much, nothing was ever asked from him, not even by the children, unless he had received a service from them; in that case they always demanded some little gratification; but this was generally limited to a pinch of snuff, which perfectly satisfied them; tobacco, coffee, and spirits, afforded them the greatest delight.

The dried flesh of seals appears to form the chief part of the food of the natives, and they also eat game and fish. (*Extract from the Journal of Captain Graah.*)—*Bull. de la Soc. de Géog.* October, 1830.

Notice by M. de Humboldt of his Travels in Siberia. (Read to the Academy of Sciences, Oct. 11, 1830.)

The journey made last year by MM. Ehrenberg, Gustavus Rose, and myself, under the auspices of the Emperor of Russia, to the mines of the Ural and Altaï, to the frontiers of Chinese Dzongary, and to the Caspian Sea, yielded a variety of observations considerable enough to form the subject of particular memoirs and works. We possess geological collections made by ourselves, and more complete than those which have been hitherto brought from that part of Asia into Europe. They are arranged by M. Rose, and deposited in the museum of Berlin by the side of the geognostical collections of Mexico, Quito, South Brazil, the Canary Islands, and different regions of Europe. I am engaged in concentrating the principal results of our labours in a physical table of the countries we have traversed, a work which will appear under the title of *Geognostical, Magnetical, and Astronomical Observations.* M. Ehrenberg, whose former travels in Nubia, Dongola, and Abyssinia, supplied him with means of comparison, very fertile in new views, will treat, in a separate volume, of the geographical distribution of plants between the Volga, Irtisch, and Obi, between the Ural and the step of Kirguises. He undertakes also the zoological descriptions, especially those of fresh water shells, insects, and fishes, with which the great rivers and the Caspian Sea abound. I shall have the honour of communicating to the Academy, at another sitting, an extract from a memoir not yet printed, and in which M. Ehrenberg, after having characterized the variety of the royal tiger of India, which appears north of the great Cordillera of the celestial mountains (Thaanchan,) and even to the north of Tarbagitai, and the dioptase district, explains the differences of the *Felis pardus* of Cuvier, of the *Felis chalybeata* of Hermann, which is the *Felis pardus* of Temminck, and of the *Felis Irbis* (the long-haired Panther,) which Pallas has confounded with the *F. pardus* of Africa; and of which we have obtained a beautiful skin from Semipolatinsk, on the banks of the Irtisch.—*Ann. des Sci. Nat.* Oct. 1830.

United States' Expedition.—The scientific expedition, for the exploration of the South Seas, fitted out by the United States, has entirely failed. The crew of the ship mutinied, and, after having set the superintendants of the expedition ashore in Peru, carried the vessel into St Mary's, a little south of Conception.

Charts of the Northern Coast of Brazil.—There is no part of the South American coast more dangerous to vessels than the northern part of Brazil, and none perhaps more incorrectly laid down on the charts. No survey has ever been made of this coast, and the only charts of it, by Arrowsmith, are found to place the line of coast from twenty to thirty miles to the northward of its true position. Coral reefs and quicksands form a sort of impenetrable barrier to it, and these dangers are increased by a current running at the rate of three and four miles an hour. Off the mouth of the Amazons, the current is much influenced by the stream of that great river, and the winds which prevail there, according to the season of the year. These things considered, as well as the little trade hitherto afforded by this part of Brazil, it is easy to imagine the sort of materials from which the charts must have been compiled. Captain Foster in H. M. ship *Chanticleer*, employed on a scientific expedition, had been some time at Maranham, before the *Mersey* was there. * It is to be hoped that this officer will afford us materials for constructing correct charts of this dangerous part of the world.

It is stated, that the harbour of St Louis, Maranham, is fast filling up—affording another remarkable instance of those changes which nature is constantly working in our globe. The effect of the rainy season is distinctly visible in the harbour, in bringing down from the interior large quantities of sand and mud; so much so, that in one place, where large ships formerly lay at anchor, even at low water, there is not now sufficient to float a boat. In the deepest part of the harbour, at present, there is not more than a depth of fourteen feet at low water, and in consequence of this, it is expected that the port for shipment of goods will be removed. That of Artaki, close by, is large, safe, and commodious, but totally deficient in the article of fresh water, which is not to be found within a distance of ten miles from it; so that it is more likely the shipments will take place from the town of Alcantara, on the opposite side of the bay of San Marcos.

The survey of Baron Roussin extends only as far as the Island of San Joao, to the westward of Maranham; and his charts, although the best of this part of the world, are in many parts susceptible of improvement. His plan of Port Louis appears to be very incomplete, and he even omits the middle ground, a large shoal in the bay of San Marcos, known to all the pilots of the place. Great credit is, however, due to the French Admiral, for his persevering exertions in discovering the position of the Manoel Luiz rock, one that had been long fatal to the trade of Maranham, whose situation was involved in mystery, and which had long eluded the search of the most experienced navigators.—*Athenæum*, No. 171.

Reef amongst the Caroline Islands.—A dangerous reef has been discovered in the Pacific Ocean, among the Caroline Islands, the N. E. extremity of which is in lat. 7° 36′ north, and long. 155° 18′ east. It was found to lie in a N. E. and S. W. direction, and is so extensive, that the whole of it could not be seen from the N. E. extremity. It is about fourteen miles, in a W. S. W. direction, from the island Bordelaise, discovered in 1826.—*Ibid.*

Dr Edward Rüppell.—This enterprizing and enthusiastic traveller left Frankfort in the early part of November last, to reside again in North Africa. He undertakes this journey, as he did his former one, entirely at his own cost; and, having gone out with the intention of spending the remainder of his private fortune (about £3000) in this undertaking, he has made an arrangement with the town, which he has so much enriched by his ardour, that if he returns, they will allow him an annuity of £100. The museum of Frankfort, entirely formed by the collections during Dr Rüppell's

* The *Mersey*, Capt. Courtenay, lately ran aground, on the Braganza Reefs, at the entrance of the Para branch of the River Amazon, entirely owing to the inaccuracy of the charts; and since then the *Thetis*, Capt. Burgess, has been wrecked off Cape Frio, near the entrance of Rio Janeiro, from the same cause.

last residence in Africa, and by the articles obtained in exchange for the duplicates in the African collection, certainly ranks third among the continental museums.—*J. E. Gray.*

Dr Belenger's Overland Journey to India.—In a former number (Vol. I. p. 211) we briefly noticed the favourable report of Baron Cuvier on the result of the travels of Dr Belenger, in the east. In M. Cuvier's analysis of the proceedings of the Academy of Sciences, during the year 1829, (just published) we find the following additional information:—

Dr Adolphe Belenger has laid before the Academy, through the minister of the interior, the results of his overland journey to the East Indies, in company with Viscount Desbassyns, governor of Pondicherry. This journey occupied fourteen months; and Dr Belenger has, to the extent of his power, laid under contribution the countries which he crossed. He has made excellent collections in zoology and botany, in Georgia, Persia, at Bombay, Mahe, on the Malabar coast, during his excursions in the Carnatic and on the coast of Coromandel, at Bengal, in the Burmese empire, and at Java; and he has amassed together millions of objects of natural history. Pegu especially, which had only been previously visited by Dr Wallich, afforded him many new things. We have particularly recommended the department of fishes to his attention, as being most incomplete in the *Cabinet du Roi.* Those which he has sent, and especially the species taken in the rivers of Bengal and in the Irrawaddi, the great Burmese river, are precious materials for ichthyology. Herpetology is also much enriched: we have particularly remarked large Pythons, a new genus of tortoises, with four toes on all the feet, and many of those little species of *Sauria* and *Batrachia,* which travellers too often neglect. Amongst the insects, about 150 species are new to the *Muséum d'Histoire Naturelle,* and of these some are very remarkable.

Botanical Tour in Mexico and California.—Mr Drummond, of Belfast, is about to proceed by New York to New Orleans, and thence to Mexico and California, on a botanical excursion. From the experience and activity of this gentleman, we anticipate numerous and important acquisitions to our knowledge of botany and the other departments of natural history. It is expected that Mr Drummond will be absent for several years.

Geographical Position of the Columbretes.—(Notice of a Paper recently communicated to the Royal Geographical Society, by Captain W. H. Smyth, R. N.)—The Columbretes consist of some islets and rocks on the coast of Valencia, in the Mediterranean: the largest lying in lat. 39° 56′ north, and longitude 0° 43′ east. The attention of Captain Smyth had been directed to these rocks during his survey of the Mediterranean, from the evidence of their volcanic origin, as well as their dangerous nature, and the circumstance of their affording a resort for pirates. They are said to be overrun by snakes of beautifully variegated colours; and, although uninhabited, are much frequented by piratical vessels. Captain Smyth entered into some detail on their geological construction, as well as their proper nomenclature. They are generally called the Columbretes, but are named Mont Calibre in the old charts. The principal feature attending them consists in the port, which is named Port Tofina, occupying the mouth of what evidently appears to have been the crater of a volcano. The Moorish xebecs and galliots lie concealed in this port, and from thence issue forth on their piratical excursions. The islets amount to fourteen in number; extend about two miles, in a S. S. E. direction from the largest, which is also the northernmost, and are nearly level with the surface of the sea. Some of the rocks rise to a considerable height, in pinnacles, affording a distant view from the top. Amongst them is one which has exactly the appearance of a ship under sail. Captain Smyth's paper was accompanied by a plan and view of these rocks.

New Nautical Almanac.—It is well known to most of our readers that, for many years past, numerous complaints have repeatedly been made against the state of the *Nautical Almanac*, as not keeping pace with the progress of astronomy and navigation; and the pages of our journal have from time to time contained many remonstrances and comments on this subject, from various individuals. An attempt, indeed, was made about seven years ago to redress the evil, and a committee of the Royal Society was appointed to consider "whether any, and what additions, ought to be made to the *Nautical Almanac*." The result, however, was not attended with any advantage to science, as the only resolution which they came to was the following, viz. "that it would highly conduce to the interests of practical astronomy, if tables of precession, aberration, solar nutation, and proper motion of 60 principal stars were formed *for every day, in the period of four years, including leap year;* and that a separate table be given for every degree of the moon's node." And in consequence of this resolution, a folio volume of tables for that purpose was computed and printed at a great expense, which has been complained of as a manifest waste of public money: since no observatory, except that of Greenwich, would, in the present state of science, ever think of resorting to so cumbrous a mode of assistance, amidst the numerous helps that are afforded by more accurate and elegant tables.

Seeing, therefore, no chance of improvement from this quarter, it was proposed to bring the subject before Parliament; and various papers were moved for and printed by the House of Commons, with this view; but, from an assurance that Government was about to take up the subject, the matter was then dropped. During the last summer, however, the Board of Admiralty, (with whom the management of the *Nautical Almanac* now rests, by virtue of a recent act of Parliament,) sent an official communication to the Astronomical Society of London, requesting their opinion and advice as to the alterations and additions that it would be proper to make in that national work; and it is to the result of the Society's labours that we now wish to draw the attention of our readers.

The Council commenced their operations by nominating a committee, consisting of forty members, comprising not only some of the most profound mathematicians, but also most of the experienced practical astronomers and nautical men of science in the country, as well as the professors from the naval establishments at Greenwich and Portsmouth. This Committee, having met, proceeded to examine and discuss *seriatim* the various parts into which the *Nautical Almanac* is divided; and having agreed on certain preliminary arrangements, appointed a sub-committee to examine them more in detail, as well as to examine and digest the various hints and suggestions which had been forwarded to them, not only by members of their own body, who were unable to attend the meetings, but likewise by other correspondents, relative to this subject. The sub-committee having made a report of their labours, it was ordered to be printed; and a copy of the same, (together with a *specimen* of the printed pages of the new almanac,) having been forwarded to each member of the committte, a *distant* day was appointed for taking it into consideration; by which means every opportunity and facility have been afforded for the most ample and open discussion of the several points in question. The final result of their deliberations is contained in a Report, which has been forwarded to the Admiralty; and we have the satisfaction of stating, that nearly the last act of the late board was the approval of that Report, and the issuing of an order for its being carried into immediate execution.

We have been favoured with a sight of that Report (which will form a portion of the ensuing volume of the Memoirs of the Astronomical Society,) and we here present our readers with the following summary of the principal alterations and additions:—

The use of *apparent time* is abolished in all the computations; and *mean time* alone adopted.

The calculations are, in general, carried one place farther in the decimals than has hitherto been done; that is, all quantities expressed *in time* are carried to *two* places of decimals in the seconds; and those *in space*, to *one* place.

The moon's right ascension and declination are given to *every hour;* and to the declinations are annexed the differences for every five minutes.

The places of the six principal planets are to be given for *every day;* and those of the four new planets for *every fourth day:* with an ephemeris of the latter for *every day*, for one month before and after their opposition.

The co-efficients, A, B, C, D, which are used for computing the apparent places of the stars, are to be given for *every day*.

The apparent *contacts* of Jupiter's satellites, and also of their shadows, with the planet, are to be inserted.

The lunar distances of the *planets* are also to be inserted: with the *proportional logarithm* of the first difference annexed to *all* the lunar distances.

Predicted occultations, (visible at Greenwich,) of planets and fixed stars, to the *sixth* magnitude inclusive, are to be given; and also,

Elements for predicting such occultations of the planets and fixed stars, to the *fifth* magnitude inclusive, as may be visible in any habitable part of the globe; with the limits of latitude annexed, within which they will be visible.

The apparent places of the fixed stars are to be increased to 100 in number; α and δ *Ursæ Minoris* are to be given for *every day;* and the remainder for every tenth day, as usual, but with the differences annexed.

The list of moon-culminating stars is to be incorporated with the work; and various tables added for facilitating the computations connected with this interesting and useful branch of practical astronomy.

These are a *few* only of the numerous alterations and additions that have been made to this national work. To enumerate the *whole* of them would far exceed the limits which we can conveniently devote to the subject; and we must, therefore, refer the reader to the Report itself. They are of a nature, as the Council very justly observe, to satisfy not only the wishes of the astronomer, but also the demands of the navigator; and (what is also very gratifying to hear) are not likely, with a due regard to economy, to add much to the expense of the publication.

Upon the whole, we cannot help congratulating the public upon this vast accession of strength to the most useful branches of astronomy and navigation; and we consider that they are much indebted to the Council of the Astronomical Society, for the great labour and time which they have devoted to this important subject. It appears that an interval of two or three years must necessarily elapse before these improvements can be completely carried into effect. The *Nautical Almanac* for 1833 is already computed, and nearly ready for publication; so that the proposed alterations cannot take place till the year 1834; and the Council have particularly requested that they be not deferred beyond that period.

With a view of ensuring a greater degree of accuracy in the computations, and as a means of detecting any errors, the Council have recommended that, in the preface to each year's *Almanac*, there be inserted an account of all the *tables* and *authorities* depended upon in every computation, with an express notice of such *equations* as may be omitted, or of any *corrections* introduced. And they have also recommended that notice of any errors should be advertised in the *London Gazette*, and in some of the public papers, as soon as possible after their discovery.

If these suggestions are strictly attended to, and the wholesome advice given by the Council be duly followed, we have no doubt that the important and valuable contents of the *New Nautical Almanac* will ensure it a place in almost every vessel that sails on the ocean, and in every active observatory in the world. — *Ann. of Phil.* Jan. 1831.

ZOOLOGICAL COLLECTIONS.

On the existence of Mustaches in the fœtus of Dolphins and Porpoises. By M. Emmanuel Rousseau. — Some time since Dr E. Rousseau, anatomical superintendant of the Museum of Natural History of Paris, observed that certain animals, entirely deprived of hair in the adult state, were provided with it on a particular part of their body, during the fœtal life. Such are the dolphins and porpoises, which at that time have on the upper lip a line of stiff hairs, prolonged at the sides, and forming a small pair of mustaches. This observation, which does not appear to have been previously made, was recently confirmed by the examination of two fœtuses of dolphins, sent to the museum amongst the beautiful collection of M. Dussumier. At the first inspection, M. Rousseau recognized the mustaches in each of the specimens, as in those he had previously seen; and M. Isidore Geoffroy, and one of the editors of the *Annals*, have ascertained the accuracy of the fact. Dr Rousseau thinks, that the existence of mustaches is temporary in the dolphins and porpoises, and that they entirely disappear a short time after birth. No traces of them have been found in the specimens, young or adult, preserved in the collections. — *Ann. des Sci. Nat.* Nov. 1830.

Digestive Organs, &c. of the Giraffe. — The liver is nearly oval, without lobes, being only slightly indented at the attachment of its suspensory ligament. The gall bladder is small. The ductus choledochus communis and pancreatic duct unite together about 7 inches from the pylorus, into a single canal $\frac{1}{3}$ of an inch in width, and $5\frac{1}{2}$ inches in length, which runs between the muscular and mucous coats of the intestine. The hepatic and cystic ducts join each other at nearly a right angle. — In the urethra there is a small sac with a blind termination, into which the excretory ducts of Cowper's glands open. The urethra is very narrow, and its extremity is united to the prepuce. — *Czermack, in Isis*, 1830, p. 557.

On a peculiar Provision in some Birds for freeing the Plumage from Vermin; and the general use of the Claws for this purpose. — In the first number of the Journal of the Royal Institution, p. 21, Mr Rennie, in adducing several instances of provision for cleanliness in animals, alludes to the serrated structure of the middle claw of the goatsucker (*Caprimulgus Europæus*:) "the use of which," he remarks, "seems to have been misunderstood by White of Selborne.

'If it takes,' says Mr White, 'any part of its prey with its foot, as I have the greatest reason to believe it does chafers, (*Zantheumia solstitialis*, Leach, MS.) I no longer wonder at the use of its middle toe, which is curiously furnished with a serrated claw.'* Mr Dillon has recently controverted this opinion; his observations leading him to suppose that the serratures are employed by the bird to comb its whiskers (*vibrissæ.*)† Mr Swainson, again, a high authority on such a subject, thinks that the fact of an American group of the same birds (*Caprimulgidæ*,) which have no whiskers to comb, and an Australian group, which have whiskers, but no serratures on the claws, are discordant with Mr Dillon's opinion.‡ "I was, I confess," Mr Rennie continues, "disposed to think Mr Dillon's opinion more plausible than true, and to agree with White, and the learned arguments of Mr Swainson, till I met with some observations of the distinguished American ornithologist, Wilson, upon some of the transatlantic species. In his description of the whip-poor-will (*Caprimulgus vociferus*,) he says, 'the inner edge of the

* Nat. Hist. of Selborne, i. 160. Ed. Lond, 1825.
† Loudon's Mag. of Nat. Hist. ii. 31.
‡ Ibid. iii. 188.

middle claw is pectinated, and, from the circumstance of its being frequently found with small portions of down adhering to the teeth, is probably employed as a comb, to rid the plumage of its head of vermin, this being the principal and almost the only part so infested in all birds.'*

"Of another species, called chuck-will's-widow (*C. Carolinensis,*) he says, 'their mouths are capable of prodigious expansion, to seize with more certainty, and furnished with long hairs or bristles, serving as palisades to secure what comes between them. Reposing much during the heat of the day, they are much infested with vermin, particularly about the head, and are provided with a comb on the inner edge of the middle claw, with which they are often employed in ridding themselves of these pests, at least when in a state of captivity.'† Considering the utility of such an instrument, we may wonder, perhaps, that, besides the herons (*Ardeæ,*) no other birds are similarly provided for attacking those troublesome insects ‡ (*Homaloptera,* Macleay, *Nirmidæ,* Leach, &c.) which often seriously injure the vigour and health of the animal infested, and sometimes even occasion death. On going to visit the ruins of Brougham Castle, in Cumberland, I was struck by the unusual tameness of a swallow (*Hirundo rustica,*) which I found sitting on the parapet wall of the bridge which crosses the Emont, on the road from Penrith. Swallows are, indeed, far from being generally shy, trusting, perhaps, to their rapidity of flight, should danger threaten; but this poor swallow allowed itself to be approached, without offering to escape. It seemed, in fact, instinctively courting human aid, at least I was inclined so to interpret its pitiful looks. On taking hold of it, I found the feathers swarming with an insect (*Craterina Hirundinis,* Olfers,) somewhat larger in size than the common house-bug (*Cimex lectularius.*) I took the poor bird immediately to the river; and, on being freed from its tormentors, it flew off joyfully to join its companions. Had it been furnished with a comb, like the night-jars, it would not probably have needed my assistance."

In the second number of the same Journal, p. 261, it is remarked by Mr Ainsworth, as a fact not generally known, that the claws of most birds are used for similar purposes; whence it happens that the birds which have short legs, as the swift, are most infested by insects. The expedients resorted to by those birds which have short legs,—by the waders, in consequence of the inflexible nature of their legs,—and by the goose tribe, from the difficulty of scratching themselves, occasioned by the membrane which extends between the toes,—are well deserving of attention, as illustrating the ingenuity of animals, and the curious provisions made by Nature for their cleanliness. "When birds," says Mr Ainsworth, "by accident or imprisonment, are deprived of the natural means of ridding themselves of vermin, they often fall victims to these attacks. Walking one day along the shore of Holy Island, off the coast of Northumberland, I disturbed an ash-coloured sanderling (*Calidris Islandica,* Step.) which flew heedlessly and as if injured. On shooting the bird, I found that it was covered with vermin, more especially about the head; so much so that the poor thing must have eventually fallen a victim to their tormenting ravages. On farther examination, I found that it had lost one of its legs, so that it was to its incapability to rid itself of these insects that their extraordinary increase was to be attributed.

"A circumstance of a somewhat similar kind also came under my notice, connected with a swallow's nest. After the young birds had been hatched, and had attained a certain size, a change was made in the arrangement of the window, whereby the parents were frightened: from that time they continued to feed their offspring, but never entered the nest; and I soon observed that the young ones were sick, and one by one they perished. I then took the nest down, and found it crowded with *acari,* which were of a very great

* Wilson's American Ornithology, v. 77. † Ibid. vi. 97.
‡ *Cursorius* and several other genera have it.—Ed.

size relatively to that of the bird. I could only attribute this fatal increase of vermin to the old birds having been prevented from cleaning out the abode of their family.

"Poultry which run about in stony or paved yards, wear away the points of their claws by friction and digging, which renders them unfit to penetrate their coating of feathers; they are, therefore, more covered with vermin, and in consequence more sickly, than fowls from the country."

New Species of Birds from Northern Africa, Described and Figured by Dr Rüppell.—In a former number, (p. 41, *supra*,) we gave a list of the new species of *Mammalia*, published in Rüppell's *Atlas zur Reise im Noerdlichen Africa*, and we proceed now to the Birds. This part, though the species were published irregularly in different numbers, forms a separate volume, and contains 36 plates. The following species are new:—

1. *Falco rufinus*, (pl. 27.) Capite et toto gastræo lætè ferrugineis, maculis oblongis umbrinis plumarum; dorso, tectricibus et braccis ex nigro umbrino et ferrugineo variis; remigibus umbrinis; cauda elongata, suprà ex albo cinerea, ad apicem rufescente lineis duabus undulatis nigris, infrà alba; ceromate et pedibus citrinis.—Total length, 1 foot, 8½ inches. Inhabits Upper Nubia, Schendi, Sennaar, and Abyssinia; frequents cultivated districts, preying on the smaller *rodentia*.

2. *Ixos leucocephalus*, described and figured under the name of *Turdoïdes leucocephala*, (pl. 4.) Rostro nigro, capite albo; alis caudæque color umbraceus, qui plumis laxis nuchæ auchenii et interscapulii dilutior. Gastræo è fusco candicante; gula maculis albescentibus varia.—Length, from point of beak to end of tail, 9 inches. The young are distinguished by a white head, spotted with brown, and by the absence of white spots on the fore part of the neck. Inhabits Sennaar; common near Welled-Medina. Feeds on insects.

3. *Ixos plebeïus*, (pl. 23.) Rostro nigro, corpore suprà umbrino, gula alba, jugulo et pectore fuscescentibus, plumis maculis albis terminatis, abdomine ex fusco candicante.—Total length, 8½ inches. Inhabits Kordofan, where it is only found in winter. Feeds on plants and worms.

4. *Malurus clamans*, (pl. 2, male.) Fronte et vertice ex albo nigroque variegatis; corpore suprà helvolo; infrà subflavo; tectricibus nigris, albo limbatis.—Inhabits Nubia, along the woody banks of the Nile. Entire length, 4 inches.

5. *Malurus gracilis*, (pl. 2, male.) Corpore suprà ex cinereo olivascente, subtus albescente; in pileo, cervice et dorso maculæ oblongæ, obsoletè fuliginosæ.—Total length, 4 inches. Inhabits Egypt and Nubia. An uncoloured figure of this species is published in the Atlas of the *Description de l'Egypte*, Oiseaux, tab. 5, fig. 4.

6. *Malurus squamiceps*, (pl. 12.) Corporis colore fabarum coffeæ naturali; plumis capitis rigidioribus maculæ oblongæ nigræ, illis dorsi et gastræi fuliginosis; gula alba.—Total length, 9 inches; length of the tail, 4 inches, 9 lines; of the beak, 1 inch. Inhabits Akaba, where it is found in the month of May in the Mimosa woods. It feeds on insects.

7. *Malurus Acaciæ*, (pl. 18.) Corpore coloris ex ochraceo isabellini; capite cinerascente, obsoletè fusco-striolato; gula alba, rostro pedibusque flavis.—Length, from the crown of the head to the end of the tail, 8½ inches. Inhabits Nubia, and Kordofan, in the Acacia woods.

8. *Caprimulgus infuscatus*, (pl. 6.) Corporis colore ex fusco rufescente; plumis omnibus striis subtilibus nigris undulatis; gula, fascia mentali, eaque remigibus, rectricibus duobus externis albis.—Length, from the point of the beak to the end of the tail, 7 inches, 8 lines. Inhabits Nubia.

9. *Emberiza striolata*, (pl. 10.) Capite et dorso rufescentibus, nigro striolatis; tænia superciliari, infràorbitali, et mentali albis; alis caudâque

nigris; pennis rufo limbatis; abdomine helvolo. — Total length, $4\frac{1}{2}$ inches. Found in the neighbourhood of Ambukol.

10. *Emberiza cæsia,* (pl. 10.) Capite, nucha, pectore cæruleo-cinerascentibus; gutture, gastræo cinamomeis; remigibus et rectricibus nigris, rufo limbatis: rectricum extimarum duarum pyonio interno macula alba. — Total length, 4 inches. Inhabits the mountains of Abyssinia?

11. *Emberiza flavigaster,* (pl. 25.) Capite nigro, fascia è medio verticis ad nucham albescente, linea superciliari et infràorbitali albis; tergo castaneo, tectricibus minoribus et majoribus apice albis; corpore infrà citrino; crisso albo. — Length, 5 inches. Inhabits Kordofan in the winter.

12. *Ploceus superciliosus,* (pl. 15.) Capitis colore læte castaneo; tænia superciliari, mentali, gula et macula infrà orbitali albis; stria nigra descendente ad latera colli; alis umbrinis, margine pennarum flavicante; corpore inferiore ex fuscescente albo. — Total length, $5\frac{1}{2}$ inches. Inhabits Kordofan. Feeds on seeds.

13. *Lanius erythrogaster,* (pl. 29.) Corpore suprà nigro, infrà coccineo; crisso helvolo. — Differs little from *L. barbarus.* Frequents bushes in Kordofan and Sennaar. Ants have been found in its stomach.

14. *Dacelo pygmæus,* (pl. 28, fig. *b.*) Capite subcristato et tectricibus obsoletè fuscescentibus, apicibus plumarum pallidioribus; gula alba; regione parotica, collari, pectore et abdomine sordidè albescentibus, maculis sparsim oblongis obscurioribus. Dorso ultràmarino; rectricibus et remigibus suprà cæruleo-viridescentibus, infrà fuscis. Rostro rubro. — Length, from the top of the head to the end of the tail, 4 inches, 9 lines. Inhabits Kordofan; frequenting woods, and feeding on insects.

(To be concluded in next Number.)

The Alpine Swift, (Cypselus Alpinus,) *a British visitant.* — This species inhabits the southern Alps of Europe, the rocky coasts of the Mediterranean, Sardinia, and southern Africa, abounding both in the inland Alpine ranges and on the rocky shores. The many acquisitions of birds from a similar range of country, which have, of late, been made to our list of British visitants, had produced a hope that this species would some time be added, and our anticipations have been, in a great measure, confirmed, by the perusal of a letter to Mr Selby from William Sinclair, Esq. of Belfast, who has received and sent for inspection a specimen killed on the south coast of Ireland. Although killed at sea, there appears little doubt of it being found on the shores, and this is rendered more probable by the bird having a provincial name given to it by the pilots and sailors, who, besides, seemed acquainted with it. We give an extract from the letter, as best describing the fact, and trust that Mr Sinclair will fulfil his intention of visiting the southern shore of Ireland during the breeding season, and will confirm the interesting discovery.

" I beg to send for your inspection a specimen of the *Cypselus Alpinus* of Temminck, which I received, in the summer of 1829, from the captain of a West Indiaman, who assured me (and he is a person on whom I can place every reliance) that he shot it within eight or ten miles of the south coast of Ireland, when on his passage to this port, and that some of the Cape Clear pilots who were on board his vessel at the time appeared to know the bird, and gave it the name of " *Cape Thrush.*" From the period of the year at which this specimen was obtained, viz. midsummer, and from the natives of the coast appearing to have a knowledge of the bird, I am inclined to think that it may possibly be found there during the period of incubation, especially as the locality would agree with the habitat assigned it by Temminck. If this turns out to be the case, it will be a new and interesting addition to our ornithology. I intend, however, next summer, to try every means of ascertaining the fact, and shall not fail to communicate to you the result. —*Belfast, November,* 1830."

On the Change which the Air in Eggs undergoes during Incubation,—(By Professor Dulk of Kœnigsberg.)—This philosopher has lately made some analyses of the air, in the large end of the egg, at different periods of incubation, and the following is the result of his inquiries:—

Before incubation, the air contains considerably more oxygen than atmospheric air; the oxygen in the former being found, at two different experiments, 25.26, and 26.77, and that in the latter, on the day of the experiments, only about 21.0.*

On the tenth day of incubation, the air was found to contain 22.47 of oxygen and 4.44 of carbonic acid: the absolute quantity of oxygen is accordingly nearly the same, but 4.44 of it has united with carbon.

On the twentieth day, the quantity of air in the egg was found to be nearly eight times as large as before incubation; the analysis gave, at four different experiments:—

Carbonic Acid.	Oxygen.
9.40	——
9.23	17.55
6.19	——
8.48	17.90

where the absolute quantity is the same as in the former experiments, but the quantity of carbonic acid is increased; that of the third experiment, being only 6.19 per cent, corresponds, however, in some degree, with the result of the other analyses, as the chicken had apparently died a considerable time before the experiment was made.—(*Schweigger-Seidel's Jahrb. der Chemie und Physik.*)—*Journ. of Roy. Inst.* No. II. p. 435.

On the Mode of Growth of Feathers; by M. Frederic Cuvier.

M. Frederic Cuvier, who has been long occupied with investigations concerning the organs which have been employed by zoologists to characterize the mammalia, has conceived that an examination of the development of feathers might throw some light upon the growth of hair. The number and diversity of their parts, and the size of the organ which produces them, give indeed more scope for observation.

Notwithstanding the varieties of size, consistence, and colour, all feathers are composed of a quill, a shaft, and barbs, more or less provided with barbules.

The organ by which the feather is produced has the form of an elongated cylinder, deeply seated in the skin of the bird by an extremity called the *umbilicus*. Its most external envelope, or capsule, is composed of several tunics, the outermost of which is of the nature of epidermis; the internal tunics are more compact, but have no appearance of organization. The shaft and barbs pass out of the extremity of this capsule opposite to the umbilicus. In the axis of the capsule is a medulla, also cylindrical, fibrous, and of gelatinous texture, adhering to the umbilicus, and receiving at its point of adhesion numerous blood-vessels. Around this medulla, or between it and the external envelope, are two parallel membranes, one internal, and the other external, obliquely striated, or rather united to each other by parallel septa, which pass obliquely from a superior and longitudinal line towards a line, also longitudinal, but situated on the other side of the cylinder. In the long and narrow spaces between these septa, the matter of the barbs is deposited, and formed into barbs and barbules, nearly in the same way as the enamel of the teeth is formed between the external membrane of their gelatinous pith and the internal membrane of their capsule. The superior smooth line, from which the striæ pass, receives, and moulds

* Though this result is somewhat at variance with that obtained by M. Bischoff, according to whom the mean quantity of oxygen before incubation, is only 23.475, the experiments of both philosophers agree, inasmuch as both shew that the air of fresh eggs contains more oxygen than atmospheric air.

on the surface of the external membrane, the horny sheath of the back of the feather, or that longitudinal band, to the two sides of which the barbs are attached; and on the surface of the internal membrane are formed the substance of the shaft, and the pellicle, also horny, which encloses it inferiorly. The line opposite to this has no other use than to establish a solution of continuity between the barbs of one side and those of the other. Thus, whilst they remain in their case, the barbs curve round the gelatinous medulla, and surround it on both sides. As the shaft and barbs acquire consistence, they pass through the extremity of the capsule, and appear externally, pushed along by the increase of the base of the gelatinous medulla till the whole of the barbed portion of the feather is protruded. The shaft and barbs are, as we have stated, secretions of the striated membranes which envelop the gelatinous medulla; but the medulla itself furnishes the matter of this secretion. M. Fred. Cuvier thinks that the spongy substance which fills the shaft is derived from it.

As the development of the feather advances, the summit of the medulla becomes empty, and forms a cone, or a kind of membranous cap, which separates from the capsule, together with the portion of the shaft and barbs which correspond to it. Many of these successive cones are then lost, falling off as they pass out, so that there is none left on the internal surface of the shaft. In certain species, or under certain circumstances, the point of the medulla is double, and then the shaft takes with it one of these points, whence there come to be a series of cones in the centre occupying the axis, and forming cellules: but, in general, this axis is filled with a spongy matter, and its inferior part alone binds in its groove a slight fold of the medulla which has formed it. When all the grooves (wherein the barbs and the portion of the shaft which carries them are formed,) are filled by the horny matter, and the barbed part of the feather is finished, this horny matter expands uniformly around the medulla, and forms the quill of the feather. In progress of time, when the quill has acquired the due consistence, the internal medulla becomes dried up, and divides into cones or cups, arranged one upon the other; but these latter cones never pass out — the quill, which is now hardened, and closed by the shaft at the opposite extremity to the umbilicus, will not permit their egress, — they remain in the interior, and constitute what we commonly call the *pith of the feather*.

Thus we see, that the formation of a feather differs only from that of a tooth in the nature of the substance which is deposited between the two tunics; but a tooth takes many years to be perfected, and there are but two series produced in one part of the jaw, and only one in the other. Feathers, on the other hand, are developed in the course of some days; they attain a length of from one to two feet and more in many birds, and they are almost all renewed every year — in many species, even twice a-year. It may be conceived, then, how much energy the organization of birds must exercise, and how many dangers must accompany so critical a period as that of the moult. — Baron Cuvier, *Rapport.* — *Mém. de l'Institut.* Tom. IX. p. cxlvi.

Notice of the Parr; *in answer to Sir W. Jardine's Queries on the Natural History of the Salmon, &c.* By William Greene, Esq. (In a letter to the Editor.)

Sir, — In a list of queries, by Sir William Jardine, published with a view to collect facts, for elucidating the natural history of certain fishes, I observe an inquiry, whether the Parr of Scotland be the same with the Brandling of the northern counties of England. It had never before occurred to me as a matter of doubt, that the little fish, found in such plenty in the Tyne and the Derwent, differed, except in name, from that which abounds still more in the Annan and the Nith. They are distinguished from the common trout, by the same indistinct dusky bars on the sides; from which circumstance, the fish, I imagine, derives its English name, being striped or brindled; as the worm with a streaked tail is, in like manner, called the brandling worm. During the summer and autumn, they swarm so much in the streams, that it is very usual for a fisher to kill his twelve dozen and upwards, two or three frequently taking his flies at the same time. It is, I believe, a general opinion, that this fish is never met with in any river or brook, unfrequented by the salmon. Whether it be the young of the latter, or a distinct species, has long been a question; and some seemingly absurd conjectures have been hazarded upon that point. It has been asserted to be a hybrid between the trout and the salmon; a suspicion from which its diminutive size, (for it is seldom found exceeding six inches in length,) might, one would think, have exempted it.

An intelligent gentleman of Cumberland assured me, that he had by experiment ascertained it to be really the young of the salmon. He said, he had kept brandlings, till they acquired the silvery scales, and became, in fact, to all appearance, the salmon-smelt or fry. He added, that, if you scrape the shining scales off a salmon smelt, you will find the same blackish bars on the sides plainly distinguishable. Perhaps the richness and delicacy of this little fish upon the table, may assist in forwarding its claims to rank as the legitimate cadet of so distinguished a family. I am, Sir, &c.

William Greene.

P.S.—Sir William Jardine, in a late account of the vendace, does not seem aware, that it is found in Bassenthwaite Lake, in Cumberland. A preserved specimen of it, procured from that lake, may be seen in Crossthwaite's Museum at Keswick. W. G.

Query on the Hereditary Transmission of Accidental Characters. (In a letter to the Editor.)

Sir,—In the first volume of the French translation of Meckel's Comparative Anatomy, p. 447, the author, after having enumerated the several modifications which external circumstances may produce in the living body, in respect of *form, number, position,* and *bulk* of the several organs, makes the following remarkable statement:

" That all these modifications of the original organization may become permanent by hereditary transmission, is a fact proved by experience. Let us instance the case of horses produced by docked stallions or mares, which have generally a less number of caudal vertebræ, and are even sometimes foaled with entire docks. This peculiarity has been particularly remarked in a province, where it is customary to cut off a part of the tail, as a preventive against vertigo. It is not uncommon there, to see young foals with only 15, 14, 12, and even 8 vertebræ in the tail.* In the same manner, dogs, whose tails and ears have been cut, often produce whelps wanting the same parts; whence this character sometimes becomes hereditary in several generations."†

As I believe general experience is directly adverse to these statements, may I request from your readers, the communication of any facts they may be acquainted with, which tend to support the opinion? The names of Blumenbach and Meckel being appended to these observations, will, I trust, be a sufficient excuse for my asking a question, which may, at first sight, appear so ridiculous. I am, &c. ☞

[From theoretical considerations, we are clearly of opinion, that there must be some mistake in the narration of these extraordinary cases. We have, in a former number, stated it to be our opinion, that the characters of an organism are permanent during the operation of the circumstances, internal or external, which produced them, *and no longer.* Whence, the original deficiency of caudal vertebræ being the result of mutilation, a new operation would be required in every successive generation, to continue the character (if it may be so called) in the race. And this is a fact sufficiently well known to all farriers and keepers of dogs. Our correspondent is, however, right in saying, that any thing stated under the authority of Meckel merits consideration; and we shall be glad to hear from any of our readers on this subject.—*Ed.*]

* *Greve* Bruchstuecke zur vergleich.—Anat. u. Physiologie. Oldenburg, 1818, p. 15.
† *Blumenbach,* ueber Kuensteleien oder zufællige Verstuemmelungen.—Voigt's Magazin, Bd. 6. 1789, p. 13.

Difficulty of preserving Whitebait Alive.—Mr Yarrell read the following notice of his late unsuccessful attempts to preserve Whitebait alive, to a recent meeting of the Zoological Society:—"Several dozens of strong lively fish, four inches in length, were transferred with great care from the nets into large vessels, (some of the vessels, to vary the experiments, being of earthenware, and others of wood and metal,) filled with water from the Thames at the time of catching the fish. At the expiration of twenty minutes nearly the whole of them were dead; none of them survived longer than half an hour; and all fell to the bottom of the water. On examination, the air-bladders were found to be empty and collapsed. There was no cause of death apparent. About four dozen specimens were then placed in a coffin-shaped box pierced with holes, which was towed slowly up the river after the fishing-boat. This attempt also failed: all the fish were dead when the vessel had reached Greenwich.

"I was told by two Whitebait fishermen that they had several times placed these fishes in the wells of their boats, but they invariably died when brought high up in the river. The fishermen believe a portion of sea water to be necessary to the existence of this species, and all the circumstances attending this particular fishery appear to prove their opinion to be correct."—*Ann. of Phil.* Jan. 1831.

Miscellaneous Notices.—We extract the following notices from a minute book of facts in natural history, communicated to the Natural History Society of Edinburgh, in 1783-84, the period when Dr Walker, (afterwards Professor of Natural History in this University,) was an active member.—Ed.

13th *Feb.* 1783.—Mr Young related two incidents tending to shew, that fear induced a change of colour in birds:—A blackbird had been surprised in a cage by a cat. When it was relieved, it was found lying on its back and quite wet with sweat. Its feathers fell off, and were renewed; but the new ones were perfectly white.—A gray linnet happened to raise its feathers at a man who was drunk. He instantly tore the creature from its cage, and plucked off all its feathers. The poor animal survived the accident, and had its feathers replaced, but they were also white.

15*th May*, 1783.—Mr Cunningham informed the Society, that one Mr Murray, in the parish of Dalmeny, seven miles from Edinburgh, had a young cow that gave milk, though she had never had a calf, or any commerce with a bull; that she had taken an affection for a calf belonging to another cow enclosed in the same place with her, which, by continually sucking her, had produced this effect.—Mr White informed the Society, that a married lady in Manchester, who had not been pregnant for seven years before, imagined herself with child from the flowing of her milk, and applied to him for advice. As there were no other symptoms from which this could be inferred, and as she continued a long time in the same state, Mr White naturally concluded that the lady was not with child, as was afterwards found to be the case.

27*th May*, 1784.—Mr Kentish informed the Society, that, a few days ago, Professor Robison had measured the growth of a hop plant by a scale, and found, that from 5 o'clock in the evening to 11 o'clock next day, it grew six inches.

Metamorphosis of the Crustacea.—At a recent meeting of the Zoological Society, a letter was read, addressed to the Secretary of the Society by J. V. Thompson, Esq. dated "Cork, Dec. 16, 1830." In it Mr Thompson urges, in support of the universality of a metamorphosis among the *Crustacea*, that he has ascertained the newly hatched animal to be a *Zoea* in eight genera of the *Brachyura*, viz. *Cancer*, *Carcinus*, *Portunus*, *Eriphia*, *Gecarcinus*, *Thelphusa?* *Pinnotheres*, and *Inachus*;

and in seven Macrourous genera, viz. *Pagurus, Porcellana, Galathea, Crangon, Palæmon, Homarus,* and *Astacus.* "These embrace all our most familiar native genera of the *Decapoda.*" The lobster, or *Astacus marinus,* Mr Thompson states, "does actually undergo a metamorphosis, but less in degree than in any other of the above enumerated genera, and consisting in a change from a cheliferous *Schizopode* to a *Decapode;* in its first stage being what I would call a modified *Zoëa,* with a frontal spine, spatulate tail, and wanting the subabdominal fins; in short, such an animal as would never be considered what it really is, was it not obtained by hatching the spawn of the lobster." In the other indigenous species of *Astacus, Ast. fluviatilis,* the river crayfish, it would appear, from the excellent treatise of M. Rathke on the development of its eggs, that the young are hatched in a form according with that of the fully grown animal. Mr Thompson, however, suspects that some source of error may exist in these observations. "If it should be found otherwise, it can only be regarded as one solitary exception to the generality of metamorphoses, and will render it necessary to consider these two animals for the future as the types of two distinct genera." In illustration of the change of form observed by him in the limbs of the lobster, Mr Thompson enclosed a sketch of the "cheliferous member of its *larva,*" which is represented as divided to its base, and consisting of, 1st, a cheliferous portion; 2d, a portion of equal length with the preceding, and terminated by natatory ciliæ, (described as the outer division of the limb, or future *flagrum;*) and, 3d, a short rudiment of one of the future *branchiæ.*—*Ann. of Phil.* Feb. 1831.

Respiration of the Sabella.—The filaments or processes placed round the mouth in the *Sabella* are generally regarded as respiratory organs. Dr Rüppell, however, maintains that they are merely tentacula, or organs of prehension. According to him, the respiratory organs are seven sacs or cells on each side of the animal, which open externally under the seven pairs of transverse plates situate on the anterior and lateral part of the body. Two blood-vessels go to each of these cells, viz. one from a dorsal, and another from an abdominal vascular trunk, and, after ramifying minutely, anastomose together. Dr R. has been able distinctly to perceive the alternate filling and emptying of the vascular system of the cells, but he could not clearly make out from which of the great trunks the blood is conveyed towards the respiratory cell, nor to which of them it is returned. The direction in which the blood moves, therefore, still remains to be investigated.—*Isis,* 1830, p. 611.

Anatomical Structure of the Larva of Œstrus Equi.—In a memoir on the internal structure of the larva of *Œstrus Equi,* by Professor Schröder van der Kolk, we find the following:—

The heart is fixed by ligaments at the posterior part; anteriorly it passes into a dilatation, and is fixed to the œsophagus, where it receives nervous filaments. It sends off many branches from its middle part, which pass into the fat, ramifying on the walls of the adipose vesicles. A ramus profundus, arising from the posterior part of the heart, is distributed among the muscles, fat, and skin, and enters the heart again at its anterior part.

The respiratory organs, situate at the posterior part of the body, consist of small vesicles, more or less distended with air, and covered with two lips. In their middle they have a small opening to the exterior, which can be closed by muscular fibres. The vesicles are connected with a reservoir of air, into which the tracheæ open; of the latter there are two large ones belonging to the body generally, and four smaller, destined for the organs of generation. When the tracheæ were examined with a microscope magnifying 500 times, canals were discovered between the spiral filaments in their parietes, which, when touched with a wetted hair pencil, seemed to absorb water. The tracheæ being examined in an animal which was opened alive, it was found that, also during life, fluids are contained in their parietes. Being kept in different gases, viz. nitrogen, oxygen, and carbonic acid, the larva lived equally long in all, viz. about four days, and exhaled always the same quantity of carbonic acid.

The organs of generation are small vesicles, in which tracheæ terminate. No difference could be perceived between male and female. — *Ibid.* p. 555.

Gland in the Gasteropodous Mollusca. — Dr Kleeberg, of Königsberg, has discovered a gland in *Bulimus ovatus*, Brug. which is not noticed in the anatomical descriptions hitherto given of the Gasteropodous mollusca. The gland is situate below the œsophagus, and the inferior ganglion of the nervous ring. From the lower surface of the gland, between its principal part or body and an anterior lobe with which it is furnished, an excretory duct arises, which opens into a wide canal running within the substance of the foot, and opening externally between the prominent anterior border of the foot and the lower lip. Dr K. has found the canal in the *Gasteropoda pulmonata*, indigenous to his own country, excepting the aquatic species and the genus *Succinea*. In *Limax* and *Arion* injections would seem to prove that it communicates with the venous system. — *Ibid.* p. 574.

The Bristles of the Annelides considered as Organs of Defence. — MM. Audouin and Milne Edwards, having studied with much care the structure of the different external organs of the Annelides, and having directed their attention to the bristles with which the feet are provided, are of opinion, that these organs, which used to be regarded as mere ornaments, or, with more reason, as locomotive organs, also serve for defensive weapons of a peculiar nature.

In the *Tubicolæ*, as M. Savigny had previously remarked, they are modified in a particular way, so as to assist the motions of the animal in the tube which it inhabits: but it is not less worthy of remark, that in the *Dorsibranchiæ*, which generally lead an erratic life, the bristles have different and no less important functions. MM. Audouin and Milne Edwards have observed, that they in general take on the form of spines or stings, the more formidable that they are retractile, and that the animal can direct them at will against any object whose attack it fears. Their form is always in accordance with this use, and their structure is varied.

The term *hairs* sometimes expresses their appearance appropriately, as well on account of their extreme fineness, as of their brilliant yellow colour. Such are the flexible bristles of certain *Aphroditæ*. These bristles, which sometimes, as in the *Aphrodita aculeata*, intertwine, so as to form a sort of felt, have no other use than to protect the body, in the same way as the coat or fleece of a quadruped. In this case, their function is entirely passive, and the animal cannot retract them, or direct them against any dangerous object. When examined under the microscope, they appear simple, and without any of the denticules which are found in others. Another kind are also simple, but stiff, stout, retractile, and sharp-edged. These the animal can make use of as so many pins for its defence. Often, again, the hairs, though simple, have a somewhat wove, complicated organization: they may terminate in a sort of fork, with two unequal branches, or present a groove, with toothed margins. Finally, they sometimes represent, in the disposition of their point, a lancet or spear, whose raised edges are serrated.

Here, then, we have certain annelides provided with stilettoes, prickles, and divers other formidable weapons fit for defence; and they have them in great abundance grouped in fasciculi on each of the feet, which in some species amount to upwards of six hundred.

However, these microscopic weapons are much less curious than those whose structure MM. Audouin and Milne Edwards have made known, and which they designate under the name *compound bristles.* Two different parts always enter into their composition, which is an essential character. Most commonly the two parts, one basilar, the other terminal, are united end to end by a true ginglymoid articulation, and the terminal portion presents different forms, which may be compared to a hooked knife, harpoon, or bayonet. But the most curious thing connected with these compound bristles is, that the animal can leave the last joint in the wound which they have made, and that the weapon, thus reduced to a basilar portion, still preserves at its extremity a sharp point, which it can use as a stiletto.

Lastly, the authors have described a kind of arms, of very complicated structure. These are of the form of barbed arrows, the more remarkable, that each carries with it its quiver, or case. This case, composed of two valves, capable of falling down when the arrow is struck into any foreign body, presents internally as many compartments as there are little teeth on the sides of the arrow, and not only contributes to preserve the weapon, but permits its entering into the body of the animal without making any rent. —(Cuvier, Rapport)—*Ann. des Sci. Nat.* Nov. 1830.

Notice of the Ropan *of Adanson; with other Observations on the Mollusca.* By M. Rang.

M. Rang, who has recently returned from a voyage to Senegal, has addressed a letter to Baron Ferrussac, in which he communicates some of the results of his voyage.

He has found that the *Ropan* of Adanson is nothing else than the *Modiola caudigera* of Lamarck, which envelops itself in a calcareous tube, with which it lines the cavity it has previously hollowed in stone. Lamarck had already seemed to believe in the presence of a tube in the *Lithodomus;* and the discovery of the fact in the living animal is the more important, that M. Ch. Desmoulins has determined it in fossil individuals from the neighbourhood of Bordeaux.

M. Rang has not been able to find the *Sormetus* of Adanson: he hesitates in admitting the existence of this molluscum.

He has found in the Senegal, beautiful *Etheriæ,* at a distance of 600 miles from its mouth.

He has examined the animals of the *Corbula,* the *Ungulina,* and also that of the *Discina,* which, he says, differs little from the *Orbicula.*

He has discovered in some rivers the *Galathea radiata,* which Lamarck quotes as coming from Ceylon. This beautiful shell is found on sand banks, which are covered by some feet of fresh water: with it live eight or ten species of *Melaniæ* of exceeding beauty, and which, in form, variety, and size, approach the genus *Potamides* of M. Brongniart, as well as the fossil *Cerithiæ* from the neighbourhood of Paris.—*Ibid.*

Classification of the Arachnides.—In a detailed anatomical monograph on the organs of motion of the bird-catching mygale, (*Mygale avicularia,* Lat.) M. Strauss makes the *arachnides* an independent class, and places them between the insects and the crustacea; he divides them into three orders:—

1. *Pulmonata,* in which the air enters a kind of vascular sac, to act on the fluids contained in the vessels.
2. *Tracheata,* which have a respiration analogous to that of insects.
3. *Branchifera,* or *Gnathopoda,* whose feet serve for jaws, and for branchiæ, with aquatic respiration.—*Cuvier, Rapport.*

BOTANICAL COLLECTIONS,

INCLUDING VEGETABLE PHYSIOLOGY.

Experiments on the Germination of Seeds.— Professor Vogel, of Munich, has made a series of experiments on the germination of seeds in various organic substances. The seeds employed were wheat and barley. They were sown in the substance to be tried, and moistened daily with distilled water. From the results of the experiments, the author arranges these substances into three classes, according to their effects on germination.

1. Those in which seeds did not germinate in the slightest degree. They are carbonate of barytes, hydrates of lime and barytes, powder of iodine, kermes, golden sulphur of antimony, magistery of bismuth, arseniate of lead, carbonate of copper, green oxide of chrome. No germination took place when the seeds were moistened with dilute solutions of sulphate of copper, arsenious acid, corrosive sublimate, nitrates of mercury and silver, and muriate of barytes.

2. The substances in which the seeds germinated feebly, were, carbonate of magnesia, copper filings, crude antimony, calomel, red oxide of mercury, watery solution of iodine. To this class also belong, in reference to wheat, sulphate of barytes, and oxide of zinc; in which substances, however, barley springs very readily, and grows vigorously.

3. The third class comprehends those substances in which the seeds germinated with vigour, and the young plants throve well. These were, white marble, carbonate of strontian, peroxide of tin, litharge, red oxide, and phosphate of lead, black oxide of manganese, and cinnabar. In reference to barley, sulphate of barytes, and oxide of zinc belong to this class; in which substances wheat germinates but feebly.

The author had expected to find, that substances which exerted a noxious influence on the animal economy, would prove equally inimical to vegetation; but the results, as he candidly admits, exhibit several instances which cannot be reconciled with this view.—*Isis*, 1830, p. 499.

Course of the Sap.—Professor Hayne, of Berlin, gives the following novel views respecting the course of the sap in vegetables:—

The sap moves in the direction in which plants grow and increase, whether in length or breadth; that is, downwards in the root, and upwards in the trunk and branches. It is absorbed from the soil by the bark of the root, and rises in the intercellular spaces of the parenchyma, till it reaches the junction of the root and trunk, which point the author calls the *nodus indifferentialis.* Arrived there, it enters the vessels, and becomes the nutritious juice or *chymus*; it then proceeds along the vessels to their extremities, descending in the root, and mounting upwards in the trunk, in which passage it is continually transmitting a portion through the walls of the vessels into the intercellular canals or passages of the longitudinal cellular texture, which portion having undergone a change in its properties, becomes the formative juice or *enchymus*, appearing as a thickish transparent fluid, in which deposits take place in the form of fine filaments and granules. Out of the filaments, the spiral or annular vessels are probably formed, as Kieser supposes, and cells are formed from the granules. The sap which remains after these new formations, in the root of dicotyledonous plants, most probably enters the intercellular canals of the pith; but, in the stem, it is conveyed into the intercellular canals of the leaves, where it undergoes farther changes in composition. In the root, stem, and branches of dicotyledonous plants, this juice is very probably also conveyed along intercellular canals, from the centre to the circumference, where it contributes to the formation of the bark. The requisite materials for the increase of the plant, and the formation of new organs, being drawn from the formative juice, substances, in many cases, remain, which, through the influence of light and chemical affinities, combine anew into a juice, differing much in qualities in different vegetables. This juice, which either exudes from the plant by glands and hairs, or is stored up in proper receptacles, is to be looked on as excrementitious, and has hence got the name of excreted juice, *succus excrementitius.* The more watery portion of the sap, as is well known, escapes by transpiration from the surface of the plant.

The author ascribes these different motions of the sap to a sort of polarity, induced in that fluid by thermo-electric agency, by which it is forced to assume opposite directions in the different parts of the plant. The direction of thermo-electric currents has been proved to be from the warmer to the colder part; and the author applies this principle in explanation of the course of the sap by endeavouring to prove, first, that the heat is greatest in the *nodus indifferentialis,* from which it gradually diminishes towards the extremities of the root and branches: secondly, that in the root, stem, and branches, the temperature diminishes in proceeding from the centre or axis to the circumference. With all this, however, he does not mean to exclude the influence of vitality, which he makes use of to account for the anomalies which cannot be explained on the supposition of polarity alone.

The whole of this doctrine is very important, if correct; but before we can be satisfied on this point, it appears to us requisite for the author to bring to the consideration of the subject a larger share of appropriate and well ascertained facts, and less of vague statement, and illogical deduction. —*Ibid.* p. 502.

Temperature of Plants.—Professor Schübler of Tubingen, has made an extensive series of experiments on the variation of temperature in plants, and particularly with a view to determine whether plants, as has been supposed by many eminent naturalists, have the power of generating heat, and maintaining a fixed temperature, independent of that of the atmosphere. The following are the results:—

1. No perceptible heat is evolved by trees during the process of vegetation: their mean temperature is very nearly that of the atmosphere, or even a little (0.2° to 0.4° R.) lower; which last circumstance is probably owing to the constant evaporation which takes place from their surface.

2. During severe cold, the temperature in the interior of most indigenous trees often sinks several degrees below the freezing point.

3. The temperature of trees sinks less rapidly after it has once got below freezing. This is most probably to be attributed to the heat evolved during the congelation of their juices, which, in a certain degree, counteracts the effects of cold till the tree is frozen to the centre.

4. When a thaw sets in, a phenomenon, in some respects the converse of the foregoing, takes place: the temperature of trees which have been frozen and cooled considerably below the freezing point, rises with less rapidity than when the heat is above that point.

5. On comparing the mean of entire seasons, it appears that in summer trees have a lower temperature, in proportion to that of the air, than in other seasons: the mean differences amounted to 1.27°—0.74° R. In individual observations this difference was often much greater, even after continued warm weather. It is very probable that this is owing partly to the copious evaporation from the surface of the tree in warm weather, and partly to the low temperature of the watery fluid absorbed by the roots from the deeper parts of the soil, which absorption is most abundant during the heat of summer.

6. The temperature of trees in spring is somewhat higher than that of the surrounding air: this apparent exception may be explained when it is

recollected, that in our climate the heat of the deeper parts of the soil, from which trees then largely extract nourishment, is usually greater in March and April than that of the air, and that the surface of the tree itself, so long as it is not shaded by the foliage, may be heated directly by the sun's rays, whilst, in such circumstances, it loses very little heat by exhalation.

7. The juices of trees are actually frozen during severe cold. In order to be assured that the freezing was not merely the consequence of exposure to the cold air after the tree was felled, the author caused several trees to be cut down at the commencement of a sudden thaw, and when the air was 2° R. above the freezing point; they were all frozen, to a certain depth, in concentric rings.

8. The depth to which the frost penetrated varied considerably in different sorts of trees: in a horse-chesnut it was 8.2 lines; a fir tree, 12.5; in a species of maple, 15.2; an ash, 16.8; and in a willow, 17.3. The mean of several measurements in six different trees gave 14.4 Paris lines as the medium depth of the frozen layer, whilst the thickness of the ice on a small lake in the vicinity was, at the time of these observations, 9.9 Paris inches, or 108.8 lines; the frost had therefore advanced $7\frac{1}{2}$ times slower in the trees than in the water. These phenomena are no doubt to be attributed to the difference between water and vegetable matter in their power of conducting heat: and the degree to which the frost penetrates in different trees is found to be proportionate to the quantity of their watery constituents, and the openness of their texture.

It follows as the general result of these observations, that the temperature of plants is modified in manifold ways by many different circumstances; that they do not, indeed, like the higher animals, possess the faculty of evolving heat in their ordinary vital processes, but that they have the power of conducting heat from the air, and from the soil, in proportions, varying with the course and impulsion of the sap, and of giving off part of it again by evaporation, so that, being bad conductors of heat, their more equable temperature must necessarily be sometimes either higher or lower than the more variable temperature of the atmosphere; that, with regard to trees in particular, the different depths to which the frost penetrates into their interior, in equal degrees of cold, depend chiefly on the different density and breadth of their concentric annual layers, and on the different proportions of watery elements which enter into their composition.

It is admitted, however, that the very different degrees in which the plants of different climates withstand the injurious effects of cold, cannot be accounted for by physical causes alone.—*Ibid.* p. 563.

Effects of Cold on Plants.—Dr Göppert of Breslaw endeavours to shew, by numerous experiments, that the sap in plants freezes in winter when the cold is severe, without injury to life: that the changes which plants undergo when they are killed by cold, do not consist in a bursting of their vessels or cells, but solely in an extinction of vitality, which is followed by changes in the chemical composition of their juices: that the effects of cold on vegetables are not always directly proportionate to its degree, but are modified by the state of development, and numerous other circumstances connected with atmospheric changes: Lastly, that the doctrine demonstrated by Schübler with respect to trees, viz. that they possess no proper temperature, independent of that of the atmosphere, must be extended to the vegetable kingdom in general. The author has tried to discover an elevation of temperature in the flowers of the *Aroideæ,* and of many other plants; but all his experiments, though conducted with the greatest care, have given a negative result.—*Ibid.* p. 497.

Use of the Cuticular Pores of Plants.—It is well known to botanists, that the cuticle of most plants is furnished, especially on the leaves, with minute organs, the function of which is a matter of conjecture, and the actual structure of which has given rise to much difference of opinion. These organs have received the names of pores, glands, or stomata, according to the views of different observers; and while one class of botanists has considered them of unknown function and structure, others have contended, that they are of the nature of pores, and that their office was, according to the one, to facilitate evaporation; to the others, to assist in the process of respiration. Their function is obviously of so obscure a nature, that no direct experiments are likely to demonstrate exactly what it is; but their structure is a point upon which observation may be expected to cast some light. Mr Bauer long ago represented these organs in the wheat, as perforations opening into a minute subcutaneous cavity, and as destined to afford a direct passage into the interior of a plant for those minute fungi, whose ravages are so well known in the form of what the farmers call the mildew in corn. Other observers have, however, doubted whether the supposed perforations always existed; and Mr Lindley, in his lectures in the University of London, has repeatedly expressed his difficulties upon the subject. The fact is, that they are so minute, the tissue of which they consist is so exceedingly transparent, and it is so difficult to examine them, except by the aid of transmitted light, that it is not, perhaps, possible to determine positively, in all cases, whether a perforation exists or not.

A memoir, by M. Adolphe Brongniart, upon the structure of leaves, and on their relation with the respiration of vegetables in air and water, read before the Academy of Sciences of Paris, throws some light upon the subject. The author states, that the leaves of plants that live in the air have a totally different structure from those that are completely submerged, and that this difference in the structure of organs is in direct relation to the two principal functions of leaves, respiration and transpiration. In leaves exposed to air, the surface of the leaf is covered by an epidermis of uncertain thickness, formed of one or more layers of colourless cellules, closely packed together. This membrane is pierced with the above-mentioned pores, or stomata. The doubts that have been entertained upon the existence of perforations in these stomata, M. Brongniart thinks he has removed, and that it is certain, that in the centre of each stoma is an opening, by which the outer air communicates with the parenchyma. This parenchyma is evidently the seat of respiration; for it is the part which changes colour in exercising this function, which becomes green by the absorption of the carbon of the carbonic acid of the atmosphere, and which is discoloured again in darkness by the combination of the carbon of its juices with the oxygen of the air. This parenchyma differs entirely from that of other organs, by the numerous irregular cavities that it contains, which communicate with each other and the outer air by means of the openings of the stomata. It is into these cavities, in the cavernous parenchyma of aërial leaves, that the atmospheric air penetrates when it is absorbed by the surface of the utricles of the parenchyma, that are distended with the fluids which seem to nourish the plant. According to M. Brongniart, aquatic leaves, if submerged, differ, in being completely destitute of epidermis. It is not stomata alone that they want, as has long been known, but the epidermis also. There are none of the cavities that abound in the parenchyma of aërial leaves; but, on the contrary, the cellules of the tissue are compactly fastened together without any interstice, and the air dissolved in the water can only act on their outer surface. For this reason the proportion borne by this surface to the whole mass of the leaf is unusually great; the leaves, from want of epidermis, dry up quickly when exposed to the air, and can only exist in water, or a very humid atmosphere. Hence the author concludes, that the epidermis is destined to protect aërial leaves against too rapid evaporation, and the stomata or pores of this epidermis become necessary to maintain a communication between the atmosphere and the parenchyma.

Mr Robert Brown has also recently published some observations on these pores, from which it is to be collected that, in the opinion of that distinguished observer, the stomata are rather of the nature of glands than of pores, and are undoubtedly, in many cases, imperforate; evidently having in their disc a membrane, which is more or less transparent, sometimes opaque, or very rarely coloured. The existence of colouring matter in the stomata is the only circumstance that could have enabled an observer to prove their imperforate nature; for, in colourless membranes, such as those of *Crinum*, in which the stomata are particularly large, the best microscopes, employed under the most favourable circumstances, shew nothing but an apparent orifice, closed up occasionally by the dilatation of two glandular bodies placed beneath it. Mr Brown states, what was certainly a very unexpected fact, that these bodies will often, in proteaceous plants, by their figure and position, or magnitude, with respect to the meshes of the cuticle, determine the limits, or even affinities, of genera, or natural sections.—*Journ. of Royal Inst.* No. II.

Smut in Corn.—This substance, which has been sometimes considered a mere organic disease, but more usually a parasitical plant, analogous to that which causes the mildew and the rust, and which has been described under the names of *Reticularia segetum*, *Uredo segetum*, and *Uredo carbo*, has been lately the subject of a particular inquiry on the part of M. Adolphe Brongniart, who thus describes the parts in which this malady is found, and who adopts the opinion, that it is caused by the ravages of a kind of fungus:—"The axis which supports the glumes and floral organs of grasses, is formed of elongated cellular tissue, the cellules of which are placed close together, without sensible intercellular passages, and of fibro-vascular bundles of false tracheæ or ducts, and spiral vessels: in the fleshy mass, of which the smut consists, no structure of this sort is visible, at whatever time it is examined; but, for examining it satisfactorily, I have taken the plant at the earliest period when the spike is capable of being examined. At this time, the fleshy mass is found to consist entirely of an uniform tissue, containing uniform four-sided cavities, separated by partitions, formed of one or two layers of very minute cellules. These cavities, which, in organization, resemble the regular lacunæ, observable in the cells of aquatic plants, are filled by a compact homogeneous mass, composed of very small granules, perfectly spherical and uniform in size; they were slightly adherent to each other, and of a greenish colour, in spikes, but little developed; distinct, or simply clustered towards the centre of each mass, and of a pale nut colour, in spikes which were a little developed; finally, at a more advanced period, the cellular partitions disappear, the globules separate completely, and the whole mass is transformed into a cluster of powder, formed of very regular globules, perfectly alike, black, and quite analogous to the reproductive bodies of other fungi."—*Ibid.*

Floral Organs.—M. Dunal, of Montpellier, has published two dissertations on certain organs of the flower, which, belonging strictly neither to those which usually compose the calyx or corolla, nor to the organs of reproduction, have been deemed anomalous, and given rise to numerous botanical discussions. On the base of the divisions of the calyx, or the sepals, he has observed in many flowers glandular organs of various forms, which he calls *lepals*, because most commonly they appear in the shape of small scales. Within these, that is, nearer the axis of the flower, he distinguishes three series of organs very closely allied to each other,—the petals, which alternate with the sepals, and two rows of stamens, opposite to each other, alternate with the petals. Very often the stamens have at their base a scale, which sometimes is attached to the filament, or even closely united with it; and, on the other hand, the anther is, in certain flowers, deprived totally or partially of pollen, or replaced by a gland, and then the scale belonging to the stamen is much more developed; so that, according to M. Dunal, the petals are merely stamens of an exterior series, and destitute of anthers; and, in short, the scales, the petals, the glandular bodies, and the stamens, whether sterile or fertile, are, in his opinion, different states of the same organ. Pursuing this idea, he arrives at the conclusion, that all the parts of a flower, in its perfect state, may be referred to three systems of organs, which are respectively composed of several verticils or series, in the following order:—I. *Calycinal system*, always sterile; 1st verticil, formed of a determinate number of parts, called sometimes exterior sepals; 2d, composed of parts equal to those of the first verticil, and alternating with them, and often called an exterior calyx; 3d, usually called the calyx by authors, composed of the same number of parts or sepals, and alternate with those of the second verticil within those of the third series; opposite to them, and often adhering to them, are an equal number of scales, but these, with the sepals, form only one verticil. II. *Male reproductive system*, or *Andræceum;* this is formed of two ranks, an exterior and interior. Of the former the 1st verticil consists of a number of parts, equal to and alternating with those of the inner verticil of the calycinal system; this furnishes the petals, in the axils of which are found scales or stamens, but which together form only one series; sometimes these scales are divided into several, as in the almond: the 2d is of an equal number of parts to the last, and alternate with them. The inner andræceum has also two verticils; the 1st has the same number of parts as the others, and alternate with the second verticil of the outer andræceum; and the 2d alternates with this. III. *Female reproductive system*, or *Gynæceum*, has also two verticils; the 1st, alternating with the last of the andræceum, usually constitutes the fruit; the 2d alternates with this. It appears to be frequently difficult to trace out these nine series; but notwithstanding, M. Dunal seems to have proved their existence, and that each constantly alternates with those next it.

Development of the Ovule.—In a memoir read before the Institute of France, in 1828, M. Mirbel slightly pointed out some discoveries he had made concerning the ovulum of plants; and, since then, he has published a supplement, detailing his observations. As this may be considered to be a history of his views on the organization and development of ovules, and as the subject is of great importance, we here present an account of it nearly as abridged in the *Annales des Sciences Naturelles*, vol. xxi. p. 233.

When the ovula have attained a state of maturity, or, in other words, have become seeds, they may be classed according to one of the three following divisions:—*orthotropous*, *anatropous*, and *campulitropous*. The orthotropous seeds are attached to the ovary by their base; their form is perfectly regular, and their axis is rectilinear. The compulitropous seeds are also fixed to the ovary by their base; but their form is irregular, and their axis is curved, so that the two ends meet. The anatropous seeds, like the orthotropous, have a rectilineal axis, but they are resupinate on their funiculus, to which they adhere longitudinally, and by means of which they are attached to the ovary at a point near their apex. Before explaining how these forms are produced, it may be first necessary to attend to the different parts of the ovulum.

The exterior envelope, called by Brown, the testa, and by Mirbel, the *primine*, receives the funiculus. The point where the vascular fibres of the funiculus traverse the primine, so as to attach it to the second envelope, the tegmen of Brongniart, and *secundine* of Mirbel, is the chalaza, which Mirbel considers as the organic base of the ovulum. The portion of the funiculus united, in the anatropous seeds, to the primine, is the raphe. The foramen of Brown, micropyle of Turpin, and exostome of Mirbel, points out the summit of the primine, and also of the ovule, according to their view of the subject. The secundine sac is totally deprived of vessels, and is formed entirely of cellular tissue. It adheres by its base to the chalaza, and has at its summit an opening corresponding to that of the primine, and which Mirbel calls the endostome. The third envelope, termed by him the *tercine,* (the nucleus of Brown,) has no visible opening, and is fixed to the bottom of the secundine: this, in its turn, includes a fourth, or the *quartine,* apparently attached to the summit of the cavity, and the quartine contains the *quintine,* or embryonic sac, which adheres both to its apex and its base. In the upper part of the quintine, the embryo appears. These different parts do not exist, or, at least, have not been seen, in every ovule; and in those in which they have been observed, they are not all visible at one time, but one after the other: when the first are most evident, the last are merely rudimentary, and when the latter are developed, the other have often become undistinguishable.

It results from the observations of Mirbel, that this series of developments presents five distinct periods. In the first, the ovulum is scarcely perceptible, being a small, pulpy, conical substance, without a foramen. In the second, the exostome and endostome open; and they are to be perceived dilating insensibly, until they have attained their maximum. The primine and secundine are manifest at this period, as is also the tercine, but this only puts on the appearance of a round, or conical, cellular mass, of which the apex protrudes beyond the secundine. In the third period, the primine and secundine, united together, increase much in size, have their double orifice closed, and, consequently, conceal the tercine, which becomes a membranous bag. In the fourth period, the quartine arises from the internal surface of the nucleus; and the quintine is elongated into a narrow utricle, attached by the one extremity to the point corresponding to the chalaza, and by the other to that near to the endostome. This is the period in which the ovule passes into the state of a seed. In the fifth period, the quintine expands,—the embryo develops the cotyledons as well as the radicle, and reaches its full size,—and the substance of the perisperm is formed either in the cells of the quintine, or in those of the quartine or tercine, when it is no longer possible to recognize the different envelopes of the ovule, and it becomes necessary to designate the parts of the seed by names different from those employed in the ovule.

With regard to the changes of form and position that the ovule undergoes in these different periods, Mirbel applies the term, *statics of development,* to the force of expansion, or of inertness or contraction of the different parts; and he endeavours to shew how, in the ovule, these causes, acting, sometimes together, sometimes independently, alter or preserve the regularity of the primitive shape. Every ovule, according to him, has at first a regular form, so that, if the development be equal in all points, its regularity must be preserved; but, if the force of development be greater on one side than on the other, an irregularity must ensue. An equilibrium of forces must thus have taken place in an orthotropous seed, but not in the anatropous, or campulitropous seeds. When an ovule tends to be anatropous, the chalaza, or the inner extremity of the funiculus, is pushed forward in a slightly oblique direction, and inverts the column, so that its base now occupies the place where its summit was, and *vice versa.* This kind of resupination takes place in a very short space of time; and, by a series of observations, M. Mirbel has been able to trace its progress. As the chalaza is merely the end of the funiculus, the inversion cannot take place without an elongation of the funiculus, equal at least to the length of the axis of the ovule. Also, in the anatropous seeds, a portion of the funiculus, (that portion which botanists term the raphe,) united laterally to the primine, extends from the exostome to the chalaza. Three characters distinguish every ovulum destined to become in maturity a campulitropous seed, viz. 1. The indissoluble union of the hilum and chalaza. 2. The great force of development of one of the sides of the ovule. 3. The inertness, or even contraction, of the opposite side. This last remains stationary, or is subject to diminution, while the other elongates. If the side that elongates had been free in its development, it would have proceeded in a straight line; but it is influenced by the inertness or contraction of the opposite one, and can only increase by turning round the other, as a centre of resistance. Hence the annular form assumed by most of the campulitropous seeds.

By only considering seeds in a general way, we should now be tempted to infer, that all might be arranged in one or other of the three classes above mentioned; but, on a more narrow inspection, we shall find, that the characters of one sometimes combine with those of another; that, in certain species, similar results arise from different causes; that examples occur, in which the developments are arrested before they attain the perfection of the type to which they seem to belong; or even that, by too great a development, they may give rise to anomalous forms. In this point of view, the field of observation becomes extensive, since seeds are different in different natural orders. M. Mirbel has already remarked many curious modifications, one or two of which we shall here notice: —

According to the common law in *Quercus*, *Corylus*, *Alnus*, &c. the incipient ovule is orthotropous: it enlarges without having its position altered. Now, all the upper portion receives very little increase to its size, but the lower becomes much larger, elongating at the base, and carrying off with it the chalaza, which thus removes from the stationary hilum to within a short distance from the vortex of the ovule: separation of the chalaza from the hilum cannot have taken place without forming a lateral raphe, so that here we have all the characters of the anatropous seed, although the ovule has preserved its original position.

The presence of a raphe may also be observed in the campulitropous type, and this anomaly happens when the first development of the ovule is similar to that in the anatropous ovules. In the pea, the young ovulum becomes entirely inverted; the summit takes its station at the hilum, and the base, where the summit was; and from the hilum to the chalaza, which is diametrically opposite to the exostome, the raphe is to be observed. If the developments were at an end, the seed would thus be anatropous: but it is only the side, on which the raphe is, that remains stationary; the other continues to increase, and the campulitropous form soon prevails over the anatropous. The seed of the pea then exhibits the combination of two types; it is termed amphitropous.

We shall cite one more example, and a very remarkable one. In general, it is a rule that the radicle points to the exostome, while the other extremity of the embryo is at the chalaza; but this position is different in the campulitropous ovule of the *Primulaceæ* and *Plantagineæ*; and the anomaly results from the inequality of the developments. The primine, in consequence of an extraordinary increase of the extensible side, and gradual contraction of the opposite one, has quickly the exostome turned towards the chalaza, and these two extremities are not long in coalescing; but the extensible side of the secundine, as well as that of the tercine, ceasing to increase with the corresponding side of the primine, it follows that the embryo, the radicle of which never separates from the summit of the internal envelopes, remains stationary with the endostome, while the exostome pursues its course, and does not stop till it reaches the base of the ovule.

M. Mirbel concludes, from his numerous observations, that the development of the ovule is generally the same in all the species of one natural family; and thus, he considers, that researches of this kind must be not only useful to the progress of vegetable anatomy and physiology, but to philosophical botany, inasmuch as they furnish characters, the more important, as they give to classification the sanction of physiology.

GEOLOGICAL COLLECTIONS,

INCLUDING MINERALOGY.

Value of Fossil Shells in indicating the relative Geological Epochs of different Strata.—A dispute has arisen between Monsieur Boué and Messrs Murchison and Sedgwick, respecting the age of certain deposits at Gossau, which the former classes with the newer secondary, while the latter, from a consideration of their "relations, structures, and fossils," assign them to the tertiary rocks. From the shells, according to Monsieur Boué, it is impossible to determine any thing, since many of them appear to belong to genera hitherto found only in the chalk, and many more to those considered peculiar to the tertiary beds. He confirms his opinion by the result of the researches of Monsieur Dufresnoy into the geology of the South of France and the Pyrenees, who, "after a careful study of all the fossils from the chalk formation of the countries under examination, concludes, that, out of 240 species, 40 are species that, until now, were considered as tertiary—a case similar to that of Gossau." The opinion of Monsieur de France, esteemed the most learned conchologist now living, is also quoted by him, and is well deserving the attention of geologists:—"I have collected fossils for a long time," said this excellent man to me, "and hence you would conceive, that the species in my cabinet would increase; but this is not the case. On the contrary, the more individuals I receive, the more transitions of one species into another I observe; and, consequently, the number of species become less and less. Each locality appears to possess, not so much its own species, as more frequently its own varieties of every where nearly the same species. This circumstance, too much neglected, makes the best works on fossils only applicable to certain localities. If, on the other hand, we could get together from all parts of the earth all the series of fossils, we would see a great many species from one locality, identify themselves with those of others, because the connecting links would be present. In short, conchologists do not possess the means of fixing the specific characters, and sometimes not even those of the genera; this can only be done by the study of the animals, without which no one can trace a strict line of separation between the accidental and specific characters of the species of fossils or of shells."—See Dr Boué's paper in *Edin. New Phil. Journ.* Jan. 1831, p. 14—34.

Heights of Table Lands.

	Toises above the sea.
The table land of Iran in Persia,	650
Table land in which Moscow is situated,	67
The plain of Lombardy,	80
Table land of Swabia,	150
——— Auvergne,	174
——— Schweitz,	220
——— Bavaria,	260
——— Spain,	350

These table lands are not longitudinal valleys between ranges of mountains. The bottom of a longitudinal valley, which is from 1500 to 2000 toises above the sea, as is the case in the Andes, is caused by the elevation of a whole *mountain chain.* True table lands, such as those of Spain and Bavaria, were probably formed by the upraising of a whole *continental mass.* Both epochs are geognostically considered different.—Humboldt.—*Edin. New Phil. Journ.* Jan. 1831.

Fossil Bones found near Brighton. — The fossil remains of a large quadruped, supposed to belong to the genus Mastodon, have been recently discovered about four miles north of Brighton, a few feet below the surface. Among them are two teeth, each weighing about eight pounds and a half. They are, we understand, in the possession of Richard Weekes, Esq. of Hurstperpoint.

Application of Electro-Magnetism to the Discovery of Metallic Veins. — In the second part of the Philosophical Transactions for 1830 is a paper by Mr Robert Ware Fox, on the Electro-magnetic properties of Metalliferous veins in the mines of Cornwall. These effects he examined, by affixing plates of copper to the wooden props of the galleries, in different parts of the mine, in the direction of the veins. These plates were connected by copper wire 1-20th of an inch in diameter, including a galvanometer in the circuit, and extending, in some cases, as far as 300 fathoms. The action on the needle he found to vary generally with the *quantity of ore*, and the *depth of the station.* Hence, from such experiments, material assistance may be derived by the practical miner, in attempting to ascertain the amount of ore in particular veins, and the direction in which it is likely to occur in greatest abundance.

Red Sandstones of Berwickshire. — Mr Witham has published a paper on this formation in the second part of the Transactions of the Natural History Society of Newcastle, from which we extract the following: — "The result, then, of these repeated journeys over the ground, and repeated examinations, has been to produce a firm conviction on my mind, of what seemed to me at first more than problematical; namely, that the red rocks in the neighbourhood of Berwick, and also those seen upon the Tweed, the Black and White Adder, and in other localities of this district, are not the new red sandstone, but subordinate members of the mountain limestone series.

"In a paper written by me, and published in the Annals of Philosophy, July last, on the vegetable fossils found at Lennel-braes, near Coldstream, I made use of the term 'Coal Formation,' there being beds of this combustible matter in this series. By some this is looked upon as correct; still, as these rocks all lie below the coal field proper, I think it more correct to class them as a mountain limestone group. South of Berwick, in this formation, several good beds of coal are worked. How far the subordinate members may prove fruitful in this useful commodity, must at present remain matter of great uncertainty.

"I cannot help now observing how cautious we ought to be in pronouncing from mineralogical characters alone, the nature of any of these sandstones. Nothing but exact observation upon position, and upon their alternation, can justify our deciding upon the series to which they properly belong. The similarity to each other, in hand specimens, between many of the rocks of this formation and the proper new red sandstone, is often so striking, that the most experienced observer, without such precautions, must be liable to very gross mistakes.

"By this investigation, two features are exhibited in these subordinate beds of the above-named formation, which before were supposed only to exist in much more recent deposits.

"First, accompanying the usual fossils belonging to the class Vascular Cryptogamia, viz. the *Sigillariæ*, the *Lepidodendræ*, the *Stigmariæ*, and *Equisetæ*, so common in these measures, you have in this field, imbedded in shale, great abundance of Gymnospermous Phanerogamous plants. The two localities already observed are seven miles apart, and I cannot entertain a doubt, that upon the banks of the White and Black Adder, and many other localities, were workings to be carried through these shale beds for any purpose, great abundance of these singular fossils would more than repay those interested in such novel discoveries.

"Secondly, the presence of gypsum in the sandstones and the shales, containing beautiful crystals of selenite, has, in deposits so low down, hitherto, I believe, escaped notice.

"My attempt, therefore, to ascertain the true position of the red rock of Berwickshire, leads me to think that there cannot remain much doubt, that the mountain limestone series extends from the point where the first limestone appears on the coast of Northumberland, to the transition range of the south of Scotland, and that beds of coal have been worked near Ross, lying immediately upon the greywacke, and are now found a few miles south of Dunbar, in a similar position: how far north this mountain limestone group may extend, will, possibly, at a future period, be the subject of another paper."

Edge Coal Seams of Mid-Lothian.—In the same part of the Newcastle Transactions, Mr Dunn, coal viewer, has given an interesting sketch of these seams, as they occur in the Niddrie and Gilmerton collieries. A fine view of these edge seams may be seen on the shore, within water-mark, where they cross out between Portobello and Joppa, about three miles from Edinburgh. They dip southeast, and their horizontal direction is about south to west. At Niddrie, the thickness of the whole formation, down to the limestone, is 724 fathoms, including 94 feet 8 inches of coal of various qualities, all splint or cubical coal in beds varying from two to six feet in thickness. The connection of these inclined, or edge beds, with the horizontal beds of Sheriff-hall and Edmonstone, has not been distinctly traced; but the opinion of Mr Dunn is, that the latter overlie the former. "Before concluding this paper," he observes, "I wish to mention, as a corroborating fact of the edge coal underlying the flat coals of Sheriff-hall, that a part of the Marquess of Lothian's ground contains a parrott coal, similar to that in the edge suite, and dissimilar to any thing in Sheriff-hall; also that the limestone is found cropping out beyond the southeastern ascertained coal. I am not sufficiently acquainted with the coal-field south of the Esk, to attempt a classification; but I have little doubt it may be proved to correspond with the coal and limestone on the northern outcrop."

Close Resemblance of Tertiary Deposits from the same Seas.—Mons. Marcel de Serres, after describing several new species of fossil shells, found in the upper marine sandy marls of the eastern Pyrenees, (the *Trochus Farinesi, Terebra subulata, Crepidula sandaliformis,*) concludes his paper as follows:—"Thus, as we have long ago remarked, and which M. Elie de Beaumont has confirmed, the tertiary basins which depend upon the same seas, present a striking similarity, not only in the relative formations which have been deposited, but also in the nature and kind of the organized bodies which accompany and characterize them. This resemblance is apparent, even in the most minute details, *while it is far from being evident in tertiary basins which depend upon different seas,* because this kind of deposits has varied with circumstances peculiar to the places where they have been formed."—*Journal de Géologie,* II. No. 5.

Charring of Wood at very low Temperatures.—The following fact, in a letter to Mr Phillips, in the *Annals of Philosophy,* (No. VIII. p. 383,) is very interesting to geologists. In some of the foreign manufactories of charcoal and pyroligneous acid, the charring is effected with great advantage at very low temperatures; but all of them much higher than that of steam, as mentioned in this extract.—Mr Charles May, chemist, of Ampthill, has sent me some specimens of wood, converted into nearly perfect charcoal, at a very low but long-continued heat. The pieces, he informs me, are part of the bottom of a tub, which held about 130 gallons, and which had been in use in his laboratory about three years and a half, and almost constantly worked for boiling a weak solution of common salt, generally with an open steam-pipe, and sometimes, though rarely, with a coil: the temperature was seldom higher than 216° or 220°, and the vessel was lined with tin, rolled into sheets, about the sixteenth of an inch thick, and nailed to the inside: the joints, however, were not so good as to prevent the liquid from getting between the metal and the wood. Mr May states also, that he had long since remarked, that on making extracts with steam, of very moderate pressure, all the apparent effects of burning might be produced, but that he was not prepared to find so complete a carbonization of wood by steam; the vessel was made partly of fir and partly of ash, the former of which was most perfectly reduced to the state of charcoal.

Fossil Skull of an Ox, recently discovered in Caithness. (Communicated by Alexander Miller, Esq. of Wick.)—There was lately found, in a marl pit, at Thrumster, in this county, (Caithness,) the skull of an animal of the ox genus. It was imbedded in the marl at the depth of eight or ten feet from the surface. Through the kindness of my friend, Dr Henderson, of this place, I was favoured with the subjoined measurements.

Distance between the roots of the horns, 9 inches.

Distance from line between the horns to the orbits, 6 inches.

Length of sloughs of horns remaining, 1 foot.

Diameter of roots of ditto, 4 inches.

The nasal bones are all wanting; and the tips of the sloughs of the horns are gone, the horns being also wanting. They curved outwards and forwards, and were in all probability at least two feet long. The distance between their tips perhaps 24 or 30 inches.—*3d January*, 1831.

Fusible Mineral Compounds.—Mons. Berthier.—This indefatigable chemist has instituted an elaborate examination of the scoriæ of various lead works, chiefly those of England, with a view to determine their value and the mode of their formation. These have led him to some very curious results, some of which may probably become highly useful in the arts. He finds that the fluorides, chlorides, and even the sulphides, form with each other, in most cases, and with certain oxides and salts, combinations which are extremely fusible. "These combinations are in general very weak, since water decomposes them completely, when one of the elementary principles is soluble. Analogous compounds are found in nature, such as the topaz, picnite, certain micas, apatite, the chlorophosphate, and the chloroarseniate of lead; but some of them are infusible." We quote the conclusion of the paper as very interesting:—Several of the fusible compounds treated of in this article may be employed for founding statues, vases, bas reliefs, medals, and other ornaments, which, would thus imitate perfectly the works of the sculptor, but which would be much cheaper, and which would have, over plaster casts, the great advantage of bearing exposure to the air as well as marble. Experience would soon teach the best compositions. Those which seem to me likely to succeed are the following:—

80 Calcined plaster of Paris + 20 Fluor spar
70 Sulphate of barytes + 30 Fluor spar
90 Sulphate of lead + 10 Fluor spar
25 Calcined plaster, 20 sulphate of barytes, 40 sulphate of lead, 15 fluor spar.

The fusible scoriae of the reverberating furnace at Lea, by recasting, would serve very well for this purpose.

We may also employ a mixture of 88 sulphate of lead, and 12 of chloride of lead; or 92 sulphate of lead, and 8 of litharge.

The mixtures which contain a huge quantity of sulphate of lead would have the advantage of great fusibility; and, from their density, of great stability also, but perhaps they might be too soft. A great porportion of fluor spar, on the contrary, would produce hardness; but these mixtures would cost dearer than those in which the sulphate of lead predominates, which is at present at a very low price. It would be very easy to colour the different compounds, by adding some metallic substances, such as chromate of lead, &c.

Tellurets of Silver and Lead from the Altaï Mountains.—During the journey through Russia and Siberia, which M. Rose, of Berlin, lately made in the company of MM. Humboldt and Ehrenberg, he found two ores of tellurium in the silver mines of Sawodinski, near those of Siranowski, at the river Buchtharma; and as this metal has hitherto been only found in the gold mines of Transylvania and in Norway, this discovery is of the greatest interest. We extract the description of tellurium-silver and tellurium-lead as it is given by M. Rose in *Poggendorff's Annalen.*

He first saw these two ores in the Museum of the town of Barnoul, near the river Ob; besides numerous smaller pieces, there were two large blocks of about a cubic foot each, which, on account of their malleability, and the large quantity of silver they contained, were considered to be silver-glans, (sulphuret of silver,) from which they, however, were found to differ greatly. *Tellurium-silver* is of granular texture, not crystallized nor cleavable; has much metallic lustre, and its colour is between that of lead and steel: it is malleable, though to a less degree than silver-glans; and its specific gravity was found, by two different experiments, to be 8.565 and 8.412. The specimens which were examined by M. Rose were adhering to greenish gray talc slate, and the ore was mixed with black blende, small quantities of sulphate of iron and of copper, and tellurium-lead.

When tellurium-silver was heated before the blowpipe on charcoal, it fused to a black mass, which, on cooling, became covered with numerous white points and ramifications of metallic silver. It fused also in open and closed vessels; and, when ignited in a retort, tinged the glass with which it was in contact of a yellowish colour: in the open tube it deposited a small quantity of white sublimate, part of which was volatilized by directing the flame upon it, the rest contracting into small globules.

According to the first analysis, tellurium-silver consists of—

Silver	62.42
Tellurium	36.96
Iron	0.24

According to the second, of—

Silver	62.32
Tellurium	36.89
Iron	0.50

And if tellurium-silver be considered as a compound of one atom of silver = 62.63, and one of tellurium = 37.37, the above results are nearly confirmed.*

The other mineral, *tellurium-lead,* is, like the former, not crystallized, but cleavable in three directions; the planes of cleavage are not quite even, but

* According to Berzelius, the atomic weight of silver is 1351.005. and that of tellurium 806.45, oxygen being 100.

seem to be at right angles to one another. Its colour is tin white, almost like antimony, but a little more yellow; it has much metallic lustre, is brittle, and of the hardness of fluor spar: spec. gr. = 8.159. It is mixed with small proportions of tellurium-silver, and before the blowpipe, on charcoal, fuses to a small button, which gradually diminishes in size, so as ultimately to exhibit a small globule of silver, surrounded by a ring of metallic hue, which seems to be formed by the volatilized and subsequently precipitated tellurium-lead. If the flame is directed upon it, it is completely volatilized, the flame becoming at the same time of a blue colour. It fuses also in a retort, and forms a small quantity of white sublimate, which, under the action of strong heat, contracts into small globules. If ignited in an open tube, it fuses, and becomes surrounded by a ring of white drops; and, at the lower portion of the tube, a very dense white sublimate is deposited, which, before the flame of the blowpipe, contracts into small drops.

As one analysis only could be made of the mineral, M. Rose refrains from giving any decided opinion on its composition at present; he is, however, inclined to consider it as a compound of 1.28 of silver, 60.35 of lead, and 38.37 of tellurium.—*Royal Inst. Journ.* Feb. 1831.

Voltaic Test of the State of Metals in Mineral Substances.—It is well known that Dr Wollaston devised a beautiful little arrangement to ascertain the conducting power of certain crystals having metallic characters, and which ultimately proved to be titanium. If a plate of copper be in contact with a plate of zinc, and part of both plates be immersed in a dilute acid, the copper, by its electric condition, decomposes water, and becomes covered with bubbles of hydrogen. If a piece of paper, or a card, be interposed where the two metals were in contact, the copper loses this power altogether, and no bubbles appear on it; but if a small hole be made in the paper or card, and a little piece of metallic matter put there, so as to touch at once both the zinc and copper, then the latter has its full power restored.

M. Macaire Prinsep has applied this test more generally; and he found, in the first place, that a metal was necessary to restore the effect—lead, bismuth, tin, &c. reproduced the bubbles; but sulphuret of arsenic, rutilite or oxide of titanium, gray cobalt ore, and the sulphurets of antimony, iron, tin, or lead, produced no effect. Portions of meteoric stone from Aigle and Barbotan, by producing bubbles, shewed that they contained uncombined metal; and the method seemed competent to indicate, in all cases, whether the metals used were free, or in a combined condition.

As lead gave bubbles, but the sulphuret of lead none, experiments were made with lead, to which sulphur, in increasing proportions, had been added:—1-100th, 1-50th, 1-32d, 1-16th, and 1-12th of sulphur, did not take away the property from lead; but when 1-8th of sulphur was used, no bubbles appeared upon the copper. Then ascertaining the proportions in the definite sulphuret of lead, he found them to be exactly those which caused the evolution of bubbles to cease (86 lead and 14 sulphur.) The same effect occurred with the sulphuret of tin; and hence it was concluded, that chemical combination in determinate proportions was necessary to prevent this electric decomposition, and that mixtures had no influence on the phenomena.

These results may be important to the mineralogist; and M. Macaire Prinsep, in illustration, concludes, that the gray cobalt ore of Lunaberg, which is composed of cobalt, arsenic, and sulphur, contains only sulphurets of the metals; that, on the contrary, the metals of aërolites, although sometimes found associated with sulphur, and always with silica, exist neither as sulphurets nor silicates, but in their metallic condition.—*Bib. Univ.* 1830, p. 146.

Produce of Gold and Silver in the Russian Empire.—Baron Humboldt, in Poggendorff's Annals, states this produce as follows:—

According to official documents, the Russian mines yield annually about 22,000 marks of gold, and 77,000 of silver. In 1828 the produce of gold was 22,256 marks (318 puds, of which 115 were obtained from imperial, and 203 from private mines); of silver 76,498 marks (1093 puds); and of platina 6570 marks (94 puds); and the respective value was, of gold, 4,896,000 Russian dollars (£700,000 sterling); and of silver, 1,071,000 dollars (£153,000 sterling.) The gold mines of the Ural yielded in—

1826,	232 puds.
1827,	282 „
1828,	291 „

In the first six months of 1829 they gave 142 puds of gold (46 from imperial, and 96 from private mines,) and 43 puds of platina.

The total produce of the Ural mines, from 1814 to 1828, is 1551 puds, of the value of about £3,413,000 sterling; the last five years alone yielded 1247 puds.

The annual produce of gold in Europe and in Asiatic Russia amounts to 26,500 marks of gold, and 292,000 of silver, of which the Russian empire alone yields 22,200 marks of gold, and 76,500 of silver.—*Poggendorff's Annalen*, 1830, p. 273.

Probable Cause of the Peculiarity of a Fall of Snow, noticed in Vol. II. p. 58.

A friend informs us, in alluding to the remarkable peculiarity of a fall of snow, noticed in No. VII. of our former series, that a somewhat similar appearance was observed by him on the shore of the Forth below Caroline Park, on the 30th January last. A slight fall of snow had occurred the preceding night, barely sufficient to cover the ground; and at the place mentioned, for the extent of about a dozen yards in length, and three or four in breadth, the shore was strewn with snow-balls. Their general size was three or four inches in circumference, the largest scarcely exceeding six. They were so fragile as to break with the slightest pressure, in attempting to raise them, and they presented no visible nucleus. This circumstance, together with the surrounding snow exhibiting no foot-prints, precludes any idea of artificial formation. The peculiar features of the ground probably afford the best explanation of their appearance; the shore at this point rising rather abruptly about high water-mark, and presenting a convexity and succeeding concavity towards the Forth, similar to the letter S. The balls were observed in the concavity, and had probably been formed by the wind, after sweeping round the convex into the concave arch, causing an eddy in again curling round in an opposite curve to escape from the latter. This is farther confirmed by the snow being slightly drifted, so as to lie somewhat more thickly in the hollow where the balls themselves lay. In a few places there were very faint furrows, as if the balls had drifted over the snow, but such were scarcely visible; and the balls were half imbedded, probably from more snow having fallen after their formation. The number of balls might be about fifty. Our correspondent is not aware of the direction in which the wind had blown during the preceding night; but, at the time the balls were observed, the current of air was almost in the direction supposed necessary to their formation, varying from it but a few points.

NOTICES AND ANALYSES OF NEW BOOKS AND PAPERS.

A System of Geography, popular and scientific. By JAMES BELL. Vol. IV. (Asia.) Glasgow. Blackie, Fullarton, and Co. 1830.

This work, the former volumes of which have already received our commendations, maintains its character as it advances towards its completion. Two more volumes will terminate the system, of which Europe, Africa, and Asia, are already published.

Ueber die Geographische, &c. On the Geographical Distribution of the Mammalia. By J. MINDING. 4to, pp. 193. Berlin, 1829.

This pamphlet is almost entirely composed of tables, exhibiting the comparative distribution of the different families, genera, and species, proper or common to the different parts of the world.

Deliciæ Musæi Zoologiæ Vratislaviensis. Auctore J. L. C. GRAVENHORST. Fol. Leipzig.

This beautiful work, on the Zoological Collection of the Breslaw Museum, is publishing in numbers, containing about 106 pages, and 17 coloured plates. The critical remarks on synonymes are particularly valuable.

Principes de Philosophie Zoologique, &c. Principles of Zoological Philosophy. By M. GEOFFROY ST HILAIRE. 8vo. pp. 226. Paris, 1830.

The following articles are contained in this work:—

1. On the Theory of Analogies, to shew how it has become the subject of a discussion in the Academy of Science, and to fix the precise points of the controversy.
2. On the necessity of printed works to supersede verbal communications in the controversy.
3. Report on the Organization of the Mollusca, presented to the Academy of Sciences, at the sitting of the 15th February, 1830.
   M. Geoffroy precedes this report, by an account of the circumstances which gave rise to the controversy between M. Cuvier and himself.
4. First argument of Baron Cuvier, being considerations on the Mollusca, and on the Cephalopoda in particular.
5. Extempore reply of M. Geoffroy.
6. On the Theory of Analogies, to establish its novelty as a doctrine, and its practical utility as an instrument.
7. On the Theory of Analogies, as applied to the organization of fishes.
8. Second argument of Baron Cuvier.
9. On the *Os Hyoïdes.* Reply to the last argument of Baron Cuvier.

There are inserted at the end of these chapters, two summaries of the doctrines, relative to the philosophical resemblance of animals, by the editors of the two daily journals, *le National* and *le Temps;* which are acute and interesting.

Anatomie Transcendante, &c. Transcendental Anatomy, Memoir IV. Law of Symmetry, and Conjunction of the Vascular System. By M. Serres. *Ann. des Sci. Nat.* Sept. 1830.

M. Serres concludes, from his observations, that the aorta, and all single arteries in the middle plane of the body, are at first double; and that the two vessels tend to unite from without inwards, by the law of centripetal formation, or of symmetry and conjunction.

On the Development of the Vascular System in the Fœtus of Vertebrated Animals. Part II. By Allen Thomson, M.D. &c. *Edin. New Phil. Journal*, Jan. 1831.

We have already noticed the former part of this Essay, and have again to speak favourably of the author's labours. The extent of reading exhibited in this memoir, is in the highest degree praiseworthy, and leads us to expect great acquisitions to our knowledge, from one who is so fully acquainted with what is already known.

But our principal object in noticing Dr Thomson's investigations, is to draw attention to what we consider to be of the first moment in the advancement of anatomical science. The study of the development of individual organs, though it cannot be said to be new to the anatomist, is certainly assuming an importance in the present day which has never been previously attached to it; and we have a fervent expectation that this school will one day be eminent in this kind of research. We have now in our eye several talented young men, to whose studies this fortunate direction has been given, and who will, we doubt not, at some future time, add much to the reputation of Edinburgh, by the cultivation of the philosophy of anatomy. The great mass of that profession, whose education necessarily leads to the prosecution of anatomical observation, have scarcely an idea beyond the mere forms and relations of organs, and if spoken to of the transcendental anatomy, which is based on a knowledge of development, they hear only a foreign tongue. But there is also another class of anatomical observers forming in this country, and we think that it is not saying too much to place Dr Thomson amongst the foremost rank.

This second part of the author's essay, (a portion of which is only in private circulation, but will be published next month,) consists of an account of the development of the blood-vessels connected with the respiratory organs, concluding with a recapitulation of the general principles deducible from the preceding observations. We shall return to this subject, of which we can at present only speak hastily; but, in the mean time, we strongly recommend Dr Thomson's essay to attentive examination.

Notice sur quelques Animaux, &c. Observations on the Breeding and Training of Animals. By M. Chassay. Bayeux. 1830. Groull. 8vo. pp. 25.

M. Chassay concludes, from experiment, that it is in the power of man to change the nature and habits of animals.

Entomographie, &c. Entomography of Russia. By M. G. Fischer, of Waldheim. Vol. III. 4to.

This work will contain descriptions of all the insects proper to Russia. The first two volumes contain species of different orders or families; but the author appears to have given up this first plan, and determined to follow a regular order. Thus this third volume begins with the Coleoptera, by the families of the *Cicindeletæ*, and *Carabici.* Excellent coloured plates, 14 in number, several of which are double, accompany this volume, which is composed merely of the descriptions of species.

Collection Entomologique. Entomological Collection, or Natural History of Insects; painted after nature, by Alex. Noel, and engraved on steel, under the direction of M. Pauquet. Part I. *Lepidoptera,* or Butterflies of Europe. Paris, 1830.

This work will be divided into four parts, the first and second of which will contain European and foreign butterflies. The third and fourth will contain the *Coleoptera,* or European and foreign insects. Each part will be composed of 10 or 12 numbers, with 8 plates, in 8vo, to appear monthly. With the last number of each part, the subscribers will receive, for the same price as the coloured numbers, (4 francs,) a volume of text in 8vo.

Observations Zoologiques, &c.—Zoological Observations on the Testacea of the Island of Pantaleria. By M. Costa. Pamphlet in 4to. Naples, 1829.

The shells, the catalogue of which M. Costa here gives, were gathered in the Island of Pantaleria, by his friend M. Gussone. The author proposes to publish, in a short time, a *Systematic and Descriptive Catalogue of the Invertebrate Animals of the two Sicilies,* so that he does not here give the description of the new species, whose discovery he mentions. This catalogue is preceded by interesting observations on the consequences which may be deduced from the predominance of certain species in different localities, from the size which they attain, &c.

Remarks on the *Achatina Stewartii.* By Mr Green. *Contributions to the Maclurian Lyceum.* Vol. I. p. 66.

The author observes, that *Achatina lugubris and Stewartii,* Green; *Helix lugubris,* Chemnitz; *H. lorata; H. luteolata; et H. vulpina,* Ferussac, are all synonymes of one species.

Conspectus Generis Gentianæ imprimis specierum Rossicarum. Auct. A. de Bunge. *Acta Mosquensia.* Vol. VII. p. 199.

The author of this work gives an enumeration of all the species of the genus *Gentiana;* but he limits himself to the specific characters, and the mention of some synonymes of the species foreign to the Russian empire, or which are well known. He gives a detailed description of the species which grow in this country, and those which are new or little known. These latter are represented by plates.

This work comprehends 80 species; but the author has intentionally omitted the 28 species collected in South America by MM. Humboldt and Bonpland, and described by M. Kunth.

Novæ Plantarum Species descriptæ et Iconibus illustratæ. Auctore Dr C. A. Meyer. Ibid. P. 137.

The author describes in this memoir the following three new species:— *Claytonia sarmentosa* from the island of St George, *Claytonia stolonifera* from Unalaska, and *Ribes tubiflorum* from California. These three plants are figured.

Observationes in Plantas Rossicas, et Descriptiones Specierum Novarum; propositæ à C. Steven. Ibid. P. 259.

These remarks on different plants, new, or imperfectly known in Russia, refer to the following genera:— *Orchis, Colchicum,* comprising a monograph on this genus, including nine species, *Gladiolus, Ornithogallum, Centranthus, Vaillantia, Galium, Heracleum.*

Some new species are mentioned, others are united, and the synonymy of several authors discussed.

Descriptiones Novarum Specierum ex Algarum ordine. Auctore R. K. Greville. *Nov. Act. Acad. Cæs. Leop. Carol.* Tom. XIV. Pars II. p. 421.

This notice contains the description of two new species of Algæ, *Sphærococcus interruptus* from the North Sea, and *Zonaria Fraseri,* from the coasts of New Holland and Rawak. They are beautifully figured in an accompanying plate.

Species Muscorum frondosorum. Edit. a D. Fred. Schwaegrichen, Hist. Nat. Prof. Lips. Pars I. Berolini, 1830.

This is an undertaking for which Professor Schwaegrichen is eminently qualified. The pupil of the great Hedwig, and possessor of his herbarium, he has the means of determining all his master's species, and having been engaged all his life in adding to the stock of our bryological knowledge, he has accumulated probably the richest mass of materials in existence on his favourite subject. His present work may be received, either as a distinct production, or as a continuation of Willdenow's *Species Plantarum.* The first part contains the genera belonging to the families *Polytricha, Buxbaumiæ, Mna, Funariæ, Brya, Lepbostoma,* and *Bartramiæ.* We are glad to perceive, on the part of the author, a disposition to reduce rather than increase the number of species.

Memoires pour servir, &c. Memoirs for a Geological Description of France. Arranged by order of M. Becquey, under the direction of M. Brochant de Villiers. By MM. Dufresnoy and Elie de Beaumont, Engineers of Mines. Vol. I. Paris, 1830.

This volume comprises four memoirs, two of which are very long. They have been already inserted in the *Annales des Mines;* but this separate publication will put them within the reach of a greater number of readers, who could not easily consult them in so extensive a work. A real service is therefore conferred on geologists, in thus affording an opportunity to those engaged in the study of the general and special geology of France, of possessing the important memoirs, which result from the researches of MM. Dufresnoy and Elie de Beaumont.

The memoirs contained in this volume are entitled:—

1. Geological Observations on the different formations in Vosges which separate the coal formation from the lias; by M. Elie de Beaumont.
2. Memoir on the existence of gypsum, and different metalliferous minerals in the upper part of the lias in the southwest of France; by M. Dufresnoy.
3. General considerations on the central plateau of France, and particularly, on the secondary formations which cover the southern declivities of the primitive mass which composes it; by M. Dufresnoy.
4. On the relations of the tertiary and volcanic formations of Auvergne; by M. Dufresnoy.

Notices sur quelques points, &c. Notices on some points in Mineralogy and Geology. By M. Voltz. *Memoirs of the Natural History Society of Strasbourg.* Vol. I.

1. Borate of Magnesia in the Keuper gypsum discovered by M. Gaillardot near Luneville.
2. Notice on the elevation of strata.
3. Notice on the Mineral Spring of Sulz-les-Baines.

M. Voltz gives the analysis of these waters by M. Berthier, and describes the geological disposition of the beds in which this spring arises, which is remarkable, inasmuch as it corresponds to well marked dislocations which accompany a necessarily very considerable rising of the beds. This fact, according to M. Voltz, is common to several other mineral springs.

4. Observations on Fossil Vegetables.

This notice is the announcement and summary of a more extended memoir, whose object is to discuss and oppose some of the opinions on fossil vegetables of M. Adolphe Brongniart.

On the Occurrence of Chalk Flints in Banffshire. By James Christie, Esq. Banff Institution. *Ed. New Phil. Journ.* Jan. 1831.

Some years ago, while examining the geognosy of the vicinity of Peterhead, Professor Jameson's attention was directed to the chalk flints found in that neighbourhood, by previous information. He traced them extending over several miles of country, and frequently imbedded in a reddish clay, resting on the granite of the district. These flints contain sponges, alcyonia, echini, and other fossils of the chalk flint, thus proving them to belong to the chalk formation, which Professor Jameson thinks will probably be found *in situ* in some of the hollows in this part of Scotland.

Since this period Mr Christie has met with a quantity of flints mixed with the water-worn stones and shingle along the shore of Boyndie Bay, to the westward of Banff, and on the rising ground between Turiff and Delgaty Castle; and what renders more probable their immediate connection with the chalk formation is, that they also contain organic remains principally of sponges and alcyonia.

We recollect an old joke about some flints being cast out with ballast near Peterhead; but this can no longer militate against the Professor's opinion, when these flints, containing organic remains, are found so extensively disseminated.

Transactions of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne. Vol. I. Part II.

This part contains five memoirs: — I. Remarks on the geology of the banks of the Tweed, from Carham, in Northumberland, to the sea-coast at Berwick, by N. J. Winch. II. Sketch of the life and works of the late Thomas Bewick, by Mr G. C. Atkinson. III. Description of a group of dykes, termed Riders, discovered in the Whitehaven Colliery, by Mr Williamson Peile. IV. Notice of the edge seams of Mid-Lothian, with a description of Gilmerton colliery now working, the lowest of the series called the North Green Seam; by Mr Matthias Dunn, Colliery viewer. V. On the red sandstones of Berwickshire, particularly those at the mouth of the River Tweed, by Henry Witham, of Lartington, Esq.

Of this part, we have made some use, as may be seen by a reference to our Geological Collections, and we may probably return to it in a future Number. We have to regret, that the *coloured* lines, red and yellow, referred to in the plan and section, illustrative of Mr Peile's very interesting description of the dykes in the Whitehaven coal-field, have been omitted in our copy, by which the position of the riders is rendered much less intelligible.

We have only room to congratulate this zealous society on their success in the geological field, and to wish them a satisfactory continuance of their useful labours.

Experimental Inquiries on Electrical Accumulation. By Mr W. S. Harris, of Plymouth. Pamphlet, in 8vo.

From an elaborate series of experiments, detailed in this paper, Mr Harris has deduced the following laws of electrical accumulation and transmission: —

1. An electrical accumulation may be supposed to proceed by equal increments. — A coated surface, charging in any degree short of saturation, receives equal quantities in equal times, all other things remaining the same. — The quantity passing from the outer coating, is always proportional to the quantity added to the inner.
2. The quantity of matter accumulated may be estimated by the revolutions of the plate of the electrical machine, supposing it in a state of uniform excitation; or it may be measured by the explosions of a jar connected with the outer coatings. — It is as the surface multiplied by the interval which the accumulation can pass. — When the surface is constant, it is as the interval. — When the interval is constant, it is

as the surface. — It is also as the surface multiplied by the square root of the free action. — When the surface is constant, it is therefore as the square root of the attractive force.

3. The interval which the accumulation can pass, is directly proportional to the quantity of matter, and inversely proportional to the surface. — It is as the quantity divided by the surface. — If the matter and surface be either increased or decreased in the same proportion, the interval remains the same. — If, as the matter be increased, the surface be decreased, the interval will be as the square of the quantity of matter.
4. The force of electrical attraction varies in the inverse ratio of the square of the distance between the points of contact of the opposed conductors, supposing the surfaces to be plane and parallel; or otherwise between two points, which fall within the respective hemispheres, at a distance equal to one-fifth of the radius, supposing the opposed surfaces to be spherical.
5. The free action is in a direct proportion to the square of the quantity of matter, and in an inverse proportion to the square of the surface. — It is directly as the effect of the explosion on a metallic wire, all other things remaining the same. — If the matter and the surface increase or decrease together, and in the same proportion, the attractive force remains the same. — If, as the matter be increased, the surface be decreased, the attractive force is as the fourth power of the quantity of matter.
6. The effect of an electrical explosion, on a metallic wire, depends exclusively on the quantity of matter, and is not influenced by the intensity or free action. — It is diminished by accumulating the matter on a divided surface. — It is as the square of the quantity of the matter. It is as the square of the interval which the accumulation can pass. — It is directly as the attractive force of the free action, all other things remaining, in each case, the same. — It is as the *momentum* with which the explosion pervades the metal.

An Experimental Inquiry into the Number and Properties of the Primary Colours, and the Source of Colour in the Prism. By Walter Crum, Esq. Glasgow. 8vo, pp. 47.

This treatise is intended to shew, that *darkness* is the source of colour, and that primary colours are only three in number, —yellow, red, and blue. We recommend the ingenious author to peruse the *Farbenlehre* of the celebrated Goethe, who has long ago shewn darkness to be, in truth, the source of colour, and secured the general reception of the same opinion in Germany.

List of the Works, and Memoirs of J. Raddi, an Italian Botanist. *

1. On the new species of Mushrooms found in the neighbourhood of Florence, and not described in the *Systema Naturæ* of Linnæus, Edit. XIII. (Inserted in Vol. XIII. of the *Actes de la Soc. Ital. des Sciences.* Modena, 1806; with five coloured plates.)

* An esteemed correspondent having suggested to us the utility of our collecting together the titles of works and papers of eminent naturalists, as opportunity may offer, we commence an intended series of such catalogues with the above List. —Ed.

2. On some new and rare species of cryptogamic plants, found in the vicinity of Florence. (*Actes de l'Acad. des Sciences de Sienne.* Vol. IX. p. 230, 1808. With four plates.)
3. Novæ species cryptogamarum inventæ in Florentinis suburbanitatibus, et descriptæ in quadam Memoria inserta in volumine Academiæ Sinensis, anno 1808. 4to; with the same plates as the preceding.
4. Novarum vel rariorum ex cryptogamiâ stirpium in agro Florentino collectarum decades duæ. Bononiæ, typis Annesii de Nobilibus. 1808. 4to; with two plates; and in the *Opusc. di Bologna,* vol. II. p. 439.
5. Synopsis Filicum Brasiliensium. Bononiæ, 1819. 4to; with two plates. (*Opusc. Scientifici di Bologna,* tom. III. p. 279.)
6. On some alimentary plants of Brazil, and particularly, on a new species of Solanum with edible fruit. (Inserted in the Continuation of the *Actes de l'Acad. des Géorgophiles de Florence,* vol. II. p. 537. 1819.)
7. Jungermannographia Etrusca. (*Atti della Acad. Ital. delle Scien.*; t. XIII, p. 14. 1818.)
8. On some new species of reptiles and plants from Brazil. (*Ibid.* vol. XVIII, p. 313; with four coloured plates.)
9. Forty new plants of Brazil. (*Ibid.* vol. XVIII, p. 382. 1820. with a plate.)
10. Notice of the life and works of Dr G. Carradori. (*Ibid.* vol. XX, p. 1.)
11. Brief observations on the Island of Madeira. (*Antologia,* vol. II. p. 259. 1821; with a lithographic plate.)
12. On some species of Psidium. (*Opusc. scient. di Bologna,* vol. IV, p. 251. 1823; with a plate.)
13. Agrostographia Brasiliensis. (*Atti della reale Academia Luchese di Scienze,* etc. vol. II, p. 399. Lucca, 1823; with a plate.)
14. Cryptogamia of Brazil. (*Atti della Societa Italiana delle Scien.* vol. XIX, p. 27. 1823.)
15. Supplement to the Cryptogamia of Brazil. (Ibid. t. XX, p. 43. 1827.)
16. Continuation of the Description of the reptiles of Brazil. (Ibid. t. XIX, p. 58. 1821.)
17. Description of a new Orchis of Brazil. (Ibid. t. XIX, p. 219. 1823.)
18. Report on the Chrysalides of some insects hurtful to grain. (In the Continuation of the *Actes de l'Acad. des Géorgophiles,* t. III, p. 353. 1823.)
19. Plantarum Brasiliensium nova genera, et species novæ vel minus cognitæ. Pars I. (*Filices.*) Florentiæ, 1825; 1 vol. in fol.; with 97 lithographic plates.
20. On the Araucaria of Brazil. (Continuation of the *Actes de l'Acad. des Géorgophiles,* t. V, p. 185. 1827.)
21. List of the species of Piper collected in Brazil by J. Raddi. (Nuov. Giorn. de' letteratti, t. XVII, p. 3. Pisa, 1828.)
22. Description of a new species of Cardamomum from Brazil. (Ibid. t. XVII, p. 13.)
23. Melastomæ of Brazil. (*Atti della Soc. Italiana delle Scienze,* t. XX, p. 3. 1828; with six lithographic plates.)

NOTICES AND PROCEEDINGS OF SCIENTIFIC SOCIETIES.

EDINBURGH.

Royal Society.—*Jan.* 17, 1831. Professor Russell in the chair. A paper was read by Professor Wallace on the Pantograph, an instrument calculated to reduce curved figures to a smaller zone of proper proportions. After giving a detailed history of the instrument, which was invented in 1603, the Professor shewed that rough diagrams only could be taken by means of it, and described the improved one invented by him, which he calls an Eidograph, by which much finer and more accurate reduced copies may be taken in a short time. The instrument was exhibited along with some plates executed with it, which shewed that it might be applied to very delicate delineations.

An interesting communication was then read from Arthur Trevelyan, Esq. noticing, that during the cooling of rods of certain metals, when in contact with masses of lead, sounds were produced, resembling those of an Æolian harp, accompanied by a tremulous motion of the rod. The sounds varied with the length of the metallic bar, its degree of heat, and the metal of which it was composed.

Feb. 7.—Professor Hope in the chair. At this meeting the following communications were read:—1*st*, On the proper construction of tide harbours, by Mr Matheson, civil engineer: 2*d*, A short notice by Mr Robison of some peculiarities in the construction of a clock recently made for the Royal Society, by Mr Whitelaw, of Edinburgh: 3*d*, A report by Professor Christison, on various articles sent to the Royal Society, by Mr Swinton of Calcutta. Amongst other things, the Professor mentioned, that he had detected a peculiar principle in petroleum from Rangoon, differing in density and in the effects produced on it by heat, as well as in other respects, from naphthaline, as described by Mr Kidd; he proposes to call it *petroline.*

Wernerian Society.—*Feb.* 5. Henry Witham, Esq. in the chair. The Secretary read an account of a new and very beautiful species of West Indian moth, named *Attacus Wilsonii*, after James Wilson, Esq. by the Rev. Lansdown Guilding; and exhibited a drawing of the perfect insect of both sexes, with its larva and cocoon.

Professor Jameson made a communication to the Society, regarding the flints found in Banffshire, by Mr Christie of the Banff Institution.

Professor Jameson read an essay *on the form of Noah's Ark*, by an anonymous F. R. S. L. and E.

Dr Scot, of Corstorphine, read a paper on the alabaster of the ancients.

Feb. 19. Professor Jameson in the chair. A paper on the beacon-lights of remote antiquity, by Robert Stevenson, Esq. civil engineer, was read by the Secretary; the chief object of which was to shew the probability that the *cyclopes* of the ancients were personifications of light-houses in their first rude state.

A communication from Dr Murray, of Aberdeen, on the influence of rocks on the nature of vegetables, was then read, in which the author expressed his opinion, that rocks do not influence the distribution of species in any general point of view.

The last paper submitted to the meeting was an interesting and vivid description of a great flood of the Mississippi, by Mr Audubon.

LONDON.

Royal Geographical Society of London.—Jan. 24, 1831. W. R. Hamilton, Esq. in the chair. A newly invented parallel ruler was presented by Mr Jones, of Charing Cross. Mr Jones' invention consists in the application of the spirit level, by which he obtains the parallel line, or one making any given angle with another: the only condition required being, that the surface of the drawing be inclined to the horizontal plane. The line required to be drawn, whether parallel to, or making a given angle with, any other, being always referred to the spirit level, renders this at once an infallible and extremely convenient instrument.

An important communication from Dr Holland was read, from the commonplace book of the Society, calling the attention of future travellers in Greece to various desiderata; some of which we shall notice in our next Number.

An account of Deception Island, of New South Shetland, by Lieutenant Kendall; and an account of Keeling, or Cocos Islands, in the eastern part of the Indian Ocean, were then read.

The following gentlemen were elected members of the Society:—Hunter Gordon, Esq.; Edward Winterbottom, Esq.; Captain Chaplin; Captain Melville Grindley; W. Westall, Esq.

Feb. 14. John Barrow, Esq. V.-P. in the chair. There was read an interesting paper on King George's Sound, communicated by Mr Nind; a notice of which will appear in our next Number.

The following gentlemen were elected members of the Society:—Capt. Sir J. Pechell, Bart.; Captain Fitzroy, R.N.; Rev. E. Hantrey; J. Watts Russell, Esq.; J. Deville, Esq.

[We must defer the reports of the other London Societies till next month.]

PROVINCIAL.

Newcastle Natural History Society.—At a recent monthly meeting of this society, a paper was read from Mr Buddle, intended as a postscript to a former paper, on an accident which occurred in Jarrow Colliery, in August last. The "postscript" gave an account of a singular phenomenon occurring in the east drift, where it was found, that, as the workmen proceeded, powerful eructations took place, when the coal was struck by the pick. These were as loud as the report of a musket, and, by their force, large splinters of coal were thrown off, much to the alarm and annoyance of the workmen. Mr Buddle thought it might be a query, whether the late accident was not to be attributed to an eruption of this nature, but of much greater magnitude. Though very uncommon in coal districts, similar phenomena have been met with in metallic veins.

At this meeting, four beautiful sections of the strata in the Newcastle coal-field were exhibited: they are drawn to a scale from actual borings and sinkings; and, having the sea-level line laid down through the whole, the eye in a moment discovers, in every part, the situation of each seam of coal, and its depth from the surface. One of the sections extends from the sea, at South Shields, to the Team, and this one Mr Buddle proposes to carry on to Pontop Pike; another is at right angles to this, from the south point of the workings of Jarrow Colliery towards the Blyth. Each of these four sections was accompanied by a descriptive memoir. The table and section will appear in the next Part of the Society's Transactions.

A resolution was passed, requesting the sub-committee of the society to prepare a prospectus and report on the best mode of proceeding to the attainment of a map of the coal district, to be submitted to the society.

A paper by Henry Witham, Esq. V.P. was read, describing the recently discovered Craigleith fossil tree. (The portion of this tree already dug out, is now deposited in the Museum of this University.)

A paper by P. J. Selby, Esq. on the birds of Northumberland, was presented to the society, and ordered to be printed in the next Part of the Transactions.

FOREIGN.

[Want of room having for some time interrupted the continuation of our Foreign Reports, we are now considerably in arrear. But we shall bring up our Notices to the present time, by taking each Society separately, and extracting such parts of the proceedings as are of general interest, till we again attain the regular system.]

Geographical Society of Paris.—February 19, 1830. M. Barbié du Bocage presented, in the name of M. Rousseau, Consul-General of France, at Tripoli, an Arabic manuscript, containing the history of that city, and bearing date, 1244 of the Hegira. M. Sueur Merlin read a notice of a new map of Italy, in 84 sheets, about to be published by M. Litta Biumi.

March 5. The Society adjudged a gold medal of 500 francs to the travels of M. Caillié in Central Africa; but, at the same time, it was thought just and proper to pay a well-merited tribute to the memory of the courageous and unfortunate Major Laing, who had preceded M. Caillié at Timbuctoo. A similar medal was consequently voted to be presented to his widow.

March 19. Professor Rafn, of Copenhagen, communicated the prospectus of a prize proposed by the Society of Danish Literature, for an exposition of the ideas which the Scandinavians held respecting the universe, from the most remote times, to the end of the thirteenth century.

March 26. The medal awarded to M. Caillié was presented.

April 2. M. Jomard communicated, in the name of M. Morin, a memoir on the barometrical elevations of the mountains of the Black Forest, extracted from the *Hertha*. Colonel Bonne announced to the Society the early departure of M. Michaud, and the geographical engineers attached to his scientific mission in the east, and requested that instructions might be addressed to them respecting Asia Minor, Syria, Palestine, and Arabia Petrea, which they proposed to visit. Similar instructions were directed to be sent to the geographical engineers attached to the Algerine expedition, to complete the work of Malte-Brun.

April 16. M. Jomard communicated, on the part of M. Muller, information relative to the death of Major Laing, furnished by a Moor named El-Hadgi-Sidi Ahmed, who had come from Timbuctoo, and was then at St Louis. The same member read a letter from M. Lautier, dated from Toubabou-Kane, containing details concerning Timbuctoo, obtained from the Moor, Bouya. M. Jomard added, that French travellers were preparing for a journey in Central Africa by way of Egypt; and M. Moreau announced that a similar expedition would set off immediately from England. M. Jomard presented a lithograph, executed by one of the young Egyptians sent to France by the Viceroy of Egypt.

May 7. M. Morin presented a table of the elevation above the level of the sea of different parts of the department of Upper Rhine. M. Girard presented, on the part of M. Becquey, several geographical maps and tables connected with the department of Doubs. M. David, vice-consul at Mexico, sent to the Society a maritime atlas of North America, by Admiral Cortez. M. Jomard communicated a letter from London, announcing the departure of a young officer, charged by the African Institution with the duty of following the southern bank of the Bahr-el-Abiad as far as Bornou, where (according to the opinions of Lord Budhoe and Major Felix, who have travelled over from 400 to 500 miles of that district) the waters seem to run rather as a chain of lakes than as a river. M. Jouannin announced that MM. Raifè and Royer contemplated travelling in the Ottoman empire.

May 21. Several communications were made respecting Algiers. M. Eyriès, president of the Section of Publication, called the attention of the Society to a MS. found at Lille in 1819, now in the possession of Mr Granville Penn, and a duplicate of which is in the Bodleian Library of Oxford. It consists of a military description of the coast of Egypt, and the means of defence which it possesses, by Gilbert de Lannoy, counsellor and chamberlain of Philip the Good.

June 4. M. Guys informed the Society, that a traveller had told him, that he had been at Pompeianopolis, and that the city was entire and inhabited. M. Jomard communicated, on the part of M. Grey Jackson, some geographical and philological observations on the empire of Morocco.

June 18. M. Fontainier announced his departure to the east, where he is sent on a mission by government. M. Rafn wrote to the Society, that he had despatched to them an unpublished dissertation on the temperature of the sea near Copenhagen, &c. by N. Dau, of Holstein. Dr Lhotski wrote from Vienna to inform the Society of his journey to Brazil, and particularly to the province of Bahia; he also sent a prospectus of a voyage to New Holland, which he intended to make for purposes of natural history: and notices of his work entitled, "The History of Austrian Travelling-Naturalists, from the Middle Ages to the Present Day." M. Jullien laid on the table a sketch of a map of Caffraria, by M. Hertzog. M. Jomard announced the return of M. de Fontmichel, a French traveller, who had passed many years at Madagascar, and in India.

July 2. M. Carcel, who intended to accompany M. Michaud in his excursions in Asia, and whose particular object was the natural history of this country, requested that the Society would favour him with instructions respecting the places he was about to visit. The Chevalier Bonne communicated a letter from M. Puillon Boblaye, dated Maratonisi, 20th May, 1830, and containing very interesting geographical information, accompanied by a plan of Sparta.

July 16. M. Paravey announced an important discovery which had been made at Oxford and London, of writings and maps older than the European system, which had been collected in China by the Jesuits, and were consequently of great interest for comparison with the maps of Marco Polo, and others of greater date.

August 6. A letter was read from M. Douville, dated Rio-Janeiro, 1st June, stating, that he was returned from his travels in the kingdom of Angola and different parts of Southern Africa, and that he had made many observations on latitude and longitude. M. Taitbout de Marigny, agent of the government of the Low Countries at the Black Sea, presented to the Society, through M. Barbié du Bocage, 1*st,* A plan and description of a shoal near Cape Yagniche-Takil, on the south coast of Kertche: 2*d,* A plan of the Bay of Baldshick in Bulgaria, in which is marked a bank discovered in 1829, and celebrated by the shipwreck of an Austrian vessel. M. C. Moreau announced that M. Lander, the companion of the late Captain Clapperton, sent in January, 1830, by the English government, on an expedition to Africa, to investigate the course of the Niger, arrived at Cape Coast 23d February, 1830, and at Accra on the 13th March following. M. Jomard exhibited a Turkish map of the world, dated 1559, which had been found at Venice; it is engraved on four blocks of wood. New Spain, discovered in 1518, is represented on it. The same member communicated a coloured fac simile of a very ancient map belonging to the Cottonian Library of the British Museum, and attributed to the 10th century, by Mr James Playfair, but which probably is more recent. Palestine is placed in the centre; Mauritania at the bottom of the right corner; Great Britain at the bottom of the left corner; the sources of the Nile at the upper corner, &c. Mr Warden communicated many documents on the American colony of Liberia.

Aug. 20.—M. Yosy announced that he was about to embark at Liverpool, on the 26th July, on a voyage to America. M. Jomard communicated a letter from M. Cochelet, Consul-General of France at Mexico, mentioning, that M. Ch. Nebel, a German traveller, who had been engaged for some years in the study of Mexican antiquities, and who had already made an extensive collection of drawings, proposed to undertake a journey to the ruins of Palenqua. M. Warden announced, that Captain d'Acosta was on the point of returning to Columbia. M. Jomard communicated a very detailed notice of M. Parrot's travels to Mount Ararat. M. le Pindray, a veteran officer, attached to the African battalion, read to the society the first part of a project of a journey into the interior of Africa, by way of St Louis; preceded by a notice of different excursions made by the author amongst several tribes in the neighbourhood of Senegal.

Sept. 3.—M. Jomard communicated a letter from the French consul at Mexico, dated 25th June last, in which he announces, that the Mexican government had sent an expedition to Mitla, and that a caravan of sixty persons left Albiqueri on the 7th November last, for California, and returned on the 1st March last, after tracing a new route: the natives exhibited great fear at the sight of the horses in the caravan. Colonel Bonne communicated a letter from MM. Callier and Stamaty, dated Therapia, 12th Aug. last, and containing an abstract of observations which they had made relating to the route from Smyrna to Constantinople.

Sept. 7.—Mr Warrington, English Consul-general at Tripoli, returned the gold medal which the Society had voted to the widow of Major Laing, as a tribute to the memory of that unfortunate traveller, in consequence of the death of that lady; and it was determined that it should be transmitted to the heirs of Major Laing.

Notice of the Academy of Natural Sciences of Philadelphia; abridged from Silliman's American Journal for October, 1830.

The Academy of Natural Sciences of Philadelphia, originated on the 25th of January, 1812, at which time a few gentlemen (among whom was Mr Thomas Say) resolved to meet once in every week, for the purpose of receiving and imparting information. Even at that late period the study of natural history in America was confined to a few zealous individuals; and although several societies had been organized for concentrating the scientific talent and enterprize of Philadelphia, their duration was for the most part ephemeral. About this period natural history received a permanent impulse from the appearance of "Wilson's American Ornithology," and from the personal exertions and published tracts of Dr Benj. Smith Barton. Botany, so ably illustrated by the ardour of Dr Muhlenberg, had many votaries at this time. Among the most zealous of them were Mr Z. Collins, Mr Nuttall, and the late Dr Waterhouse, who first gave popular lectures on botany in Philadelphia. Mr Say was indefatigable in several branches. Mr Ord was devoted to zoology. Mr Godon, Mr Conrad, and some others, were active in exploring the mineral resources of their vicinity. Mr Maclure was assiduously engaged in geology, whilst many others, who have since become distinguished for their scientific acquirements, were then just venturing on the threshold of inquiry.

Most flourishing institutions have had their probationary difficulties and discouragements. The Academy was for some time located in a very disadvantageous situation, and may even be said to have struggled for an existence. Books and collections of natural objects, those indispensable parts of such an establishment, accumulated but slowly; and money, that *primum mobile* of human achievements, was sparingly at the disposal of an embryo institution. At this juncture the Academy found a truly munificent friend in Mr William Maclure, in whose contributions the present valuable collections may be said to have mainly originated. It is but justice, however, to observe, that from the commencement of the society, its members have been characterized by untiring zeal and industry; and that their unostentatious but effectual exertions in the cause of science were the great incentives to Mr Maclure's subsequent liberality.

The Academy was instituted in 1817, about which time the publication of the "Journal of the Academy" was commenced. From that period its permanence and prosperity may be dated. Its locality, though not the most desirable, was respectable, and, in some respects, convenient; and its collections of books and specimens augmented rapidly. It was soon found necessary to provide more extensive accommodations than those hitherto enjoyed, and, in the spring of 1825, the Academy purchased the spacious building they now occupy, and they have spared no expense in adapting it to their purposes.

To render the collection of the Academy extensively useful, and to diffuse the love of science in every class of the community, the Academy, about two years since, passed a law, rendering its museum accessible to the public; and it is now open to the *gratuitous* admission of citizens and strangers on the afternoons of Tuesdays and Saturdays throughout the year.*

The meetings are held every Tuesday evening. They are open to strangers, excepting the last meeting of each month, which is reserved for the private affairs of the institution. The present number of resident members is about sixty. The list of correspondents is much more numerous, and embraces a large proportion of the eminent scientific men in all parts of the world.

The "*Journal of the Academy*" is chiefly confined to brief and technical statements of discoveries in natural history, and is widely circulated in America and Europe. It is replete with important details in every branch of natural science, and probably contains a greater body of facts in reference to the natural history of America than any other work. Five octavo volumes have already been published, and the sixth is nearly completed. It is published when a sufficient number of *original* papers are accumulated, without reference to any precise interval.

"Such," concludes the author, after giving a general survey of the present state of the museum, "is the present situation of the Academy of Natural Sciences; and while we feel an honest pride in recording the success of a favourite institution, our gratification is much enhanced by observing the collateral exertions which are making in almost every section of the Union to extend the boundaries of scientific information. The *American Philosophical Society*, perhaps the oldest of our scientific and literary institutions, acting on the broad basis of 'promoting useful knowledge,' has done, and is still doing, a laudable share in the accomplishment of that great design, in which is included every branch of natural history. The *New York Lyceum*, established with similar views to the Academy, is not behind the latter in the talents and industry of its members, nor perhaps in the degree of its success. Its '*Annals*,' published on the same plan with the Academy's Journal, are indispensable to the student of American

* A paragraph proper for the perusal of several influential persons connected with the Edinburgh College Museum. — Ed.

natural history, while its collections are already extensively numerous and valuable."

Meeting of German Naturalists at Hamburgh. (Zoological Section concluded.)—*Fourth Sitting.*—*23d Sept.*—Dr Bergman exhibited several preparations of the brain. Professor Otto read a treatise by Stannius, a student of Hamburg, on the anatomy of the *Amphinome rostrata.* Professor Schulze, from Freiburg, exhibited preparations of the hearts of the Ringed snake (Ringelnatter.) Von Olfert, from Berlin, made some observations on *Medusæ.* Professor Otto made some remarks on certain skinny, tendinous, and vessel-like substances, occasionally passed by dyspeptic people. Professor Schultze laid before the meeting his treatise on the molecules of Mr Robert Brown, with an especial reference to Ehrenberg's rejection of the doctrine of *equivocal generation.* Dr Berendt, from Dantzic, intimated to the members, that he would be happy to exhibit to them his rich collection of insects in amber. Professor Hornschuch, from Griefswalde, made several remarks in confirmation of the views of Professor Schultze, in reference to *equivocal generation.* Mr Gray, from London, was appointed president for the next sitting.

Fifth Sitting.—*24th Sept.*—Professor Schultze exhibited, by dissection, several organs in a living snake. (This dissection had chiefly in view to exhibit the circulation of the *blue* blood.) Professor Hornschuch made observations on several rare birds of Pomerania. Justiciary Bore made some remarks on the principles of the separation and formation of *genera.* Dr Sundewald, of Lund, described a parasitic beetle, found in the body of the *Blatta Germanica.* Von Winthem, of Hamburg, confirmed this observation by exhibiting the occurrence of the *larva* of the *Tachina pacta* in the bodies of the *Carabus gemmatus* and *violaceus.* Mr Johnstone, from Edinburgh, communicated some observations of Mr Stark on the changes of colour in fresh-water fish. Professor Fischer, of Moscow, spoke concerning the use of the musk to the animal itself. Professor Jacobson explained the mode of suction in molluscous animals. Mr Gray, of London, described a new animal from the Cape, belonging to the class *rodentia.* Von Winthem exhibited a living specimen of the *Thomisus leucosia,* from Brazil. Dr Steinheim, of Altona, exhibited an embryo of the *Squalus acanthias,* in which he shewed the double membrane of the yolk bag. Professor Reinhardt, of Copenhagen, was elected president of the following meeting.

Sixth Sitting.—*25th Sept.*—The Secretary having stated that illness had prevented Professor Reinhardt from presiding on this day, Professor Jarocki, of Warsaw, was requested to take the chair. Professor Otto read a paper by Professor Muncke, of Heidelberg, on *infusoria.* Surgeon Rosenfeldt was examined by Professor Oken on the blowing of the whale. Several memoirs, by Professor Eichwald, of Wilna, and Dr Sachs, of Berlin, were given in to the Secretary; and printed papers by Professor Jarocki and Dr Neuber, of Apenrade, were distributed among the members. Professor Leuckart, of Heidelberg, exhibited, in illustration of a peculiar metamorphosis, the outer gills of a fœtus of the *Squalus acanthias,* brought from Heligoland. He spoke also concerning the anatomy of a new species of *Holothuria,* and on the species of the Madrepore genus *Fungia.* Professor Fischer spoke concerning the fossil elephant. Professor Schultze exhibited the sympathetic nerve of the snake. Dr Von Nordman made known his observations on worms in the eyes of fish; to which Professor Gurlt of Berlin added his observations on worms found in the eyes of horses.

MISCELLANEOUS INTELLIGENCE.

Chichester. — A literary and philosophical society is about to be established at Chichester.

Mineralogical Survey of Scotland. — The details connected with this survey are called for by the House of Commons; by which, we suppose, is meant, the accounts of the money expended, and the purposes to which it has been applied, — for we are not aware of any very detailed advantages which science has received from this project.

Russia. — The Emperor of Russia last year contributed from his private purse, 1*st,* To the expenses of a scientific journey in Russia: 2*d,* To the continuation of the publication of the Memoirs of the Imperial Society of Naturalists of Moscow: and, 3*d,* To the publication of a monthly *bulletin* of the Society.

London University. — This university is now to receive a charter, with power to grant degrees. It is feared that this circumstance will have an injurious influence over this school; but we are of a contrary opinion, — rivalry never represses true talent.

A monument to the memory of John Locke is about to be erected in the hall of the University.

Royal Institution, London. — Our former coadjutor, Mr Ainsworth, is now lecturing on geology in the Royal Institution.

Halley's Comet. — The return of Halley's comet ought to take place in 1834; but it is possible that it may be so influenced by Saturn and Uranus, as not to make its appearance before 1835, or even 1836.

LITERARY NOTICES.

We understand that the proprietors of the Map of the Basin of the Firth of Forth are about to publish, uniform in size, and upon the same scale, 33 by 26 inches, a Map of the Basin of the Tay, executed by Mr James Knox, whose talents are so well known to the public by his former productions. It includes the greater part of Perthshire, Strathmore, and the Braes of Angus, a part of the Mearns, and a portion of the county of Fife. It is beautifully engraved; and the physical features of that important and valuable portion of Scotland are accurately delineated. In order to render it more interesting, they will also publish along with it, The Topography of the Basin of the Tay, including the same districts as the map, and by the same author.

We observe that the next volume of the Edinburgh Cabinet Library treats of Egypt.

Sir John Sinclair, with that generosity which has ever distinguished him, has presented the copyright of his Statistical Account of Scotland to the Society for the Benefit of the Sons and Daughters of the Clergy; and these gentlemen are about to publish a new edition of it.

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OF

NATURAL AND GEOGRAPHICAL SCIENCE.

APRIL, 1831.

ORIGINAL ARTICLES.

ART. I.—*Descriptions of New or Little Known Species of Birds.* By SIR W. JARDINE, Bart. F.R.S.E. F.L.S. M.W.S. F.Z.S. &c.

THE following descriptions have been written with the view of making known as early as possible those species of birds in my own collection, which appear to be undescribed, or to possess something remarkable in their external appearance and anatomical structure. They will be continued occasionally, as arrivals from abroad, or other circumstances, may put me in possession of new or interesting materials.

No. 1.—*Lanius melanoleucus,* JARD. Pied Shrike.

L. niger, scapularibus, uropigio, hypochondriis fasciaque remigum albis; plumis capitis, colli jugulique elongatis, acuminatis; cauda longissima.

Three specimens of this elegant and curiously formed shrike were some time since received from our valued South African correspondent, Dr Smith. The accompanying notes mention that "they were killed in the vicinity of the Orange River, and that nothing was known of their history." From the latter circumstance we may conclude that they are of considerable rarity; and, though anxiously asked for, no specimens have been included among the numerous species we have since received from that country.

In the true and typical shrikes, taking *Lanius excubitor* of Europe, and the African *L. collaris,* as examples, we have a somewhat robust form; the bill strong, considerably hooked, and possessing a prominent notch,—the latter being in strict analogy with the more noble falcons; wings rather powerful, yet shewing, by the form and gradation of the quills, that they are not adapted for either very rapid or lengthened flight; the tail lengthened, regularly graduated, and generally containing twelve feathers, of which the centre two are longest. In the species now before me, all these characters are very strongly pourtrayed; the shrike-like form is developed to its utmost extent, and, although I might be inclined to use this species as the type of a new form among the *Laniadæ*, were more assimilating species known, I do not feel justified in separating it as an individual. That which most nearly resembles it is the *Lanius corvinus;* but in this the strength of the bill is very inferior. It also, at first sight, strongly reminded me of the *Lanius Leverianus*, (*Bethyllus*, Cuv.) in the lengthened tail, and the pied plumage, with the sharp and lengthened form of the feathers on the head and neck, a peculiarity not met with in the true *Lanii*, where the whole plumage is rather soft and downy. At a little distance, and when on the wing, it much resembles our common magpie, which the manner of perching, and the motion of the tail, among the shrikes, may tend to increase. As minute a description as possible of this curious bird is subjoined, and I would anxiously recommend the investigation of its habits to the ornithological members of the South African Institution.

The entire length of the skin is eighteen inches and a half, of which the tail measures twelve inches; the bill is strong, and bending towards the tip, with the notch very prominent; the head, neck, back, under parts, and tail, rich glossy black; the feathers on the head, neck, throat, and upper part of the breast, rather lengthened, of a pointed or hackled form, like those of the common starling; on the upper parts, they are glossed with green, on the throat, and fore part of the breast, with a coppery or purplish lustre; the rump is grayish white, which extends also upon the sides, and under the wings, where one half of some of the webs are black, giving a streaked or dashed appearance of black and white; the feathers on the sides are more than usually elongated and puffy; the scapulars are pure white, and join the gray feathers of the rump when the wings are closed, forming, as it were, a crescent-shaped band across the body; the secondaries are black with white tips; the quills are also black, the tips with a white spot, commencing upon the third, and increasing in size, with the progression of the quills; at the base, they are crossed with a white bar of about an inch and a half in length, which extends over both webs, except in the first, where it is confined to the inner one. The tail consists of twelve feathers; the ten first gradually progressing in length, at the rate of about one inch and a quarter; the eleventh and twelfth, or outer ones, exceed the rest by three inches and a half; the four longest feathers are hollow underneath, and, when the tail is closed, lie entirely over each other, covering the rest, and making the tail appear very long and slender. The feet and legs are remarkably strong. One of the specimens sent is, fortunately, a young bird, evidently in the state of first moult, or about four or five months old. In this the general colour is of a brownish tinge, the feathers tipped with a paler margin; those of the head and neck of the usual form, not pointed and elongated as in the adults; the white parts of the plumage in the adult, are here of a dull reddish brown; the bill has not attained its full bend, and the very strong notch is not fully developed.

No. 2.—*Gracaulus tenuirostris*, Jard. Slender-billed Gracaulus.

G. griseus, loris tectricibusque narium nigris; remigibus, secundariis, scapularibus nigris etiamsi, marginibus, pallidè griseis; cauda subfurcata; rectricibus duobus mediis griseis, apicibus nigro maculatis, reliquis nigris griseo terminatis, griseo exteriorum tertio longitudinis equanti.

I have applied the above specific title to this bird at the suggestion of Mr Swainson, to whom it was submitted for examination as an undescribed species. The name is characteristic of the slender and more than usually attenuated bill, being actually as high as it is broad, in which it differs from its congeners, though, in other respects, there is a perfect resemblance.

The specimen in my possession was received some time since from New Holland. The exact length is ten inches; that of the bill, to the extremity of the rictus, one inch and an eighth. The space between the eye and nostril is clothed with thick and strong bristly feathers of a deep black colour, which lie over and cover the nostril more than in the typical species. The entire plumage of the body is a rich bluish gray, of a duller shade on the under parts, and on the chin and cheeks, approaching to blackish gray, forming an indistinct band of that colour below the eyes. The quills, secondaries, and scapulars, are black,—the latter with broad, the former (excepting the first and second) with narrow, clear, grayish margins. The tail contains twelve feathers,—the two centre ones of the same colour with the body, and having the shafts, as well as a round spot at the ends, surrounded by a narrow margin of grayish black; the next four feathers become gradually longer, and give the form of a slight fork; they are black, with a narrow margin of gray at the tips; the last, on each side, are nearly half an inch shorter than the longest, are also black, but have a large oblong patch of gray at the ends. The stiff feathers on the rump of this individual are remarkably abundant, forming a complete pad, and possess an equal pointedness and rigidity with the African species. They are in this respect at variance with M. Temminck's description of the genus in the letter-press to his *Planches coloriées*, where he remarks, that the species from Asia, New Holland, and the islands in the South Pacific, are similar in plumage to those of Africa, except in the feathers on the rump, which, though thick and downy, want the stiff and sharp points. I may add, that in all the species in my possession, from both Asia and New Holland, there appears little difference in the construction of these feathers, the smallest and weakest even possessing feathers of equal strength and rigidity, and with the same sharpened points, as those of Africa.

No. 3.—*Ægithalus Smithii*, JARD. Dr Smith's Penduline.*

Æ. supra olivaceus, subtus flavescens, fascia frontali obscura, genis juguloque albis.

Ægithalus was some years since proposed by Mr Vigors to characterize the form exhibited by the penduline titmouse—*Parus pendulinus* of authors; at this time the only individual known to exist, inhabiting the south of France and Italy, Poland and Russia, and, according to Vieillot, Siberia. I am now indebted to Dr Smith for a second species from Southern Africa, and trust that he will accept the above testimony of our regard in the dedication of the species to its discoverer.

The Pendulines differ from the true Titmice chiefly in the form of the bill, which is slender, nearly straight, runs to a sharp point at the tip, and in general form resembles considerably that of the genus *Carduelis*, to the members of which group, particularly the siskins, it appears somewhat allied by its manners; and I question much if its future station will be found among the *Pipridæ*, where Mr Vigors now places it. We are ignorant of the habits of our present species,—that of Europe frequents marshy places, building a suspended nest, in which it resembles the bearded titmouse, (*P. biarmicus*,) a species which also deviates very considerably from the true *parian* type.

The length of this species is about three inches and a half; the bill, bluish black; upper parts of the plumage, deep brownish oil green; the feathers on the forehead are black, with narrow white tips, and form a dark narrow frontal band; the wings are light brown, the feathers with pale edges; the tail is of the same colour, but some of the feathers are wanting. The form, which appears to have been more rounded than in the type of the genus, cannot be exactly ascertained, and the texture is less rigid; the cheeks and throat are white; the breast, belly, and vent, rich honey yellow; the feet and legs are blackish gray.

References to Plate V.:—

Fig. 1. *Ægithalus Smithii.*
2. *a*, bill of the *Parus*, seen from above.
b, the same seen in profile.
3. *a*, bill of the *Ægithalus*, from above.
b, the same in profile.

(*To be continued.*)

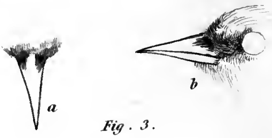
* See Plate 5.

Ægithalus Smithii.
Dr. Smith's Penduline.

a

b

Fig. 2.



a

b

Fig. 3.

ART. II.—*The Loves of the Moles.* Abridged from the *Cours d'Histoire Naturelle des Mammifères*, of M. GEOFFROY ST HILAIRE. (With a Plate.)

FREQUENTLY as the operations of the mole (*Talpa europæa*) are brought under our notice, by the hillocks which it throws up on the surface of the ground, and destructive as are its ravages in the districts it infests, the habits of this animal have attracted the attention of few persons, excepting, perhaps, its professed destroyers; and, indeed, it is to a mole-catcher, M. Henri le Court, that we are principally indebted for what information we possess on this subject.*

Our popular histories of the habits of animals teem with accounts of the architectural instinct and ingenious operations of the beaver,—how it makes bridges and raises dykes, by the margin of the stream, to serve as a bulwark to its subterraneous dwelling, and how its wonderful faculties are adapted to the circumstances in which it is placed. Not less characteristic and surprising are the habits of the mole, with any particular account of which, in the English language, we are, however, unacquainted; and we are, for this reason, induced to believe, that a short notice of the natural history of this animal, as observable at this season of the year, may not be unacceptable to our readers.

The mole pairs in March; and this, the great object of the existence of all animals, secondary to none, excepting the necessary continuation of the life of the individual, brings into play the most remarkable habits. Dormant during the winter, in the habitation of the preceding year, the mole arises with the sun of spring, and prepares for the great purpose of its being. The cycle of its yearly habits runs through the course of burrowing, pairing, breeding; and again the mole immures itself in its winter dwelling. Beautiful example of a mechanical series of actions, excited by stimuli, which are imperceptible to any eye but that of Him who ordained all things; but which, depending not upon the volition of the animal, requires no education, and is as perfectly performed in the first year of pairing, as at any after period of its life!

It is in the study of organization alone, however, that we can ever hope to have this mystery solved; and when we look into the structure of the mole, and observe how admirably several of its organs are adapted to its mode of life, we feel some assurance that the way towards knowledge is open, and that all our labour is not vain.

Burrowing, or digging, is the leading feature in the habits of the mole. An insectivorous animal, it burrows for food, for the

* *Vide* LE COURT, *de la taupe, de ses mœurs, de ses habitudes, et des moyens de la détruire.* Edit. par Ant-Alexis Cadet-de-Vaux. 12mo. Paris, 1803.

preservation of its existence; and it burrows equally for the continuation of its species. And as it is our object, in this notice, to describe its habits during the period of the propagation of its kind, it may not be out of place to shew how the adaptation of its organization to the purpose of burrowing illustrates the above remarks.

The anterior locomotive organs of the mole exhibit several striking peculiarities of structure. The clavicle, which seems to influence all the other modifications, deserves particular notice. In man, the ape, and the bat, the clavicle forms a powerful arch, which maintains the separation of the arms. In the bat especially, where it is longer, it supplies the arm with a point for rotation towards the head, during flight,—a position in which it is permanent in the mole. With this view, the clavicle is contracted and short, forming a trunk, whose length is less than its breadth. It is supported anteriorly by the extremity of a vertical plate, which comes from the sternum; and in order that the bone, thus shortened, may be preserved at a certain distance from the trunk, the scapula is converted into an elongated bone, with a mere rudimentary spine towards the posterior edge, and anterior to the tubercle, which supplies the place of the acromion. Thus the shoulder is placed anteriorly to the trunk, and at the same time below, and far removed from the cervical vertebræ.

The long sternum, which advances towards the head, carries with it the shoulders. They do not rest on the thorax; and thus the muscles moving the arm, which are of such a size as to weigh more than all the rest of the muscular mass, are prevented from exercising any injurious pressure.

The shaft of the humerus is so small, that the bone may be said to be composed of little more than two large extremities.

The bones of the fore arm partake of the modifications of the other parts. The radius is short and strong, and although not anchylosed with the ulna, has no power of supination. The ulna is a long trigonal plate, prolonged beyond the articular cavity, and terminated by a strong transverse hook, into which the olecranon is transformed. The curvature, and lateral position of the humerus, and many concurring circumstances arising from the disposition of the muscles, particularly of the panniculus carnosus, raise the elbow higher than the shoulder, and draw the palm of the hand backwards, a beautiful provision for throwing the earth sidewise, during the animal's progression.

The conformation of the hand is equally adapted to the habits of the animal: It is strong, as broad as long, and the extremities of the fingers are provided with nails, terminated by a sharp margin, thickened externally, and provided internally with a cutting edge.

From this description, it will be evident that the anterior member of the mole is ill adapted for uninterrupted progression. The precautions which have been taken to separate and maintain the fore legs in a lateral position, have entirely deprived the animal of the power of moving them under the belly. The hind legs, however, are well adapted for this kind of motion. Whilst digging, the mole rests on its trunk; but on a level, it is supported by its hind feet, and drags itself forward by the nails of its fore feet.

The mole is also assisted in digging, by its snout and head, the vertebral muscles of which are assisted by the highly developed panniculus carnosus, continued around the whole of the body. Thus, when it is at work, the whole body is employed,—the head, the snout, the feet, the hands, and even the thorax, by which the animal plasters the walls of its gallery, and rids away the produce of its labour.

We have now to shew what the mole proposes by its work: It labours to live and to produce. It always excavates galleries with many branches; and, commencing each time at a different place, it constantly returns to the main track. In a short time, the earth is undermined in many directions. Some burrows join together accidentally, and others are purposely made to communicate. The mole connects together many canals, enlarges others, and forming common routes, concludes by arranging all the perforations it has made, into a combined system, which, when brought to perfection, is called the encampment of the mole. Its bed usually occupies the centre. The nest in which the young are brought up, is a separate, and, in some respects, a different apartment. In order that these habitations may be sheltered from the rains, their floor is formed almost on a level with the soil. It is, consequently, much higher than the floor of the galleries, which receive and absorb the rain water.

"Under the guidance of Henri le Court," says M. St Hilaire, "I made the following observations on the construction of the bed of the mole: We at once arrived at the hillock of a mole bed, which we set about opening. The mole feared nothing, and indeed, had no need to fear, on account of its dwelling being opened; because its precautions were such, that it could not be taken in this habitation. The place where the bed is formed is chosen with care; so that it cannot be trampled in nor crushed, being constructed at the foot of a wall, a hedge, or a tree. By a greater quantity of soil thrown up, the animal forms a larger hillock. The whole is soon fashioned into a circular gallery; not content with which, the mole works along through the earth, continuing its digging from within outwards, by the action of its body and head. This gallery is marked *i i*, in the figure A″ of the annexed plate VI.* Another circular gallery, *u u*, below the former, is of greater size, and on a level with the

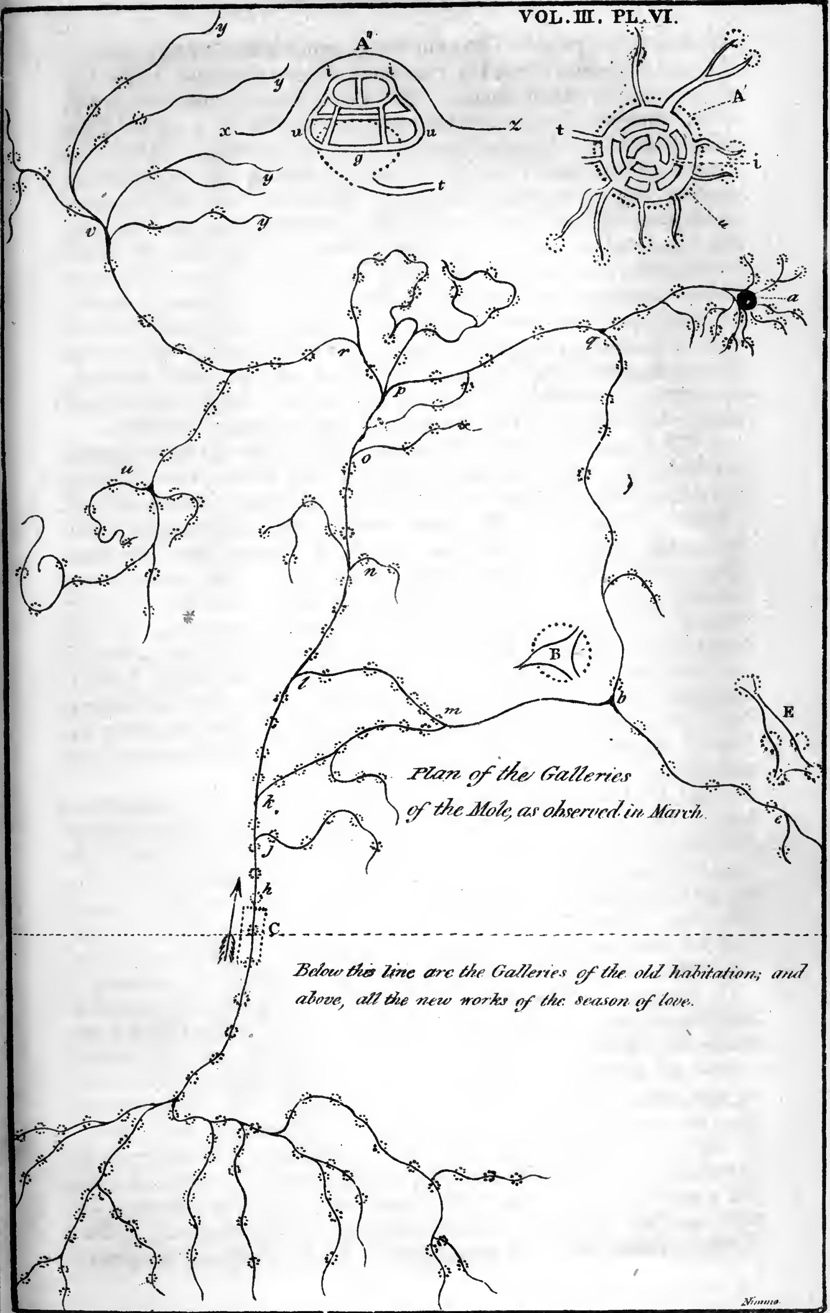
* At *a* in the plate, the bed is seen in relation with the other galleries; *A″* is a magnified vertical section of the bed, *x z* representing the surface of the hillock; and *A′* is a magnified ground-plan.

surface of the ground. The galleries communicate by five passages, at equal distances; and the superior gallery terminates at the top of the bed, by three roads. The bed or the chamber which the mole inhabits, is the circular part, surrounded by a dotted line, and marked *g*. An opening, *t*, is found at its base. This is the entrance to a road of safety, in case of attack; and is generally guarded by a quantity of grass. In order that the burrows under the hillock may acquire the greatest possible firmness, the mole opens many other blind passages, the sides of which it smooths down with its soft hair, and the pressure of its body. These passages are, moreover, like so many advanced guards; for the first being broken into, the tumbling in of their internal walls becomes a subject of alarm. By this signal, which falls like a thunder clap, on these profound and peaceful solitudes, the mole is awaked, if asleep, and, taking fright, hides itself under the heap of grass, or escapes by its passage of safety.

"The dotted line, C, in the plate, divides the old encampment, in which the mole has been lodged during winter, from the new galleries wrought by the male mole, under the guidance of the instinct of pairing. The place where these observations were conducted was in a meadow, at a short distance from Pontoise, above, and a little to the right of the river. The meadow was scarcely yet freed from the winter's snow, and the pools of water. The male mole, which had taken possession of this seat of operations, had come to a considerable distance from its winter quarters, which were in an elevated fallow field. I shall suppose, for the sake of precision, what is often, but not always the case, that the first individual established in the meadow was the conqueror of his rivals, and the exclusive possessor of the property.

"Arrived at the meadow, our mole, guided by the instinct of love, advances to C, and finds the gallery terminating there. The earth is light, and easily penetrated. To gain speed, he does not collect the earth, but throws up the refuse in hillocks, which are marked in the plate by the little dotted circles along the lines. Eight days suffice for the formation of the galleries, and for effecting the object of these labours. These galleries are, however, only opened gradually, and as they are wanted.

"As soon as the work is terminated, the male returns to his former quarters in search of a mate; and, having found one, brings her along with him. This journey to the old winter quarters, however, arouses other males, which follow in the track of the couple on their way to the meadow. Our male, which, for the sake of distinction, I may call the bridegroom, since, in the given hypothesis, he must become so, commences by shutting up his female in the bridal gallery, of which he has yet only dug out a part: he then returns to the opening, to prevent the entrance of his rivals, and keeps them at a little distance from the old encampment. In the figure, this place



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Plan of the Galleries of the Mole, as observed in March.
Below this line are the Galleries of the old habitation; and above, all the new works of the season of love.
Nimmo.

will be seen, surrounded by dotted lines; the transverse line, C, cuts across this field of battle, where the strife begins, by the most violent attacks, and continues till an end is put to it, by the retreat, and, sometimes, by the death of the conquered. The two rivals, before commencing the fight, enlarge the part of the gallery where they are met. The victory is decided in favour of him who first wounds his adversary before the ear; a wound which is mortal if it comprize the artery which accompanies the course of the trifacial nerve.

"The female, during the action, is shut up in the bridal gallery, so as to be unable to escape; for which purpose, however, she uses all her resources in digging, and attempts to get away by the passages which she opens at the sides, marked *j*, *k*, *l*, *n*, *o*, in the plate. But the conqueror hastens to rejoin his faithless mate, and to bring her back into his galleries. This manœuvre is repeated many times, as often as other males enter the lists. The time, however, soon arrives when the superiority of the conqueror is recognized; and from thence he has only to occupy himself with his mate, who becomes more docile. The pair work together, and finish the galleries, as figured in the plate; after which the female digs alone for food.

"After the galleries have been formed, as at *o*, *r*, and *s*, the male conducts his mate to the point marked *v*. From this time, the female no longer digs in the solid earth, but towards the surface. She advances by merely separating the roots of the grass. Returning to the gallery, she is driven back by the male towards the branches, *y*, *y*, *y*, *y*, which go off from this point. At the extremity of the tracks, copulation has been several times attempted, and is at last accomplished at one of these points; for then the female, weary and annoyed by the increased light, ceases all resistance. Henri Le Court has passed many nights observing the habits of the moles during their amours; and he states, that copulation takes place an hour after sunrise.

"This narrative, and the explanation of the different windings represented in the plate, are given on the evidence of this clever observer, who, in March, 1825, communicated to me the fruits of his long experience; and he remarked, that no ground had before offered him so favourable an opportunity for observation as that which had served for our investigations.

"The breeding chamber, or the nest, is not always surmounted by an external mound; when it is, its hillock is distinguished by being four times the size of the common hillocks, and by its form being neither flat nor pyramidal, but similar to a reversed wooden bowl.

"The female mole, which constructs the nest, merely enlarges one of the crossways, formed by the junction of three or four roads. The letter *b* shews this nest in its relation with the gallery traced by the male, and *e*, a deserted nest of the preceding year. At B and E, are separate and magnified representations of the nests, to give an idea of their form.

"In the nest we found a bed, made of stalks of wheat, which at this season only consists of tufts of lanceolate leaves. We were curious to count the number of stalks, Le Court for the purpose of remarking the immense injury which the mole causes to agriculture, and myself for the purpose of contemplating the results and extent of the labour and industry of an enemy so small, and apparently so feeble. We counted no less than 402 stalks. Le Court suggested, that, from the similar size and freshness of these plants, they must have been destroyed in a very few days.*

"The labours of the mole are infinitely varied. Le Court treats of them under different titles,—*taupinière d'hésitation; d'entrée d'héritage; d'entrée de culture; du cantonnement; du repos; de passage; de gîte; de nid; des mâles.* It is impossible for us to enter into all these details, which are amply dilated upon in the work published by Cadet-de-Vaux."

Such is the interesting narrative of M. St Hilaire, in which the purposes of description have required a greater shew of system and regularity, than may be expected in our observations of the habits of these singular animals. The above is, besides, the result of long and patient watching on the part of the mole-catcher, whose avocations rendered indispensable the most minute attention to the manners of this animal. The subject is, however, open to the investigation of any person who lives in the country, and might be advantageously pursued at this season of the year.

Note.—It must be kept in mind, in the examination of the plate, that an exact relation has not been preserved between the length of the subterranean roads and the width of the lines which indicate the canals and the hillocks. The relative dimensions may, however, be judged of from the following measures: The line from the point C, passing through *h, j, k, l, m, &c.* to the point *e*, was 24 metres, (about 26 yards,) long; and the line passing from the nest *b*, and through *q*, to the bed *a*, was 15 metres, (about 16 yards,) long.

* The amiable Ettrick Shepherd has, however, attempted to prove, in the *Quarterly Agricultural Journal*, that the mole, instead of being a curse, is a blessing to the agriculturist. We would, nevertheless, deprecate a superabundance of such blessings,—of which alone, indeed, does the farmer complain; but hyperbole is the poet's prerogative.—ED.

ART. III.—*Description of a Fossil Tree, discovered in the Quarry of Craigleith, near Edinburgh.* By HENRY WITHAM, Esq. of Lartington, F.G.S. &c.*

(Read before the Royal Society of Edinburgh.)

IN the month of November last, a magnificent fossil stem was discovered in Craigleith quarry. In geological position, it is situate in the mountain limestone group, considerably below the great coal basins of the Lothians. In the part of the quarry in which the fossil was found, the strata incline to the N.N.E. one foot in four and a half. This part of the quarry, from unknown causes, assumes a trough-like shape,—the one side dipping at an angle of 20 deg. to the south, and the other, at an angle of 20 degrees to the north; and at the bottom of this trough lie the roots of this splendid fossil, very much truncated, probably by abrasion. The length of the stem, from the highest point discovered, to the root, was forty-seven feet. The diameter of the highest part being one foot seven inches, by one foot four inches, it appears quite evident, that many feet of the top part of the stem must have been taken away unobserved, ere it attracted the notice of the public. The superincumbent mass must have been above one hundred feet thick. The tree presents the appearance of a large branchless trunk, in some parts greatly flattened, so as to form an elliptical section. The higher part was the least flattened. The stem tapers gradually, and is marked, at irregular intervals, with transverse ridges, or irregular prominences. The bark, as is usual, has been converted into coal, and presents indistinct longitudinal markings, with very small transverse rugæ. At some of the prominences, the rugæ are contorted in the same manner as they are round the origins of the branches in various pines.

The usual way of accounting for such flattenings, as were found in this tree, is by pressure; although, in the present case, where the tree is not parallel to the strata, it is rather difficult to suppose its form to be owing to that cause. The pressure by loose sand, or by sand mixed with water, would act all round the stem, and so would not flatten it; but, if we suppose that the tree, in its recent state, was carried along by a torrent of water and sand, and left sticking, as the latter consolidated, it would afterwards begin to decay, and then the hardened strata would naturally press down upon it, and so produce the flattening; and those parts

* This remarkable fossil has already been noticed in a former number of this Journal; but any communication from the pen of Mr Witham, who has identified his name with this branch of geology, will, we feel assured, be acceptable to our readers. We are indebted to this gentleman for a notice of another fossil tree which has been recently discovered near Dalkeith. See *Geological Collections*, infra.

Since the above article was in the press, the lower part of the trunk and roots of the magnificent Craigleith fossil have been removed from the quarry; and, no doubt, with very liberal intentions, have been presented to the Botanic Garden, while the other part of the tree is deposited in the University Museum.—ED.

of the stem which decomposed rapidly, would naturally most shew the effect of pressure. By this means, I believe the compression to have acted upon this fossil.

Several scientific gentlemen having stated as their opinion, that this fossil is a Lycopodium, I beg to mention the reasons why I have come to different conclusions.

1*st*, From external appearance. In this plant there are no appearances of insertions of leaves on any part of it, or any markings similar to the scales of palms or ferns, or the imbricated leaves of the Lycopodium. Judging from external appearance alone, the probability is, that it is the stem of a tree of the dicotyledonous or the gymnospermous phanerogamic class.

2*dly*, From internal structure. Having examined with care the internal structure of this fossil tree, under the microscope, agreeably to the rules laid down in my Observations on Fossil Vegetation, I find it cannot belong to the former of these classes. It has, however, most decided medullary rays, and a woody texture, with some appearances of concentric circles, and must therefore belong to the Coniferæ. It cannot be a Cycas, a Zamia, or a Lycopodium, because these are vascular cryptogamic plants, composed of cellular tissue, with vascular fibres, destitute of medullary rays, concentric rings, and woody texture, and generally dichotomous. Great numbers of these phanerogamic plants have lately been discovered in the shales of the mountain limestone groups, affording strong reason to conclude, that plants of this class are quite as abundant in these early deposits as they are in those lying much higher up, although contrary to the opinion of many who have favoured the world with their ideas upon this hitherto neglected department of fossil botany.

ART. IV.—*Notices of the Anatomical Structure of the Lion, (*Felis Leo,*) as observed upon Dissection, in relation to the Habits of the Animal, as described by Travellers.* By Henry H. Cheek and T. W. Jones.

The subject of the following observations having been forwarded by Mr Wombwell to Dr Monro, Professor of Anatomy in this University, we were permitted to make such use of the carcass, as was necessary for the purposes of dissection;* and as the lion is not an object of every day examination with the naturalist, we have thought that it would not be uninteresting to our readers, were we to select from our notes, such portions of the description, as have obvious reference to peculiarities in the tribe to which this animal belongs. And we are farther induced thus to occupy a few of our pages, from the consideration, that

* We cannot mention in too warm terms, the obliging liberality with which we have been allowed by Dr Monro to pursue our inquiries in the anatomical rooms of the University, nor the facilities which were offered to our investigations by his assistant Mr Mackenzie.

many non-professional persons must be entirely unacquainted even with those facts, which are well known to comparative anatomists; and that, in defiance of the knowledge which we actually possess, our most popular and widely disseminated books still continue to copy from the older authors, descriptions which the slightest personal examination would at once have shewn to be entirely erroneous.

The anatomical structure of particular animals may be made interesting to the general reader, either as illustrative of the type or model of construction, which is observable in natural or well marked groups; as exhibiting striking differences, or anomalies of composition, in comparison with allied types; or as affording instances of the relation between the habits or natural history of the animal, and the adaptation and contrivances of its different organs. Two of these considerations belong to the subject of the following memoir: In the first point of view, when we contemplate the natural family of the Cats, to which the lion belongs, and which exhibits a pretty universal similarity of structure and habits in all the species, we consider ourselves fortunate in having under our inspection so magnificent a specimen, in which Nature has, as it were, unfolded the plan of this tribe, and shewn us her model on the largest scale. And, secondly, when we behold so many beautiful contrivances wrought out of a series of elements, identical with that of all vertebrated animals, we cannot but admire and reverence that Power, which has been able to subdue his fundamental plan unchanged, to the purposes and necessities of individual animals. Thus, in the lion, the whole framework of the body is identically the same as that of all other vertebrated animals; but is adapted in an admirable manner to the peculiar and remarkable habits of the feline tribe.

The anomalies of structure, which so frequently afford an ample scope for investigation, are rare in the *Felinæ;* for, with the exception of the chetah, or hunting leopard, (*F. Jubata,*) which, in several respects, appears to be a connecting link with the dogs, and of the lynxes, with their trifling peculiarities, the type is almost uniform; the species of the cat tribe, as it is well remarked by Desmoulins, exhibiting almost as few differences, as the individuals of our domesticated animals.

The species of the genus *Felis* are associated together, and distinguished from other genera, by a variety of characters; and, as these are not mere arbitrary marks of similarity drawn from single organs, but pervade almost the entire organization, and belong to the whole group of species, they represent in zoology what is termed in botany a natural family. It seems to be unnecessary here to repeat from systematic works, the descriptions of the teeth of the cats, nor to mention, that their toes are universally five in number on the fore feet,* and four behind, all being

* Accident has, however, placed in our hands the fore foot of a common cat, which possessed only four toes, one of which was small, and represented the inner toe of the

provided with retractile claws. Nor is it requisite that we should allude to the invariable similarity of the digestive organs, nor to give any detailed account of the general resemblance in the habits, and mode of life. Suffice it to say, that in all the great fundamental characters of the organization, as well as in the principal natural habits, all the species of this tribe are intimately allied, —size and colour being almost the only specific distinctions.

There are, however, certain peculiarities in these latter characters, which may seem to require subgeneric division, if that degree of strictness be desired which would only congregate together, under one term, any two or three species, which have more points of resemblance with each other than with a fourth. Thus, for instance, the leopard is more like the panther or ounce, than the lynx; and this latter more resembles the caracal and serval, than the puma and the lion,—a circumstance which, indeed, has suggested to some naturalists the propriety of establishing subdivisions. * And the purposes of utility would, perhaps, receive no diminution, were the genus distinguished in the systems, into the Cats of a uniform colour, the spotted, and the striped, and those with short tails, and a tuft of hair on the tips of the ears. No invariable distinction in such characters can, however, be expected; and such an arrangement is only reduced to a level with all others, when we find species which unite the characters of both divisions, as, the ocelot and Cape cat, which are striped above, and spotted below.

The lion is distinguished from the other Cats, by the combined characters of superior size, an uniform yellow colour, a mane in the male, and a brush of hair at the end of the tail. The figure of the head is also more square than that of the other species. We proceed now to the description of the more remarkable parts of the structure of this animal:

The functions of relation offering the most interesting subjects for observation, the organs with which they are connected, first attract our attention; and we shall collect from the descriptions of travellers, the natural habits which have been observed in this animal, and consider the structure in relation to them.

The natural habits of the lion may be easily and briefly defined. He is the "king of the beasts," in point of physical strength, which, vulgarly allied to the notion of moral power and excellence, has led to the erroneous impression, that he is also noble and brave. The lion is cowardly and cunning; but cruel only when under the pressing influence of hunger. When his appetite is allayed, he is indolent and sluggish; and the strong excitement of hunger is necessary to arouse him to exertion. Living animals

tribe. It was evident, from the appearance of the foot, that external injury could not have been the cause of the peculiarity.

It is possible that the examination of a single specimen, and that one of this anomalous kind, led the author of the *Menageries* to give as part of the "*scientific character*" of the genus *Felis*, "three toes on the hind feet, and four on the front." See *Lib. of Entertaining Knowledge*, i. 216.

* Dr Forster, (*Phil. Trans.* 1781, p. 1.) Dumeril, (*Zool. Analytique,*) &c.

form his natural food. He prowls in the night. By his terrific roar, he affrights the inferior beasts of the forest, which fly confounded before the thicket in which he lurks; and he either steals secretly and insidiously upon the devoted prey, or leaps upon it suddenly from his lair. He then tears into pieces, and devours the living flesh of his victim, and sates his thirst on the reeking blood.

Pointing to these habits, the senses of taste and smell are obtuse; vision is adapted to the gloom of the night; and hearing to the detection of distant sounds: the sense of touch is also fitted to secure a careful and noiseless motion. It will be seen, from a general description of the organs of these senses, how admirably these peculiarities are explained by the anatomical structure.

The *tongue* is to be considered as a prehensile, lacerating organ, rather than as an organ of taste, an exquisite development of which was unnecessary to an animal, whose food is always the same. In the dissection, we found the gustatory nerves, as described by Desmoulins, remarkably small, and distributed principally to the muscles. The filaments, which were very minute, could not be traced far into the skin of the tongue.

The tongue, following the development of the other organs of prehension and laceration, is, however, of considerable size, measuring twelve inches from the tip to the root of the epiglottis, and three inches in width. The anterior extremity is free, for the length of six inches. The tip and sides of the tongue are covered with numerous filiform papillæ, which, proceeding backwards, gradually become sheathed with small recurved spines. A minute description of these spines would be tedious, and unsuited to this place, although they offer several points of interest to the comparative anatomist. Suffice it to say, that they occupy the whole upper surface of the tongue, gradually becoming smaller, as they proceed backwards, and at length terminate in soft papillæ, which preserve the same direction, decreasing in number, and increasing in size, until very few are found at the root of the epiglottis.

Where the spines are succeeded by the soft papillæ, there are four mucous follicles, termed calyciform papillæ, two on each side. These papillæ, it may be remarked, vary considerably in number in the Cats. The panther, cat, lynx, &c. have as many as ten, whilst in the tiger, caracal, &c. as in the lion, there are only four.

The use of the sharp and strong spines is apparent. They serve the double purpose of tearing the flesh, and opening new channels for the blood, and of directing the food into the fauces.

On the under surface of the tongue, near the tip, is a structure which may be considered as a rudiment of the worm in the dog. It is marked by three longitudinal dilations, separated by contractions; and, in this specimen, was three-fourths of an inch long.

The *organ of hearing* of the lion, has a direction the most convenient for its habits, the opening of the meatus and the external ear being both directed forwards and outwards.

The *organ of vision* is adapted to the nocturnal prowling. The pupil of the eye is circular, and the tapetum shines through it with a brilliant yellow colour. The use of the different shapes of the pupil, observed in the cat tribe, has been a question with naturalists. By some, the Cats have been divided into the diurnal and nocturnal species, the former being distinguished by a circular pupil, and the latter by that of an oval figure. Every one will have remarked the oval shape of the pupil in the domestic cat; and it is a popular belief that this animal is thereby enabled to see in the dark. It has, however, been very properly remarked, that it is doubtful whether the shape of the pupil be at all connected with the power of vision, though its size must, in all probability, be of importance in this respect. The lion, although he sees by day, is said never to hunt his prey while the sun is above the horizon, unless pressed in an extraordinary degree; and yet, the pupil of his eye is at all times circular.

There can be no doubt, however, that the brilliant tapetum conduces to the nocturnal vision of this animal, upon what theory soever its properties be explained.

As an *organ of touch*, the sensible mustaches have been described as of use in indicating any obstacle which may present itself to the passage of the body through confined places; and thus, also, to secure a stealthy motion. The skin, however, having been removed from the specimen under our examination before it came into our hands, we merely allude to these organs.

A provision, equally obvious, as conducing to silent progression, is found in the thick, and dense pads, stuffed with granular fat, which are placed on the soles of the feet, and under the ball of each toe. This mechanism is also admirably calculated to break the force of the fall after a violent leap.

We have said that the lion's roar is terrific; and we find the *larynx** well adapted for this end. The anterior ligaments, which are composed of a fold of mucous membrane, and a few muscular fibres, are supposed by Cuvier to perform the functions of the vocal chords. The posterior, or true chords, project very little, and are also composed of a fold of mucous membrane, in the substance of which is a ligamentous band, approaching to the nature of the yellow elastic tissue; it is attached above to the arytenoid cartilage, and below to the re-entering angle of the thyroid cartilage.

The ventricles of the larynx are small; but it is provided with large lateral pouches, the anterior ligaments being at a considerable distance from the aryteno-epiglottidic folds.

In most of the cat tribe, the epiglottis is triangular; but in the lion we found it rather rounded.

But our limited space is already exhausted. We shall proceed to the organs of locomotion in our next Number.

* The larynx of the lion is well described by Cuvier. *Anat. Comp.* IV. 506.

(To be continued.)

ART. V.—*Notice of the Aurora Borealis of Last Winter.* By the Rev. W. DUNBAR, of Applegarth, Dumfries-shire.

THIS beautiful phenomenon, seen but seldom in our comparatively low latitudes, has, during the past winter, been very frequently visible, and marked with uncommon splendour. Its first appearance was, I believe, in November, when it spanned the heavens in the form of a luminous arch, stretching across from east to west. Towards the zenith, its breadth was nearly that of the rainbow, gradually tapering from the centre to the extremities, each of which terminated in a slender point, and seemed to rest upon the horizon. The graceful curve which it exhibited in the early part of the evening became somewhat deranged as the night advanced; the centre slowly, and with an undulating motion, falling away towards the south, as if impelled by a breeze of wind, while the extreme points on which it rested appeared to keep their place. The appearance of this phenomenon during last winter has completely belied a remark often made on the subject, that they are most frequently visible after a dry summer.

On the evening of the 25th of December, the aurora appeared in a form much more striking; for, in addition to a fleecy arch resembling the one formerly seen, though not so brilliant, flickering rays of a pale silvery colour continually ascended to the zenith, converging to a point, like flames confined within a hollow hemisphere; and, what is now rarely seen south of the polar regions, a broad girdle of crimson extended across the sky, parallel to the arch, and from east to west, imparting something of a terrific hue to the scene, and exciting in the observer a feeling of awe. It was a vision which, in unscientific periods of the world, would have carried terror to the nations, and been regarded as the disastrous omen of bloodshed and war.

On the 11th of January, the phenomenon shewed itself under a very different aspect, and altogether divested of that gloomy hue which the untutored mind would have associated with scenes of slaughter. The northern region of the sky was flooded with light, as if *there* were the reservoir from which the beautiful scintillations that sparkled throughout the firmament drew their existence, and their nourishment. The rays, converging in the zenith round the whole concave, excepting towards the south, did not, as in general, resemble pale flames, but were of a brilliant golden green, brought prominently forward by a dark back ground, shooting with lively rapidity round and round the horizon, now melting away into obscurity, and then starting again in an instant into gorgeous light, with such activity, as forcibly to remind us of the poet's allusion to

> —— the Borealis race,
> That flit ere you can point their place.

The impression made upon the observer by this aspect of the meteor was wholly of pleasure and admiration; and we cannot wonder that the inhabitants of the northern parts of Europe should have given to these richly streaming lights the appropriate appellation of "The Merry Dancers."

It is now considered as a settled point, that the phenomenon of the aurora borealis has its origin in electricity; though philosophers, in discussing the subject, speak with a degree of mysteriousness which affords a suspicion that "the light within them is yet," comparatively speaking, "but darkness." At the same time, appearances are certainly in favour of the electric theory; particularly the sound which these streamers are known to emit, and which bears a strong resemblance to the crackling noise proceeding from an electrifying machine when in operation, though of course much louder. Doubts, it is true, are entertained respecting the actual existence of this sound; and it is certain that the members of the Arctic Expedition, under Franklin and Richardson, never once heard it, although, from its forming the subject of a part of their instructions from government, they bestowed the closest attention in watching the phenomenon. They were assured, however, by their Canadian attendants, that this sound had been heard by them hundreds of times; and these persons expressed their surprise that a circumstance of such common and frequent occurrence should be the subject of doubt.

The writer of this notice has no doubt on the subject. He knows that a distinct sound, such as has been described above, is emitted by the aurora borealis; causa scientiæ patet,—he has heard it at least fifty times. He resided in one of the islands of the Hebrides for nearly six years; and, during that period, heard almost every winter evening, when the phenomenon was visible, the crackling noise of the aurora. He has oftener than once mentioned this fact to Dr Richardson; and that gentleman, while he observed that he had never been an ear-witness of the sound, yet acknowledged, that he had scarcely any doubts as to its existence; and expressed himself satisfied, that if it did exist, it would be of the nature described,—that is, it would resemble the hissing or crackling noise of an electrifying machine.

It is worth bearing in mind, that many ancient historians and poets, though these last may be considered perhaps as inadmissible evidence, when describing those luminous appearances in the heavens, which superstition clothed with so much terror, always speak of them as being accompanied with noises. In fact, it is probable that these noises suggested to them the notion of aerial legions contending in sanguinary conflict; and that, while fancy beheld, in the terrific streamers, the blood-red banners of war, the actual sound emitted by the meteor could only be

> The noise of battle hurtling in the air.

GEOGRAPHICAL COLLECTIONS.

Swan River Colony.— We are not disposed with the herd to cry up the success of this settlement in opposition to direct evidence, even though government has been induced to sanction the scheme. We are by no means clear, notwithstanding the gaudy pictures of this speculation, which are still industriously disseminated through the daily press, that a job has not been precipitately taken under government patronage; and, until we are convinced to the contrary, our opinion will be freely expressed. Our readers will remember that in a late number we alluded to a letter from a settler to a friend in Edinburgh, which had been communicated by Professor Jameson to the Wernerian Society. We are now enabled to give the letter at length from the *Edinburgh Literary Journal*, and shall only premise, that we have reason to know that the writer is no discontented grumbler, but one who speaks freely of facts as they are; and that the document originally comes to the knowledge of the public through a quarter which entitles it to some consideration. It cannot be supposed that such astounding evidence would be unadvisedly divulged upon dubious authority; nor do we believe that any other desire than that of letting the truth be known has led to its promulgation. It will be observed that much later information has been received from the colony, but none which sufficiently negatives the conclusions to be drawn from this letter.

" When I last saw you in Edinburgh, you requested me to write you an impartial account of this colony. I shall do so in this letter, in the hope that others may not believe the trash which was published last spring concerning it. I have the *Quarterly Review, No.* 78, before me, article ' Swan River Settlement,' to which I was referred at the Colonial Office, for the only authentic information. By running my eye over it as I go on, I shall be able to point out some of the numerous inaccuracies with which it abounds.

" In the first place, we have found the climate much hotter, for, instead of the average being 72° and the extremes 84° and 59°, the glass has seldom been below 80°, from that to 96°, 100°, and once 103°. This heat in England would be insupportable, but the sea-breeze generally sets in after ten in the forenoon, and renders the heat bearable. Next, mention is made of an almost innumerable variety of grasses, and that, in consequence, there cannot be any deficiency in soil, heat, and moisture. Certainly, if the country did abound with grasses, that conclusion might very justly be drawn, but I have not seen any thing like grass on which stock would thrive. To prove this, it will be sufficient to state, that the greater part of the stock brought out by Mr —— have perished from the want of proper food; that working oxen, which, in a new colony, ought to be very valuable, are sent to the butcher as soon as purchasers can be found for the meat, and that the same fate attends sheep. As to rivulets, I have not yet seen one, or even the dry bed of one. As to springs, I can only say, that I have with great labour got water by cutting forty feet through solid rock. We have had moderate rain about half a dozen times since the 15th December, when we arrived. A kind of half salt water may be got by digging three or four feet on the beach, and not much above high-water mark; but many have suffered severely from dysentery by drinking it.

" The channel into Cockburn Sound, to say the best of it, is very intricate, and, without a leading wind, dangerous for large vessels. The Sound is, I believe, considered by naval men tolerably well protected, and safe enough. Gage's Roads, off the entrance to Swan River, are particularly unsafe. One ship was on shore about a fortnight ago, another broke her capstan and several strained their cables, dragged their anchors more or less, and expected to be on shore. 'But then there might be a ship canal into Melville Water, or the bar at the mouth of the Swan might be got rid of.' As to cutting a ship canal more than a quarter of a mile through solid rock, and through a rocky cliff to begin with, from thirty to forty feet high, his Excellency might as well talk of building a few Egyptian pyramids. Part of the rocky bar at the entrance of the river might perhaps be more easily got rid of; but, unfortunately for that scheme, the channel for two or three miles from the mouth is shallow and intricate.

"Perhaps the most ridiculous part of Mr Fraser's report is that which speaks of the peculiar advantages to be derived by settlers to this colony: '1st, The evident superiority of soil; 2d, The facility with which a farm may be cultivated, the average number of trees not exceeding two to an acre; 3d, The abundance of springs; and, 4th, The advantage of water carriage.' As to the soil, I have been ten or twelve miles up the Swan, and have not seen any thing but sand. A few miles beyond that point, I hear, there is some good land near the banks; but it does not extend on each side more than a quarter or half mile. The navigation is tedious in the extreme, on account of the numerous sand-banks; and for boats, Melville Water, about four miles from the mouth, and extending seven or eight, is particularly dangerous, from frequent squalls, attended by heavy seas. The country is so open, that for two trees you may fairly substitute 200, and not take any account of rubbish and underwood. You will see, page 326, the description of Garden Island; now you would scarcely believe that the officers and men of three ships of war, many of whom are living on shore, have not even yet obtained a scanty supply of vegetables. Again, 'the cattle abundant on Garden Island, were left amidst a profusion of grass.' We were there five days, during which time I penetrated far into the interior, and did not see one blade of nourishing grass. Nothing but the eternal red sand, which was rendered so hot by the burning sun, that I could scarcely bear my hand in it. The situation, in a commercial point of view, may be good, but we cannot, as we have not soil, grow the valuable productions enumerated by this writer of the Quarterly, or, at all events, not in sufficient quantity for exportation.

"Here I take leave of the Review, and shall merely state, that the grant I have now contains 20,000 acres, and that, for fertility, I should give the preference to the wildest moorland I have seen in Scotland or Wales, or the worst part of the fens in Cambridgeshire. On the one, a few sheep and cattle might find grass, while the other might be improved by draining. If, in a tract of country of 20,000 acres, or I might as well write 200,000, there should not be 200 acres of good land, or even tolerable land, would any man call that an advantageous spot for establishing a colony? Now, I assure you, I do not think that, *taking the whole extent of the colony*, there is one acre in ten thousand good. If the land had been as good, or half as good, as it was represented to be, I should have liked the life of a settler; and I feel certain that it would have answered. I am now writing in a very comfortable room, in a well-built, convenient cottage, which I brought out with me. I have no reason to fear the rains in winter, and I have an abundant supply of provisions of every description, and some luxuries. I have tools of all descriptions; and my outfit was so complete, that I scarcely feel the want of any necessary for the house. I have an excellent female servant, who is attached to my wife, and a good steady set of labourers to begin with. My stores are under lock and key, in a building substantially built and thatched, twenty-four feet by twelve; the men have huts; and, if the soil had been good, I should have had time this season to cultivate a few acres, or, at all events, to commence a garden. As the case stands, however, I scarcely know how to employ the men; my seeds are rotting, provisions vanish, wages go on, and no prospect of a return. The governor will, of course, do every thing in his power to keep people here; and a few who have risked every thing, or who have not the means to return, may endeavour to support him; but it is my firm opinion that this will never be a flourishing colony. Government may think it advisable to form a military station here; and a few may, with great labour, obtain a scanty subsistence. More than this must not be expected. I shall endeavour to leave in September or October. My loss cannot but be very considerable, as farming implements do not meet with a ready sale, or sell at such ridiculously low prices, that I intend to bring them back with me.

"I cannot say that I feel very unhappy; perhaps the time is not yet come for me to be so. I always find a merry face at home, and, when away, I am generally too much engaged to reflect. The labourers will have the choice of remaining here, or of going on to Sydney, where they will be able to get good wages, and, if steady, do well.

"Our voyage out, like most other voyages, was tedious and unpleasant enough. The ship was crowded to an excess with cabin and steerage passengers, dogs, horses, cows, pigs, &c. &c. We touched at Madeira and at the Cape, and were about four months at sea. The natives are a very peaceable race; they are not numerous, and, with kind treatment, would not, I think, prove troublesome. Kangaroos are plentiful; but without dogs trained to hunt them, it is almost impossible to obtain the large sort. I sometimes catch a few in traps, which weigh four or five pounds, and have a few sent me as presents from Garden Island, where they abound. They make a delicious stew, — at least we think it so.

"I have, on the whole, been tolerably successful with my gun, as wild ducks abound in the lakes. Parrots and cockatoos we find good eating, but eagles, hawks, crows, and sea-gulls, are eaten by some, and nothing in the shape of fresh meat is thrown away. There is now a tolerable supply of mutton, at 10d. per lb., about 1000 sheep; there are also some oxen, so that we shall not starve, or be entirely reduced to salt provisions. Poultry thrives; and I am happy to say, that I have twenty-three young chickens, which, in due time, will go into the pot. I have not yet been able to shoot a black swan, although I have seen many; they are a very handsome bird, but smaller than the common white swan. An emu crossed my path one day, which I had the good fortune to bring down. It weighed ninety pounds; and as it measured from the tip of the beak to the end of the claw nearly eight feet, I think it must have stood nearly seven. It ran very swiftly; and as I had only broken one of the legs, I had great difficulty to kill it. The flesh very much resembled, in colour, taste, and appearance, very tender beef. This was a fine windfall, as it gave us all a supply of fresh meat for three days, besides some handsome presents I was able to make. — *Cockburn Sound, Swan River, April* 26, 1830."

*Inhabitants of King George's Sound.** — A paper on the manners and customs of the inhabitants of King George's Sound, was communicated to the Royal Geographical Society in February last. The author had accompanied the party to form the settlement in that part of Australia, in 1826, in the capacity of medical attendant, and remained there till 1829. Mr Nind's communications with the natives were much facilitated, in consequence of their friendly dispositions and frequent visits to the settlement; and he did not lose the opportunity thus afforded him, of making observations on a race of whom we previously knew little.

The natives of King George's Sound do not differ materially from the aborigines of Sydney. Their only article of dress is a cloak of kangaroo

* We have to acknowledge our obligations once for all to the *Athenæum* for early reports of the papers read before the Royal Geographical Society; and, amongst others, for the following interesting notice. — Ed.

skin, reaching to the knees, and fastened about the shoulders with a rush, so as to leave the right arm free. But, in common with all other Indians, they make a free use of a reddish coloured earth, mixed with grease, with which they disfigure themselves. Painting their bodies is not, however, as at Sydney, a sign of war, but seems to be more general, and carefully attended to, as grease is more or less to be had; and, when plentifully obtained, their cloak undergoes the same process of painting as themselves. Another barbarous custom—that of cutting gashes in different parts of their body, but principally about their shoulders—is common among them, and a means of distinguishing the various tribes or families. From these gashes elevated cicatrices are raised, and are considered marks of distinction. They also perforate the septum of the nose, and wear a feather in it.

It appears that they have few or no chiefs; the most influential persons among them being doctors, or mulgarradocks, who claim to themselves supernatural powers. Mr Nind witnessed an attempt of one of these mysterious persons to stop a thunder-storm. His process was to stand in the rain, making violent gesticulations, shouting loudly, throwing his arms about, and shaking his cloak, for a length of time. They also believe they can cure disease; but their attempts are attended with as little success, as they are likely to be on the elements. They are generally a healthy race, and are very particular in the diet of their sick. Roots only are at first eaten by them, then lizards, bandicoots, opossums, &c.

Polygamy is general among them, but their customs relating to these matters, Mr Nind says, are yet in obscurity. The whole of the natives are divided into two classes, and it is a law that they must intermarry with each other; those who break this law being subject to heavy punishment. The girls are promised by the fathers even before they are born, and are always at their disposal. There are instances, however, of elopements, as among ourselves; and the displeasure of the parents is great, during the temporary absence of the parties. A period of six months, or a year, with presents, is sufficient, however, to wear off the impression of such *misconduct.* They have a barbarous practice, in the event of any of their women having twins, of putting one to death; generally preserving a female, and asserting as a reason, that the mother has not sufficient milk for both.

Their principal method of taking game is, by setting fire to the face of the country, which, being generally dry, burns very rapidly. The men place themselves in the paths which are most frequented by the animals, and vast numbers of kangaroos, opossums, and emus, are thus destroyed. In order to prevent the fire from extending too far, they burn it in consecutive portions. Snakes, it appears, form an article of their food. When they kill one, they are particularly careful to beat its head to atoms before they take it in their hands. If they find it has recently eaten food, they reject it, stating that it causes sickness. They are very careful of their dogs, which they consider entitled to a portion of the game they kill; but when they are deficient of provisions, these animals frequently leave their masters to provide for themselves, and generally return to them at the expiration of a few days.

In summer they come down to the coast for the purpose of taking fish. They generally spear them in shoal water, and sometimes take them in a sort of weir, which they form of bushes in the shallow parts of the rivers. They also practise the system, so common among our fishermen, of attracting them by a light at night. It sometimes happens that a dead whale is thrown on shore by the sea, which affords them food, and a quantity of fat, which lasts them a long time. They are very fond of their children, but do not always treat their women with kindness. These, as is customary with the North American Indians, perform many useful offices. They not only do much towards procuring food, but build their huts, prepare their cloaks, besides various other services. Of domestic utensils they have very few.

A piece of soft bark makes a drinking cup, the claw of a kangaroo serves for a needle, and through a hollow rush, or the wing-bone of a bird, they suck water, when they cannot conveniently reach it with their mouths.

Their dances are described as being inelegant, and principally of a nature to represent their various methods of killing game. They generally perform these feats entirely naked, but exhibited them before the settlers with their cloaks fastened round them. A fire is made on the spot where the dance is to take place, and on one side of it is seated an old man. The dancers then advance, and retire on the opposite side of the fire towards him, stepping together, sometimes stooping, and moving their heads and bodies in the most grotesque attitudes—shouting together, and each bearing a green bough in his hand, which they finally deposit with the old man. This grave personage assumes a very serious air during the ceremony, and gives directions to the dancers as he pleases. The women, it seems, are not allowed to dance with the men.

Retaliation seems to be their principle in quarrels. If a man is killed, his friends are content with the death of any one of the tribe to which the aggressor belongs. If he should have been killed by accident, as falling from a tree, his friends impute it to an adverse tribe, and kill one of them in consequence. If a man is ill, and imagines he shall not recover, he attempts to kill somebody, and fancies by so doing that he shall get well again. Although their war implements are of a dangerous nature, they are described as being by no means a warlike race of people. They are very dexterous in avoiding the spear; and in their wars with each other, generally arising from quarrels about their women, they are content with inflicting a wound, which is a signal for battle to cease. When their attacks on each other are intended to be fatal, they are generally made by stealth, and during night; and it is curious, that the friends of a person who may be killed in this manner, (which is always by the spear,) are careful never to mention his name, asserting that, if they do, it will raise his ghost. Should another person have the same name as the deceased, he will immediately change it, to avoid repeating it. They bury their dead, with much lamentation, in a grave about a yard wide, four feet long, and about a yard in depth. The bottom of the grave is covered with the bark of trees and green boughs. The corpse is then placed in it, ornamented, and wrapped up in his cloak, with the knees bent to the breast, and the arms folded across the body. Green boughs are then laid over the body, then bark, and earth; more boughs are then placed on the earth, on which are laid his spears, knife, hammer, and ornamental feathers. His womena, or throwing-stick, and curl, or carved flat stick, are also stuck on each side of the mound. They also cut circles in the trunks of the adjacent trees. Their mourning is either by daubing their faces with black, or large blotches of white paint, particularly on the foreheads, which they continue to wear a long time. The implements of the women are also buried with them; but there is not so much ceremony in their funerals as those of the men.

The climate is reported, by Mr Nind, to be very favourable to vegetation; the crops are not only certain, but luxuriant, where the ground has been manured. In all parts of the country, stagnant pools of water are found. The prevailing rock in the vicinity of the settlement is granite. The number of settlers in October, 1829, when Mr Nind left it, was 52. The settlement is situated about the middle of the north shore of Princess Royal harbour, at the foot of the low part of Mount Melville. The position of it is considered very eligible, in many points of view, but it is destitute of good timber, as well as good water. The soil is extremely barren near it, being a pure white sand a few inches from the surface.

Extract from the Log-Book of the ship Layton; communicated to the Royal Geographical Society.—The ship Layton, J. Hurst, master, in a voyage from Sydney to Manilla, in crossing the Carolina chain of islands, fell in with the Hogolen islands, belonging to the Ulean group. Passing to the N. W. of them, the Layton discovered a reef, extending twenty miles to the S. S. E. from the southern point of the island Anonima. The former islands do not appear in most charts, and the latter is erroneously called Lamurree. According to Krusenstern, the island Lamurree is one of a group of thirteen, about one hundred leagues to the westward, and the island Anonima, which is inhabited, was discovered in 1801 by Captain Ibargoita, in the ship Phillippine. Mr Hurst confirms the opinion of its being inhabited. Its position is 8° 36′ N. lat., and 450° E. long.; and it received its present name from the discoverer, because it had never before appeared on the charts. The track of the Phillippine passes to the westward of the island, by which means the reef, extending to the S. E. was unobserved. The Layton narrowly escaped being wrecked on these reefs, the determination of which will form a valuable addition to the erroneous charts of a part of the ocean fraught with danger.

Hydrography of the Pacific Ocean—Archipelago of the Tonga Islands.—Between the islands of Tongatabou and Anamooka there is a reef, seen by Maurelle and La Perouse, and placed by M. de Krusenstern in lat. 20° 21′ S. and long. 177° 35′ W. of Paris, under the name of *Baxo de Culebras.* In 1821, the English ship, *The Supply,* was thought to have been aground on the same bank. Captain Thornton says, that it extends to a great distance, and that it is formed of sub-marine rocks. As he places it in 20° 25′ S. lat. and 177° 24′ west long. from Paris, it would seem that the *Baxo de Culebras* extends farther to the east than was supposed.

This same Captain Thornton discovered, in lat. 10° 04′ S. and long. 152° 36′ W. of Paris, an island, or rather a group of small islands, extremely low, 15 miles long, and 5 broad.

Captain Beveridge, commanding the English ship, St Michael, has lately discovered two banks between the islands Hapaë and Vavaoo. The first, which he met with at 18 miles to the N. ¼ of N. E. of the Isle of Haano, is not very dangerous, and has always 4 to 6 fathoms water above the rocks. Its extent was estimated at 12 to 16 miles. The islanders stated that it formed a very advantageous mark for the canoes which go from Vavaoo to the Hapaë Isles.

I may here transcribe a passage from the log of the St Michael, which I saw at Sydney. "5th October, 1822, at 4 P. M. the high land of Latti stood to the W. N. E., Vavaoo to the N. ¼ N. W., and we had a reef by the cat-head for two leagues in the N. E. ½ E.—6th October, we discovered a large and dangerous reef, with a bank of sand, in the W. point, about a ship's length. It lies to the S. S. E. ½ S. of Vavaoo, at the distance of 12 miles." The ship passed between the bank and Vavaoo.

The navigation of Captain Beveridge leads me to think, that besides the rocks marked on the maps to the south of Vavaoo, there are others which extend farther east.

Captain Beveridge has sounded the anchorage to the west of Haano Island. It is very good; but care must be taken of a rock which is not very far from the beach.—J. DE BLOSSEVILLE.

Keeling or Cocos Islands.—An account of these islands was recently communicated by Mr Barrow to the Royal Geographical Society. They are situated in the eastern part of the India Ocean, in lat. 11° S., and are of coral origin. The paper gives a description of the various sorts of timber found on the islands, and stated that the live stock and fruits which had been transferred there from the Mauritius, were in a thriving condition. Two Englishmen were the only settlers on the island.

The Geographical Reliefs of K. W. Kummer, of Berlin.—These reliefs differ from common globes and maps most essentially in the following particulars: instead of representing the hills and valleys by etching, they exhibit real elevations and depressions, corresponding to those on the earth's surface. The mountains and valleys are thus made visible and palpable; the coast, also, is clearly raised above the level of the sea, and its peculiar character, whether of lofty rock, or level sand, is accurately delineated. The high table-lands, like those of central Asia, are placed on a higher level than the flat lands near the coasts; and the rivers and lakes are seen confined within their channels and basins. Not only is the general direction of the hills clearly laid down, but also the varieties in their steepness, their declivities, and the great isolated summits are delineated in their proper proportions. Appropriate colours, too, are used; the eternal snow of the highest mountain-tops, and the ice of the polar regions, are represented white; the sandy deserts yellow; the steppes brown, or a yellow-brown; the stony, barren regions gray and uneven; the forests green; and all water is made blue. The material employed is paper of a fine and light kind, not liable to be broken; the weight of one of the largest reliefs is very small, and they may be handled without any risk of damaging them. Names are also written on these reliefs, and the clearness even of the smaller characters is surprising.

This method of Kummer has been applied by him both to globes and to flat surfaces, or relief-maps (Relief-Erdkugeln und Landkarten,) of various sizes. Amongst them are a large globe of 26 Paris inches in diameter; one of 16, and another of 2½. Portions of the great sphere may be bought separately, it being divided into six parts. Europe may be had by itself, price 11 or 12 German dollars;* Asia for 16 or 17. If the names are omitted, the parts are, respectively, about two dollars cheaper. There are relief-maps of Germany, of the Island of Rügen, of the Mountain-Range of Mont-Blanc, and of France. The map of France is on a scale in which the lined measure is 1-2,000,000th of the real lineal measure on the earth's surface; it is 24 Paris inches long, 21 broad, and comprises the country from Cologne and Dover, as far as Figueras and Geneva, in the direction of north and south. It comprehends the Pyrenees, the whole of Switzerland, and the valley of the Po. The price of this is not mentioned.

The price of the map of Germany is, without names, 8 or 10 dollars; with names in German characters, and with the addition of the places where the rivers are crossed, and of the parts that are navigable, the cost is 14 to 16 dollars; with the political divisions added to the above, the price is 18 to 20 dollars.

It has been objected to the method of Kummer, that the true ratio between the lineal horizontal and vertical measures is not preserved. This is true: but, though the real ratio between the horizontal and vertical measure is not observed, the proportion between the various *vertical* heights, among themselves, is strictly adhered to, and it is all that is necessary. It would not be possible to represent mountains and valleys with any degree of clearness, in such a map as that of Germany, for example, without giving to the heights of the hills a greater elevation than is due to them, compared with the horizontal measures; and, if the *true* horizontal and vertical proportions were observed, it would only be practicable to delineate, by the aid of relief, very small districts. The objections made to Kummer's reliefs may be made to common maps also, where the breadths of rivers are often greater on the paper than they ought to be.—*Journ. of Education*, No. I. p. 190.

Height of Lake Aral.—The surface of Lake Aral is 117 feet higher than that of the Caspian Sea.—*Humboldt.*

* The German dollar is about 3s.

Desiderata in the Topography and Antiquities of Greece.—At a recent meeting of the Royal Geographical Society, Dr Holland called the attention of future travellers in Greece to various desiderata, among which were the following:—

1. There being evidence that the great plain of Thessaly was once covered with water, to examine whether there be any lacustrine or tertiary formations skirting the chain of older hills which surround it.

2. The site of the celebrated cave in Delphi, from which the Pythian oracles were delivered. According to a passage in Justin, (lib. xxiv. 6.) Dr Holland is of opinion, that it may be sought for at some point above the Castalian fountain, ascending the steep cleft, or break, which separates the two Delphic summits; and that inflaming currents of carburetted hydrogen gas from crevices in the rock, might lead to its discovery.

3. The site of the celebrated oracle at Dodona, in Epirus, Dr Holland is of opinion, might be found in the district of the river Arta, (ancient Aracthus,) instead of that of Joannina, where it is arbitrarily placed by travellers.

4. The monasteries of Meteora might be examined for ancient manuscripts; and the geological formation of the rocks of Meteora, as well as that of the lofty chain of Pindus; the course of the valley of Aracthus, from Kalarithes upwards to Metzovo, and the pass over the mountains into Thessaly.

5. The district of Paramithia, in Albania, might be examined for remains of antiquity.

6. The ancient theatre near Joannina would be well worthy the attention of travellers; with the exception of Colonel Leake, having been entirely overlooked by those who have already visited that district.

7. The site of the Tetropolis of Doris has never been sought for;—but, among the various points in Greece affording a field for future research, Thebes, Corinth, Argos, and Olympia may perhaps be more especially mentioned, having, from political circumstances, never been minutely examined, and being important in history, as well as famous for works of art.

Deception Island.—This island, one of the new South Shetland group, was visited by Lieut. Kendall, while belonging to the ship *Chanticleer*, Capt. Foster, and a notice of his observations was read before a late meeting of the Royal Geographical Society. It is situated in lat. 62° 55′ S. and long. 60° 28′ W. and is of volcanic origin. The interior of it is occupied by a circular lake, which communicates with the sea on its S. E. side. Compact lava, ashes, and pumicestone, are among the component parts of the island, the highest part of which is about 1800 feet above the sea. It seems that volcanic action is still in progress, as many apertures were found, from which steam was constantly issuing with a loud noise. Hot springs abound in the island, and Lieut. Kendall found water at a temperature of 140° issuing from under the snow-clad surface of the ground, and running into the sea. Alum was seen in several places. The remains of a wreck were found, too old, however, to afford any clew to the name of the vessel, or the country to which she had belonged.

Desiderata in the Topography and Antiquities of Greece.—At a [illegible] meeting of the Royal Geographical Society, Dr Holland called the attention of future travellers in Greece to various desiderata, among which are the following:—

1. That, being evident that the site of [illegible] was connected with [illegible] [illegible] [illegible] formations [illegible] the ground [illegible] [illegible].

2. The site of the [illegible] [illegible] [illegible]. Pythic oracles were delivered [illegible] [illegible] [illegible], [illegible] xxiv. 6. Dr Holland is of opinion that [illegible] [illegible] point above the Castalian fountain, ascending the same angle [illegible] [illegible] [illegible] two Delphic summits, and that [illegible] [illegible] [illegible] hydrogen from crevices in the rock, might lead to its discovery.

3. The site of the celebrated oracle of Dodona in Epirus, Dr Holland is of opinion, might be found in the district of the river Arta (ancient Arachthos) instead of that of Joannina, where it is arbitrarily placed by travellers.

4. The monasteries of Meteora might be examined for ancient manuscripts; and the geological formation of the rocks of Meteora, as well as that of the lofty chain of Pindus; the course of the valley of Arachthus, from [illegible] upwards to Metzovo, and the pass over the mountains into Thessaly.

5. The district of [illegible] [illegible], might be examined for remains of antiquity.

6. The ancient theatre [illegible] would be well worthy the attention of travellers; with the [illegible] [illegible], having been entirely overlooked by those who [illegible] that district.

7. The site of [illegible] [illegible] [illegible] [illegible] sought for;—but, among the various points in [illegible] [illegible] for [illegible] research, Thebes, [illegible], [illegible], and [illegible] [illegible] [illegible] more especially mentioned, having, from [illegible] [illegible], [illegible] been minutely examined, and being [illegible] [illegible] [illegible] for works of art.

[illegible]

Fig. 1.

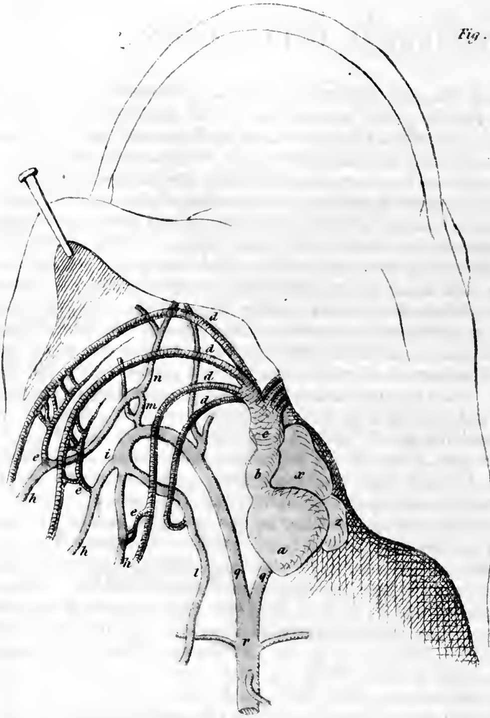


Fig. 2.

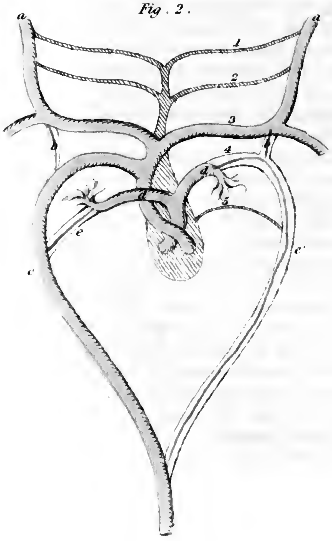
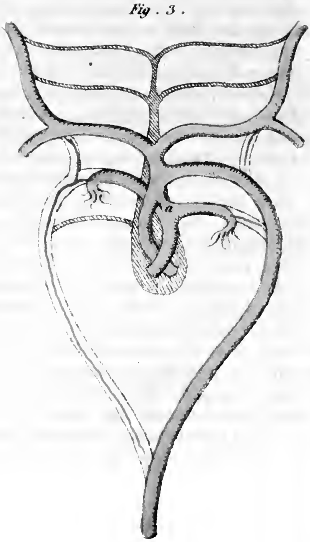


Fig. 3.



ZOOLOGICAL COLLECTIONS.

On the Existence of Vascular Arches in the Fœtus of Mammifera, Birds, and Reptiles, similar to the Branchial Arteries in Fishes and the Larvæ of the Batrachian Reptiles.—(With a Plate.)—It is well known that the batrachian reptiles, (such as the frog, toad, water-newt, &c.) have the organization and habits of a fish during the first period of their existence, and that, by a metamorphosis, they afterwards assume the structure of the perfect reptile.

Among the organs which we should expect to undergo the most remarkable changes during this metamorphosis, are those of circulation and respiration; and accordingly, we find that in the tadpole, as in the fish, there is but a single heart, consisting of an auricle and a ventricle, (Pl. VII. fig. 1. *x a*,) the former of which receives the venous blood from the system, and the latter sends it by the branchial arteries to the gills. From these organs, when it is aërated, it is returned by vessels, which, uniting together, form the aorta; by the subdivisions of which, the blood is carried to the different parts of the body. The organs of respiration in the tadpole are gills, in which the blood seeks the aërating medium; in the perfect animal, lungs, in which the air seeks the blood.

The organization and habits of the higher animals are so very different, even from the time of their birth, that it might be at first supposed that the analogy was far-fetched which went to shew a correspondence between the gills, and the arteries distributed to them, in the fish and tadpole, and any structure in the mammifera, birds, or higher reptiles. This, however, is not the case; the analogy, on the contrary, is close and striking, as the researches of the German physiologists into embryogenesis have fully shewn: thus, in the early period of the development of the fœtus of the mammifera, birds, and higher reptiles, there are, (as was mentioned in a former number of this Journal, Vol. II. p. 173,) the rudiments of external gills; and there is a disposition of the great arterial trunks, similar to that of the branchial arteries of the fish and tadpole, (Pl. VII. fig. 2, 3.)

The analogy is still more complete if we compare these rudimentary structures of the mammifera, birds, and reptiles, with the similar structures in the fish and tadpole, at the early period of their development; for, as they become more developed in these latter, they, of course, resemble less the rudimentary structure in the former. From this, amongst other considerations, the transcendental anatomists infer, that the vertebrated (if not the invertebrated) animals are constructed according to the same *type* or plan; and that the higher animals, before arriving at their ultimate degree of development, successively run through stages in which their structure is similar to that of animals of less complex organization. This certainly is the case with individual organs; but it is properly remarked by Meckel, that, as all the organs are not at the same time in the same relative degree of development, we cannot say that a mammiferous animal is at any time a fish, a reptile, or a bird. From this gradual process of formation, we can understand the production of monsters, some of which have been shewn by St Hilaire to be caused by a stoppage of the development of some of their parts; so that a monster from among the inferior animals having a malformation of the brain, never has it so complicated as that of man, although, on the contrary, the ill formed brain of a human monster may resemble that of an inferior animal. Other monsters are supposed to be formed by excess of development, but these are comparatively rare in the more perfect animals, and must arise principally from a loss of balance in structures, which are merely rudimentary in the perfect state of the animal.

We have, in former numbers, referred to the essay of Dr A. Thomson, on the development of the vascular system in the fœtus of vertebrated animals, in which much valuable information will be found serving to the elucidation of this doctrine of analogies. From this paper we extract the following generalizations on the development of the great vessels connected with the organs of respiration:—

"In all vertebrated animals, the anterior part of the intestinal tube is encompassed by four or five pairs of arterial vessels, formed by the subdivision of the ascending aorta, and these vessels, after passing round the œsophagus, unite again with one another above this tube, and below the vertebral column, to form the dorsal aorta.

"In the lower aquatic animals, gills become developed along the course of parts of these vessels, while in the higher or air-breathing animals, after being so disposed as to indicate slightly the appearance of gills, these vessels are gradually converted into the systemic and pulmonic arteries by the processes of enlargement, partial obliteration, separation, &c. Though the general phenomena occurring during this transformation of the arteries in the neck, are analogous in all vertebrated animals, there are certain remarkable differences respecting the obliteration of some, and the permanence of others of these vessels, in various species of animals. 1. In cartilaginous fishes, all the branchial divisions of the aorta remain permanent to form gills, undergoing very minute subdivision in these organs, so as to be converted into branchial arteries and veins. 2. In osseous fishes, five pairs of branchial arches are also observed in the fœtus, but only four of these remain to form the gills; the anterior being partly obliterated, gives rise to the roots of the carotid or head artery. 3. In batrachia, there is a gradual transition from the structure of fishes to that of the higher reptiles. The gills in the batrachia are, during some period of their existence, developed along the course, or from particular parts of the branchial arches, in which, as in fishes, minutely subdivided branchial arteries and veins are formed; but these last gradually disappear, and more or fewer of the primitive branchial vessels remain. *a.* In the batrachia with permanent tails, the aorta is formed, as in the fœtus, by the union of the whole four branchial arches on each side, the pulmonary artery arising from the posterior arch; *b.* while in the batrachia without tails, as in the frog, only one branchial vessel remains on each side, so as to form the right and left roots of the aorta; and the pulmonary artery, which in the fœtus was given off from the posterior branchial arch, appears to spring from the aortic root itself, in consequence of the obliteration of the posterior part of the arch communicating with the descending aorta. 4. Two branchial arches also remain entire in the saurian and chelonian reptiles; but in these, as well as in all the other animals in which the ventricular part of the heart is more or less divided in the progress of development, the pulmonary arteries—formed, as in batrachia, by the posterior branchial arch—are separated from the aorta and its branches; each of these sets of vessels communicating directly with its proper ventricular cavity. 5. In birds, the second pair of arches, and the fifth arch of the right side, are wholly obliterated without giving rise to any branches. The first and third form the arteriæ innominatæ, or carotid and subclavian arteries on both sides, the communicating branches between these arches and the roots of the aorta being obliterated at an early period. The fourth arch on the right side alone remains entirely pervious during the whole of life, and forms the proper trunk of the aorta from which the innominatæ spring. The fourth arch on the left, and the fifth on the right side, united in a common root, give rise to the pulmonary arteries. These arches remain pervious till birth, forming the ductus Botalli, or arterial ducts, leading from the right ventricle into the aorta. 6. In mammalia, nearly the same changes take place in the transformation of the anterior arches; but the aorta is formed in them by the fourth arch on the *left* side, this vessel descending on the left side of the œsophagus. The fourth arch on the right, and fifth on the left side, appear to give rise to the pulmonary arteries. In the mammalia, the ductus Botalli is formed, not as in birds or lizards, by the permanence of the posterior part of the pulmonary arches; but by a communication which remains in the bulb of the aorta, between the roots of the pulmonic and systemic trunks.* Thus it is explained how the aorta of birds corresponds with the right root of this vessel in lizards, and that of mammalia with the left; the arteria innominata of the left side being first given off in birds, while, in mammalia, that on the right springs first from the aorta.

"From these observations, it appears that it is erroneous to compare the single heart of fishes, or batrachia, with the right side, or pulmonary cavities of the heart of higher animals. They are similar, it is true, in this respect, that they both propel the blood into a respiratory organ; but the relation of the gills differs widely from that of the lungs to the heart; and it would be more correct to compare the single heart of fishes with the whole heart of the higher animals though divided, or with this organ in the early stages of their fœtal development."—*Edinburgh New Philosophical Journal. April,* 1831.

Explanation of the Figures.

Fig. 1.—The organs of circulation of the larva of the aquatic salamander, magnified. From Rusconi.—*a,* The heart; *b,* the trunk which arises from the base of the heart; *c,* dilatation of this trunk in the form of a bulb; *d d d d,* the four arches of the right side, three of which go to the gills, and one opens into the artery which goes to the lung; *h h h,* the three branchial arteries; *e e e,* communicating vessels between the branchial arteries and veins; *i,* union of the two internal branchial arteries into a single common vessel; *l,* pulmonary artery; *m,* vessel communicating between the common carotid *n,* and that which is formed by the union of the two internal branchial arteries; *q,* continuation of the common vessel, and its union with its fellow of the other side, from whence the aorta arises; *r,* aorta; *x,* auricle; *z,* venous sinus.

Fig. 2.—Diagram, from Burdach, *reversed,* shewing the branchial divisions of the aorta of the chick on the lower side of the pharynx, and the mode of their transformation into the aortic and pulmonary vessels.—*a a,* The carotid arteries; *b b,* communicating vessels of the branchial arches, which are obliterated; *c,* the right root of the descending aorta; *c′,* the left, obliterated; *d d,* the pulmonary arches, or arteries; *e,* ductus arteriosus; 1, 2, 3, 4, 5, branchial arches.

Fig. 3.—Diagram of the branchial arches of mammalia, and their transformations, corresponding with that of birds, by Burdach. From Dr A.

* There is an approach to this form in the structure of the vessels rising from the heart in some of the saurian reptiles.

[It has, in opposition to this view, been ingeniously suggested by our friend Mr Paget, whose attention has been directed to this subject, in connection with inquiries into malformations of the heart, that the *ductus Botalli,* or *arteriosus,* in the mammalia, is formed precisely as in birds and reptiles, viz. out of the posterior branchial arch, but on the left side; and we understand, that this, which was also the opinion of Baer, has since been verified by Dr Thomson. We are, however, at a loss to understand what is represented by the "communication," which was observed by Dr Thomson to remain "in the bulb of the aorta, between the roots of the pulmonic and systemic trunks," and at first supposed by him to be the *ductus Botalli,*—unless it be explained by the following passage, from a previous part of the memoir:—In the fœtus of mammalia, after the division of the aortic bulb into the systemic and pulmonic arteries, the "*ductus arteriosus* remains, for some time, short and wide, and has the appearance of being an opening of communication between, or a deficiency in, the parietes of the juxta-posed tubes, (the aortic and pulmonary roots;) it afterwards becomes lengthened out and narrowed, and appears, during a short period, to pass from the aorta to the pulmonary root and aorta continuous with it; but, about the tenth week, in the human embryo, this part is dilated, and forms a more direct communication between the ascending and descending aorta, and the *ductus Botalli* is now formed by another part, viz. the end of the pulmonary root, leading into the arch of the aorta." There is, however, considerable ambiguity in the description.—Ed.]

Thomson.—The fifth branchial arch on the left side forms the *Ductus Botalli.* The communication *a* is referred to in the note, p. 237, *supra.*

Arvicola amphibius, (the Water Rat.)—The black variety of the water rat seems to frequent certain parts of Aberdeenshire. We have recently been favoured, by Sir George Mackenzie of Coul, Bart., with a specimen for dissection, which, as far as we could judge from its appearance when removed from the spirits in which it was preserved, must be referred to this variety. But we should wish to examine a more recent subject before giving a decided opinion as to the differences which it may present, and should be glad to receive specimens from any of our friends. This individual "was turned up by a plough in a field; in its nest was a quantity of the roots of the knot grass, (*Polygonum aviculare.*)"

We believe our friend Mr Macgillivray has a description of this variety in the forthcoming volume of the *Wernerian Memoirs,* in which he has been able to establish some fundamental characters distinguishing it from the common water rat.—Ed.

Mergus cucullatus, Hooded Merganser.—I have great pleasure in adding this beautiful species of *Mergus* to the list of British birds, upon the authority of a specimen killed near Yarmouth, in Norfolk, in the winter of 1829. The skin of this bird was lately sent to me by Mr Elton, of Redland, near Bristol, to whom it was presented by a friend, who purchased it as a rare variety, in a fresh state, from the person who actually shot it. From the state of its plumage, it appears to be a young female, the crest not being so full or large, and the white upon the secondary quills less extended than in the skin of an old female, lent to me by Sir William Jardine for comparison. At first I was much in doubt as to the species, the description of the female in Wilson's *American Ornithology,* and in other works, being very deficient in accuracy and detail; and until I received the American skin from Jardine Hall, I was almost inclined to consider it a new species, or one very nearly allied to the *Mergus fuscus* of Latham's *Index. Ornith.,* Pennant's brown merganser, which, indeed, I suspect to be the young male of *Mergus Cucullatus.*

This is the first recorded instance that I can find of its capture, not only in Britain, but in Europe, as it is not mentioned by Temminck, or other continental authors. The following is a correct description:—Length about 18 inches. Bill, 1½ inch, rather slender, and not nearly so thick or high at the base as in the smew; the serratures broad and flat; colour, reddish brown at the base, the tip, black; the nail, hooked and prominent. The chin is grayish white, speckled with grayish brown; and the whole of the face, cheeks, and neck, of an uniform grayish brown, or mouse colour; crown of head, darker; occipital crest, large and semicircular, composed of long lax feathers of a pale reddish brown colour, tinged with gray; the breast is gray; the margins of the feathers paler; the upper back and wing-coverts, grayish black; the feathers margined with obscure grayish brown; the scapulars and lower back are black; the margins of four or five of the secondary quills are white, and form a small spot in the middle of the wings; the quills and tail are grayish black; the lower part of the breast, the belly, and abdomen, pure white, with a silken lustre; the sides and flanks, deep grayish brown; the legs, reddish brown; the tarsus measures 1 inch in length.—*P. J. Selby.*—Twizel House, March 14, 1831.

Chenalopex Egyptiaca, (Anas Egyptiaca, Linn.)—*Egyptian Goose or Spurwing.*—About a week ago a beautiful female of this species, which had been shot upon the Tweed, near Berwick, a day or two previously, was sent to me in a fresh state. Although this is the fifth specimen killed apparently in a wild state, in this district, within the last fifteen months, I still feel very diffident as to its claim to rank as a British bird in the list of rare and occasional visitants, being one of those species very generally kept in ponds and artificial pieces of water, and, unless pinioned, very apt to fly and roam abroad. These birds, I know, are kept in considerable numbers at Gosforth, the seat of the Earl of Wemyss, no very great distance from Berwick, where they annually breed, and, as I am informed, are never pinioned, or have their wings cut, but are in the constant habit of flying about the park; I therefore feel strongly inclined to suspect, that the five individuals which appeared upon the Fern Islands in Feb. 1830, four of which were killed by the keeper of the lighthouse, and the late one from the Tweed, were birds which had escaped, or quitted this state of semi-domestication; and this supposition is farther strengthened by the tameness they exhibited, allowing, without difficulty, of a near approach.—*P. J. Selby.*

Additions to the Catalogue of British Birds. By William Yarrell, Esq.

1. *Falco rufipes,* (Bechstein.)—Ingrian falcon of Latham, *Syn.* vol. i, p. 102; orange-legged hobby, Lath. *Syn. Sup.* vol. ii, p. 46; faucon à pieds rouges, Temm. *Man.* vol. i, p. 38.

Three examples of this small falcon were observed together at Horning in Norfolk, in the month of May, 1830, and, fortunately, all three were obtained. On examination, they proved to be an adult male and female, and a young male in immature plumage. A fourth specimen, a female, has also been shot in Holkham Park; and others will probably be found in preserved collections, on close examination, as some little difficulty occurs in detecting them, from their resemblance to other British species. The old male is somewhat like our hobby, but smaller; and the female resembles the merlin. A figure of the male, in the *Planches enluminées* of Buffon, No. 431, is called "variété singulière du hobreau." A living female is now in the garden of the Zoological Society in the Regent's Park, which was brought from the European continent during the last summer; and I possess a male and female preserved, which were given me by my friend Mr John Morgan. These last were brought from Russia, where they are said to be plentiful.

2. *Alauda alpestris,* (Linn.)—Shore lark of Pennant's *Arctic Zoology,* vol. ii, p. 392, and of Lath. *Syn.* vol. iv, p. 585; alouette à hausse-col noir, Tem. *Man. d'Orn.* vol. i, p. 279; Wilson's *Birds of the United States,* vol. i, p. 85, plate 5, fig. 4.

A specimen of this lark was killed on the beach near Sherringham, in March last, which passed into the hands of Mr Sims of Norwich, by whom it was preserved; and it is now in the collection of Edward Lombe, Esq. of Great Melton, who also possesses one of the males of *Falco rufipes,* before mentioned. The north of Europe and Asia is frequented by this lark; and Wilson gives a characteristic description and representation of it among his *Birds of the United States,* vol. i, p. 85, plate 5, fig. iv.

3. *Western Duck, (Anas Stelleri* of Pallas.)—Anas occidua of the *Naturalist's Miscellany,* No. 34; western duck of Pennant's *Arctic Zoology,* vol. ii, p. 497, plate 23; *id.* Lath. *Syn.* vol. vi, p. 532; *id.* Lath. *Supp.* vol. i, p. 275; anas dispar, Lath. *Ind. Orn.* vol. ii, p. 866, sp. 83.

A male of this beautiful species was shot by a collector near Yarmouth, and is now in the possession of a gentleman at Acle. This bird has been found on the western coast of America; it is also an inhabitant of Kamtschatka, where it breeds among rocks. It is said to fly in flocks, confining itself to the sea-coast, and near the mouths of large rivers. M. Temminck has not included this species in his manual of the birds of Europe.

4. *Sterna Caspia* of Pallas.—*Id.* Lath. *Ind. Orn.* vol. ii, p. 803, sp. 1; Caspian tern of Pennant's *Arct. Zool.* vol. ii, p. 526; *id.* Lath. *Syn.* vol. vi, p. 350; hirondelle-de-mer tschegrava, Tem. *Man. d'Orn.* vol. ii, p. 733.

Two examples of this tern, the largest of the European species, have been killed at Yarmouth; one of them is in the collection of a gentleman residing in Norwich; the second I have not been able to trace. Excellent figures of this bird in its summer plumage occur in the works of Meyer and Stor, and a representation of the egg is given by Dr Schintz, plate 13, fig. 6.

Descriptions of the plumage of these four birds will be found in the different works to which I have referred; and repetition is therefore avoided here as unnecessary.—*Loudon's Mag. of Nat. Hist.* March, 1831.

A new Species of Marten.—The following is a description of a short-tailed marten, which I believe has not before been noticed in any zoological work:—Marten, *Apus.* Length, $4\frac{3}{4}$ inches; breadth, 14 inches; bill, dusky; iris, dark brown; chin, white; forehead and fore part of the eye-brow, light brown mixed with white; rump, and corresponding parts of the sides, white; all the rest of the plumage blackish mouse colour, with an obscure greenish gloss; the primary and secondary quills, except the three outer, having narrow light tips; the wing curves considerably, and measures $5\frac{1}{4}$ inches from the bend to the tip, reaching 1 inch beyond the tail, which is even when expanded, and very short, being scarcely more than half an inch in length; feet, black; tarsi, short and feathered; fore toes directed forward; claws, black, strong, and much hooked; the feathers of the spurious wing are remarkably large, the outer one being more than $1\frac{1}{4}$ inches in length; the under tail-coverts are of a bluish mouse colour. This marten is a common bird in Southern India, and does not at all differ in its habits from the black marten or swift of Europe. It is not described in Griffith's *Animal Kingdom*; and has not the forked tail which is assigned to the family by Cuvier's remark in the text, that "the martens (*Apus*) have the tail forked," and that of the writer in the Supplement, who says the same thing. —*Correspondent in Mag. of Nat. Hist.* March, 1831.

Clupea Leachii, *a new Species of Herring.*—At a recent meeting of the Zoological Society, several specimens were laid on the table of a *Clupea*, taken in the mouth of the Thames, which Mr Yarrell regarded as distinct from the common herring of our coasts, the *Clupea Harengus*, Linn. Mr Yarrell has dedicated this species to Dr Leach, who, he had understood, has often stated that the British coast possesses a second species of herring. The *Clupea Leachii* is much deeper in proportion than the common herring; an adult fish, 8 inches long, being $1\frac{7}{8}$ inch deep, while a common herring of the same depth measures $10\frac{1}{2}$ inches in length. The dorsal and abdominal lines of the new species are much more convex: the latter is keeled, but has no serration. The under jaw has three or four prominent teeth placed just within the angle formed by the symphysis; the upper maxillæ have their edges slightly crenated. The eye is large. The scales are smaller than in the other species, and there is no distinct lateral line. The back and sides are deep blue, with green reflections, passing into silvery white beneath. The dorsal fin is placed behind the centre of gravity; but not so far behind it as in the common herring. The number of the fin-rays, and of the vertebræ, differs in the two species as follows:—

	D.	P.	V.	A.	C.	Vertebræ.
Clupea Harengus -	17	14	9	14	20	56
Clupea Leachii -	18	17	9	16	20	54

The new species differs also from the common herring in flavour, being much more mild. It is at this season (beginning of February) full of roe, while the adult common herrings ceased spawning in November, and having retired subsequently to the deep waters, are not at present to be met with on the southern coast.

Mr Yarrell is of opinion, that a third species of herring, of a larger size than either of the others, occurs sometimes on our eastern coast.

He also mentioned to the meeting, that he had obtained last summer from the Thames, the two *shads,* regarded by M. Cuvier as the *Clupea Alosa,* Linn., and the *Clupea fallax,* Lacép.

Notice regarding the Salamandra atra. By Mr Stark.—The two specimens of this reptile presented to the Royal Society of Edinburgh by George Fairholme, Esq. "were found very high on the Alps, in the canton of Berne. They are perfectly black, frequent dry grounds, and have a slow crawling motion. I have not, (says Mr Fairholme, in a note which accompanied the specimens,) seen this kind in any museum, even at Berne; and it is not much known, probably from its only appearing a few weeks of the year. The chamois hunters call it *Raggimulli,* and consider it venomous; but it appeared perfectly harmless when alive."

Mr Fairholme is not without reason in supposing that the present species is not much known; for it is not alluded to by Cuvier in the first edition of the *Règne Animal,* probably from that celebrated naturalist never having seen the animal. In the second edition of this work, however, the species is noticed at the close of the description of the *Salamandra terrestris,* on the authority of Laurenti, in these words: "There is found in the Alps a salamander similar to the common one, but entirely black, and without spots. *Sal. atra,* Laurenti, pl. 1, fig. 2."

The other French naturalists who have mentioned the *Salamandra atra,* do not appear to have been able, by the possession of specimens, to identify them with the description and figure of Laurenti. Sonnini and Daudin, long before the publication of the *Règne Animal,* had described the black salamander of the Alps as a separate species; but their statements rested solely on the authority of the original describer. Daudin, in particular, thus speaks of the *Salamandra atra*: "Laurenti has described and figured this salamander, which appears not to differ from the preceding species, (the *Salamandra terrestris,*) but in its colour, which is deep black, without any yellow spot, and in its being one-half smaller. This author informs us, that the Austrians name it *Lattermandl,* and that it is found in holes or clefts in the mountains of Etscher, where the salamander with yellow spots has never been observed. We ought, then, with Laurenti and Sonnini, to regard this salamander as a particular species, and not a simple variety, as Gmelin, Lacepede, Latreille, Schneider, and other learned naturalists have believed."—Daud. *Hist. Rept.* viii. 225.

I have not been able to procure a sight of Laurenti's work containing the description and figure of the *Salamandra atra*; but there can be little doubt, that the specimens which Mr Fairholme presented to the Society, are those of the animal which Laurenti has described. The locality of this species, at a certain elevation, joined to the total want of the coloured spots, and its diminutive size, distinguish the *Salamandra atra* from the common *Sal. terrestris.* The doubts of the French naturalists seem to have arisen from not having seen this apparently rare species.—*Edinburgh Journal of Science. April,* 1831.

Anatomical characters to distinguish venomous from harmless Serpents.—Travellers in Brazil, Africa, and India, relate, that many serpents regarded by naturalists as harmless, because they want fangs in front of the palate, are, nevertheless, reputed to be very noxious by the natives. A point so important to science and humanity requires clearing up. For this purpose, M. Duvernoy has made a great number of researches, not only on the serpents in the Museum of Strasburg, which he had at his command, but also on those of the Museum of Comparative Anatomy of the Garden of Plants of Paris; and he has presented a memoir on this subject to the Academy of Sciences.

From his observations, it appears, that the genera *Dipsas, Homalopsis,* or *Cerberus,* ought to be classed among the venomous serpents, as well as several species of *Colubri* hitherto confounded with the harmless *Colubri,* and of which it is necessary to form a new genus. M. Duvernoy has discovered in these serpents, behind the series of maxillary teeth, another larger tooth, separated from the first by a vacant interval, and hollowed by a more or less marked groove along its convexity. But besides this grooved fang, which is always found behind the series of maxillary teeth, the serpents in question have also a venomous gland, occupying the place of the supra-maxillary salivary gland of harmless serpents, or the venomous gland of common venomous serpents.

In these latter, (*Crotali, Viperæ, &c.*) the venomous gland consists, according to the researches of M. Duvernoy, of a soft and spongy substance, protected by a more or less thick fibrous envelope, and having a single excretory duct, which opens at the base of the fang. This gland is always connected with the anterior temporal muscle, which is detached in great part from the temples to be fixed to its capsule; it has, therefore, the remarkable character of possessing a voluntary muscle for compression. In serpents with posterior fangs, the venomous gland is equally soft, spongy, and not granulated: circumstances which distinguish it from salivary glands, as has been already observed by Schlegel; but it never has that thick and fibrous envelope which every where covers the venomous gland of *Viperæ, Crotali,* and other venomous serpents, properly so called. In serpents with posterior fangs, the anterior temporal muscle is scarcely connected with the gland, which it covers a little in some cases, undoubtedly to compress it also, but under which it descends in other cases, as under the supra-maxillary gland in the harmless *Colubri.*

In serpents with posterior fangs, as in those with anterior ones, the supra-maxillary gland has been interrupted in its development, and is sometimes found reduced to the most rudimentary state. The lachrymal gland is always, in the harmless *Colubri,* of a size equalling at least the ball of the eye; placed chiefly behind the orbit, it appears to have as important a function in the venomous serpents with posterior fangs, as in harmless serpents; whilst, in the common venomous serpents, it is frequently reduced to its small intra-orbitar portion. In this case, the anterior temporal muscle, which no longer compresses it, belongs more exclusively to the venomous gland.

The venomous apparatus of serpents, with posterior fangs, is, therefore, much less perfect, much less fit for attack, for piercing a wound, and distilling venom into it, than that of serpents with anterior fangs. The venomous gland can scarcely be compressed in some species by the anterior temporal muscle; in other species, it is entirely incapable of this action. Besides these imperfections, the generally smaller size of the posterior fangs will easily shew how the latter serpents are much less celebrated than the venomous serpents, properly so called, the more active nature of their venom not compensating for the imperfections of their dental apparatus.—*Bull. des Sci. Nat.* Oct. 1830.

Eggs of the Planaria lactea.—M. Ch. Desmoulins has found, that in the space of twenty-four hours, the egg of the *Planaria lactea,* (which first appears under the form of a milky white mass,) becomes perceptible in the body of the mother, acquires its form and dimensions, becomes yellow, reddens, is laid, and becomes completely black. When, however, the delivery is a little premature and artificial, the egg does not become quite black for several days.

The *Planariæ lacteæ* always fix their eggs to some solid body. Left to themselves, they deposit them in dark places free from currents, in cavities, and even in the mud. These eggs are not supported by a pedicle.

Each individual may lay more than once in the spring, without being fecundated anew after the first laying. The interval which occurs between the two layings is five days, unless the animal has in the interval been provided with abundant nourishment.

The artificial expulsion of the egg is difficult when it is not the time, or near being so; but when it is ripe, or nearly so, it is very easy, and takes place suddenly.

The appearance of the fœtus takes place twenty days after the laying, according to the only strict observation M. Desmoulins was able to make on this subject. The first young planaria which he saw, appeared towards the 15th of March, whence it might be inferred, that the commencement of the general laying took place from the 20th to the 25th of February. It must be remarked, that the winter of 1829 was excessively long and severe. In ordinary weather, the laying may probably commence about the 15th of February, or even sooner.*

The egg contains from ten to fifteen fœtus.—*Actes de la Soc. Linn. de Bordeaux*, iv. 109. June, 1830.

MM. Audouin and Milne Edwards on the Annelides and Mollusca.—These indefatigable naturalists have laid before the *Academy of Sciences* three extended memoirs on the invertebral animals of the coast of France.

The first, which is entitled "A Classification and Description of the *Annelides* of France," forms a manuscript volume of nearly 400 pages, and is accompanied by many plates, some of which are engraved, and ready to appear.

The second treats particularly of the bristles of these animals, considered as organs of defence. Of this memoir we gave an analysis in our last number, p. 176.

The third, which contains the general results of their investigations, exposes, in a summary way, several new facts relative to the anatomy of the crustacea, and the discovery of many new species of annelides and mollusca.

1. *Annelides.* In the part of this memoir devoted to the annelides, the authors have described a new species of *Siphonostoma*, from the coast of France, whose feet are provided with hooked bristles like those of the *Tubicolæ*, a circumstance which supports the opinions previously advanced by these naturalists on the place which this genus ought to occupy in the systems.

The structure and habits of one of the unpublished species of *Clymene*, discovered by them, establish new relations between this genus and *Lumbricus*, in proximity to which they had placed it, whilst M. Savigny included it amongst the *Tubicolæ*.

The habits of the annelides have hitherto been little attended to. MM. Audouin and Milne Edwards have observed many interesting facts on this subject. They have shewn that the *Nephthys*, *Ariciæ*, *Glyceræ*, *Cirratuli*, *Aglauræ*, and several *Eunicæ*, live buried in the mud or sand, like the *Arenicola;* and they have described the mode in which these animals form their subterranean habitations. They have explained how certain *Sabellæ* change their place by means of the long tentacula which surround the

* We have within these few days met with a great number of the ova of the *Planaria lactea*, in various states of perfection, at the bottom of the Glasgow Canal, which was in part laid dry during repairs. The eggs were attached to the under surface of stones, and were also to be seen in several instances passing out from the body of the mother. We hope shortly to be able, in conjunction with our coadjutor, Dr Scouler, Professor of Natural History in the Andersonian University, to lay before our readers the results of our observations on the development of these animals from the egg.—Ed.

mouth, a singular phenomenon which had also been observed by M. Cuvier;* and they have assured themselves of the injurious influence which another animal of the same order, the *Hermella,* exercises over the oysters of Cancale, where they have already destroyed one of the richest beds.

2. *Mollusca.* The authors treat also of the habits of different mollusca of the French coast, and they have had opportunities of observing many animals of this class, either imperfectly known or entirely new. Amongst the former may be cited *Calyptræa, Phasianella, Pleurobranchus, Onchidium,* and *Dentalium;* and of the latter, *Actæon, Dorimorphus, Tectura,* and *Cribella.* According to the observations of these naturalists, the *Aplysia viridis* of Montagu, of which Ocken has formed the genus *Actæon,* is remarkable in having the general form of the *Aplysiæ,* whilst it is, at the same time, distinguished from them by one of the most important characters of its organization; it does not possess true branchiæ, the common integuments appearing to be the only respiratory organ. The genus *Cribella* of MM. Audouin and Milne Edwards, is also very remarkable; for, although the gasteropodous molluscum, which bears this name, has the form of the *Pleurobranchus,* and also resembles this genus in having, on the right and left, a groove which separates the foot from the mantle, it does not possess any trace of branchiæ in this hollow; respiration seems to be performed by the skin of the mantle, which is wrinkled on each side, and perforated by an infinite number of pores. The *Dorimorphus* of these authors is less removed from the types already known, and occupies the middle, so to speak, between the *Doris* and the *Pleurobranchus.* Lastly, their genus *Tectura* is interesting, from affording a proof, more indisputable, perhaps, than any other, that the study of shells, separated from that of the animals which construct them, may lead to most erroneous classification. In fact, this genus has been established to receive a little red limpet of our coasts, (*Patella parva?*) the animal of which, instead of resembling that of our common limpet, has, like the *Pileopsis,* an anterior cavity containing a branchia; and, what makes it still more remarkable, is, that the form of the shell is exactly similar to that of the *Patella;* there is neither depression nor groove which can, as in the *Siphonaria,* afford a distinctive character.—*Cuvier, Rapport.*

Distribution of the Invertebral Animals of the French coast.†—In considering the topographical distribution of the invertebral animals of the coast of France, MM. Audouin and Milne Edwards distinguish four principal zones or regions, comprized between the limits of the highest and lowest water,—regions which are in general very distinctly marked, and which are characterized by the species whose habitation is fixed within them.

In the highest of these zones, which is always dry during common tides, the *Balani* are found attached to the rocks; few or no marine animals frequent this region.

The second zone commences a little below the level of the sea during dead water. Where rocks occur, they are usually found covered with seaweed, and form the seat of the *Turbo, Patella, Purpura, Natica,* the red *Actinia,* &c.; on the fine sandy beach, we may hope to meet with the

* In the *Terebella conchilega,* belonging to a neighbouring genus, these tentacula are employed in the construction of the tube, which is composed of grains of sand, glued together round a mucous sheath. We have frequently observed the mode of formation, which is thus effected: Single grains of sand are taken up by the points of the long extensible tentacula, which are then folded back upon the body to deposit their load, in apposition with the part of the tube, which is already formed. They are not, however, at once placed in close contact with the perfected part of the tube, but arranged around detached centres, on the surface of the body, (like the development of bone from points of ossification,) and then pushed backwards, by withdrawing the body within the tube and hooking the tentacula over the margin. At intervals, the animal moves up and down the inside of the tube, apparently to deposit the mucus exuded from the surface of the body, and so to increase the density of the lining membrane of the tube.—Ed.

† Upon the whole, this distribution will be found equally applicable to our coast; but it must be taken in a general point of view.—Ed.

Talitrus or the *Orchestes*, as well as the *Terebella* and *Arenicola*; and in muddy places, the *Nephthys*, or little *Sipunculi*.

The third zone is principally characterized by the presence of corallines, and is only bare at very low tides. The animals which inhabit it differ according to the nature of the locality; on the rocks not overturned, but beaten by the waves, we often see mussels, limpets, &c.; in the most sheltered places the green *Actiniæ* and compound *Ascidiæ* fix themselves; where many large stones occur loose in the soil, we find, on turning them over, the *Porcellana, Doris, Pleurobranchus, Haliotis*, simple and compound *Ascidiæ, Polynoes, Serpulæ, Planariæ*, &c.; and when the rocks are irregularly lying upon each other, their interstices are often clothed with sponges, *Tethiæ, Lobulariæ*, and *Ascidiæ*. The portions of this region, which are not rocky, are also frequented by a great number of animals, which are never found at higher levels. If the sand be covered with *Zostera marina*, we are almost sure to find in the pools left during ebb tide, millions of little *Cerithia*, and many *Rissoæ*; and, lastly, in places where the sand is not mixed much with mud, we often find, some inches below the surface, the *Cardium, Venus*, and *Solen*, as well as the *Terebella* and other *Annelides*.

In the fourth zone, which is only uncovered at the lowest tides, the rocks are covered with *Laminariæ*, and different large marine plants, amongst which are found beautiful limpets, (*Patella pellucida*, Lam.) *Asterias, Actiniæ*, and many animals which are also found in the preceding zone. In this region alone, MM. Audouin and Milne Edwards found the *Callianassa, Axius*, and *Thia*, which lie buried in the fine, clear sand.

Lastly, at a still lower level, that is to say, where the sea never retires, the region commences, which is inhabited by the *Ostrea, Calyptræa, Pecten, Aphrodita*, certain *Portuni*, the *Maia*, the large species of *Asterias*, &c.—*Ibid.*

Ciliary or Vascular Motions in the Arenicola Piscatorum, (Lumbricus Marinus, Lin.)—Our readers will recollect to have read with interest, in a former Number of this Journal, (Vol. II. p. 334,) a paper by Dr Sharpey on the mechanism by which respiratory currents are produced in certain aquatic animals. These currents were shewn to take place along surfaces which are beset with innumerable vibratile ciliæ, in constant motion; and were noticed as occurring, amongst the *Invertebrata*, in the common mussel, the fresh water mussel, the oyster, and another species of bivalve unnamed; the *Doris* and *Eolis* of the *Nudibranchiata*; the *Buccinum undatum*, and other species of the *Pectinibranchiata*; and the *Patella* and *Oscabrion*, (*Chiton*, Lin.) which form the two genera of the *Cyclobranchiata*; in the *Actinia* of the *Radiata*; and the *Amphitrite* of the *Annelides*.

During an anatomical examination of the sand-worm (*Arenicola piscatorum*) belonging to the family *Dorsaliæ*, (with dorsal branchiæ,) we have detected an apparently analogous motion to that of the respiratory currents of Dr Sharpey, in connection with those internal organs supposed by Sir E. Home to be *livers*. The branchiæ in this animal are remarkably well developed, and composed of thirteen expansible tufts, placed along each side of the back; but we have not been so fortunate as to observe any ciliary or other motions along the surface of these organs,—which would indeed seem to be rendered superfluous, by the great facility of motion with which they are, as a whole, endowed.*

* This remark may be also applied to other species of *Annelides* which have fallen under our examination, and particularly to the *Amphitrite ventilabrum* and *Terebella conchilega* of the second division of *Amphitritææ*, with terminal fan shaped, or ramose branchiæ placed at the anterior extremity of the body,—a disposition which has been usually held to be common to the *Amphitritææ*, and which is apparently rendered necessary by their inhabiting tubes imperforate at the sides. Dr Sharpey, however, states, that the annelide he examined, and which he informs us was the *Amphitrite a ruche* of Cuvier, (*Sabellaria alveolata*, Lam. of the first division of *Amphitritææ*,) had *dorsal* branchiæ; in which case the description of both Cuvier and Lamarck will require re-examination. The *Sabellaria*

It is not our intention now to enter into a particular description of the organs in the *Arenicola,* to which we have alluded. Suffice it to say, as our object is merely to direct attention to the fact at this season of the year so favourable for investigations of this nature, that, attached to the concave surface of the sacs, or *livers* of Home, which are disposed on each side of the anterior third of the body, (see Home, *Comp. Anat.* vol. iv, tab. xl,) is a vascular membrane, around the fimbriated margins, and over the surface of which, rapid motions are seen to be produced by vibrating *ciliæ,* (if that term be applicable to certain peculiarities observable in the structure of these organs.) The communication of the vessels is easily traced to the principal vascular trunks.

These motions appear to us to be entirely unconnected with the respiratory process; but we must reserve to ourselves the development of our views till a more convenient occasion. * If it should, however, be supposed that these sacs may possibly be a second system of branchiæ, analogous to the respiratory vesicles of the leech, we would remark, that the ciliary motions in the interior of the animal can have no influence in moving water contained within the sacs; and we may farther mention, that, although there is a peculiar canal stretching along the surfaces of each articular segment leading from the middle line to an external orifice, (but apparently not opening internally,) we could observe no aperture leading to the sacs.

We may here mention, that in the terminal extremities of the cœca of the sea-mouse, (*Halithæa aculeata,*) contained within sacs under the dorsal plates, we have also seen similar motions, though very faint in degree; and Dr Sharpey informs us that he also has observed them. It is the opinion of Carus and Treviranus, that the intestinal canal here takes on the function of respiration; in which case these may be considered as true respiratory motions; but there are difficulties with respect to that opinion. The motions, however, in the *Halithæa* are not to be confounded with those above noticed in the *Arenicola.* We shall return to this subject.—Ed.

Anatomical Observations on the Cyclades; by L. L. Jacobson.—Wishing to determine if the young of the bivalves, from the commencement of their development, resemble their mothers, or if they undergo any metamorphosis, M. Jacobson has conducted a series of observations upon the *Ostrea, Mytilus, Cardium,* and *Mya,* but without success. He has, however, been more fortunate in examining a little fresh water species, the *Cyclas cornea,* which is frequently found in the canals of Denmark. The animal is small in proportion to the shell; on opening which, however, he discovered the foot placed in the middle, the organs of respiration, and the cellular tissue contained between the pellicles which attach the animal to the shell. The foot, as is well known, is the organ which serves for locomotion; this species can elongate it more than any other animals; strong ligaments attach it to the belly. In the belly the apparatus of digestion is immediately perceptible. The mouth is round, and surrounded by four tentacula, which are of a triangular and pointed form; the stomach is encircled by the liver; the intestinal canal descends directly towards the ovary, reascends towards the back, forms an angle there, and redescends towards the heart to terminate at the anus. The lower part of this canal is frequently filled with a mass of a deep greenish colour.

differs from the true *Amphitrite,* in having what were supposed to be the branchiæ much shorter, and never advanced, whilst the latter has them of very large size, and susceptible of considerable motion.

* Dr Sharpey is of opinion, that "in the bivalve mollusca, the property of exciting motions in the water may serve other important purposes besides respiration, and it is probably in this way," he remarks, "that their nutriment is carried to the mouth, and that the ova are excreted, or conveyed from one part of the body to another." We conceive that, in the case above alluded to, these motions will be found to serve very different and far higher functions than those here mentioned.

The liver is large in the *Cyclades*. The organs of touch consist of the tentacula already mentioned, and of the sensitive filaments which encircle the tracheæ. As to the nervous system, M. Jacobson easily distinguished the first pair of nervous bundles situated behind the tentacula, and two nervous fasciculi, which are prolonged on the sides of the belly. With regard to the parts belonging to the organs of circulation, he could only make out with certainty the form of the heart. The organs of respiration in the *Cyclades* present several peculiarities. All the testacea have two pairs of gills, which are commonly of the same size. In the *Cyclades*, however, M. Jacobson was struck, on opening them, by seeing that the external pair is twice as long and broad as the internal pair; but this is only because the skin which attaches the pair to the belly of the animal is much advanced. The intestinal canal runs along the upper margin of the gills; it is more distinct in the external than the internal; the lower or convex margins of the two pairs are scattered over with small points.

With respect to the organs of generation, M. Jacobson could find only the ovaria. They are situated on the two sides of the belly, and bounded by the liver and the convolutions of the intestinal canal. Each ovary is composed of a quantity of small sacs or cylindrical capsules, attached by their pointed extremity to a strong pellicle in the interior of the ovary. They touch by the other end the wall of the gills without being attached to them. It is in these sacs or capsules that the fœtus are formed. They grow there, and, when come to maturity, rupture the sacs, and are let out by a lateral opening, having the form of a crescent. The *Cyclades* bring forth young during all the summer. We therefore find in the gills, young already formed, and capsules which contain the growing fœtus. The largest young found in the gills are about one-fourth of a line in diameter. They are of a white colour, and of a round and flattened form, and the foot protrudes between the shells. They perfectly resemble the mother, except that they are flat. They grow rapidly; the shell assumes a yellow tint, and the foot is gradually drawn in. When they are half a line in diameter, they can close their shells perfectly, which at length assume a more convex form. When the little ones have attained the size of a lentil, or one line and a half in diameter, they quit the mother. Thus a quantity of these little ones is found at the bottom of ditches.

The author, at the end of his memoir, sums up his observations, reducing them to four results, as follow:—1. Among the acephalous mollusca there are some which produce their young alive: the *Cyclades* are of this number. 2. The young of these animals resemble their mothers from the first, and consequently undergo no metamorphosis: their belly is not slit or open: their foot is only large in proportion to the shell. 3. They grow very rapidly. 4. Their shell contains but little calcareous matter.—*Bull. des Sci. Nat.* Oct. 1830.

Polyzoa, a new animal discovered as an inhabitant of some Zoophytes.—In the last number of the *Zoological Researches*, Mr Thompson describes, under the name *Polyzoa*, the animals of *Sertularia imbricata* of Adams? *S. cuscuta*, *S. spinosa*, and *S. pustulosa*. He finds the inhabitants of these zoophytes to be totally different from those of the *Campanulariæ*, *Plumulariæ*, and the genuine *Sertulariæ* of Lamarck, "which are undoubted *Hydræ*;" and of this new form of animal, he remarks, that "while it must be allowed to belong to a new type of the *Mollusca acephala*, it resembles exteriorly in some measure the *Hydra*." For want of space, however, we must delay farther notice of Mr Thompson's discovery until our next number.

BOTANICAL COLLECTIONS,

INCLUDING VEGETABLE PHYSIOLOGY.

Botany of the Island of Juan Fernandez. (Extract from a letter from Dr Bertero.)

[We place this interesting letter amongst our Collections, though extending to a greater length than our usual notices, as it may be considered in the light of a series of remarks on particular species. It will be found much increased in value by the notes of Mr Walker Arnott.—Ed.]

The flora of this spot in the Pacific Ocean is not rich in species, but its size is small, the whole island not being more than 40 miles in circumference, after taking into consideration its principal bays. The country is hilly, and consists, for the most part, of inaccessible peaks. The principal, and, perhaps, only kind of rock, is basalt, in which olivine is occasionally found: crystals of carbonate of lime are not common; but, nevertheless, occur in it. Ochre is very abundant, and of different shades; a deeply coloured variety, called by the natives *colo,* is deserving of being made an article of commerce. There is no volcano: the stones that have been taken for lava, and which much resemble scoria, or even pumice, appear to be only decomposed basalt. This rock is also found in the globular form, arranged in concentric layers. No mines are known; the only metal in this island being iron, in a state of oxidation.

Water is abundant, and of excellent quality. It often rains, even during summer. The prevailing winds are westerly, varying more or less to the north or south, almost never from the easterly point of the compass. The country is well wooded, but there is no great variety of timber. The canelo, (*Drymis chilensis,*) mayu,* (*Xanthoxylon mayu,* Bert.) and the luma,† or temu,‡ (*Myrtus?*) are the most common; some of these grow to a large size.

Although in the same latitude as Valparaiso, this island presents a considerably different vegetation, approaching perhaps nearer to that of Chiloe. Some plants of California, and others of New Zealand, are, however, to be met with; *Tetragonia expansa,* the *Xanthoxylum,* three *Peperomias,* and three species of arborescent ferns, are examples. Twelve or fifteen species of ferns occupy the greater part of the soil; the rest is either wooded, or perfectly destitute of plants. A palm, known in the country by the name of *Chonta,*§ is found on the acclivities of the more elevated mountains: although I have not seen the flower in a perfect state, I think it must form a new genus.

The *Resina,* esteemed in Chili, on account of its supposed medical virtues, is a green resin, produced by a small tree, which I believe to be a *Senecio.*‖ It exudes from the branches and from the trunk, and, by the action of the air, becomes solid and brittle; when thrown on the fire, it gives out a smell analogous to that of frankincense. Two kinds are distinguished—the *Resina macho,* and the *Resina hembra.* The last gives out the least, and it never acquires the consistence of that of the first. *Resina* is the product of

* Molina calls this, in his account of the island of Juan Fernandez, "yellow wood, or *Fagus lutea:*") It is not the mayu of Chili. (W. A.)

† *Myrtus Luma,* Mol., *M. multiflora,* Juss. De C. Prod. iii. p. 240. (W. A.)

‡ *Temus moschata,* Mol. De C. Prod. i. p. 77. Perhaps Molina's plant is not the real temu, or the description is bad, as most modern botanists assert it to be a *Myrtus.* (W. A.)

§ The chonta of Peru is *Martinezia ciliata,* R. P. *Bactris ciliata* Mart. (W. A.)

‖ *Helianthus thurifer,* Mol. *H. glutinosus,* Hook. and Arn. (W. A.)

the *macho;* and *inciensa,* of the *hembra.* Perhaps two species may be confounded; for the leaves of the last are narrower, the flower with a yellow disk and deep red ray, and cymose, while those of the first are corymbose, and entirely yellow. Another shrub of the same kind, called *Resinilla,** is a new species: this does not yield any resin. A tree of considerable elevation, and of the tribe of the *Eupatorineæ,* appears to me quite unknown; it produces a gum-resin of the same smell as incense. The *Myrtus ugni* of Molina is found on the high mountains. The *Hippotis triflora* of Ruiz and Pavon is very common; it is a shrub of moderate size. The tree which is called *Peralilla,* belongs to the same genus, and is even, perhaps, only a variety; but its trunk is four times as large; the leaves, of the size of those of the pear-tree, undulated on their margin; and with a fruit perfectly turbinate: I have not seen the flower. What is named in the country *Manzano,* is an arborescent species of *Urtica,* from ten to twenty feet high. I have found a *Plantago* allied to *P. princeps* of Chamisso, but probably distinct. The *Arrayan*† *macho,* or *espinillo,* is a middle-sized tree, with a fleshy fruit of the family of *Bignoniaceæ;* at first I took it for a *Xanthium,* but I afterwards recognized it to belong to a genus that I had found in Chili, and named *Poeppigia.* The *Sophora macrocarpa,* Sm. (*Guyacan,*) differs from the *Mayu*‡ of Chili in the shape of the leaves; its stem is, besides, of a considerable size, while that of the last is a shrub. I have given the name of *Colletia spartioides* to an arborescent *Colletia,* with flowers of a white colour, tinged with red, and small and very numerous leaves. The *Lobelia tupa* is very common; its root is perennial, but the stems die down to the ground every year, after having produced its very large flowers of a brilliant scarlet. Another herbaceous species, which grows always in the clefts of the rocks near the sea, is, in my opinion, new. The *Malva umbellata,* and a shrubby *atriflex,* which I did not see in flower, are only found in Goats Island. A *Tillandsia,* or a nearly allied genus, is found on the highest mountains; and a *Bromelia,* near to *discolor,* is very common on the more elevated and arid rocks. The *Azara serrata* is frequent in the woods.

A genus which I think new, and which I have dedicated to M. Lesson, belongs to the family of *Umbelliferæ,* near to *Astrantia* or *Sanicula.* It is a small tree, from 8 to 10 feet high. A *Berberis,* which I believe to be the *glauca,* Forst, § is known in the country by the name of *michay;* its wood affords a beautiful yellow dye. The *Arundo quila,* ‖ Molina? is pretty common. The stem of *Gunnera scabra,* Gært., grows here to the height of ten feet; its leaves vary much; I have seen them peltate, very smooth, free from wrinkles, and even shining. This plant, which is called *pangue,* being good for tanning, might be made an object of speculation; for the margins of the rivulets, and the mountain valleys, are covered with it. An *Arbutus,* which I have called *rigida,* and which is known in the island by the name of *murtilla,* has an elegant appearance. I have also gathered in this island an *Escallonia,* with red flowers, and a tree which has no vernacular name, and which I could not determine; two species of *Campanula,* of which one is the *C. gracilis,*¶ Forst; the other, very distinct, appears new; an arborescent *Lomaria,* three or four feet high, besides three or four herbaceous species; an arborescent *Davallia,* probably new, and a *Cyathea,* or an allied genus, which I could not determine; a genus allied to *Lycopodium,* and which appears

* Probably a *Baccharis,* of which several yield a similar resin. (W. A.)

† The arrayan from Peru is a species of myrtle. (W. A.)

‡ Mayo, or "Pseudo-acacia, foliis mucronatis, flore luteo, Mayu" of Molina, is the *S. macrocarpa* of Smith, and Chili is the only station given by its describer. Perhaps Bertero means to say that the guyacan is a distinct species. The guyacan, or huyacan, of Chili, is *Porlieria hygrometrica.* (W. A.)

§ Perhaps *B. ilicifolia,* Forst: there is no *B. glauca,* Forst. (W. A.)

‖ The *Arundo Quila,* Mol. appears to be a bamboo, but not an arundo. Bertero's plant may be distinct. (W. A.)

¶ More likely to be *C. chilensis,* Mol. or *Wahlenbergia cinarioides,* A. De C. The other new species is undoubtedly *Wahlenbergia Fernandeziana,* A. De C. (W. A.)

quite distinct; several species of *Polypodium*, among which are the *californicum*, the *pruinatum*, and the *spectabile*; a pretty *Aspidium*; the *Nothochlæna nivea*, Desv., and three species of *Asplenium*, viz. the *magellanicum*, and two other species probably new.

The *Salicornia peruviana* is only found in the northern parts of the island. Mosses, lichens, and fungi are very numerous: but it was impossible to determine them on the spot.

Phytoxis acidissima,* Molina? a tree from 6 to 10 feet high, deserves to be well studied. I think the generic character ought to be entirely remodelled, provided my plant be not something different.

Such are the most remarkable plants that I have observed. I have, however, forgotten to speak of one thing which much astonished me, concerning five or six species, which, in my opinion, ought to constitute a distinct genus. They belong to the tribe of *Cichoraceæ*, and seem allied to *Sonchus*: three of them are trees from 10 to 15 feet high, with the stem in proportion; the wood is hard, the branches almost always ternate, and the flowers in a panicle. In one species, they bear a resemblance, in size and colour, to those of *Hypochæris helvetica*. By an incision, they give out a prodigious quantity of very thick and viscous milk. The stem and the branches are hollow; the inflorescence panicled; the leaves alternate, and usually simple, although in one species they are pinnatisect; and in this one the segments vary exceedingly in shape; some being linear, simple, or bifurcated; others being toothed, and the terminal lobe cordate, or reniform, as in the *Caltha palustris*, or *Asarum europæum*, but much larger. I rank these among the best of my discoveries.

Among the plants that were introduced when the island was inhabited by the Spaniards, some may be mentioned which are so abundant, that one might take them to be indigenous. Such are *Melissa officinalis*, *Apium petroselinum*, several species of *Medicago*, *Avena sativa*, *Chenopodium anthelminticum*, and *Physalis peruviana*, which produces excellent fruit. The peach tree is in such abundance, that one can scarcely form an idea of the quantity of fruit that is gathered; and it is, in general, good to eat, notwithstanding the state of nature into which the trees have fallen. The *Cestrum parqui* is frequent in the neighbourhood of houses; it was brought from Chili, along with several others, to which medical properties are attributed. The vine is very rare; the cherry tree abundant, but the fruit worthless. The *Fragaria chilensis* is common, and its produce superior to what is to be had in Chili. There are abundance of fig trees.—*Ann. des Sc. Nat.* vol. xxi. p. 344.

Penæaceæ.—In the 4th vol. of the *Linnæa*, Kunth has a paper on the genus *Penæa*, which he divides into three, of which *Geissoloma* of Lindl. has eight stamens, and axillary flowers; but *Penæa*, (with a quadrialate style,) and *Sarcocolla*, (with a filiform style,) have only four, and a terminal inflorescenee. In the *Penæaceæ*, the seeds are usually erect; but the raphe is on the outer side, or that most remote from the placenta; and, therefore, they may be supposed to be suspended, and erect only by resupination; especially as *Geissoloma* has them actually pendulous. In the ovule, the foramen of the testa is near the hilum, and, consequently, the radicle ought to point to it; but it is remarkable, that neither Mr Lindley, nor Kunth, nor Gærtner before them, has been able to detect any distinction between albumen, cotyledons, or radicle; the whole nucleus is fleshy, and perfectly homogeneous. Gærtner supposes that this happens by the seed having the embryo often abortive; but that idea is scarcely admissible. It is a subject

* The plant of Molina is the *Algue laguen* of Feuillee, Chil. 3. t. 1; which, again, has been determined to be the *Sphacela campanulata* of Bentham in *Bot. Reg.* t. 1289.—(W. A.)

highly curious, and deserving of the attention of those who receive seeds of this family from the Cape, and will either dissect them, or cause them to germinate; and we particularly recommend to those botanists who interest themselves with physiological researches at the Cape, to study this point there, and to send to this country as many dried specimens and fruits of the whole order as they can collect.

Artificial plants.—M. Robillard d'Argentelles, during a residence of twenty-four years in the Isle of France, has been engaged in forming a collection of models, on a new plan, of vegetables difficult to be preserved. They have been exhibited to the Institute of France, and are said to represent the objects intended with scrupulous fidelity, both as to form and colour.

Japanese Plants and Seeds.—At the distribution of prizes given by the Botanical Society of Gand, M. Van Hultem, the president, made a speech, the following passages of which will be read with interest:—

Each year brings us new vegetable productions. You may traverse the gardens of France and England to see if any flowers and plants are there which we have not in our collections. The East Indies, Brazil, and South America, transmit to us from time to time, plants, trees, and shrubs, little known in our climates; and if we throw a glance over the last fifty years, how many beautiful shrubs and flowers now enrich our gardens, the existence of which we scarcely then knew!

The *Ginkgo biloba* of Japan, the *Fuschia coccinea* of Chili, the *Hortensia* of China, the numerous varieties of *Camellia* of Japan, the beautiful *Azaleæ* of the East Indies, the arborescent *Pæoniæ* of China, the *Pyrus* and *Mespilus japonica*, the *Ferraria pavonia* of Mexico, the *Cactus alatus* and *speciosus* of Peru, the *Melaleuca* and *Metrosideros* of New Holland, and a great number of others, have become almost as common as indigenous plants.

There is yet an island, at a great distance, and of difficult access, which contains a great number of trees and shrubs, the culture of which, as far as climate goes, would be easy in our country. Of these, scarcely more than ten or twelve shrubs have come to us. You will immediately perceive that I speak of Japan, where the inhabitants of our kingdom are admitted, and where we have a factory. These circumstances, the beauty of the shrubs which we possess, and the description of a great number of others which Thunberg has given us, induced us about eight years ago to make a list of the most beautiful plants of this remote land. His Excellency M. Falck, then minister of the colonies, sent an order to Japan, and, in 1826, we received a letter from Dr Siebold, in which he promised us to collect and send over the plants and seeds which we wished to have. This botanist has kept his word, and, a few months since, a ship, with fifteen cases of plants and seeds, arrived at Anvers; but all the plants had perished in this long voyage, and we only received a part of the seeds of about 200 plants, trees, and shrubs. These seeds have been intrusted to the care of our excellent cultivator, Mossche, chief gardener of the garden of the University, and our colleague, M. Louis Papelen, a zealous cultivator of foreign plants. It is from their combined care that Europe may expect one day to acquire a considerable number of the plants of Japan.—*Moniteur Universel*, 26th June, 1830.

GEOLOGICAL COLLECTIONS,

INCLUDING MINERALOGY.

Earthquakes in Murcia, in 1829. — We extract the following account of these remarkable and destructive earthquakes from a paper by Professor Gutierez, of Madrid, published in the *Journal de Géologie,* Vol. II. No. 5.

" The district in which these shocks have been experienced, comprehends the country between Carthagena and Alicant, and stretches inland to Murcia, and even to Lorca, a space of about 100 square leagues. The direction of the coast is N. N. E.

" The mountains of Orihuela, and the Sierra de Callæsa, a ridge of black marble, rising to the height of 586 yards, bound to the north the land called the Huerta of Orihuela, the principal theatre of the earthquake. On the south they are bounded by mountains stretching from Guadamar to Murcia, on the east by the Mediterranean, and on the west by the Huerta of Murcia.

" The country is flat, and slopes gradually to the east, where, in a deep channel, flows the river Segura. The whole of this low country was saline, moist, unhealthy, and covered with saline plants, such as the *Salicornia, &c.* until Cardinal Belluga dug canals, which have drained it, and rendered it healthy. By employing the river water to irrigate the land, he has also brought it to a remarkable state of fertility. The soil consists of sand and marl, resting at the depth of three or four feet on a thick compact blue marl, which prevents the infiltration of the water. The interior of the country, to the left of the Segura, has suffered most, and especially *Almoradi,* the largest of the towns which have been destroyed.

" Since the commencement of the present century, this country has suffered occasionally from earthquakes. On January 17, 1802, a series of shocks began to be felt at Torre-la Mata and Torrevieja, which continued till the 6th of February. Some houses were destroyed at this period. In 1817, the shocks became more frequent; there happened no fewer than 116 in three months. On the 8th of October, 1821, there was a great trembling, which lasted 26 days. On the 18th of January, 1823, there was another, which overthrew several houses. The shocks were repeated more than 200 times in 24 hours. The effects were experienced at Carthagena, Alicant, and Murcia, over the same extent as in 1829. On the 15th of September, 1828, at 5 P. M. a trembling commenced, which was repeated 300 times in 24 hours, and destroyed several houses. These shocks continued feebly, until the 11th of March, 1829, and at length ceased entirely, until the 21st of the same month. On this day, one was experienced at noon; and the most violent took place a few seconds later than half past six P. M. Then succeeded the immense vibratory shock, which totally destroyed seven towns, and partially reduced to ruins nineteen others. During the night, there happened more than 100 shocks, after which they ceased.

" From this time, noises, or slight shocks, were regularly repeated, 30 or 40 times every day, until the 16th of April. On this last day, at 7 A. M. a very violent shock was felt; and, on the 18th, another, as alarming as that of the 21st of March.

" At Torrevieja the noise is said to have been heard for more than forty-five minutes. In the month of September the noises ceased. They are said to have generally resembled the firing of cannon, though sometimes they gradually increased and ceased suddenly. The peasants relate, that where the noises were loudest, the shocks were least perceptible. It was not so, however, on the 21st of March; 3000 buildings were then destroyed, 349 persons killed, and 365 wounded. The earth received an undulatory motion, and every thing was overturned. At Dajanueva and Dajavieja, the surface was rent, and little fissures were formed, which vomited a large quantity of dry sand, composed of silica, lime, oxide of iron, impregnated with common salt, a little sulphur, and a bituminous substance. In some places jets of water were thrown out, mixed with sand; and this water contained sulphate of alumina, the muriates of soda and lime, and sulphuretted hydrogen. The country people believed it to be sea water. Even in the month of September, this water was met with on digging. At first, it injured vegetation a little, but irrigation with pure water speedily removed this effect. The sand projected was probably derived from the beds, more or less thick, which underlie the vegetable mould,—since, in a well at Guadamar, the earth dug out, at the depth of seventy feet, is a blue marl, apparently identical with the matter thrown out. The beds being horizontal, the undulatory movements would compress certain parts of it, and, the weaker giving way, there might be driven out crushed, and sometimes dry substances. At Benejuzar, the fissures were three or four inches in diameter, and with the sand, there were thrown out fragments of jet or lignite."

Geological Structure of the Country round Algiers.—M. Rozet finds, in the geological structure of the country around Algiers, a striking resemblance to that of the coast of France on the opposite side of the Mediterranean. The formations are,—

1. A talcose schist passing into mica slate, differing little from that which forms the coast of France from Toulon to beyond Fort Lamalgue. On this schist the city of Algiers is built. The vegetation on this deposit is magnificent.

2. The talcose schist passes into a well characterized brown mica slate irregularly stratified, dipping to the south at angles from 30° to 45°, and containing veins of quartz, in which are found splendid crystals of tourmaline. It then becomes a perfectly characterized gneiss, which rises into mountains that command the city and castle of Algiers.

3. The strata of gneiss everywhere disappear under a coarse calcareous sandstone, passing into a puddingstone, and which resembles in every respect the calcareous sandstone of Montpellier. This stone is employed for building, and is burned into a bad quicklime.

4. The plains and valleys are covered with a diluvium of red or yellow marl, presenting the same characters as in Germany and France.

The first two groups, observes M. Rozet, present a very remarkable geological phenomenon,—a gneiss, which has all the characters of a primitive rock, rests upon talcose schists, which appear to belong to transition formations, and there exists an insensible gradation of rocks between them; but, on the other hand, the portions of micaceous schist imbedded in the gneiss evidently prove that rock to be of a more recent formation, though it be the lower. Thus appears verified the beautiful theory of M. Cordier,—"In the primary formations, those deposits are the most recent which occupy the lowest level." See *M. Rozet's Mémoire, Jour. de Géol.* Vol. II. No. V.

The Fossil Elephant and the Palæotherium found in Deposits of the same Age.—Professor Jarocki, of Warsaw, states, that in digging a well, in June, 1829, there was found, in a white quaztzose, slightly calcareous sandstone, the head, a tusk, and a grinder of an elephant, now preserved in the Museum of Krzeminiec. Several other bones, which were too firmly attached, were left in the rock. Here then, (says Professor Pusch, in a Memoir on the formations of Podolia and Southern Russia,) we have an elephant in the middle of a rock containing only sea shells, and at a depth of 456 feet beneath the surface. Now this rock is identical in mineralogical and palæonthological characters with the tertiary sandstone, near Szydtow and Chmielnik in Poland, or with the upper marine sandstone of Paris. This remarkable fact connects itself with the discovery of an elephant's tooth at Wieliezka, in the tertiary sandstone of Rzaka—a sandstone which contains the *Pectinites polonicus*, saxicaves, and several other marine shells. We see, then, that the remains of such *mammifera* exist not only in the sand and marly clay called diluvium, as M. Cuvier and others have stated, but are found already, in the tertiary period, at the same time with the palæotherium and the anaplotherium, since, in Poland, the beds which enclose them correspond to those which at Paris cover the deposit containing the palæotherium, &c. See *M. Pusch's Mémoire.—Ibid.*

Structure of the Environs of Roveredo, in the Tyrol.—The fertile and delightful basin of Roveredo, in the Southern Tyrol, is circumscribed by high mountains, composed almost entirely of Jura limestone. In the valleys of this basin, however deep, no trace can be found of any rocks inferior to the limestone. The more ancient formations of the Vicentine are found only in the highest valleys of the Tyrol, or in the mountains of the province of Bresse.

Upon the Jura limestone of the environs of Roveredo is seen here and there a rock, similar to that which forms the crest of the mountains of the Vicentine, and which is known by the name of *scaglia*. To this succeeds a tertiary formation of some extent. The Adige has traced in the middle of this basin two channels, deeply cut into the limestone; but towards the centre of the valley this river passes over a considerable portion of rocks of a more recent origin.

M. Louis Pasini, from whose paper, translated for the *Journal de Géologie*, we make these extracts, gives a detailed account of the deposits and general appearance of this district, from which he draws the following interesting conclusions:—

1. That the Jura limestone of the mountain *Recoaro*, and of the lake *Garda*, dip generally E. N. E., and that the inclination is seldom troubled by limited local disturbances.

2. That the Jura limestone seems to rest at present about the mean height at which it was deposited, and that the basin, crossed by the Adige and the other valleys in which the Jura limestone occurs, has been formed before the *scaglia* was deposited.

3. That the *scaglia* was deposited so as to envelop, like a cloak, at once the bottom of the valleys, and the sides and elevated plains of the mountains, taking the horizontal or inclined form, according to the outline of the inferior stratum, and connecting all the heights formed by the Jura limestone.

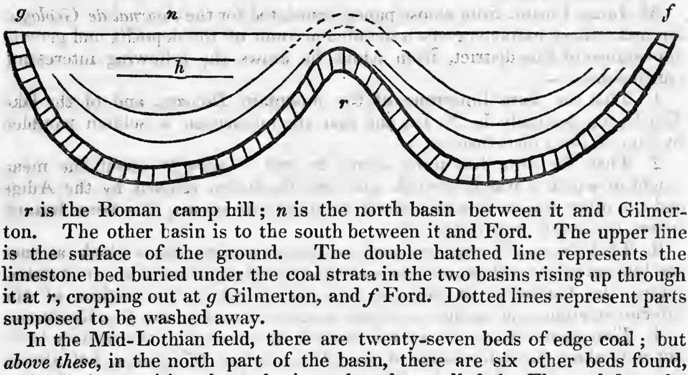
4. That upon this *scaglia* were deposited, in succession, the tertiary beds, not only along the outer flanks of the Alps, and in the plains, but also in the interior valleys shut in by straight gorges, and which almost form basins. Such are unquestionably the valleys of *Roveredo*, *Arco*, and *Sugana*.

If we may judge from the traces of these tertiary beds which still remain, it appears that they have been deposited at rather a low level, and not upon all the heights, like the *scaglia*.

The rocks of porphyry and granite so well known in Southern Tyrol, are certainly posterior to the *scaglia*, as I have shewn in a paper published in 1825, (*Giornale di Fisica di Pavia*, Juglio, Augusto, 1825.) These rocks seem to have imbedded themselves in valleys, dug in the midst of the Jura limestone and the scaglia. I do not deny, certainly, that the strata underwent partial elevations and derangements when these igneous rocks appeared; but a general view of the facts above detailed does not warrant the conclusion that the elevation of *our* calcareous Alps above the level of the sea was due *principally* to the effusion of these modern igneous rocks. The mica schist, which forms the base of our sandy and calcareous formations, has been raised to its actual height before the red sandstone was deposited; the dolerite, which has traversed it in every direction, in the form of masses and veins, appears to have been alone the ancient cause of elevations. The red sandstone, regularly stratified upon the mica schist and the dolerite, is composed of fragments of these two rocks, and the secondary deposits which cover it, from the magnesian to the Jura limestone, seem to occupy the level at which they were deposited by an ancient sea.

Fossil Tree in the Coal Field near Dalkeith.—In cutting a water level about ninety fathoms down the gangway at Brian's farm, in the coal field belonging to the Marquis of Lothian, a fossil tree has lately been discovered. It is standing in a vertical position. Only a small portion of the stem has as yet been exposed. That part now visible leaves room to conclude that its height is very considerable. The portion already exposed is about seven feet high. The bottom diameter about three feet. The class to which this plant belongs is the vascular cryptogamic. It is a *Sigillaria.* They who are conversant with the botanical history of fossil plants will easily perceive the marked difference between those belonging to this class and the coniferous plants of the same epoch, whose internal structure is in as beautiful perfection at this day as the various pines which now grace our hills and valleys.

Coal Formation of Mid-Lothian.—In our last Number we gave an extract from a paper by Mr Dunn, on the edge seams of this formation. The annexed wood cut will give a tolerably correct idea of the whole field, as described by Mr Bald in the *Scotsman* newspaper some time ago.



r is the Roman camp hill; *n* is the north basin between it and Gilmerton. The other basin is to the south between it and Ford. The upper line is the surface of the ground. The double hatched line represents the limestone bed buried under the coal strata in the two basins rising up through it at *r*, cropping out at *g* Gilmerton, and *f* Ford. Dotted lines represent parts supposed to be washed away.

In the Mid-Lothian field, there are twenty-seven beds of edge coal; but *above these,* in the north part of the basin, there are six other beds found, which lie in a position almost horizontal, and are called the *Flat-coal, h* on the section. The relative situation of these is shewn, by two horizontal lines, in the north basin. They are worked at Edmondstone and Sheriff-Hall, and supply most of the coal which comes to Edinburgh from the Mid-Lothian field. They are not found to the westward of Sheriff-Hall, because a great slip occurs here, which, having thrown up the strata on the west side a great many fathoms, the flat-coal beds, with the interposed rocky strata on that side, had most probably been washed away by those great currents and floods which have left so many traces of their agency on the earth's surface. The flat-coals existing, are perhaps merely the remnants of larger masses, the bottoms, or lower parts, of basin-shaped strata, of which all the upper, or edge parts, have been swept away.

Number of Mineral Species found in Moravia and other Countries.—In Moravia, so poor in mines, there have been collected, in a space of 413 square miles, 111 mineral species, and 643 varieties. This is three more than have been found in Bohemia, which is much greater in extent; eleven less than Great Britain has produced, eight more than Sweden, and nine more than Hungary, which is so rich in mines, and has an extent of more than 5102 square miles.—*Hruschka.* Denmark, we may add, produces only about 30 mineral species!—J.

Kakoxene.—Professor Steinmann, of Prague, was the first to describe this mineral, of which he has given an analysis. It occurs in acicular, radiated, and in earthy, or pulverulent forms. M. Hruschka has examined its structure, and finds that its form is *hemi*prismatic, and that it thus differs from *wavellite,* the crystals of which are prismatic.—*Bull. de Sci. Natur.* October, 1830.

Bituminous Spring in the United States.—The *Louisville Advertiser* states, that a spring of rock oil has been discovered in the county of Cumberland, while boring a rock for water. On reaching a depth of 130 feet, the oil gushed out, forming a jet of 12 or 14 feet above the ground. It flowed out at the rate of 75 gallons in a minute, and very soon formed a little stream, which ran into the Cumberland river, and covered its surface to a considerable distance. The oil burns well, and gives a brilliant light. Abundance of salt water has been found in the neighbourhood, on boring to 200 feet, and rising to the height of 25 feet above the level of the Cumberland river. —*Ibid.*

The Labrador of Finland.—M. J. Senff, (*Poggend. Ann.* XVII. p. 352,) describes the following phenomena which he has observed in the labrador felspar of Finland:—

1. In the direction of the principal cleavage are seen striæ, some of which are coloured, and some without colour. If the stone be turned 180° round the axis of the surface on which the play of light is seen, the lines which before were coloured, are now seen colourless, and *vice versa.* This phenomenon is also seen in the labrador from other places.

2. If a slip of labrador be turned, as before, about its axis, then for a rotation of 90°, we have a new play of colours, for a rotation of 180° a third, which appears opposed to the first, for a rotation of 270° a fourth, opposed to the second.

3. The labrador of Finland shews coloured crystallizations, that is to say, the colours are distinctly separated from one another, and each of them forms a rectilineal polygon, whose sides are parallel to the cleavages of the crystal, and to the different secondary faces. These coloured polygons are also concentric.—*Ibid.*

It is this last character which peculiarly distinguishes the beautiful labradors of Finland. M. Nordenschiold has published a scientific examination, with measurements and drawings, of the coloured crystallizations, in the Stockholm Transactions for 1830. The specimens which accompanied his paper to the Academy, and which we were fortunate enough to see on their arrival, were the finest we have ever met with.—J.

Fulgurites.—M. Ribbentrop has lately found two of these vitrified tubes in the green sand at Reinstein, on the north of the Hartz Mountains. Similar tubes have been found in the waste of Senner. At the late meeting in Hamburg, Professor Brandes exhibited to the Mineralogical Section some beautiful specimens, eight or ten feet long,—one of which he presented to the Swedish Academy of Sciences.

Tin and Tellurium in Asiatic Russia.—M. Rose has been fortunate enough to discover sulphuret of tin in South Ural or Bachkyre, and a combination of silver and tellurium in a mineral from Sawodinski near Altaï. The existence of tin and tellurium was, before our voyage in the year 1829, as unknown in Asiatic Russia as the existence of diamonds in European Russia.—*Ann. des Sci. Nat.* Oct. 1830.

NOTICES AND ANALYSES OF NEW BOOKS AND PAPERS.

Vollstaendiges Handbuch, &c. Complete Manual of Mathematical Geography, with a succinct Account of the Construction of Maps and Globes, Barometric and other Levellings; and a Register of the Latitudes and Longitudes of the Principal Places. By REUTER. 8vo. Kupferberg, Mayence.

The author divides this work into two principal parts, each of which is subdivided into sections and chapters. An introduction contains the definition of Geography in general, according to its objects, its extent, and its utility, and an account of the most common measurements. The first part contains generalities, or the most remarkable facts on straight and curved lines, and on the relations of our planet with other celestial bodies; we are thus led to the knowledge of some parts of astronomy necessary for understanding mathematical geography.

The second part contains mathematico-geographical views, or the earth in respect to its form, its dimensions, its motions, the determination of longitudes and latitudes, and the calculation of the surface of particular countries; these are followed by directions for the construction of terrestrial and celestial globes.

Remarques pour servir à la Rectification, &c. Corrections of the Geography of some places in the Pacific Ocean. By Captain GOARANT DE TROMELIN. *Annal. Marit. et Colon.* II. 295.

The Pacific Ocean has been for some years overrun by a great number of English and American whalers, and other trading vessels. It is probable that all the remarkable places in the latitudes visited by these ships have been observed; they have described a great number of banks, islands, and reefs, which are not found in any map; but the want of precision with which navigators determine positions, and the little care which they take to make known the places they have visited, leave many very interesting points yet unknown. With the view of extending our knowledge on this subject, and of giving precision to what is already known, M. de Tromelin has published a series of very valuable remarks on places which he visited, in a voyage of circumnavigation, in 1826–29.

We shall select some of the most important of these facts for our next number.

Resumé d'un Cours Elémentaire de Géographie Physique, &c. Summary of an Elementary Course of Physical Geography. By J. V. L. LAMOUROUX. 2d edition, revised and corrected by J. P. LAMOUROUX. Verdière. Paris.

Our readers will be well acquainted with the valuable work of the late M. Lamouroux. This new edition is enriched by notes by Dr

Lamouroux, and a notice of the life of the author. This, however, being an elementary work, the notes are very properly restricted to clearing up obscure or incomplete passages of the original.

Instruction pour les Voyageurs, &c. Instructions for Travellers, and those employed in the Colonies, on the Method of Collecting, Preserving, and Transporting Objects of Natural History; drawn up by request of his Excellency the Minister of the Marine, under the direction of the Museum of Natural History. 3d edit. 8vo. Paris, 1829. Belin.

We have so often had inquiries as to the mode of preserving and sending home objects of natural history, that we, once for all, give this as one of the best books of directions with which we are acquainted. Another of the same class is the *Manuel du Naturaliste Préparateur.* We have no good book in the English language on this subject. "*Taxidermy*" is, we believe, the best.

Travels in the East Indies. By CH. BELANGER. *Zoology.* 1 vol. in 8vo. with 4to atlas of 40 coloured plates. *Prospectus.*

We have in a former Number, (p. 164 *supra,*) noticed M. Cuvier's favourable report on the zoological collections and manuscripts of M. Bélanger. We have now a proposal for the publication of these interesting materials. The mammalogy and ornithology will be intrusted to M. Isid. St Hilaire; M. Lesson will take charge of the description of the fishes and reptiles; the insects will be described by M. Guérin; and the mollusca by M. Deshayes.

This zoological part will be preceded by general observations on the people of Asia and Chinese India; and each of the classes of this section by general remarks on the geographical distribution of the animals of which it treats.

Fifteen plates will be devoted to the mammalia and birds; fifteen to the fishes and reptiles; four to the mollusca and radiata; four to the insects, and two to the crustacea.

The zoological part will appear in eight fasciculi; each of which will be charged eight shillings to subscribers.

Histoire naturelle des Mammifères, &c. Natural History of the Mammalia. By MM. F. CUVIER and GEOFFROY ST HILAIRE. 4to edit.

Two more *livraisons,* the 8th and 9th, are at last published of this tardy work. The baboons, or *Cynocephali,* are completed in these two numbers. The text contains the description of the genus *Cynocephalus,* and commences the history of the American apes.

This edition, if it were but published regularly, has many advantages over the ponderous and expensive edition in elephant folio.

Observations sur les Chauve-souris, &c. Observations on the Bats, and description of a new species. By M. BREHM. *Isis,* 1829.

The author has already announced in the *Ornis* that the females of the bats live together after they are fecundated, and that they inhabit a common hole, into which they will not permit a male to enter. Recent observations have enabled him to verify this fact, which is particularly striking in the *Vespertilio noctula* and *Bechsteinii.* The females remain always together by a dozen or more until they have brought forth their young and reared them. M. Brehm has also assured himself that they only produce one at a birth, and that if there should be two, it is an exception to the general rule, as in the human race. He has observed, that the bats sometimes make use of their anterior extremities as hands, and in this respect they differ from birds, which can never lay hold of any object with their wings.

The species which he describes is named *V. rufescens:* it has short reniform ears; rather short hair; the upper part of the body grayish rust colour, the under part gray rust colour; the wings, straight; the tail, exceeding the membrane 2½ lines; spread of the wings 16½ inches. This species has some analogy with the *V. noctula,* and *V. ferrugineus,* Brehm. The description was taken from a female found in an old tower in Jena.

Ornitologia Toscana, &c. Tuscan Ornithology. By Dr Paul Savi. Tom. II. 8vo. pp. 383. Pisa, 1829.

This 2d vol. terminates the *Passeres,* and contains the *Gallinæ* and *Grallæ.* The third vol. will be devoted to the *Palmipedes.*

The work is carefully got up; the descriptions of each bird are given in an uniform manner; after the Italian name, we have the Latin generic and specific names, as adopted by the author; then the character in Italian and Latin: after which the description of the different plumages of age and sex, the synonymy, the dimensions, the habits, and manners, and the mode of propagation.

Histoire Naturelle des Poissons, &c. Natural History of the Fresh Water Fishes of Central Europe. By L. Agassiz, M.D. &c. *Prospectus.*

Dr Agassiz puts in the most favourable point of view his qualifications for this undertaking. The work is intended to comprise 180 plates in folio; 18 plates to appear every three months, with 10 or 12 sheets of letter-press. Sixty-seven plates are to be devoted to anatomy; the others represent about 100 species and 25 varieties. The text will be published in German and in French. The price of a coloured part will be 18 florins, uncoloured 9 florins. If the promises contained in the prospectus be performed, this will be an invaluable work.

Enumeratio Coleopterorum Agri Monacensis. Auct. J. Gistl. 38 pp. in 18mo. Munich.

This enumeration contains 1829 species belonging to 306 genera. Forty new species are described, and many rare ones;—the synonymes are given.

Vegetations Karte, &c. Map of the Vegetation and characteristic forms of the Plants of a part of Rio Janeiro, St Paul, and Minas Geraes. 1 sheet.

The Map of Piauhy is a precious document for the geography of South America, and would, perhaps, have been more valuable, had MM. Spix and Martius, instead of publishing the great map of this continent, only given to the world their own particular labours during their stay in Brazil. These materials would have enriched the geography of this continent, and would have been considered as positive data, whilst their great map is but an incomplete work.

The first attempt at a map of these countries is attributed to Father Henrique Antonio Galluzi. He must have determined, in 1761, the latitude of the capital, and of all the towns of the Capitania, as well as some longitudes. Two other editions were afterwards completed, and upon these the map of which we are now speaking is founded.

These maps were enlarged and corrected by MM. Spix and Martius, after some original designs, some itineraries of the environs of Rio de San Francisco, and memoirs in the Portugese Journal, *O Patriota.*

The two last sheets, that is to say, the Sections and the Map of Vegetation, form part of the great atlas of MM. Spix and Martius, which is joined to the description of their travels in Brazil.

Flora der Phanerogamischen Gewæchsen, &c.—Flora of the Phænogamous Plants of the Environs of Leipsic. By Klett and Richter; with a preface by Professor Reichenbach. Leipzig. Hofmeister.

Many works have been published on the Flora of Leipsic; they are, however, very far from presenting a complete view of the vegetable riches of the neighbourhood of this city; and the authors of this Flora have done a service to botanists, in collecting all the materials to perfect their work. M. Klett died in 1827, and M. Richter now continues the publication of the work alone. M. Schwægrichen having proposed to publish shortly a topographical description of Leipsic, in relation to its Natural History, M. Richter has not introduced this department into his work. The whole is written in German; and though valuable, as are all local floras, it is not of much immediate interest to the English botanist.

Synopsis Hydrangeæ generis specierum Japonicarum; Auct. Siebold. Nov. Act. Acad. Nat. Car. Tom. xiv. p. 686.

M. Nees Von Esenbeck, the editor of this memoir, mentions in a note, that the author had announced a complete work, accompanied with figures, on the species of *Hydrangea;* but that, with a fatality which seemed to attend all works published on the natural history of Japan, these descriptions had not yet arrived in Europe. To neglect nothing, however, which might be serviceable to botanists, he had given this *Synopsis,* where the characters of the genus and species of *Hydrangea* are stated in a concise way.

A dissertation on the genus *Hydrangea* has been published by M. Courtois, in the *Sylloge Plantarum* of Ratisbon, II. 38, in which the American species have been particularly examined, and the description of the fruit given by M. Nees Von Esenbeck. The memoir of M. Siebold is devoted to the Japanese species, which are nine in number: *H. hortensia, H. Azizai, H. japonica, H. Thunbergii, H. viridis, H. paniculata, H. involucrata, H. alternifolia,* and *H. sitsitan.* The author gives a specific character for each of these, with the Japanese and Chinese synonymy, written in Roman, Japanese, and Chinese characters.

Mémoire sur les Volcans éteints, &c. Memoir on the Extinct Volcanoes of the Val di Noto in Sicily. By G. GEMELLARO. *Actes de l'Acad. des. Sci. Nat. de Catane.* Vol. III.

Dolomieu first directed the attention of geologists to the extinct volcanoes of Sicily, which, from their neighbourhood to Etna, had not attracted the observation of the ancients. M. Gemellaro places in the Val di Noto the outlet of that subterranean fire, whose products cover the surrounding country. He admits two calcareous deposits, and two great volcanic eruptions. The most ancient of these deposits, which forms the mountains, dates from the first eruption, which took place by nine craters, whose site is yet perceptible. The newest calcareous deposit which constitutes the lower formations of Sicily, covers a part of the preceding; after this deposit the eruptions took place, which produced the bed of lava, expanded in different directions, and to more or less considerable distances, and which is mixed in many places with alluvium.

Meeting of the Cultivators of Natural Science and Medicine, at Hamburgh, in September, 1830. By JAMES F. W. JOHNSTON, M.A. &c. &c.—*Edinburgh Journal of Science*, April, 1831.

This is a graphic sketch of the proceedings of the meetings of German naturalists, at the last of which Mr Johnston assisted. At a time when a proposition is made for establishing a similar meeting in Great Britain, this paper becomes peculiarly appropriate; and if the perusal of it do not light up in the reader a desire to be a witness of such a scene in his own country as that here described, whose characteristic object is amiable feeling and good fellowship among a class of men who, to their disgrace be it said, are notorious for jealousy and ill will, we should be hopeless of the success of the project of which we have given notice in another part of this number, (p. 269.)

It will be recollected, that an attempt was made last summer to establish a similar meeting in Edinburgh, but without success. The plan of choosing York, a central and delightful city, for the first place of assembly, is, however, a great improvement on the original suggestion, and we sincerely wish it may be carried out.

Writings of M. Fuchsel.

M. Fuchsel was the founder of the public museum of Natural History at Rudelstadt, in Germany, where he died, in 1773.

In 1762, he published the remarkable essay, entitled *Historia terræ et Maris, ex historia Thuringiæ per montium descriptionem erecta.* Acta Acad. Elect. Maguntinæ, (Proceedings of the Society of Mayence, established at Erfurt,) II. p. 44-209.

This memoir is followed by another entitled *Usus Historiæ suæ terræ et maris.* Ibid. 209-244.

He gave also a geological map of Thuringia, in which the formations are indicated by letters, and which contains many sections. This was the first geological map ever published, and for some time the only one.

In 1773, he published a work in German, entitled, *Entwurf zu der æltesten Erd und Menschen geschichte,* (Sketch of the Ancient History of the Earth and of Man,) 8vo. pp. 275.

NOTICES AND PROCEEDINGS OF SCIENTIFIC SOCIETIES.

EDINBURGH.

Royal Society.—*March* 7, 1831. Dr Hope, V. P. in the chair. A paper was read by Dr Christison, containing an account of his analysis of the suety matter obtained by boiling the seeds of the *Laurus cinnamonum*, or cinnamon tree. This he found to consist of a great proportion of the vegetable principle of cerine, got by Professor Jahn of Berlin from the seeds of the *Myrica cordifolia*, but which that chemist had not succeeded in freeing from impurities. Dr Christison having, by repeated ablutions with alcohol, removed all foreign matters, was enabled to describe the properties of pure cerine. The most interesting of these is its capability of saponification with alkalies. Being led, by the knowledge of the fact that the same chemical principles exist in the various species of one genus, to extend his observations to other species of the genus *Laurus*, the professor succeeded in obtaining from the berries of the *Laurus nobilis*, or common bay, a principle exactly the same with that described above. In order to be able to distinguish vegetable cerine from the principle of animal wax, with which Jahn conceived it to be identical—a view not supported by Dr Christison's observations—the professor proposes to place before the word cerine the generic name of the plant yielding it. Thus, lauro-cerine, &c.

Dr Knox read an account of a case of supposed congenital opening in the front of the human trachea, or windpipe.

Mr Allan read an extract of a letter from his son, giving an account of the changes going on in Vesuvius, particularly in a crater about 800 feet deep—about the size of Arthur's Seat inverted—which was nearly filled up by the matters projected from a partial eruption about the end of December and beginning of January last.

March 21. Professor Russell in the chair. A communication from Dr Brewster was read, containing an account of a new analysis of white solar light. He shewed that it consists of the three primary colours, red, yellow, and blue; and that the other colours, shewn by the prism, are also compounds of these. A portion of white light cannot be decomposed at all.

A paper was read from Arthur Trevelyan, Esq. on the vibration of heated metallic rods, when placed in contact with cold masses of another metal; a notice of which had already been laid before the Society. Mr Trevelyan's conclusions, as summed up at the end of this paper, are, 1. That, to produce the effects, the metals must be of different kinds; one hard, which must be heated, the other soft, which must be cool. 2. That the difference of their temperature must be considerable, though the exact degree is not determined. 3. That the surfaces must not be exactly smooth, or no vibration will take place. 4. That the interposition of a piece of another metal, however thin, stops the vibration. 5. That the contact of the air, though essential to the formation of the sounds, is not necessary for the occurrence of the vibration.

Wernerian Society.—*March* 5. Professor Jameson in the chair. A paper on Indian Hail-storms, communicated by Dr Turnbull Christie, was read. The occurrence of hail storms had been supposed to be confined to the more elevated parts of the Indian continent; but Dr Christie found, that even the peninsula of India was occasionally visited by them, and that the hailstones were sometimes of a large size.

The Rev. Dr Scot read a communication on the *Zebi* of the Scriptures—the *Roe* of the English translation—which he considered ought to be rendered *Mountain Gazelle.*

Some meteorological tables, exhibiting the state of the weather in the Isle of Man, from 1824 to 1830, and in other parts of the kingdom, were laid on the table by Professor Jameson.

An account of the structure of the fossil trees of Van Diemen's Land, by Mr Nicol, was then read. Some fine specimens, which had been transmitted to Professor Jameson, were exhibited; as well as a series of recent and fossil woods, prepared by Mr Nicol, on the plan described in a former number of this Journal, (Vol. III, p. 62.) so as to illustrate the structure in the clearest manner. Most of the specimens from Van Diemen's Land, were at once referable to the *Coniferæ.*

March 19. Professor Jameson read a notice of a subterranean forest, discovered in the coal formation near to Glasgow; communicated by James Smith, Esq. of Jordan-hill. Several trees were discovered, many feet below the surface, vertically imbedded in a stratum of sandstone, but with the trunks abruptly cut off by the superincumbent shale. The bark is converted into coal; but the woody structure, for a considerable space downwards, is of a shaly nature.*

A catalogue of coleopterous insects, collected in the neighbourhood of Edinburgh, by Mr Duncan, was next laid before the society. Little has been done hitherto for the entomology of Scotland. Many years ago, a list of insects, known to have been found in the neighbourhood of Edinburgh, was drawn up by the late Mr Charles Stewart, and published in the first volume of the *Memoirs of the Wernerian Society*; but, in this list, scarcely more than one hundred species of *coleoptera* are recorded. Mr Duncan has extended the list to nearly five hundred species.

GLASGOW.

Andersonian University of Glasgow.—A dinner was given on the 22d of last month, to commemorate the opening of the splendid museum which has recently been fitted up in the Andersonian University; and, to describe which, we may be here pardoned a slight digression, previously to entering on a detail of the festivity.

Those who have not entered the Andersonian buildings since last year, would now scarcely know their interior, so much has it been altered by the judicious arrangements made by the able and public-spirited managers. A handsome staircase, in the west wing, leads to the anteroom of the museum, from which the stranger is ushered into a rotunda of noble dimensions, being 52 feet in diameter, and 30 feet high. It is lighted with seven windows on the ground floor, with glass cases between them, filled with quadrupeds, South Sea and Indian dresses and arms, antiquities, and geological specimens. Immediately over the windows there is a gallery, supported on richly ornamented consoles; a stair, with a double flight of steps, leads to the gallery; a range of glass cases, all round, is filled with the Sabine collection of birds; the whole is surmounted by a dome, from the centre of which a large sky-light throws a strong and steady light on the upper range of glass cases, and on the floor, on which there is exhibited, in tables, an extensive series of minerals, fossils, organic remains, shells, coins, medals, and antiquities. These are in general clearly arranged, and carefully and elegantly named, and at the head of the flight of steps leading to the

* Under the escort of Mr Smith, we have recently had an opportunity of seeing this splendid phenomenon. Imbedded in the solid mass of sandstone, are the forests as they grew in a former world! There are only a few persons capable of asserting that these trees are not *in situ.* We shall notice them in our next.—Ed.

gallery, there is a statue of the founder, in his robes, in a sitting position. This was modelled and presented to the museum by our ingenious townsman, Mr Hart, and is said to be an admirable likeness. The arrangement of the various articles is extremely tasteful, convenient, and harmonious, and the whole spectacle produces, on entering, a very imposing effect. It will form a most agreeable and instructive place of resort to the numerous citizens who already have subscribed to it, and, as such, cannot fail to command the success and popularity to which it is justly entitled. We now turn to the dinner.

This mingled scene of science and conviviality was numerously attended by gentlemen of the highest talents, attainments, and rank, in this city and neighbourhood, and by not a few literary and scientific gentlemen from a distance. The president of the University, James Smith, Esq. of Jordanhill, occupied the chair; and the duties of croupier were ably discharged by Dr Corkindale, the treasurer. Right and left of the president sat the following distinguished gentlemen:—On the right, Sir W. Napier, Bart., Mr Wallace of Kelly, Mr Witham of Lartington, Mr May, Mr Wilson of Hurlet, &c.; and, on the left, Mr Fergusson, senior magistrate, Professor Mylne, Dr Greville, Mr Walker Arnott of Arlary, Mr Cheek, &c.

After the cloth had been removed, and the healths of their Majesties and other preliminary toasts drunk,

The Chairman rose to propose the memory of the illustrious founder of the Andersonian Institution. The highest tribute that could be paid to him would be found in the numerous assemblage of distinguished men of science, who were now met to do honour to his memory, and to testify the interest they took in the progress of the Institution, founded by him for the noble purpose, to use his own expression, of "the improvement of science and the good of mankind." He was old enough to have attended his class, and he remembered well the impression produced by his dignified and gentlemanlike demeanour, the felicity of his illustrations, his eloquence, always graceful and elegant, and, when he adverted to final causes, or the great First Cause, rising to sublimity. But his enduring fame could neither be ascribed to his great attainments as a man of science, nor his success as a teacher. His was the undoubted honour of having been the first to unlock the gates of science to mankind. He first founded an institution for popular science, open to every class of the community, where high birth and humble genius might alike "derive the benefits of knowledge," and be alike "elevated in the scale of thinking being."

After this toast had been drunk with the usual marks of respect, the Chairman again rose, and gave "Success to the Andersonian Museum." He said he felt it altogether superfluous, when he remembered whom he was addressing, to enter into the general subject of the advantages of cultivating the studies of natural history, or of the necessity of an extensive collection of specimens for the purposes of cultivating them with success. He would content himself with giving some account of the progress of the museum, which, he observed, although circumstances had only permitted it to be opened to the public on that day for the first time, was, in fact, coeval with the existence of the institution itself. They had a printed catalogue of the fossils in their museum so far back as 1798. That collection, which had been formed by Professor Anderson, covered with the dust of more than thirty years, or only disturbed by the rude handling of students or operators, had no doubt suffered considerable dilapidation; but it had been much increased by donations. Mr J. A. Anderson, and Mr Andrew Bannatyne, had each presented their private collections; they had also received donations of many rare and beautiful specimens; and, as far as their limited means would allow, they had supplied the desiderata by purchases. He was aware that they could not boast of many of those matchless or unique specimens that are the delight of the amateur; but they might vie with more extensive collections in what was of much greater importance—its fitness for communicating knowledge to the student. They were much indebted to the personal labour of two gentlemen, for the clear manner in which the minerals had been arranged, and the beautiful manner in which they were named. He alluded to Mr J. G. Brown, one of the trustees, and Mr Young, the very respectable teacher of writing, connected with the institution. The geological collection was, perhaps, the most valuable part of what belonged to Professor Anderson. Mr Eddington had added to it an interesting series of rocks, formed at Freiburg, under the inspection of Werner himself; and he (the Chairman) had also contributed a collection of organic remains, illustrative of the secondary and tertiary formations, which he hoped to render less unworthy of their acceptance by an addition of fossil shells; and when he remembered the interesting geological locality on which Glasgow is placed, he could not help expressing a hope, that in this most interesting department of natural history, their collection would not be inferior to any other provincial museum. Their zoological collections were yet in their infancy, with the exception of the well-known and valuable ornithological collection of Mr Joseph Sabine, which they had purchased entire. The same might be said of anatomy and comparative anatomy; but from the zeal with which the medical professors entered on these departments, he had no doubt that they also would make rapid progress. They had been deeply indebted to the interest the public had taken in the museum, for numerous donations of coins, medals, South Sea and other curiosities. It would have been a gratifying task to have enumerated the donors, but it was still more gratifying that the length of the list precluded the enumeration; he, however, could not help alluding to two ladies of distinguished rank in society—the wife and daughter of Admiral Harvey—who had taken such an interest in the success of the museum, that they had formed, and arranged, and presented to them a beautiful collection of fossils from the chalk formation in Kent, as well as of shells and insects. He was conscious that he might have given an exaggerated view of what had been done, by mixing up anticipations with performance; but if they had laid the foundation upon safe principles, they had no doubt that the superstructure would exceed the most sanguine anticipations. When they remembered the peculiar advantages which Glasgow possessed—when they remembered that her commerce sent forth to every quarter of the globe her enterprizing and intelligent sons—he could not doubt that they would feel an honest pride in contributing their part to increase the scientific reputation of their native city, and that they would feel an honest pride in having their names inscribed in the temple of science which their townsmen had erected.—(*Great applause.*)

The Chairman next proposed "The Lord Provost and Magistrates of Glasgow." The Lord Provost, but for indisposition, would have graced their assemblage with his presence to-night.

Mr Fergusson, senior magistrate, returned thanks; and the Chairman, in a forcible and neat speech, proposed the "University of Glasgow, and Professor Mylne."

This toast was received with unbounded applause; and on the venerable Professor rising to return thanks, he was almost overwhelmed with the warm gratulations of the company. He thanked them all for the honour done the University and himself; expressed the greatest interest in the success of the rival Institution; and sat down after proposing the health of the Chairman, "James Smith, Esq. of Jordanhill."

The acclamations that followed this toast were of the most enthusiastic kind;—but we really must here depart from particulars, and merely state in general, that the great variety of other toasts which followed, were all highly appropriate to the occasion, and, as such, were in a like spirit received and responded to by the company.—*Glasgow Free Press.*

LONDON.

Royal Geographical Society.—*March* 14. Lord Goderich, President, in the chair. Mr Lloyd's paper on the Isthmus of Panama was concluded.

The following communications were then made from the chair:—That several members of the society had suggested to the council that its objects would be essentially advanced by appointing committees to pursue particular branches of research, which suggestions were much approved of; and it had been resolved, in consequence, that those members who might be inclined to afford their assistance in carrying this plan into operation, should be invited to communicate with the secretary on the subject.

Also, that at the ordinary meetings of the society, the business of the evening being concluded, any member present who might wish to offer any remarks, or to make any inquiries relating to the subject of the paper previously read, or could communicate any farther information on it, should be invited by the council to do so.

This measure had already been attended with great benefit at the meetings of the Geological Society. By such communications, a free discussion has been carried on among the members, by which much information has been elicited and disseminated.

The committees particularly recommended by the council are as follow, viz.

A statistical committee, to make the vast subject of statistics its sole object, and to supply the place of a statistical society in this country, as established in Paris.

A colonial committee, having for its object the geography of the British colonies, as well as those of other countries, or, what may have formerly been so, as may be hereafter determined.

A committee for the purpose of obtaining the most accurate and complete geographical knowledge of a particular kingdom or country, which may serve as a model for the adoption of others established for a similar purpose with regard to other parts of the world.

Although the labours of such committees might necessarily be incomplete, they would tend to shew in their progress the want of information respecting countries with which we are most familiar, and would probably be the means of procuring it, by directing inquiry to the proper quarter. The second of these committees is likely to be of considerable public utility in questions regarding the geography of our colonies. There are points and considerations of a political nature with which it would be quite foreign to the labours of such a committee to interfere. But the features of the country, and its quality in a physical point of view, fairly and impartially represented, would not only be of service to the public, but beneficial to government.

Royal Society.—*Jan.* 13 *and* 20, 1831. A paper was read on the equilibrium of fluids; and the figure of a homogeneous planet in a fluid state; by James Ivory, Esq. A.M. F.R.S.

Jan. 27. A paper was read on the probable electric origin of all the phenomena of terrestrial magnetism; by Peter Barlow, Esq. F.R.S. Corr. Mem. Inst. France, and of the Imp. Acad. St Petersburg.

Feb. 3. A paper was read on the lunar theory. Communicated by Dr Lardner.

Feb. 10. Davies Gilbert, Esq. V.P. in the chair. Part of a paper was read from E. Davy, Esq. of Dublin, on a new combination of chlorine and nitrous gas.

Feb. 24. A paper was read on the chemical action of atmospheric electricity. The author of the paper proposed to connect the researches of Dr Franklin with the chemico-electrical experiments of Davy.

The first part of a paper was read, on the operations carried on to determine the difference of level between the river Thames at London Bridge, and the sea at Sheerness, by A. J. Lloyd, Esq.

Geological Society.—*Jan.* 19 *and Feb.* 2. A paper, entitled "Supplementary Observations on the Structure of the Austrian and Bavarian Alps," by R. J. Murchison, Esq. was read.

Feb. 16. A letter was read from Peter Cunningham, Esq. dated Newcastle, on Hunter's River, New South Wales, Oct. 16, 1829, and communicated by John Barrow, Esq. F.R.S. The letter was written with a view to give some insight into the former state of the interior of New South Wales.

A memoir was read "On the Geology of the Island of Juan Fernandez, in the Pacific Ocean, by Alex. Caldcleugh, Esq. F.G.S." [A notice of the botany of this island will be found in our present Number, p. 248, *supra*; the geological facts mentioned therein are corroborated by Mr Caldcleugh. He remarks, that the island is about 12 miles in length, and 4 in breadth, possessing three ports, and consisting of very high land, the culminating point of which rises to about 3005 feet above the sea. All the rocks consist of greenstone and trap, of various mineralogical structure; the basalt in some parts is almost columnar, and in others has a peaked and serrated outline, the mass being, here and there, traversed by dykes. Owing to the peculiar character of this basalt, and especially to the great quantity of olivine it contains, Mr Caldcleugh compares its age with that of Bohemia, the Rhine, the Vivarrais, and Beaulieu, in Provence.

Feb. 18. *Anniversary.*—The anniversary meeting of the Society was held at its apartments in Somerset House, on the morning of Friday the 18th inst., for the purpose of electing officers for the ensuing year. The Rev. Adam Sedgwick, Woodwardian Professor in the University of Cambridge, F.R.S., and President, in the chair.

The late Dr Wollaston having bequeathed to the Geological society £1000, the interest to be employed annually in recompensing or encouraging geological inquiries, and the council having directed a medal to be struck, bearing the impress of Dr Wollaston, the first of these, together with a sum of money, had been adjudicated to Mr W. Smith. Before the delivery of the medal, the President gave a chronological account of the discoveries of Mr Smith, by which he justified the terms of the following award, viz.:—

"That the first Wollaston medal be given to Mr W. Smith, in consideration of his being a great original discoverer of English geology, and especially for his having been *the first to discover and teach the identification of strata, and their succession, by means of imbedded fossils.*" *

The undermentioned gentlemen were declared to be chosen out of the new council, as the officers of the society:—

President, Roderick Impey Murchison, Esq. F.R.S. F.L.S. &c. Vice Presidents, W. J. Broderip, Esq. F.R.S. F.L.S.; Davies Gilbert, Esq. M.P. V.P.R.S. &c.; the Rev. W. Buckland, D.D. F.R.S. &c.; and the Rev. W. Conybeare, F.R.S. &c. Secretaries, Dr Turner, F.R.S.L. & E. and Henry Thomas De la Beche, Esq. F.R.S. F.L.S.

Foreign secretary, Charles Lyell, Esq. F.R.S. F.L.S. Treasurer, John Taylor, Esq. F.R.S.

In the evening, the Fellows and their friends, to the number of ninety,

* Some pertinent remarks on this adjudication will be found in the Number of Dr Brewster's Journal for the present month.

dined at the Crown and Anchor, the newly elected President, Mr Murchison, in the chair.

The party afterwards adjourned to the society's apartments at Somerset House, where the Ex-President, Professor Sedgwick, delivered his annual oration on the present state of geology, and its progress during the previous year.

Linnæan Society.—*Jan.* 18, 1831. Edward Forster, Esq. in the chair. The paper read was entitled, A Notice of several recent Discoveries in the Structure and Economy of Spiders; by John Blackwall, Esq. F.L.S.—The object of the author's particular investigation was the *Clubiona atrox*, of whose habits, and mode of fabricating its residence and its snare, he gave a detailed and curious account.

Feb. 1. A. B. Lambert, Esq. in the chair. A communication from John Blackwall, Esq. F.L.S. was read, entitled, Remarks on the Pulvilli of Insects. In this paper the writer controverts the statement of Dr Derham in his Physico-Theology, supported by Sir E. Home, and generally adopted by naturalists, that the feet of flies and other insects are furnished with "skinny palms," which enable them to stick on glass, &c. by means of the pressure of the atmosphere. Mr Blackwall states that he found that minute hairs, very closely set, and directed downwards, so completely cover the inferior surface of the expanded membranes, improperly called suckers, with which the terminal joint of the tarsi is provided, that it cannot possibly be brought into contact with the objects on which these insects move. He concludes, from observation and experiment, that the insects traverse the vertical sides of smooth bodies, by means strictly mechanical, as Dr Hooke had suggested.

Feb. 15. The reading of Mr Blackwall's paper on spiders was concluded.

FOREIGN.

Geographical Society of Paris.—*Oct.* 1. 1830. M. Jullien introduced Mr Buckingham to the meeting. Mr Buckingham submitted to the society a sketch of his plan for a voyage round the world, by the way of India, China, and the islands of the Pacific Ocean, having in view the combined objects of discovery, civilization, and commerce. A special commission was appointed to examine this project.

M. Jomard announced that M. Paul-Emile Botta, son of the author of the History of the United States, &c. and already known for a voyage in the Pacific, was at that time at Beyront, and had commenced to explore Mount Lebanon. He then read a letter from Captain Gourbeyre to Count Chabrol de Volvic, on the subject of the French expedition to Madagascar.

Oct. 15. M. Bianchi read a letter from M. Cardin, interpreter to the French consulate in Egypt, mentioning that a complete set of the journal published in Cairo, in Turkish and Arabic, was on its way to the society. M. Jomard stated, that the first number had been laid upon the table last year, and that it contained much interesting information connected with geography.

M. Warden communicated some information on the opening of the Canal of the Chesapeake and Delaware, and on the subdivision of Upper and Lower California into four districts.

M. de la Roquette announced that M. ——— had desired him to communicate the results of his travels in the Sandwich Isles and in California; which he would take an early opportunity of doing.

M. Barbié du Bocage presented from M. Stanhope four plans of the Greek towns of Megalopolis, Tanagra, Aulis, and Eretria.

Nov. 5. M. Jomard communicated to the society a letter which he had received from Prince Christian of Denmark, containing details on Captain

Graah's explorations on the east coast of Greenland, accompanied by a map of this coast from 60° to 65° 30′ N.

M. Steenstrup, and Professor Rafn, also gave information on this subject. M. Jomard read a letter from M. Fontanier, dated Constantinople, Sept. 6, and calling the attention of geographers to the inaccuracy of the maps in respect to the coasts of the Black Sea. He intended to follow the coast to Trebisonde, in a small boat, and to lay down with care the mouths of the rivers.

Captain d'Urville made a very extended report on Mr Buckingham's project of a voyage of circumnavigation.

Nov. 19. M. Rafn communicated a description of a Runic monument discovered on the east coast of Greenland.

M. Graberg de Hemso sent a notice on M. Caillié's Travels, discussing the different denominations given by travellers to the city of Timbuctoo.

Dec. 3. Colonel Poinsett presented several works on Mexico, Florida, and the State of Michuacan; and recommended particularly to the support of the society, M. Franck, a distinguished artist, who had made a very curious collection of Mexican antiquities.

Dr Reinganum addressed to the society a notice on the globes and maps in relief of M. Kummer. See GEOG. COLLECTIONS, p. 233, *supra*.

M. Jomard announced that M. Henri Ternaux was on his return from travels in America.

Captain D'Urville communicated to the Society a table of observations on the temperature of the sea at different depths, made by him during the voyage of the Astrolabe.

M. Rifaud read some remarks on Egypt from his journal.

Dec. 10. *General Assembly.*—The Duc de Doudeauville, peer of France, titular president of the society, opened the meeting with a neat address.

M. Jouannin then read his report of the proceedings of the last year, (See the last number of this Journal, p. 150.)

The Assembly elected MM. Dufour, Gualtier d'Arc, Caussin de Perceval, and Ansart, the members of the central commission for the succeeding year.

Dec. 17. M. Barrow wrote to the society, with a copy of the Report of the Committee of the Astronomical Society of London, relative to the improvements of which the *Nautical Almanac* is susceptible; and with it was a specimen of the changes, additions, and improvements proposed to be made in this work for 1834.

The society received, in competition for the prize of 1830, a memoir on the barometric levelling of Cevennes.

M. Eyriès corrected the orthography of some of the names of places in the notice of the east coast of Greenland. (*These corrections will be given in our next Number, as* addenda *to the notices of Capt. Graah's Expedition,* pp. 99, and 161, *supra.*)

The central commission elected Baron Walcknaer, President; MM. Jomard and Bonne, Vice-presidents; and M. Jouannin, General Secretary, for the ensuing year.

Great Scientific Meeting to be held at York.—Arrangements are now making for holding at York, in July or August next, a meeting of the cultivators of science from every part of the British Islands. The object of the association is similar to that of the German Society of Naturalists and Philosophers. The sittings will continue for a week. The Lord Mayor, and the authorities at York, have, as might have been expected, entered heartily into this plan, and the Philosophical Society of that city have kindly offered to charge themselves with any preliminary arrangements which may be necessary.

Scientific individuals who propose to attend, or to become members of the association, are requested to communicate their intention to John Robison, Esq. Secretary to the Royal Society of Edinburgh, who has undertaken to act as secretary till the association be constituted. Such communications will of course be post paid.

Meeting of Naturalists at Hamburgh, in September, 1830.—(Proceedings of the Botanical Section.)—Dr Mertens of Bremen was appointed President, Dr Siemers of Hamburgh, Secretary. Discourses were held by Count Sternberg of Prague, Baron Jacquin of Vienna, Professors Mertens of Bremen, Fischer of St Petersburgh, Agardh of Lund, Reum of Tharand, Runge of Breslaw, Hornschuch of Greifswald, Lehmann of Hamburgh, Horkel of Berlin, Wickström of Stockholm, Dr Berendt of Dantzic, Dr Siemers of Hamburgh, Messrs Booth and Staudinger of Flottbeck, and Mr Oldendorf of Hamburgh. Treatises and memoirs were given in by Professor Hunefeld, of Greifswald, and Dr Gaertner from Calw, in Wurtemberg, which were discussed in the sittings. Many specimens of dried plants were exhibited. A new *Syringa* from Siebenbürgen was described, and drawings of it exhibited by Baron Jacquin, under the name of *Syringa Josikæa,* from the Baroness Josicka, by whom it was discovered. Dr Steinheim, of Altona, exhibited a new arborescent *Polyporus* from Surinam, which was named by the section *Polyporus Agardhii,* in honour of Professor Agardh. Dr Henry Mertens had sent in several remarkable new *Fuci,* being prevented by ill health from attending the meeting personally. Count Sternberg exhibited as a supplement to his Primitive Flora, (Flora der Vorwelt,) drawings of vegetable impressions on stones, which belong to the newer as well as to the older epochs of the world. Among these were the remarkable impressions found on the Styrian Alps, at the height of 6000 or 7000 feet above the level of the sea. Among impressions belonging to the oldest periods of the earth, were many *ferns* and plants resembling *fuci,* also *palms,* and a fruit resembling that of the *Magnolia.* Dr Berendt of Dantzic exhibited vegetable remains imbedded in amber, by which some light was thrown on the ancient flora as well as on the origin of this interesting substance. Baron Jacquin exhibited a beautiful microscope, made by Plössel, of Vienna, which exhibited the entire field of view with the greatest clearness, under a magnifying power of 20, as well as with a power of 300 or 400 times. Professor Lehmann exhibited two living hybrids,—the one a hybrid *Potentilla,* the other a hybrid *Cactus.* Mr Booth shewed a plant sent from England belonging to the family of the *Dryandræ* and *Banksiæ.* Professor Lehmann shewed also the *Lindenbergia urticæfolia,* and Mr Booth some remarkable varieties of shrubs and trees from that part of Germany,—all of which were much admired. Professor Hornschuch brought before the section the important researches of Ehrenberg on infusorial animals; many of which had formerly been classed among plants. By a magnifying power of 400 times, these animals are shewn to possess organs formerly seen only in the higher animals, so that all these zoophytes must now be ranked amongst animals. (See p. 112 of the present Vol.) Professor Runge laid before the meeting the results of his experiments on chemical botany, shewing the importance of chemistry in directing to a true classification of plants. In reference to the physiology of plants, Professor Reum detailed some interesting facts and views concerning the course of the sap, the nourishment, and the freezing of plants. Professor Agardh gave a short outline of his views on the unity of vegetable forms, a contribution to botanical physiology. Professor Mertens gave an outline of the present state of algology. Professor Fischer exhibited the plan and arrangement of the Imperial Botanic Garden at St Petersburgh. Mr Oldendorf, of the Hamburgh Botanic Garden, explained what he found the most successful method of propagating some of the more difficult plants. Dr Steinheim sent a new *Dædalea* for determination. Dr Siemers exhibited several *fungi* which had grown upon insect larvæ. Mr Staudinger, of Flottbeck, spoke concerning the diseases of plants. One of the most important discussions, which engaged the botanical section, had reference to the desire that Dr Wallich might remain longer in Europe to communicate his rich collection of plants to the botanical world, as well as to finish his splendid engravings. The botanical section thought that a letter to his Majesty the King of England, and to the East India Company, might attain this end, and agreed therefore to request the general meeting to empower the office-bearers to subscribe the letters as an evidence that the wish of the entire society agreed with that of the botanical section. At the conclusion of the sitting, the president distributed among the members several of the rarer and more beautiful *fuci.*

MISCELLANEOUS INTELLIGENCE.

A Zoological Garden on the Surrey side of London.—On January 25th, a public meeting was held at the Horns Tavern, Kennington, for the purpose of establishing a zoological institution on the Surrey side of the metropolis, similar to the one already existing in the Regent's Park. It was stated that £10,000 would be required to carry into execution the objects of the meeting; and it was calculated that the expenses of purchasing animals, laying out the ground, buildings, &c. would fall within that sum. The money was proposed to be raised by 400 debentures of £25 each; the annual subscriptions, and the admission money received at the doors, to form a fund for the payment of interest. Resolutions, declaring the expediency of forming a Zoological Society, and stating the mode in which it was to be managed, having passed, a committee was appointed to carry the above-mentioned objects into effect.

A General Library and Museum for the County of Bedford are establishing at Bedford; and though the museum is yet in its infancy, it contains several hundred specimens of fossils, shells, birds, insects, and vegetables.

Mineralogical Survey of Scotland.—In our last Number, we hinted that all was not right with respect to this survey. We have since perused the report printed by the House of Commons, in which is exposed one of the most flagrant jobs that ever disgraced the annals of science. Surmises had been hazarded in conversation amongst scientific men, tending much to the discredit of a person who shall be nameless, as the supposed principal in this affair; but, since this exposure, it is but justice to this gentleman to let it be known, that it is Dr Macculloch who has pocketed the enormous sums granted for this survey, though he has not yet produced a single page or plan as evidence of its being expended for the public service. We refrain from making any remarks upon the Report, as it is our intention to give an analysis of the whole proceedings shortly.

A college has been founded at Cairo for teaching the sciences of agriculture and political economy.

Representation of Science and Education.—A motion has been made in the House of Lords by the Earl of Haddington for the return of members for the Scottish Universities, so that these schools may have their interests attended to as well as the universities of England. Differences of opinion exist as to the utility of such a measure; but, were the franchise liberal, and the dangers of the close system guarded against, we are inclined to think that very much advantage would be gained by the universities individually, and by the cause of education generally. At all events, there seems to be no good reason why one university should have a representative and another not; or why the divinity of Oxford and Cambridge should differ in this respect from the medicine of Edinburgh and Glasgow.

Bridgewater Prize.—The late Earl of Bridgewater left, by will, the sum of L.8000, at the disposal of the President of the Royal Society, for the purpose of "some person or persons being nominated and appointed by the said President to write and publish a work on the Power, Wisdom, and Goodness of God, as manifested in the Creation; illustrating such work by all reasonable arguments; as, for instance, the variety and formation of God's creatures in the animal, vegetable, and mineral kingdoms; the effect of digestion, and, thereby, of conversion; the construction of the hand of man; and an infinite variety of other arguments; as also by discoveries, ancient and modern, in arts, sciences, and the whole extent of literature." But, be it observed, the said Earl did not say, that this sum, being left to promote the increase of knowledge and advancement of science, should be given to him or them who produced the best Essay; but left the mode of employing the money to the judgment of the President of the Royal Society for the time being. Under these circumstances, Mr D. Gilbert, the late President, felt sufficiently the weakness of his own judgment; and "in order to place the whole transaction above even the suspicion of favouritism or partiality," he called in the aid of two distinguished prelates, the Archbishop of Canterbury and the Bishop of London. The success of his measures is now apparent in the result; for, "after much deliberation," they determined, not that the munificent legacy should be offered as a prize for the competition of Europe, but that the following eight gentlemen should be appointed to write the work:—

The Rev. William Whewell, M.A. F.R.S. Fellow of Trinity College, and Professor of Mineralogy in the University of Cambridge.

The Rev. John Thomas Chalmers, Professor of Divinity at Edinburgh.

John Kidd, Esq. M.D. F.R.S. Regius Professor of Medicine in the University of Oxford.

The Rev. William Buckland, D.D. F.R.S. Canon of Christ Church, and Professor of Geology in the University of Oxford.

Peter Mark Roget, Esq. M.D. Sec. R.S.

Charles Bell, Esq. F.R.S. Surgeon.

The Rev. William Kirby, M.A. F.R.S.

William Prout, Esq. M.D. F.R.S.

Whether the leisure of these gentlemen will give full play to their pre-eminent talents, we know not; but time will shew. In the interim, the President has the power of advancing £800 on the expectancy.

Collection of Insects to Sell.—This collection comprises all the Linnæan insects, that is to say, *Crustacea, Arachnida,* and insects proper. It is the fruit of twenty-three years' labour and expense. It is composed of about fifteen thousand species, comprizing nearly 32,000 individuals. More than one-third are foreign to France. Address to M. Polydore Roux, Conservator of the Cabinet of Nat. Hist. at Marseilles.

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ORIGINAL ARTICLES.

ART. I.—*On some New Species of Loaseæ.* By G. A. WALKER ARNOTT, Esq. F.L.S. F.R.S.E. &c.

THE following new species of *Loaseæ* were collected and given me by Dr Gillies. They are from the mountainous district which separates the province of Mendoza from Chile, comprising from about 32° to 35° south latitude.

BARTONIA.

1. *B. albescens.*—Caulis epidermide laxo niveo nitido, foliis sinuato-dentatis, capsula nuda 3-valvi, seminibus late marginatis.

B. albescens. *Gill. MSS.*

HAB.—In the Jarillal or uncultivated grounds between Mendoza and the mountains, generally by the side of dry water-courses, where water is only found after rain ; the elevation above the level of the sea is about 3000 feet.

This is a decided Bartonia, as far as regards ten petals, a placenta bearing two rows of seeds, and the seeds compressed and very numerous. But the leaves are not pinnatifid, nor are the flowers large, but, on the contrary, small; nor are they terminal and solitary, but in a sort of leafy panicle, each branch of which usually consists of one flower on an elongated peduncle, with another sessile near its base. This plant does not turn black in drying, as in the other species, and is readily distinguished from them by the beautiful white loose epidermis of the stem.

LOASA.

1. *L. prostrata.*—Caule prostrato flexuoso, foliis oppositis sessilibus cordato-ovatis exciso-angulatis, pedunculis axillaribus unifloris folio subduplo longioribus, lobis calycinis lanceolatis fructu longioribus petala æquantibus, capsulæ valvis setis longis rigidis arcte tectis, seminibus ovoideis maximis testa lævi.

L. prostrata. *Gill. MSS.*

HAB.—On la Cuesta de los Manantiales, Cerro de San Pedro Nolasco, in Chile. (April, 1826.)

This has all the appearance of a twining plant, but is really not so. It is covered with long, rigid, stinging hairs. The costæ on the fruit are straight.

2. *L. pallida.*—Caulis epidermide laxo nitido, foliis oppositis omnibus petiolatis ovatis grosse dentatis, paniculis oppositis axillaribus folio multo longioribus, pedicellis in dichotomia brevibus florem subæquantibus, lobis calycinis lineari-oblongis petalis duplo brevioribus.

L. pallida. *Gill. MSS.* Cavalluna, *nom. vern.*

HAB.—Loose debris, on the banks of el Rio del Yeso, near Arroyo de San Nicolas, in Chile, at an elevation of about 5000 feet. (March, 1826.)

This plant is most nearly allied to *L. sclareæfolia,* Juss.; but that does not appear to have the loose epidermis on the stem, and the leaves are much larger, and lobed; but we cannot speak of the radical leaves of our species, not having them before us. In Jussieu's plant, the pedicels in the fork of the panicle are elongated.

3. *L. coronata.*—Caule brevi, foliis oppositis petiolatis pinnatisectis, segmentis bipinnatifidis, lobulis denticulatis, pedunculis axillaribus 1-floris elongatis petiolum æquantibus, lobis calycinis pinnatifidis laciniis linearibus ovario longioribus, fructu maturo ovali, petalisque maximis dimidio brevioribus, seminis testa reticulata corrugata.

L. coronata. *Gill. MSS.*

HAB.—On both sides of the Cordillera of the Andes, between Mendoza and Chile, but most abundant on the eastern side, between Las Yseras and Las Cuevas (March, 1821); also found sparingly on the Uspallata range, near el Cerro Pelado. Elevation above the sea, from 8500 to 11,000 feet.

Whole plant covered with long, rigid, stinging hairs, but particularly the calyx and fruit. The mature fruit differs slightly from the character of the genus: it is oval, and bursts into three valves, from the base upwards; the placentæ then separate from the sides of the capsule, and have the appearance of three arched columellæ. Perhaps this may form a new genus. *L. acanthifolia,* judging by Jussieu's figure, has a fruit precisely similar.

This plant first makes its appearance at the Yseras, at an elevation a little above the Rio de Horcones, where it is pretty general. On descending into the extensive plain called Las Lenas, it disappears, and does not again shew itself until arriving at the Paramillo de las Cuevas, around the sides of which it is very abundant: from thence it appears frequently until ascending about two or three hundred feet above the beginning of the ascent to the Cumbre. On the other side of the Andes, a few plants only are seen near Las Calaveras. The general aspect of the plant is very peculiar; and on examining its whole economy, we are struck with the care taken by nature to protect the flower, and ensure its impregnation. It forms a large convex mass, rising one or two feet from the ground: the upper part is composed entirely of a great abundance of dark green leaves, along the margins of which, and protected by them, are arranged the large whitish flowers, forming one or two, or sometimes more circles or fillets, giving the whole a very singular and elegant appearance. The corolla, which is contracted towards its mouth, is of considerable size; the transverse section, at the widest part, being, in some cases, as large as that of a hen's egg. When the capsules are ripe, they are generally prostrate on the ground, the peduncle being too weak to support them.

4. *L. lateritia.*—Caule subnullo! foliis oppositis longe petiolatis pinnatisectis, segmentis rotundatis crenato lobatis, pedunculis binis unifloris terminalibus folium subæquantibus, lobis calycinis ovalibus tubum superantibus corolla dimidio brevioribus.

L. lateritia.—*Gill MSS.*

Hab.—Los Imposibles, near foot of descent from the Planchon towards Chile, and in El Valle de Fray Carlos, at the base of the Volcano of Peteroa, in Chile, at an elevation of about 9000 feet. (March and April, 1827.)

This species is readily distinguished by its large flowers of a brick red colour, and by its very short stems or radical branches, each of which bears one or two pair of opposite leaves, and between the upper pair of which arise two peduncles terminating the branch, each one flowered. The fruit has the costæ straight. The seeds are pale brown, (perhaps not quite ripe,) with a strongly reticulated testa, as in the next species; and, as in it, the hairs are short, and not stinging.

5. *L. pinnatifida.*—Caule suberecto, foliis oppositis longe petiolatis radicalibus inferioribusque pinnatisectis, segmentis pinnatifidis lobis rotundatis approximatis superioribus pinnatifidis, pedunculis axillaribus subunifloris, lobis calycinis ovatis fructu subdimidio et corolla multo brevioribus.

L. pinnatifida.—*Gill. MSS.*

Hab.—La Cuesta del Inga, in Chile, at an elevation of about 9000 feet. (March, 1826.)

Plant clothed with short, rigid, but not stinging hairs. Tube of the calyx and fruit with straight, not spiral ribs. Seeds with a black and prominently reticulated testa.

ART. II.—*Notices of the Anatomical Structure of the Lion,* (Felis Leo,) *as observed upon Dissection, in relation to the Habits of the Animal, as described by Travellers.* By HENRY H. CHEEK and T. W. JONES.

(*Concluded from* p. 224.)

THE lion advances by leaps, and springs upon his prey; his motions are sudden and prompt, but of short continuance. In the locomotive organs, we find an ample explanation of these facts.

The bones of the extremities are thick and short; the scapula is elongated; and the clavicle a mere rudiment, lying as an isolated bone in the muscular mass of the shoulder. Thus it is apparent, that, as respects the framework of the locomotive organs, strength and a certain facility of motion will be combined. The muscles are also formed with the same view,—remarkably thick, and inserted so as to give great power, but a limited extent of motion. Thus the pectoral muscle, arising by four heads from the sternum, the acromio-sternal ligament, the ligamentum nuchæ, and the linea alba, is inserted into the whole length of the humerus. And thus the flexors of the fore-arm arise, as four large muscles, from the sternum, the acromio-sternal ligament and clavicular bone, the tuberosity which represents the coracoid process, and from the outer surface of the humerus; and are inserted, by a common tendon, into the anterior part of the radius.

The lion tears his prey by the conjoined action of his teeth and claws; pressing the animal to the ground with his feet, and tearing it to pieces by the powerful motions of his neck.

The muscles which are employed in this action are the largest in the body; the great erectors of the neck, peculiar to this tribe, at least in function, and the great extensors of the fore-arm. But neither our limits nor the nature of this paper, permit of our entering into a particular description of these organs, which have, moreover, already been accurately described and figured by Wolff and Rudolphi.*

During the laceration of the prey, the claws are amongst the most powerful organs in action; and, as they present some interesting peculiarities, we may be permitted to enter somewhat into detail.

The remarkable mechanism of the claws of the cat tribe has, from a very early period, excited the admiration of the naturalist. Pliny (lib. viii. c. 15.) remarks, that the nails of the lion are retracted within a sheath whilst walking; and Plutarch (*Lib. de*

* For a description of the muscles of the shoulder and arm, *see* Wolff, de Leone Obs. Anat. *Nov. Comm. Petrop.* xv. 517.; and, for the muscles of the fore arm, *vide* Rudolphi, *Beitrag zur Anatomie des Löwen.* Pamphlet, in 4to, Berlin, 1820.

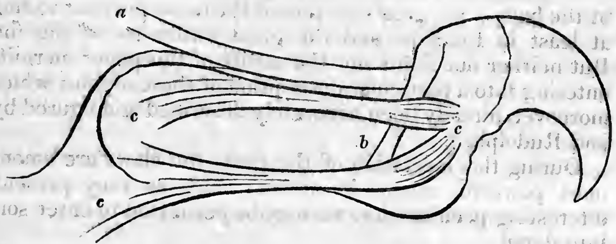
Curiosit.) describes a peculiar articulation of the last phalanx of the toes; and, in fact, the nails are both retracted within a sheath whilst walking, and peculiarly placed with relation to the bones of the toes.

To preserve the points of the claws constantly sharp, it is necessary that they should not rub on the surface of the ground; and we consequently find them always directed with their points upwards, and sunk in the hair on the upper surface of the toes. Desmoulins thinks that this also contributes to the noiseless tread of the animal.

The means by which the claws are preserved in this state of retraction during the passive condition of the animal, is not the least remarkable part of the mechanism: by the disposition of ligaments composed of the yellow elastic tissue, whose property it is always to remain in a state of contraction, until acted on by an extending force, the claws are constantly kept in this condition, except during the action of the flexor muscles.

These ligaments were described* and figured by Perrault,† but in an inaccurate manner, the extensor tendon of the joint being mistaken for the retracting ligament of the claw. And as his figure is associated with other inaccuracies in a publication issued by the Society for the diffusion of Useful Knowledge, before alluded to, we have thought that a correct diagram of this beautiful mechanism would not be out of place, and would at the same time interest those who admire the wonderful contrivances which are displayed in providing for the necessities of living beings; contrivances, of which this is a very striking example, as being founded on a mere physical property of matter supplying the place of a vital contraction, which the animal would have been unable to maintain in permanent action.

Fig. 1.



In the annexed diagram, Fig. 1, in which the claw is extended to shew the retracting ligaments, *a* represents the extensor

* The description given by M. Cuvier of these ligaments is remarkably meagre and incorrect. "Cette position reversée, dit-il, est celle du repos. La phalange y est maintenue par deux sortes de ligamens; savoir *la capsule articulaire, et deux ligamens latéraux* qui viennent de la seconde phalange."—*Anat. Comp.* I. 312.

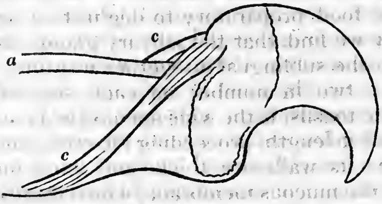
† *Mémoires pour servir à l'Hist. Nat. des Animaux,* 1758.

tendon inserted into the last phalanx of the toe; *c c c* indicate two lateral elastic ligaments, which are, however, sometimes condensed into one; *b* is the proper retracting ligament of the claw.*

We have said that the claws are retracted, so that the points are hidden in the hair; but for this purpose it is evident that the heel of the claw must attain a lower level than that which it possesses in the extended state; and we find this effected by the last phalanx, to which this nail is attached, being articulated to a tubercle on the outside, and not absolutely to the extremity, of the second phalanx, as in other animals.

In the thumb, or internal finger of the forefoot, the last phalanx is directly articulated to the extremity of the preceding bone, and is consequently incapable of that degree of retraction which is possessed by the other claws, and which would indeed be unnecessary in this toe from its being placed at a sufficient distance from the ground to prevent attrition.† In this case what we have called the proper retracting ligament is not present, but two lateral ligaments may be said to combine its disposition with that of the lateral ligaments of the other toes.

Fig. 2.



In fig. 2. *a* represents the extensor tendon; *c c* the two lateral elastic ligaments of the thumb extended.

The nails are inserted into the last phalanx by a peculiar kind of double articulation, of which Perrault has given a bad representation; the bone and the nail are dovetailed into each other by means of processes and fissures. As the nails do not continue to grow, from not being so much worn as in other animals, the layer of the skin underneath them is of inferior vascularity, and almost entirely converted into periosteum.

We have now terminated our notices of the organs of relation, and proceed to the consideration of the organs of the nutritive functions.

* This ligament, when fully extended, is one and three-eighths inch long, but when contracted, measures only half an inch in length.

† Perrault is, however, incorrect in saying that the peculiar structure of the toes does not obtain in the thumb, which, he states, is only flexed forwards, or, in other words, is not capable of any retraction.

The digestive system, the great centre from which all the physical peculiarities of animals are reflected, and from the observation of which they may, for the most part, be predicated, assumes in the lion, as one of the *carnivora*, a marked influence over the habits and mode of life. It would be superfluous here to dwell upon those characters of this system which are so well known; we must restrict ourselves to brief allusions to such portions of the structure as present any thing remarkable.

The dental apparatus of the feline tribe is the most simple which occurs in the carnivora, and the most appropriate for the laceration of flesh. In the lion, it differs from the common cat merely in the degree of development. The incisors have the form of blunt wedges, and, opposed crown to crown, are adapted rather for crushing than cutting. The canines are conical, and remarkably powerful, and the molars are sharp, and so arranged as to be rather suited for cutting than grinding.

Connected with the functions of the teeth, we may again refer to the spines which crown the papillæ of the tongue, and which are indeed themselves, abstractedly speaking, to be looked upon as rudimentary teeth.

As the lion feeds on flesh still soaked with fluid blood, it is apparent that a less abundant secretion of saliva will be required to moisten the food preparatory to deglutition and digestion; and accordingly we find, that the salivary glands are particularly small, and even the sublingual altogether wanting. The tonsils are also small; two in number on each side of the fauces. Anteriorly to the tonsils, is the wide opening of a pouch about two inches and a half in length, proceeding forwards, and terminating in a cul-de-sac; its walls are thick, and lined internally by a continuation of the mucous membrane, which there becomes very spongy, vascular, and follicular. We have seen a similar sac in the common cat, although we are not aware under what name it has been described by authors.

It is stated by Cuvier, that the muscular fibres of the œsophagus have a spiral direction in the Cats.* This disposition did not occur in our dissection; the external fibres were longitudinal, the internal circular. Transverse folds of the lining membrane formed interrupted rugæ, which were not continued round the whole circumference, but so arranged as to have an imbricated appearance.

In proportion to the difference between the nature of the food and the textures of the animal to which it is to be assimilated, is the digestive system more or less complex. In the lion, then, we should expect the lowest degree of complexity; and our anticipation is realized, by the examination of the stomach, which, according to the acknowledged definitions of this organ, is extremely simple,—and of the intestines, which are short, and provided with a particularly small coecum.

* *Anat. Comp.* III. 367, where this organ is otherwise well described.

It may be here mentioned, that, near the opening of the anus, there are two anal glands, which secrete a thickish yellow fluid.

Connected with the rectum, there is a muscle, which does not appear to have been particularly described in this animal. Arising from the second caudal vertebra, and interlacing its fibres with those of the depressor muscles of the tail, it proceeds in a thick fleshy band to be inserted, by a fan-like expansion, into the upper part of the rectum, about three inches from the anus. Its use would appear to be to protrude the anus.

It is a remarkable statement made by Perrault, that the heart of the lion is much larger in proportion than in any other animal. In the specimen under our inspection, this certainly was not the case; and the opinion which we had formed of the comparatively small size of the lion's heart receives confirmation from the subjoined paragraph from the excellent memoir of Wolff.*

The statement of Perrault seems, however, to be allied to a popular prejudice, that, on account of the supposed courage of the lion, its heart must be proportionably large; and hence the term *lion-hearted.* But, as we have already stated, the lion, however majestic his air and movements, is a cowardly and treacherous beast.

It appears to be unnecessary to enter into any minute description of the anatomy of the heart, after the accurate memoir of M. Wolff, above referred to. It may, however, be mentioned, that the general internal structure of this organ would appear to be disposed so as to increase its capacity, while its dimensions are small; the *columnæ carneæ* being much flatter, thinner, and fewer in number, than in the human heart, or perhaps that of any other animal.

The area of the great blood-vessels is small, compared with that of the heart; Wolff remarks, that the aorta is almost twice larger in proportion to the ventricle in man than in the lion. This relative difference is an interesting fact, when the highly developed state of the muscular and osseous systems are considered. In the *graminivora,* we observe a contrary disproportion in the size of the heart and vessels; and in man it may be

* "Magnitudo autem cordis, quam determinare in superioribus pollicitus sum, pro mole corporis parva esse videtur. Longitudinem cordis vidimus esse 5 poll. 3 lin. Longitudo corporis a symphysi maxillæ inferioris, capite erecto, usque ad symphysin ossium pubis, vel etiam a naribus usque ad principium caudæ erat pedum 5 et 11 poll. Mediocre cor humanum longitudine gaudet 4 poll. et 10 lin. ergo homo mediocris staturæ, si cor leonis proportionatum esset cordi humano, mensura sumta a vertice capitis usque ad ossa pubis, vel ad principium ossis coccygis esse deberet 5 pedum et 5 pollicum. Jam pars corporis humani a vertice capitis usque ad ossa pubis dimidiam circiter totius hominis longitudenem efficit. Ergo homo mediocris, si cor leonis humano proportionatum esset, longitudine esse deberet 10 pedum et 10 poll. quam gyganteam magnitudinem, cum vix quisquam mortalium habeat, patet cor leonis pro mole corporis insigniter parvum esse."—*De corde Leonis.* Nov. Comm. Petrop. xvi. 471.

occasionally observed, that the area of the great vessels in weak, leucophlegmatic, and old persons is considerably more capacious than in the young and robust.*

From the relative size of the cavity of the ventricles and the area of the blood-vessels, it is deducible that the velocity of the circulation must be greater in the lion than in man; and Wolff, alluding to the debility arising from the retardation of the circulation in the vessels of the surface, when distended by warmth, and the contrary condition which occurs in cold weather, and to the increased mental excitement caused by the rapidity of the circulation during acute fever, and the cessation of these symptoms after venesection, advances the opinion that agility and ferocity belong to the lion, on account of the peculiarities of its vascular system. But it will be sufficient to remark, that the lion is neither agile nor ferocious, except when in search of food; he is, on the contrary, sluggish and forbearing. We need not refer to the opinion that he is noble, from his refusing to injure what he cannot use, and would rather ally his fits of agility and ferociousness to temporary changes in the respiratory process, than to any permanent difference in the relative capacity of the heart and vessels. And, besides, certain *graminivora* are both agile and ferocious, without possessing this disproportion in the parts of the circulating system.

We have, however, already extended these notices to too great a length, and must restrict ourselves to the remark, that the generative system presents nothing which seems to require notice, excepting, perhaps, the presence of the *transversalis penis,* that muscle which has lately attracted so much of the attention of our friend Mr Houston.†

This muscle is small in the lion; it arises from the ramus of the pubis and crus penis, and is inserted into a tendon attached to the symphisis pubis, and into the tendon of its fellow of the opposite side; it certainly passes over the venæ dorsales in such a way as to prevent any compression of these vessels.

In concluding this sketch, it will be sufficient to remark, that though the technicalities of anatomy could not well be supplied by vernacular terms, we have sought to avoid, as far as possible, any scientific detail, which might be tedious to the general reader.

* It may be here suggested, that whilst, as remarked by Söemmering, the brain in man is larger in proportion to the nerves than in the lower animals, we observed in the lion, that the nerves are small, though the brain is of considerable size; thus approaching to the condition of the nervous system in man. The small size of the nerves is connected with the fact, that strength and not variety of motion is the characteristic of the muscular development of the lion.

† We may take this opportunity to say, in reply to Mr Houston's complaints, that we hope he will dispel from his mind the recollection of our having joked him on the revival of this old story.

Art. III.—*Notice of Professor Muller's Recent Discoveries on the Structure of the Eyes of the Gasteropodous Mollusca.* By the Editor. (*With a plate.*)

The structure of the eyes of insects* and mollusca, has recently been the subject of careful investigation with continental anatomists. The labours of Professor Muller, of Bonn, have been particularly successful in this branch of anatomy, and we conceive, are entitled to especial attention. And having in our possession a minute and accurate description of the eye of one of the *cephalopoda*, the highest family of the mollusca, by our friend Mr Jones, we think that there cannot be a more fitting place than this, for the introduction of a notice of Muller's account of the anatomy of the eye of the *gasteropoda*, the second division of the same great order.

In the snails, as in most other *gasteropoda*, the eyes are found at the extremities of the largest tentacula. These tentacula, when extended, may be represented as formed of two portions, one basilar, and the other terminal. During the retraction of the tentaculum, the latter portion entering the other, becomes internal,—a change which is effected by the contraction of the muscular fibres which surround the walls.

Plate VIII. Fig. 1. represents the interior of the tentaculum of the snail (*Helix pomatia,*) in the state of extension. *a,* The nerve of the tentaculum; *b,* the fleshy cylinder; *c,* the external skin of the tentaculum, which is joined at *d* with the fleshy cylinder; *e,* the eye, situated a little laterally.

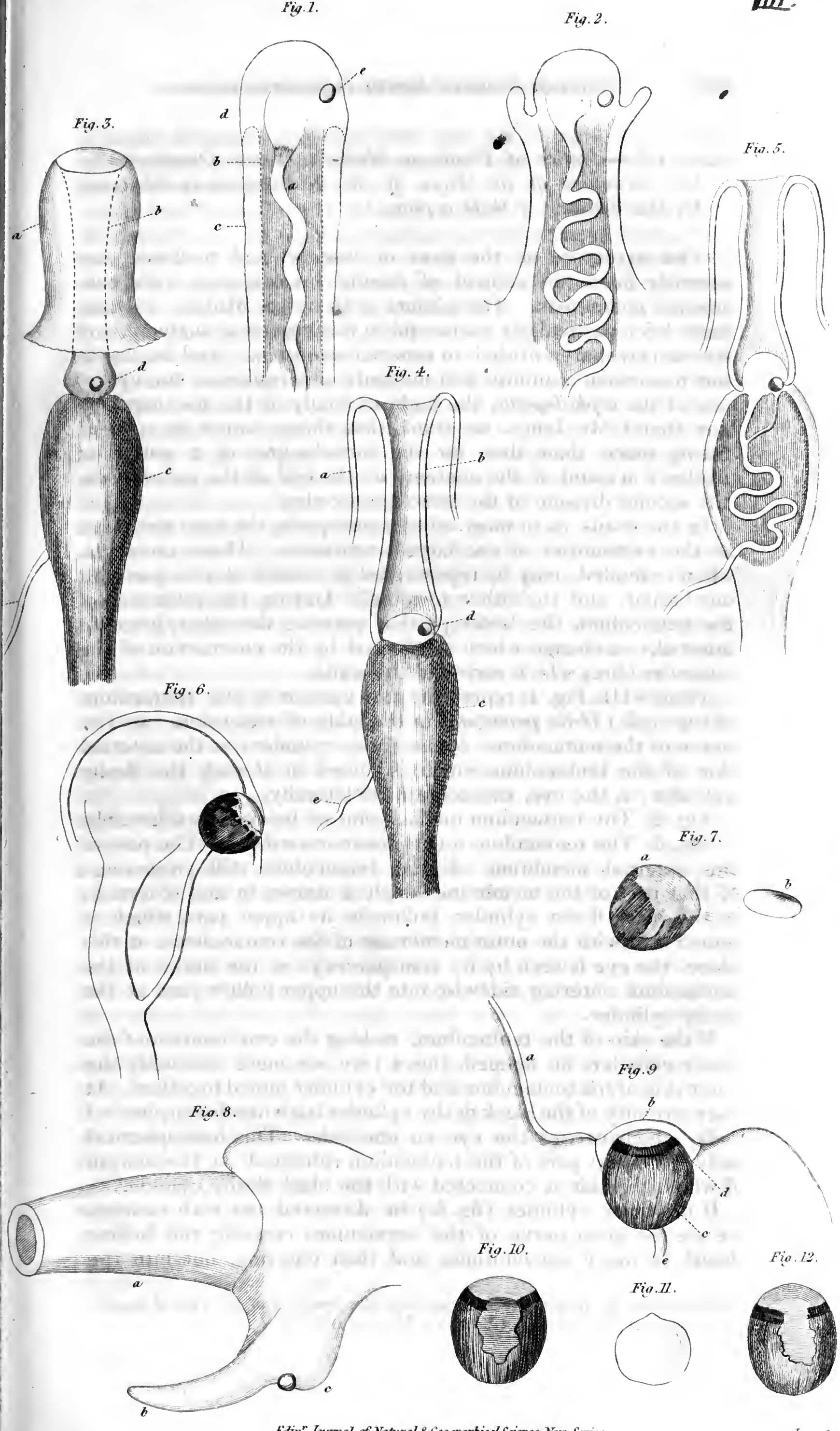
Fig. 2. The tentaculum on the point of being drawn inwards.

Fig. 3. The tentaculum much drawn inwards. *a,* The part of the external membrane of the tentaculum still projecting; *b,* that part of the membrane which is drawn in and reverted; *c,* the black fleshy cylinder, hollow in its upper part, which is joined at *d* with the outer membrane of the tentaculum; at this place, the eye is seen by its transparency: *e,* the nerve of the tentaculum entering sidewise into the upper hollow part of the fleshy cylinder.

If the skin of the tentaculum, making the continuation of the fleshy cylinder, be opened, (fig. 4.) we see more distinctly the outer skin of the tentaculum and the cylinder joined together. At the extremity of the black fleshy cylinder is a white hemispherical body, which carries the eye on one side. This hemispherical body is the last part of the tentaculum retracted, at the margin of which the skin is connected with the black fleshy cylinder.

If the black cylinder (fig. 5.) be dissected out with caution, we see the great nerve of the tentaculum crossing this hollow sheath in many convolutions, and then entering, not into the

* An account of Muller's investigations into the structure of the eyes of insects, may be found in No. XVIII. of Loudon's *Mag. of Nat. Hist.*



Lizars Sculpt.

ually situated eye, but into the outer extremity of the tentaculum, and there terminating in a papilla, which is covered by the external skin.

The eye, situated at the side of the obtuse extremity of the tentaculum, (fig. 6.) is almost spherical, a little flattened anteriorly. It is covered in front by a very thin transparent layer of the external skin, and is surrounded, laterally and posteriorly, by an entirely black choroid. This black globule contained, in all the individuals examined by Muller, a transparent and semifluid substance, apparently entirely filling the eye; at the bottom it seemed more fluid, and appeared to contain many brilliant particles, when the eye was dissected under the microscope. In the anterior part of the eye is a small discoid, or lenticular body, (fig. 7. a. b.) perfectly clear and transparent, and composed of the same semifluid matter which filled the bottom of the eye, differing only from it in being a little more dense. In all the specimens of the snail which Muller examined, the transparent matter was not solid, and the discoid crystalline was semifluid and compressible. In the Helix Pomatia, this lenticular portion is quite hard, and of a globular form.

One principal fault in the [illegible] which have hitherto been made is, that the great nerve of the tentaculum has been taken for the optic nerve itself. This nerve, though very small, is, however, larger than the eye, [illegible] containing delicate [illegible]; it passes at the obtuse extremity of the tentaculum into a great white pillar, which has been erroneously considered to be the ganglion of the optic nerve. The true optic nerve is, however, but a very minute branch of the tentacular nerve, which is given off to the eye at an acute angle, about [illegible] from the extremity of the great nerve, (fig. 6.) [illegible] which is extremely [illegible] examination; but after repeated [illegible] the fact is established [illegible] (fig. 6.) [illegible]

Some authors, upon experiments, have supposed that the snail cannot see [illegible]; these experiments, however, seem to be inaccurate, as [illegible] and Steifensand have remarked, that [illegible] when a straw is held at the distance of [illegible] four lines from its eye, but without touching [illegible], that the animal was thus made to [illegible] to the other. He also remarked, [illegible] glass was presented, the animal [illegible] the glass was touched.

We thus see that [illegible] eye containing [illegible] organ of sight [illegible] at the side of a tentacle [illegible] and is provided with [illegible] eye is [illegible] externally [illegible] laterally situated eye, but into the round extremity of the tentaculum, and there terminating in a papilla, which is covered by the external skin.

The eye, situated at the side of the obtuse extremity of the tentaculum, (fig. 6.) is almost spherical, a little flattened anteriorly. It is covered in front by a very thin transparent layer of the external skin, and is surrounded, laterally and posteriorly, by an entirely black choroid. This black globule contained, in all the individuals examined by Muller, a transparent and semifluid substance, apparently entirely filling the eye; at the bottom it seemed more fluid, and appeared to contain many brilliant particles, when the eye was dissected under the microscope. In the anterior part of the eye is a small discoid, or lenticular body, (fig. 7. *a. b.*) perfectly clear and transparent, and composed of the same semifluid matter which filled the bottom of the eye, differing only from it in being a little more dense. In all the specimens of the snail which Muller examined, the transparent matter was not solid, and the discoid crystalline itself was semifluid and compressible. In the *Murex Tritonis*, this lenticular portion is quite hard, and of an amber colour.

One principal fault in the investigations which have hitherto been made is, that the great nerve of the tentaculum has been taken for the optic nerve itself; this nerve, though very small, is, however, larger than the eye, which is remarkably delicate; it passes at the obtuse extremity of the tentaculum into a great white pillar, which has been erroneously considered to be the ganglion of the optic nerve. The true optic nerve is, however, but a very minute branch of the tentacular nerve, and is given off to the eye at an acute angle, about a line and a half from the extremity of the greater nerve, (fig. 6.) This branch, which is extremely small, will escape observation without careful examination; but, after repeated dissection, the accuracy of the fact is established.

Some authors, in consequence of different experiments, have supposed, that the snail cannot see. These experiments, however, seem to be inaccurate, as MM. Leuchs and Steifensand have remarked, that the snail turns away its tentacula when a straw is held at the distance of from two to four lines from its eye, but without touching it. M. Steifensand states, that the animal can thus be made to move from one side to the other. He also remarked, that when a transparent piece of glass was presented, the animal touched it, but not when the glass was coloured.

We thus see that the snail is provided with the rudiment of an eye containing transparent parts; and that it is not the only organ of sense in the tentaculum, being situated at the side of a large papilla, which performs the function of touch, and is provided with a distinct and much larger nerve than the eye.

It is known that the eyes of the *murex* are situated externally to the tentacula, on a small eminence; so that their axis is almost in the same direction as that of the tentacula. The surface of the eye is convex; but this convexity is surrounded by a little elevated margin, formed of the substance of the tentaculum. It is not very difficult to raise the eye with a sharp needle. We then procure a globule, of a grayish black colour, whose longitudinal diameter in the axis of the eye is somewhat greater than the transverse diameter. The substance of the tentaculum forms the external circular margin of the eye: a very delicate membrane passes over the surface of the globule; and this, which may be considered as the cornea, is distinctly separated from the surface of the globule. Muller is convinced, that there is between this cornea and the rest of the eye, a small space, which advances to the anterior third of the eye. Posteriorly, the eye is imbedded in the substance of the tentaculum. It is probable that, during life, a fluid may be contained in this contracted space.

The eye, situated under this transparent lamina, is composed externally of a grayish black membrane, which passes on the anterior surface into an iridiform black ring, and which is perforated in the middle by a very distinct pupil; hence it results that the eye seems more opaque externally. The cornea-form epidermis passes a little farther than the external circumference of the obscure margin.

At the posterior surface of the eye the optic nerve enters, being a branch of the nerve which supplies the tentaculum. On opening the eye with a needle, under the microscope, the internal surface of the choroid is seen to be almost entirely black, and containing a hard round body, which entirely fills the choroid. The central body of the eye is of a somewhat irregular figure, very hard, and of the colour of amber; to its surface is attached here and there a whitish film, probably the rest of the retina which could not be seen separately in the interior of the eye. The crystalline, when cleared, is semitransparent, resembling generally the crystalline as described by Muller, in the eyes of the *Arachnida*, when they have been preserved in spirits; it is difficult to say whether it should be called a crystalline or a vitreous body.

Plate VIII. Fig. 8. Situation of the eye of *Murex Tritonis* at the side of the tentaculum, of its natural size. *a*, The proboscis; *b*, the anterior part of the tentaculum, endowed with the sense of touch; *c*, the eye on an eminence at the base of the tentaculum.

Fig. 9. A portion of the preceding figure much magnified, and showing in its situation the eye in the substance of the tentaculum, and under the thin skin. *a*, The margin of the tentaculum raised round the anterior convexity of the eye; *b*, the epidermis or cornea; *c*, the choroid; *d*, its anterior black iridiform margin, with the pupil; *e*, optic nerve.

Fig. 10. The choroid opened, to shew its internal black surface. The crystalline is removed.

Fig. 11. The crystalline alone.

Fig. 12. The crystalline contained in the choroid.

The next higher family of Mollusca is the *Cephalopoda*, the greater complexity and peculiarities of whose eye are in perfect accordance with the remarkable anomalies which distinguish this from all other animals. The anatomist who is acquainted with the nature of our previous knowledge of the structure of this organ, will be able to appreciate the corrections which Mr Jones has been enabled to deduce; and the general reader will be struck by the comparison of the preceding descriptions with the following notice.

To compare the functions of these organs is impracticable in the present state of our knowledge.

ART. IV.—*Description of the Eye of the Cuttle Fish,* (Loligo sagittata.) By T. W. JONES.

THE eye is a perfect optical instrument, composed of membranes and humours of different degrees of density, which transmit and converge the rays of light; so that they may exactly impinge on the sensitive part of the organ. But as water has a density different from air, and as difference in density has an influence on the mode of transmission of light, it follows that the eye, which can see in air, shall not see in water. This difference has been provided for. Does an animal live on the surface of the ground?—the cornea is moderately projecting, and the crystalline lens rather flat. Does the animal soar to great heights?—the cornea becomes more projecting, and the crystalline lens flatter. Does the animal live in water?—the cornea is quite flat, and the crystalline lens spherical.

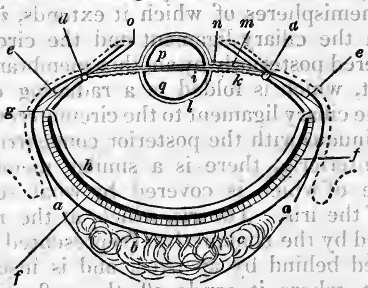
Such are the modifications, (founded on optical principles,) of the eye in different animals; but if we meet with one, the eye of which, (at first sight very large, and highly organized, and, therefore, apparently well adapted for vision,) presents certain structures, incompatible with the usual function of an eye, we are struck with the anomaly, and are induced to exclaim,—"What can be the use of this organ, in some respects so highly organized, and in others so imperfectly adapted for vision?"

On the structure of the eye of the cuttle fish, which possesses the peculiarities I have described, I propose to make some remarks, and endeavour to correct the confusion in which the anatomy of this organ is involved, by the inaccurate and vague descriptions given by those who have treated of it. *

In the *Loligo sagittata*, the opening of the eyelids is sufficiently large to allow the crystalline lens to project. At the margin of

* Whether the doctrine of unity of organization can, or can not, be extended to the *invertebrata*, it is difficult at present to decide. Until, however, it is satisfactorily proved, either one way or the other, we must speak of the organs of the *invertebrata* always with a reference to those of the *vertebrata*.

the opening, the skin is reflected like the conjunctiva in man; but does not so suddenly pass upon the eyeball, which is consequently covered by it to a greater extent. It is very thin at its reflection on the eyeball, but afterwards becomes somewhat stronger, and again thin at the margin of the aperture, where the cornea is wanting. Here it joins a membrane, which may be called the iris, as its relations are exactly the same as those of that membrane in the higher animals.



The sclerotic is divided posteriorly into two layers, *a a*,* (in the annexed figure,) between which the ganglion-like optic nerve *b*, and a peculiar white lobulated body, *c*, are contained. It is here perforated by a great number of holes, for the passage of the filaments of the optic nerve, which, at their origin, cross each other. Anteriorly, the sclerotic is open, so as to make it appear that the cornea is wanting; but this, I am inclined to suppose, is not exactly the case, and would rather say, that the cornea is present, but perforated in the middle; all that part of the sclerotic between *d d*, which I consider as the ciliary ligament, and the opening through which the crystalline lens projects, appearing to be analogous to the circumference of the cornea.

A choroid is altogether wanting, unless a delicate membrane, *e e*, which arises from the inside of the most projecting part of the sclerotic, may be considered to be a rudiment of this coat. It proceeds forwards as far as *d*, the ciliary ligament, after having joined the fibrous, or outer layer of the retina. When the sclerotic is removed, we see what has been termed the nervous part of the retina, but this, I think, should not be called any part of the retina, being only the filaments of the optic nerve, before their extremities have passed through *f f*, the fibrous layer of the retina, to terminate in the nervous part, which is distinguished by the short lines. The nervous part of the retina, the inner surface of which is covered by a dark purple pigment, proceeds forwards as far as the great circumference of the eyeball, *g*, where it and the pigment terminate. At this point, the hyaloid membrane, *h*, which differs from that of the higher animals, in not entirely surrounding the vitreous

* Cuvier considers the outer layer as a peculiar membrane.

humour, is inserted into the outer, or fibrous layer of the retina, which now proceeds forwards, lined internally by a dark pigment, differing in tint from that which covers the inner surface of the nervous part of the retina, as far as the ciliary ligament *d*, a little behind which, as I have said, it is joined by what I am inclined to consider a rudiment of the choroid *e*. At the ciliary ligament, this fibrous layer of the retina is reflected, and passes straight across to the crystalline, between the anterior and posterior hemispheres of which it extends, *i*. This membrane, between the ciliary ligament and the circumference of the lens, is covered posteriorly by another membrane, *k*, coloured with a pigment, which is folded in a radiating direction, and extends from the ciliary ligament to the circumference of the lens, where it is continuous with the posterior concentric laminæ, *l*, of that body. Anteriorly, there is a similar membrane, *m*, the anterior surface of which is covered by what seems to be a reflection, *n*, of the iris. The iris, which, at the margin of the pupil, *e*, is joined by the conjunctiva, (represented by the dotted line,) is covered behind by an uvea, and is inserted into the ciliary ligament, where it sends off the reflection, *n*, which covers the anterior surface of the crystalline. The crystalline, which is spherical, resembles in structure that of the higher animals; but is composed of an anterior, *p*, and posterior, *q*, hemisphere, joined to each other, through the medium of the fibrous layer of the retina, which passes between them, and the folded membranes, on its anterior and posterior surface,—parts which are analogous to the ciliary processes in the higher animals, the anterior folded membrane corresponding to the true ciliary processes, and the posterior membrane to the structure, called the zonule of Zinn. The vitreous humour is not contained in cellules, but flows out when the hyaloid is punctured, or when the anterior part of the eye is destroyed.

ART. V.—*Geographical Position of the Principal Places on the Frontiers and Interior of the Province of Buenos Ayres.* By JOHN GILLIES, M.D. Member of the Wernerian Society, &c.

THE following positions were originally published in the *Registro Estadistico*, a periodical register brought out under the auspices of the government of Buenos Ayres. This publication was commenced in February, 1822, with the view of investigating the statistics and geography of the province, and of affording an opportunity of publishing all the most important documents connected with this subject which were to be found in the public archives of Buenos Ayres.

The data from which these geographical positions were laid down, were the astronomical observations made in 1796 by Don Pedro Antonio Cervino, geographical engineer, and Don Juan Inciarte of the Spanish marine.

	S. Lat.			W. Long.		
Buenos Ayres,	34°	30′	29″	58°	23′	34″
Villa de Lujan,	34	38	36	59	24	44
Guardia de Lujan,	34	40	15½	59	48	48
Fortin de Areco,	34	23	15	60	12	57
Guardia del Salto,	34	18	57	60	38	23
Guardia de Rojas,	34	11	48	61	5	13
Fuerte de Mercedes,	33	55	18	61	27	48
Fortin de Melinque,	33	42	24	61	54	12
Mauantiales de Pineiro, Pampas,	34	18	36	61	40	30
Laguna de Rojas,	34	19	7	61	26	30
Laguna de Carpincho,	34	35	31	61	16	18
Lagunas de Casco,	35	7	58	60	35	48
Laguna de Palantelen,	35	10	15	60	30	8
Laguna de los Huesos,	35	14	30	59	58	18
Laguna del Trigo, west of El Salado,	35	14	3	59	38	28
Cerrillo de los Mauantiales,	35	40	56	58	44	34
Laguna de los Porongos,	35	54	50	58	21	39
Altos de Troncoso,	36	5	30	58	1	48
Guardia de Chascomus,	35	33	5	58	1	14
Fortin de los Ranchos,	35	30	46	58	20	14
Guardia del Monte,	35	26	7	58	54	44
Fortin de Lobos,	35	16	7	59	15	44
Fortin de Navarro,	35	0	13	59	26	59
San Isidro,	34	28	2	58	31	44
Conchas,	34	25	15	58	33	5
Pilar,	34	26	4	59	16	28
Cauada dela Cruz,	34	20	44	59	25	31
Areco,	34	11	57	59	50	21
Arrecife,	34	3	8	60	29	47
Pergamino,	33	53	16	60	47	59
Baradero,	33	45	50	59	48	38
San Pedro,	33	40	51	59	55	34
San Nicolas,	33	10	59	59	58	23
Cauada de Moron,	34	40	45	58	46	23
San Vicente,	34	49	3	58	39	26
Magdalena,	35	5	20	57	39	34

The greatest length of the province of Buenos Ayres is 66 maritime leagues, extending from El Arroyo del Medio, situated at the north-west extremity, in from 33° to 33.30° S. Lat. as far as La Eusenada de Samborombon, at the mouth of the Rio del Salado, in 36° S. Lat. forming the south-eastern extremity. Its diameter is 23 leagues, giving to the whole province a superficies of 1513 square leagues.

The river Salado formed the southern boundary of the province of Buenos Ayres, while under the dominion of Spain; but since obtaining their independence, numerous estancias, or estates for breeding cattle, have been formed, and various military stations have been established a considerable distance to the south for their protection. These estancias are most numerous on that side which borders on the Atlantic, and being situated in the finest and most fertile part of the country, are rapidly increasing in number, and will speedily become continuous, as far south as Baya Blanca, in 39° S. Lat. where about three years ago, a new city was founded, named New Buenos Ayres.

GEOGRAPHICAL COLLECTIONS.

Comparative Fertility of the Old and New Continents. — Paradoxical as the fact may appear, we are satisfied that the New Continent, though less than half the size of the old, contains at least an equal quantity of useful soil, and much more than an equal amount of productive power. America is indebted for this advantage to its comparatively small breadth, which brings nearly all its interior within reach of the fertilizing exhalations of the ocean. In the old Continent, owing to its great extent from east to west, the central parts, deprived of moisture, are almost everywhere deserts; and a belt round the western, southern, and eastern shores, comprises nearly all that contributes to the support of man. How much fruitful land, for instance, is there in Continental Asia? If we draw a line from the Gulf of Cutch, (near the Indus,) to the head of the Yellow Sea, we cut off India and China, with the intervening Birman empire, and the southern valleys of Thibet; and this space, which comprises about 3,500,000 square miles, if we take surface and fertility together, embraces five-sixths of the productive power of Asia, though it covers 17,000,000 of square miles! Arabia, Persia, Central Thibet, Western India, Chinese and Independent Tartary, are deserts, with scattered patches of useful soil, not amounting to the twentieth part of their extent. Siberia, or northern Asia, is little better, owing to aridity and cold together. Anatolia, Armenia, the Punjab, and a narrow strip along the western shores of the Pacific Ocean, north as far as the 60th parallel, compose the only valuable agricultural territory beyond India and China. Europe, which is merely the western margin of Asia, is all fruitful in the south; but, on the north, its fruitfulness terminates at the 60th or 62d parallel. Africa has simply a border of useful soil, round three-fourths of its sea-coast, with some detached portions of tolerably good land in its interior. Of the 31,000,000 of square miles which these three continents occupy, we cannot find, after some calculation, that the productive soil constitutes so much as one-third, and of that third a part is but poor.

Now, in estimating the useful soil in America, we reject, 1. All the region northward of the latitude of 53°, amounting to 2,600,000 square miles; 2. A belt of barren land about 300 miles broad, by 1000 in length, or 300,000 square miles, lying on the east side of the Rocky Mountains; 3. A belt of arid land of similar extent, situated on the east side of the Andes, between 24° and 40° of south latitude; 4. The desert shore of Peru, equal to 100,000 square miles; 5. An extent of 100,000 square miles for the arid country of California and Sonora; and, 6. An extent of 500,000 square miles for the summits of the Andes, and the south extremity of Patagonia. These make an aggregate of 3,900,000 square miles; and this deducted from 13,900,000, leaves 10,000,000 square miles as the quantity of useful soil in the New World.

Now, what relation does the fruitfulness of the ground bear to the latitude of the place? The productive powers of the soil depend on two circumstances — heat and moisture; and these increase as we approach the equator. First, the warm regions of the globe yield larger returns of those plants which they have in common with the temperate zones; and, next, they have peculiar plants, which afford a much greater portion of nourishment from the same extent of surface. Thus, maize, which produces 40 or 50 for one in France, produces 150 for one on an average in Mexico; and Humboldt computes that an arpent, (five-sixths of an acre,) which will scarcely support two men when sown in wheat, will support fifty when planted with bananas. From a consideration of these and other facts, we infer, that the productive, or rather nutritive powers of the soil, will be pretty correctly indicated by combining the ratios of the heat and the moisture, expressing the former of these in degrees of the centigrade scale. Something, we know, depends on the distribution of the heat through the different seasons; but, as we do not aim at minute accuracy, this may be overlooked.

Latitude.	Annual rain, inches.	Mean annual heat.	Product.	Ratio.
60	16	7	112	4
45	29	14	406	15
0	96	28	2688	100

Thus, if the description of food were a matter of indifference, the same extent of ground which supports four persons at the latitude of 60°, would support 15 at the latitude of 45°, and 100 at the equator. But the food preferred will not always be that which the land yields in greatest abundance: and another most important qualifying circumstance must be considered,—it is labour which renders the ground fruitful; and the power of the human frame to sustain labour is greatly diminished in hot climates. In the torrid zone, in low situations, we doubt if it is possible for men to work regularly in the fields for more than five hours a-day, or half the daily period of labour in England. On these grounds, and to avoid all exaggeration, we shall consider the capacity of the land to support population as proportional to the third power of the cosine (or radius of gyration) for the latitude. It will therefore stand thus in round numbers:—

Latitude,	0°,	15°,	30°,	45°,	60°.
Productiveness,	100,	90,	65,	35,	12½.

In England, the density of population is about 230 persons per square mile; but England is, in some measure, the workshop of the world, and supports, by her foreign trade, a greater population than her soil can nourish. In France, the density of population is about 160; in Germany it varies from 100 to 200. Assuming, on these grounds, that the number of persons whom a square mile can properly sustain, without generating the pressure of a redundant population, is 150 at the latitude of 50°, we have 26 as the sum which expresses the productiveness of this parallel. Then taking, for the sake of simplicity, 35 as the index of the productiveness of the useful soil beyond 30° in America, and 85 as that of the countries within the parallel of 30° on each side of the equator, we have about 4,100,000 square miles, each capable of supporting 200 persons, and 5,700,000 square miles, each capable of supporting 490 persons. It follows, that if the natural resources of America were fully developed, it would afford sustenance to 3,600,000,000 of inhabitants, a number five times as great as the entire mass of human beings existing at present upon the globe! The novelty of this result may create perplexity and doubt on a first view; but we are satisfied that those who investigate the subject for themselves, will be satisfied that our estimate is moderate. But, what is even more surprising, there is every probability that this prodigious population will be in existence within three, or, at most, four centuries. We are quite aware of the objections which may be raised to this conclusion, but they all seem to us to admit of an answer. In particular, we would observe, that the expense and difficulty of transporting men from situations where they are redundant, to others where vacant space exists, which is so much felt in the Old World, will be incredibly facilitated by the employment of steam navigation upon the innumerable rivers which are ramified over four-fifths of the New Continent.

The imagination is lost in contemplating a state of things which will make so great and rapid a change in the condition of the world. We almost fancy that it is a dream; and yet the result is based on principles quite as certain as those which govern the conduct of men in their ordinary pursuits. There are many elements of disorder now operating in Spanish America, but these are merely the dregs left by the old Spanish despotism; and the Anglo-American republic is a pole-star to guide the people in their course towards freedom and prosperity. Nearly all social improvements spring from the reciprocal influence of condensed numbers and diffused intelligence. What, then, will be the state of society in America two centuries hence, when a thousand, or two thousand millions of civilized men are crowded into a space *comparatively* so narrow, and when this immense mass of human beings speak only two languages! We take for granted that the Portuguese will merge into the Spanish; and it is clear to us that the Russian will never obtain a footing in the New World. Such a state of things may be said to undo the curse of Babel, and restore the great mass of mankind to their pristine facility of intercourse; for the languages spoken by the communities of Europe and Asia will be as unimportant then, in the general scale of the globe, as the dialects of Hungary, Finland, and Bohemia, are in Europe at this day. History shews that wealth, power, science, literature, all follow in the train of numbers, general intelligence, and freedom. The same causes which transferred the sceptre of civilization from the banks of the Euphrates and the Nile to western Europe, must, in the course of no long period, carry it from the latter to the plains of the Mississippi and the Amazon. When we reflect on these changes, which are not more extraordinary than they are near and certain, the conviction is forced upon us, that society, after all its advances, is yet but in its infancy; that the habitable world, when its productive powers are regarded, may be said hitherto to have been an untenanted waste; and that we have at present only an imperfect glimpse of the state of things under which the true destiny of man, and the grand scheme of Providence in this lower world, is to receive its full development. We are quite aware that some will smile at these speculations; but if any one suspects us of drawing on our fancy, we would just request him to examine thoroughly the condition and past progress of the North American republic. Let him look at its amazing strides in wealth, intelligence, and social improvement; at its indestructible liberty; and, above all, at the prodigious growth of its population; and let him answer the question to himself, "What power can stop the tide of civilization which is pouring from this single source over an unoccupied world?" Let him trace the laws on which this progress depends, and let him then apply them to unfold the future history of society in the New Continent.—*From an excellent article on America, by Mr Maclaren, in the New Edition of the* Encycl. Britannica.

Rocks in the Atlantic.—It was found lately, by a vessel coming to England from America, when passing over the supposed situation of some rocks, called "Hervagault's breakers," that the thermometer indicated a decrease of 13° in the temperature of the sea. Previous to this, it had been steady at 72°; and, on passing to the N. E., it again rose to the same temperature. Unfortunately, no soundings were tried for, as no change was observed in the natural *blue* colour of the sea. An incident of this nature might add to the probability of the existence of these rocks, if it were not for the numerous ice islands which have been frequently seen in the part of the ocean where these dangers are supposed to lie. They have not been heard of since the year 1723, at which time they are reported to have been seen by M. Hervagault, on his way home from America, in the *Conquerant* of Nantes. They are described by him as being about two hundred yards apart from each other; that the sea broke over them in three different places, and between each that it appeared clear. M. Hervagault states also, that he passed between them.

There is, perhaps, nothing more difficult in the hydrographer's vocations, than that of deciding on the existence or non-existence of these reputed dangers. To reject them on the grounds of their not having been seen during a long period, as in the present instance, might be the means of occasioning shipwreck; while to insert indiscriminately all that are reported to exist, would so fill the charts, that seamen would have enough to do in striving to keep clear of them; and the greater part would, doubtless, prove to be only whales, pieces of timber covered with weeds and barnacles, ice islands, and such other floating substances. It is well known that these are often met with at sea. During the search for Aitkin's rock last summer, by Captain Vidal, a spar was seen floating, which at first was decided to be the rock; but, after a search of three months, no rock was found. In such uncertainty, the safest way at once presents itself of giving the authority, and particulars of each, when, should the accounts eventually prove to be correct, it will be satisfactory to know, that every care has been taken to publish them. The Hervagault breakers are stated to be in lat. 41° N., and lon. 49° W.—*Athenæum.*

Albany.—State of New York.—"The establishment of canals, and the rapid increase of population in the north and west, have given great commercial importance to the town of Albany; the number of its inhabitants has increased nearly 10,000 since 1825, and is now 26,000. The facilities of conveyance are proportionally improved. Passengers go from Montreal to New York (390 miles,) in from 40 to 50 hours; and I have myself travelled from Albany to Philadelphia (260 miles,) in 24 hours. One hundred and twenty coaches, and from three to six steamboats, go and come daily, and we may estimate at 2000 the number of passengers every day on the road."—(Extract from a letter to M. Warden.)—*Bull. de la Soc. de Géog.* Jan. 1831.

New Nautical Almanac.—In a report made to the Geographical Society of Paris on the specimen of the *New Nautical Almanac*, sent by Mr Barrow, the most flattering commendations are given to this improved work. "The different ephemerides published at Paris, Vienna, Berlin, Milan, Coïmbra, &c." says the reporter, "have their peculiar advantages: the English ephemerides unite them all. Even the *Connaissance des Temps*, which is unquestionably one of the most complete collections of this kind, will comparatively be far behind: it contains the indispensable; the *Nautical Almanac* will give the indispensable and the useful, and sometimes perhaps what will approach to the superfluous."

Icelandic Inscription found on the East Coast of Greenland.—The Royal Commission for the preservation of antiquities received, with the news of Capt. Graah's discoveries, (*see Nos. III. and IV. of this Journal,*) a stone engraved with very remarkable characters, sent to him by the director of the colony of Juliana Shaab. A native, named Christian, found this Runic monument near Igalikko, to the east of Juliana Shaab, in lat. 61°, under some ruins, supposed to be those of an old church, which was afterwards confirmed.

The stone is about one ell fourteen inches and a half long, by fourteen inches broad, Danish measure; but is broken about three inches below the inscription.

The inscription in the Icelandic tongue, or primitive language of the north, is as follows:—

Vigdis M. D. (Magnus dottir) *hvilir hèr; gledè gud sart hennar!*

Vigdisa, filia magni (Marci, Martini) requiescit hic; exhilaret Deus animam ejus!

Thus we have a monument written at the time when Greenland was inhabited by our Scandinavian ancestors, as well on the southern part of the west coast, as on the northern part recently visited by the Danes. The discovery of a Runic inscription at Kingiktorsoak has been already published in the *Journal of Natural and Geographical Science.*—See letter from Dr Rafn to the Geog. Soc. of Paris.—*Bull.* Feb. 1831.

Travels in South America.—M. de Parchappe, old officer of artillery, and pupil of the Polytechnic School, who was driven from France by his opinions at the period of the restoration, has taken advantage of his liberty to explore the less known countries of South America. He found there the unfortunate Bonpland, and became his friend and companion; since then another French traveller, the intrepid and courageous D'Orbigny, has, in conjunction with him, made the most important discoveries in natural history, whilst M. de Parchappe has been occupied with the geography of these countries, of which our maps give but very imperfect sketches.

The materials collected by M. Parchappe, on the Argentine republic, the course of the streams towards Patagonia, the boundaries of the basin of the Pampas, the manners and customs of the people who inhabit this vast territory, and the rivers Parana and Uraguaï, as yet so little known, will form parts of a publication which cannot but interest statesmen and men of science.—*Le Temps.*

Audubon, the American Ornithologist.—This enthusiastic naturalist is gone again to the woods. He left Edinburgh last month, and after visiting Paris, intends to proceed to New Orleans in August. It is his purpose to spend eighteen months or two years in exploring the western side of the valley of the Mississippi, up towards the Rocky Mountains. He will then return to Edinburgh, and spend the rest of his days in arranging his collection, and publishing a continuation of his *Ornithological Biography.*

Influence of Climate and local causes over the proportion of Male and Female Births.—Amongst the important investigations in which Dr Bailly has been engaged during his stay in the Levant, we may particularize those which regard the action of climate and local circumstances on generation, or rather on conception and its products. To be able, however, to form a judgment of the labours of Dr Bailly, and the consequences which are deducible from them, it will be necessary to understand the state of the question before his attention was directed to it.

Before statistics had been applied to the determination of the law which presides over the proportion of male and female births, there was an opinion in the east, which, if not founded on positive knowledge, had at least the institution of polygamy to support it: Most of the publicists, with Montesquieu at their head, had supposed that where men espoused many wives, nature must have formed more females than males. According to this opinion, polygamy was founded on a physical law proper to the east, whilst nothing could justify it in Europe where the number of male births approximated very closely to that of female births.

When statistics, which have thrown so much light on the different branches of our knowledge, were applied to this subject, it was thought, from a peculiar interpretation of the results, that an opposite conclusion to that of Montesquieu might be deduced; and it has been stated that the proportion of males and females is always the same under all climates, and that temperature has no influence whatever on the proportion of the sexes. How to reconcile two contradictory opinions, one of which was founded on facts, and proclaimed with the authority of a great name, whilst the other had in its favour the irresistible power of figures, certainly appeared to be an object worthy of consideration. And from the researches of Dr Bailly it appears, that in spite of the authority of Montesquieu, the East does not produce more females than males, and that notwithstanding the opinions admitted in

France, climate, and other local causes, have a very determinate influence on the proportion of the sexes.

To prove that climate has not this influence, the relation of male and female births, during eleven years, was examined in thirty of the most southern departments of France; and it having been found that this relation was as 16 males to 15 females in the whole of France, it was concluded that climate had no influence, since the same relation was obtained both in the north and in the south. But it is one thing to observe the fact of this equality, and another to conclude that climate and local circumstances can produce no variation in it.

Climate comprehends not only heat, cold, and the variable action of seasons, but also all the local causes, such as agricultural labours, the different periods of harvest, of Lent, the variety, abundance, or scarcity of food, which may, in a given country, alter the degree of strength or weakness, of health and well-being, of the population which inhabits it.

Dr Bailly thinks that the germ before fecundation being absolutely indifferent as to sex, is only determined by the strength or weakness of its parents at the time when it is called into development. If, then, instead of examining separately each of the circumstances which may strengthen or debilitate the constitution, we investigate the collective result of all the influences which succeed each other during a year, we can obtain only a mean term which gives us no definite information. In place, therefore, of taking the total number of births in a year, during the course of which man has been successively affected by so many strengthening and debilitating causes, the births must be examined at different periods of the year, corresponding to each of the successive and variable actions which influence the constitution. In this manner, we shall obtain for each kind of agent an effect of unalterable certainty; and it is in this way that Dr Bailly has prosecuted his inquiries, the results of which are as follows:—

1. The sex of an infant depends exclusively on the state of the parents at the time when its development commences; consequently, cold, heat, moisture, abundance, want, and peculiar qualities of food, medicines, too great or too little exercise, moral condition, habitual kind of occupation, and, in short, every thing moral or physical which is capable of acting favourably or otherwise on the powers or on the health, may vary the proportions of male and female births.

2. Every thing which favours conception augments the proportion of males; every thing which diminishes the chances of conception, increases the proportion of females: for instance, if we examine the different months of the year, we shall find that, in general, those in which there have been the greatest number of conceptions, give the greatest proportion of males, and the months in which there have been the least number of conceptions, have a greater proportion of females.

3. Extreme heat and extreme cold diminish the number of conceptions. Thus, in France, the northern departments have fewest conceptions in winter, and the southern have fewest in summer. The greatest number of conceptions in the north is in summer; in the south, in spring and winter.

4. Vegetable diet diminishes the number of conceptions; the month of March, in consequence of Lent, and years of scarcity, is remarkable for the small number of births, and for the great diminution in the proportion of males.

5. In Paris, the higher classes have fewer children, and proportionally fewer males, in winter than in summer. This circumstance coincides with numerous circumstances, such as great dinners, balls, late hours, which, in winter, weaken the constitution, whilst the more simple and healthy life in the country during summer, permits the body to restore the forces expended

during the gay season. The contrary holds with the poor, who are submitted to opposite conditions.

The application of these principles in the East is most satisfactory. Constantinople, for instance, where Dr Bailly made most of his observations, is of very equable temperature in summer and winter, owing to its position, and the favourable winds to which it is subject at the different periods of the year. According to the above proposition, extreme heat and extreme cold diminish the number of conceptions, and the proportion of males; this single circumstance would, therefore, be expected to render Constantinople favourable to conceptions, and especially to those of males. The result of Mr Bailly's researches shews, that this is precisely the case with Constantinople, and in most of the islands of the Archipelago, the proportion being 8 males to 7 females.—*Bull. de la Soc. de Geog.* Nov. 1830.

Notice of the Cherokees.—The progress in civilization made by the Cherokees is altogether unexampled. The bulk of the people live in comparative ease; many of them even in high style. Colonel Gold, of Connecticut, who resided eight months amongst them, was witness of many of their works during that period; of the cultivation of land, of the building of houses and boats, and many improvements. The education of the children particularly attracted his attention. Religious instruction is gradually spreading amongst them. We have seen many letters written by young Cherokees educated in the schools of the missionaries. They are well written, and the spirit of piety which pervades them proves evidently, that they who have taken charge of these children have not neglected their most precious interests.

A great number of families are occupied with the manufacture of wool and cotton for their own use, and also for exchange. The wheel and loom are found in almost every house. Colonel Gold possesses specimens of their work, which will bear comparison with the best of the kind. Their roads are attended to, and in good condition. The Colonel has travelled in a carriage through all parts of the country. He was present at a meeting of the general council of the nation, and was surprised at the order and regularity which was preserved in the deliberations, and at the talent exhibited by many of the members.

Every thing we learn respecting the Cherokees proves to us that these Indians have abandoned their nomadic life for domestic habits; that they have exchanged the tomahawk and the carabine for the plough, the hoe, and the loom; and that they have already arrived at a surprising degree of civilization, the more extraordinary, that it was thought these sons of the forest could never relinquish their natural inclinations.—*Courrier des Etats-Unis*, 17th July, 1830.

Statistics of the Kingdom of Poland.—(Extracted from the official report of the minister, Count Mostowsky in 1830.)

Religion.—The catholic population of the kingdom, which, in 1828, was 5,474,282, is now divided into 1917 parishes, with 369 chapels of ease, which are served by 1369 priests, exclusive of the higher clergy; 1783 monks occupy 136 monasteries; and 351 nuns, 29 convents. The revenues of the catholic church amount to 1,600,000 florins, (£40,000,) furnished by the treasury, and 890,278 florins, by the estates of the congregation. There are 325 restored churches, and 12 new ones; 101 are undergoing repairs.

Scientific Institutions.—The number of students at Warsaw is 589: the provincial colleges contain 8687 pupils: 1624 young artizans frequent the Sunday schools in the capital and the provinces. In the deaf and dumb school, there are 60 individuals; in a Jewish school, founded in 1826, there are 72 pupils; in four other elementary Jewish schools, there are 298 scholars.

Rural and Domestic Economy.—The number of cattle, particularly of sheep, increases rapidly. The latter has doubled in a very short time; and as there are no estates proper for the breeding and improvement of sheep, and as there are few merinos, the price of wool, notwithstanding the increase of manufactures, is considerably decreased. Whilst, in 1815, there were scarcely 100 looms for weaving common cloths, Poland now contains more than 6000, which annually produce more than seven millions of ells of cloth, of every colour and quality, part of which is exported even to China. This cloth, and the woollen stuffs, such as casimir, flannel, circassias, &c. are almost the only articles of export from this kingdom into Russia; whilst it imports, in return, cotton and silk stuffs, linen cloth, leather, paper, metals, porcelain, ironware, wax, candle, oil, tar, hops, corn, cattle, and even game, fish, and butter. Industry and commerce are maintained by newly made highways, which already extend 138 miles. Thus, for example, the new road from Warsaw to Niemen unites the commerce of the west with that of the east.

Population.—The population of the kingdom, at the commencement of 1829, was 4,088,289, exclusive of the army. In many towns, particular quarters are still assigned to the Jewish population, estimated, in the whole kingdom, at 384,263 individuals. The population of Warsaw, not counting the garrison, was, in 1829, 136,554; with the garrison, 150,000; the number of Jews was 30,146.

Military Condition.—The army obtains horses partly from Russia. The clothing of the troops is manufactured in the same country, producing a revenue of nearly two millions. A manufactory established at Warsaw furnishes the engineers and the artillery with mathematical instruments, which used to be obtained from abroad. Several military schools, established in the country, have furnished, during the last six years, 311 able officers.—*Nouvelles Ann. des Voyages*, Jan. 1831.

Terrific Mountain Pass in the Department of Isere.—A path, worn in the rock by the feet of mules rather than by the hand of man, forms the only communication between some districts and the Chef-lieu of the Canton, (de Pont en Royano); but this path, although uneven, narrow, and verging on precipices, is not the greatest difficulty which is met with on this passage. When the path has reached a certain point, it is blocked up by a perpendicular rock, which joins directly with that in which the torrent has dug itself a deep and narrow bed. To advance, it is necessary to get to the other side of the stream; and the only means of accomplishing the passage, is a basket, suspended by a pulley on a rope stretched across the chasm. Rudely assailed by the impetuous gusts occasioned by the configuration of the mountains, this frail machine is drawn across the opening by a cord attached to it; and, if the unfortunate passenger should feel alarmed at the prospect of returning in the same way, he has no alternative but to remain, and partake of the privations and the miserable condition of the inhabitants of Rencurel, as impassable mountains shut them in from the rest of the world on all other sides.—*D'Haussez' Statistical Account of the Dept. de l'Isere, (Dauphiné.)*

ZOOLOGICAL COLLECTIONS.

[In another part of this number we have spoken of the delightful work on American Ornithology, which Mr Audubon has recently given to the world. The nature of this *Journal* does not permit of lengthy criticisms or eulogiums; but having in the *Notices and Analyses* briefly expressed our opinion of the "Biography" of Birds, we think that some pages of the *Zoological Collections* may be advantageously occupied with a few extracts, which will give the reader an idea of our author's style. — Ed.]

Ivory-billed Woodpecker. — The ivory-billed woodpecker confines its rambles to a comparatively very small portion of the United States, it never having been observed in the Middle States within the memory of any person now living there. In fact, in no portion of these districts does the nature of the woods appear suitable to its remarkable habits.

Descending the Ohio, we meet with this splendid bird for the first time near the confluence of that beautiful river and the Mississippi; after which, following the windings of the latter, either downwards toward the sea, or upwards in the direction of the Missouri, we frequently observe it. On the Atlantic coast, North Carolina may be taken as the limit of its distribution, although now and then an individual of the species may be accidentally seen in Maryland. To the westward of the Mississippi, it is found in all the dense forests bordering the streams which empty their waters into that majestic river, from the very declivities of the Rocky Mountains. The lower parts of the Carolinas, Georgia, Allabama, Louisiana, and Mississippi, are, however, the most favourite resorts of this bird, and in those States it constantly resides, breeds, and passes a life of peaceful enjoyment, finding a profusion of food in all the deep, dark, and gloomy swamps dispersed throughout them.

I wish, kind reader, it were in my power to present to your mind's eye the favourite resort of the ivory-billed woodpecker. Would that I could describe the extent of those deep morasses, overshadowed by millions of gigantic dark cypresses, spreading their sturdy moss-covered branches, as if to admonish intruding man to pause and reflect on the many difficulties which he must encounter, should he persist in venturing farther into their almost inaccessible recesses, extending for miles before him, where he should be interrupted by huge projecting branches, here and there the massy trunk of a fallen and decaying tree, and thousands of creeping and twining plants of numberless species! Would that I could represent to you the dangerous nature of the ground, its oozing, spongy, and miry disposition, although covered with a beautiful but treacherous carpeting, composed of the richest mosses, flags, and water-lilies, no sooner receiving the pressure of the foot than it yields and endangers the very life of the adventurer, whilst here and there, as he approaches an opening, that proves merely a lake of black muddy water, his ear is assailed by the dismal croaking of innumerable frogs, the hissing of serpents, or the bellowing of alligators! Would that I could give you an idea of the sultry, pestiferous atmosphere, that nearly suffocates the intruder during the meridian heat of our dogdays, in those gloomy and horrible swamps! But the attempt to picture these scenes would be vain. Nothing short of ocular demonstration can impress any adequate idea of them.

The Cow-pen Bird. — When the female is about to deposit her eggs, she is observed to leave her companions, and perch upon a tree or fence, assuming an appearance of uneasiness. Her object is to observe other birds while engaged in constructing their nests. Should she not from this position discover a nest, she moves off, and flies from tree to tree, until at length, having found a suitable repository for her egg, she waits for a proper opportunity, drops it, flies off, and returns in exultation to her companions.

The birds in whose nests the eggs of the cow bunting are thus deposited, are all smaller than itself. That which is most frequently favoured with the unwelcome gift is the Maryland yellow-throat. The other species in which I have found the egg of the cow bird are the chipping sparrow, the blue bird, the yellow bird, several fly-catchers, especially the blue-grey and the white-eyed, and the golden-crowned thrush. The nests of these birds are very different in form, size, and materials, as well as in position, some being placed high on trees, others in low bushes, and that of the thrush on the ground.

It is also a very remarkable circumstance, that although the cow bird is larger than the species in the nests of which it deposits its eggs, the eggs themselves are not much superior in size to those of their intended foster-parents. This is equally the case with the European cuckoo, which selects, for the purpose of depositing its egg, the nest of the titlark, hedge-sparrow, or some other small bird. And here, as in so many other cases, may we observe the adaptation of means to ends which nature has so admirably made. The egg of the cuckoo, in fact, is not so large as that of the sky-lark, a bird which, to the other, hardly bears the proportion of one to six. The intention here has not been, by a similarity in size and colouring, to deceive the bird in whose nest the egg is placed, for, on all occasions, the individuals on whom the gift has been bestowed, receive it unwillingly, and, in fact, manifest great alarm and resentment. On the contrary, the object has been to secure the development of the embryo, by adapting the size of the egg to the capability of imparting heat to it.

Should the cow bird deposit its egg in a nest newly finished, and as yet empty, the owners of the nest not unfrequently desert it; but, when they have already deposited one or more eggs, they generally continue their attachment to it. There is reason for believing, however, that, on all occasions, they are aware of the intrusion that has been effected.

The cow bird never deposits more than one egg in a nest, although it is probable it thus leaves several in different nests, especially when we consider the vast numbers of the species that are to be seen on their return southward. It does not make a forcible entrance, but watches its opportunity, and, when it finds the nest deserted by its guardians, slips to it like one bent on the accomplishment of some discreditable project. When the female returns, and finds in her nest an egg which she immediately perceives to be different from her own, she leaves the nest, and perches on a branch near it, returns and retires several times in succession, flies off, calling loudly for her mate, who soon makes his appearance, manifesting great anxiety at the distress of his spouse. They visit the nest together, retire from it, and continue chattering for a considerable time. Nevertheless, the obnoxious egg retains its position, the bird continues to deposit its eggs, and incubation takes place as usual. The egg of the cow bird is of a regular oval form, pale greyish-blue, sprinkled with umber-brown dots and short streaks, which are more numerous at the larger end.

Incubation has been continued for nearly a fortnight, and the young cow bird bursts the shell. Another remarkable occurrence now takes place. The eggs of the foster-bird are yet unhatched, and soon after disappear. In every case, the cow bird's egg is the first hatched, and herein also is manifested the wisdom of nature; for the parent birds, finding a helpless object, for whose subsistence it behoves them to provide, fly off to procure food for it. The other eggs are thus neglected, and the chicks which they contain necessarily perish. Birds have probably the means of knowing an addle egg, for, when any such remain after the hatching of the others, they always remove them from the nest; and, in the present case, the remaining eggs are soon removed, and may sometimes be seen strewn about in the vicinity of the nest. In the case of the cuckoo, matters are differently managed; for the young bird of that species very ungratefully jostles out of the nest all his foster brothers and sisters, that he may have room enough for himself. If we are fond of admiring the wisdom of nature, we ought to mingle reason with our admiration; and here we might be tempted to suspect her not so wise as we had imagined; for why should the poor yellow-throat have been put to the trouble of laying all these eggs, if they are, after all, to produce nothing? This is a mystery to me; nevertheless, my belief in the wisdom of nature is not staggered by it.

As the young cow bird grows up, its foster parents provide for it with great assiduity, and manifest all the concern and uneasiness at the intrusion of a stranger, that they would do were their own offspring under their charge. When fully fledged, the young bird is of a sooty brown colour. Long after it has left the nest, it continues to be fed by its affectionate guardians, until it is at length able to provide for itself.

[Though not zoological, the following extracts are characteristic.]

Description of a Cane-brake. — The cane formerly grew spontaneously over the greater portions of the State of Kentucky and other western districts of our Union, as well as in many farther south. Now, however, cultivation, the introduction of cattle and horses, and other circumstances connected with the progress of civilization, have greatly altered the face of the country, and reduced the cane within comparatively small limits. It attains a height of from twelve to thirty feet, and a diameter of from one to two, and grows in great patches resembling osier-holts, in which occur plants of all sizes. The plants frequently grow so close together, and in course of time become so tangled, as to present an almost impenetrable thicket. A portion of ground thus covered with canes is called a *Cane-brake.*

If you picture to yourself one of these cane-brakes growing beneath the gigantic trees that form our western forests, interspersed with vines of many species, and numberless plants of every description, you may conceive how difficult it is for one to make his way through it, especially after a heavy shower of rain or a fall of sleet, when the traveller, in forcing his way through, shakes down upon himself such quantities of water, as soon reduce him to a state of the utmost discomfort. The hunters often cut little paths through the thickets with their knives, but the usual mode of passing through them is by pushing oneself backward, and wedging a way between the stems. To follow a bear or a cougar pursued by dogs through these brakes, is a task, the accomplishment of which may be imagined; but of the difficulties and dangers accompanying which, I cannot easily give an adequate representation.

The canes generally grow on the richest soil, and are particularly plentiful along the margins of the great western rivers. Many of our new settlers are fond of forming farms in their immediate vicinity, as the plant is much relished by all kinds of cattle and horses, which feed upon it at all seasons, and again because these brakes are plentifully stocked with game of various kinds. It sometimes happens that the farmer clears a portion of the brake. This is done by cutting the stems, which are fistular and knotted, like those of other grasses, with a large knife or cutlass. They are afterwards placed in heaps, and, when partially dried, set fire to. The moisture contained between the joints is converted into steam, which causes the cane to burst with a smart report, and when a whole mass is crackling, the sounds resemble discharges of musketry. Indeed I have been told that travellers floating down the rivers, and unacquainted with these circumstances, have been induced to pull their oars with redoubled vigour, apprehending the attack of a host of savages, ready to scalp every one of the party.

Settlement of Kentucky.—The Virginians thronged towards the Ohio. An axe, a couple of horses, and a heavy rifle, with store of ammunition, were all that were considered necessary for the equipment of the man, who, with his family, removed to the new state, assured that, in that land of exuberant fertility, he could not fail to provide amply for all his wants. To have witnessed the industry and perseverance of these emigrants, must at once have proved the vigour of their minds. Regardless of the fatigue attending every movement which they made, they pushed through an unexplored region of dark and tangled forests, guiding themselves by the sun alone, and reposing at night on the bare ground. Numberless streams they had to cross on rafts, with their wives and children, their cattle and their luggage, often drifting to considerable distances before they could effect a landing on the opposite shores. Their cattle would often stray amid the rich pasturage of these shores, and occasion a delay of several days. To these troubles add the constantly impending danger of being murdered, while asleep in their encampments, by the prowling and ruthless Indians; while they had before them a distance of hundreds of miles to be traversed, before they could reach certain places of rendezvous called Stations. To encounter difficulties like these must have required energies of no ordinary kind; and the reward which these veteran settlers enjoy was doubtless well merited.

Some removed from the Atlantic shores to those of the Ohio in more comfort and security. They had their wagons, their negroes, and their families. Their way was cut through the woods by their own axemen, the day before their advance, and when night overtook them, the hunters attached to the party came to the place pitched upon for encamping, loaded with the dainties of which the forest yielded an abundant supply, the blazing light of a huge fire guiding their steps as they approached, and the sounds of merriment that saluted their ears assuring them that all was well. The flesh of the buffalo, the bear, and the deer, soon hung in large and delicious steaks, in front of the embers; the cakes already prepared were deposited in their proper places, and, under the rich drippings of the juicy roasts, were quickly baked. The wagons contained the bedding, and whilst the horses which had drawn them were turned loose to feed on the luxuriant undergrowth of the woods, some, perhaps, hoppled, but the greater number merely with a light bell hung to their neck, to guide their owners in the morning to the spot where they might have rambled, the party were enjoying themselves after the fatigues of the day.

In anticipation, all is pleasure; and these migrating bands feasted in joyous sociality, unapprehensive of any greater difficulties than those to be encountered in forcing their way through the pathless woods to the land of abundance; and although it took months to accomplish the journey, and a skirmish now and then took place between them and the Indians, who sometimes crept unperceived into their very camp, still did the Virginians cheerfully proceed towards the western horizon, until the various groups all reached the Ohio, when, struck with the beauty of that magnificent stream, they at once commenced the task of clearing land, for the purpose of establishing a permanent residence.

Others, perhaps encumbered with too much luggage, preferred descending the stream. They prepared arks pierced with port-holes, and glided on the gentle current, more annoyed, however, than those who marched by land, by the attacks of the Indians, who watched their motions. Many travellers have described these boats, formerly called arks, but now named flat-boats. But have they told you, kind reader, that, in those times, a boat thirty or forty feet in length, by ten or twelve in breadth, was considered a stupendous fabric; that this boat contained men, women, and children, huddled together, with horses, cattle, hogs, and poultry, for their companions, while the remaining portion was crammed with vegetables and packages of seeds? The roof or deck of the boat was not unlike a farm-yard, being covered with hay, ploughs, carts, wagons, and various agricultural implements, together with numerous others, among which the spinning-wheels of the matrons were conspicuous. Even the sides of the floating mass were loaded with the wheels of the different vehicles, which themselves lay on the roof. Have they told you that these boats contained the little all of each family of venturous emigrants, who, fearful of being discovered by the Indians under night, moved in darkness, groping their way from one part to another of these floating habitations, denying themselves the comfort of fire or light, lest the foe that watched them from the shore should rush upon them and destroy them? Have they told you that this boat was used, after the tedious voyage was ended, as the first dwelling of these new settlers? No, kind reader; such things have not been related to you before. The travellers who have visited our country have had other objects in view.

I shall not describe the many massacres which took place among the different parties of white and red men, as the former moved down the Ohio; because I have never been very fond of battles, and indeed have always wished that the world were more peaceably inclined than it is; and shall merely add, that, in one way or other, Kentucky was wrested from the original owners of the soil.

Hereditary Transmission of Accidental Characters. (In a letter to the Editor.)

SIR,—In reading the third Number of the *Edinburgh Journal of Natural and Geographical Science,* I met with the following remark:—"The characters of an organism are permanent during the operation of the circumstances, internal and external, which produced them, and *no longer*;" and that "the original deficiency of caudal vertebræ being the result of mutilation, a new operation would be required in *every* successive generation, to continue the character in the race." If I understand the letter to which this annotation is annexed, and the annotation itself, it would tend to advance, that the offspring of a mutilated animal would not be deficient of those parts that the parent animal had lost. A circumstance has, however, fallen in my way, that proves that the contrary is sometimes the case, though not generally so. My father had some time in his possession a pointer bitch that had lost, through some accidental cause, I believe from being caught in a trap, a portion of the tail, and the whelps, without one exception, came into the world without tails—at least so much so, that they could hardly be said to possess more than the rudiments of tails. Only *one* litter, I believe, came under my observation. These dogs were remarkable for their sagacity, and steadiness in the field. Having been, since that period, 1824–25, on the Continent, I have lost sight of the dogs, and, consequently, cannot advance any thing as to their subsequent peculiarities, or as to the effect the mutilation, in the first generation, might have had upon the third.—I am, &c. B. S. SHUTTLEWORTH.

Edinburgh, March 29, 1831.

[We are very much indebted to Mr Shuttleworth for this interesting fact. To render it available, however, it would be necessary that the characters of the father were given; and to prove that it was something more than a coincidence, it would be desirable to ascertain what were the characters transmitted to the third generation. Congenital peculiarities are by no means uncommon; but the question is, "can a merely accidental character become permanent in the race?"—ED.]

On the existence of Peritoneal Canals in the Female Kangaroo, and several other new circumstances connected with the Sexual Organization of the Marsupial Animals. By M. Geoffroy St Hilaire.—A female kangaroo having died at the Museum of Natural History of Paris, M. St Hilaire seized the opportunity of examining into the structure of the organs of generation, and into the circumstance related by Sir Everard Home, of there being air in the interior of the sexual organs of the female. Directed by M. St Hilaire, Dr Martin de St Ange examined whether or not there were peritoneal canals, as in the crocodile and turtle. He had not searched long before he found them open at the fundus of the uterus, on the inside of the uterine necks of the two ad-uterums; these canals opened into the abdomen, near, and on the inner side of the roots of each ad-uterum.

Thus, says St Hilaire, I have discovered tubes carrying air into the abdomen; and, which is of great importance, upon the ovaries. I have seen the ovaries formed like those of birds; ovula in small number, but large; ovula of all sizes, and some larger and irregular on the surface, like the ovulum of the common mammifera, when it has come to its degree of maturity in the uterus. I have also found the ad-uterums of the body of the central uterus; they have a black membrane, which lines the interior. I have seen a bag near, and a little to the inside of the margin of the anus, which is quite similar to that singular bag which Fabricius ab Aquapendente discovered in birds, and which has been called *Bursa Fabricii.* From its size, it would be expected to have an important use. It is nothing but a repetition of the preputial bursa of the penis of the male. It is true that it presents this extraordinary circumstance, that it is large even when the clitoris is extremely small.

Now, the author continues, the use of the marsupial bones is discovered; they favour the entrance of the air towards the anal opening, by enlarging the capacity of the abdomen. The gap made by these bones, performing in this place the office of a sternum, causes the air to penetrate into the sexual organs, and into the abdomen, by means of its own elasticity.

It might be inferred, that, as in the turtle and the crocodile, the peritoneal canal should be met with in both sexes; but M. St Hilaire, assisted by M. Martin de St Ange, could not discover them in a male which died some time after the female.—*Bull. des Sci. Nat.* Nov. 1830.

On the changes of Shape which the Cranium of the Otter undergoes by Age. By M. Berthold.—The differences between the crania of the young and adult otter are very striking, particularly with regard to the frontal bones. In the young animal, the frontal bones are broad and extensive, but as age advances, they become narrow; and as the frontal bones form the cavity of the olfactory lobes, it follows that the size of these must diminish with age. In the young animal, the parietal bones give a rounded form to the cranium; but in the adult, the cranium becomes more angular and broader at its base; the sagittal suture rises in the form of a crest; the lambdoidal suture becomes equally prominent, and projects above the occipital, the dimensions of which increase with age; the occipital hole, which is sunk in the young animal, has its margins more projecting as age advances. The ethmoid is almost as much developed in the young as in the old animal, as are also the nasal bones. The malar bones are considerably separated from the head, and are prolonged as age advances.

Generally speaking, the cranium of the adult animal has the greatest analogy to that of the seal, and the cranium of the young animal to that of the polecat.—*Ibid.*

Remarks on M. Prevost's Observations on the Circulation of the Fœtus of Ruminants. By M. Raspail.—Some years ago, M. Prevost announced that the globules of the blood of the fœtus differ in diameter from those of the mother; whence he concluded, that in the mammifera, there was no direct communication between the vascular systems of the fœtus and mother.

M. Breschet and I have verified the observations of M. Prevost, having found the globules of the blood of the fœtus of a dog three times larger than those of the mother; but this fact alone is not sufficient to prove that there is no communication between the vascular systems of the mother and the fœtus, because the difference in size of the globule depends on the blood of the fœtus being more watery than that of the mother, which is proved by the globules of the blood of the mother enlarging when diluted with water.

M. Prevost advances, as another proof that the vessels of the fœtus do not communicate with those of the mother, the circumstance of his having seen, by means of the microscope, the blood of the chorion of the fœtus of a sheep, (at an early period of gestation, when that organ had not yet adhered to the uterus,) passing directly from the veins into the arteries; but this is no proof that the vessels of the fœtus and mother do not communicate at any period of gestation, seeing that a communication might be established, after the chorion had contracted adhesions with the uterus, by means of placentæ.

By the aid of the microscope, together with injections made in different ways, M. Breschet and I have come to the conclusion that no vascular communication exists between the uterus and the chorion. — *Ann. des Sci. d'Observation*, I. 474.

The Albatross. — An interesting discovery, which I made during an excursion to Ponte-du-Bambou, is that of an albatross, the *Diomedea fuliginosa*, Linnæus, which was dying on the sand, and which I took possession of. This beautiful sea bird, the same, I believe, which was found near the antarctic polar circle, by Cook and Forster, rarely comes so far as the tropics. There had been, for some days, a very strong breeze from the S. E., and probably the bird was sick. Its stomach was filled with a great number of small ascarides, of an inch long, pale, with some reddish shades; I also found in it two mandibles, and two crystalline lenses of the *Octopus*. No one in the island remembers having before seen this species of albatross. — Julien Desjardins. — *Ann. des Sci. Nat.* Dec. 1830.

Remarks on the Anatomy of the Draco fuscus. By A. A. Sebastian. — The establishment of this species of flying lizard having given rise to disputes, and its characters not being everywhere stated identically, M. Sebastian first describes the individual he examined, which came from Java. The fore part of the animal is of a clear brown, the back part deeper; around the outside of the wings there are large spots of a deep brown; on the inside, and on the back, small spots of the same colour. On the head is a large round dark spot; on its sides, a brown line, which extends transversely almost over the eyes. The largest scales are on the fore part of the head, on the sides of the neck, on the middle of the back, and on the sides of the tail and limbs; the smallest, on the anterior surface of the wings, and on the part stretched between their nerves; on the posterior surface of the same organs, these scales were seen to be altogether wanting, at least to the naked eye. The guttural pouch, of a little more than an inch and a half in extent; the wings, attached to the anterior surface of the upper parts of the thigh, which is fixed to the leg by a fold of the skin, extending lower than was represented by Tiedemann in the green dragon; the tail, grooved by nine rows of scales, which make it angular. Such are the characters which constitute the description of the individual, which was six inches in length.

As to its anatomy, we shall only mention in what it differed from the descriptions of previous authors. The wings are formed by the six first false ribs, which are prolonged laterally, and covered by the skin; the ribs, therefore, have become organs of locomotion — a function they also perform in serpents. This change of use is so much the less remarkable, as, *vice versa*, parts of the extremities may replace the ribs, as far as these serve to protect the pectoral organs; for instance, in fishes and frogs. Notwithstanding that the dragons approximate to birds in their mode of locomotion, they must not be placed nearer them than certain other reptiles,—any more than the flying mammifera, in preference to others of the same class. The alar ribs of dragons diminish from before backwards, except the second, which is a little longer than the first, &c. Their vertebral half is osseous, the other, cartilaginous; the latter does not, as in the green dragon, extend to the outer edge of the wings, but becomes thick, and is bent against the rib immediately behind: this part may be considered as representing the common costal cartilages, &c. Besides the muscles which extend from the vertebræ to the false ribs, there are other smaller ones in the interval of the two alar ribs. The author enters into the description of them with much detail. He examines the mechanism of flying of this singular animal. The muscles of the belly are very simple: there are two, a superficial and longitudinal, and a deep and transverse. As to the apparatus of nutrition, there may be first remarked, the guttural pouch, which ends in the œsophagus, the mucous membrane of which forms many folds which terminate in the stomach. This pouch has been found filled with flies and ants; it is very analogous to the buccal sac of apes, as has already been remarked by Tiedemann, and is not destined, as Carus thinks, merely to receive air. M. Sebastian compares it more particularly to the gizzard of diurnal birds of prey, or to the guttural sac of the *Otis tarda.* What is chiefly remarkable in this pouch, is the black pigment which covers the outer surface of its muscular envelope, an analogous substance to which has been found by M. Vrolik, in the cameleon. It is to be remarked, says the author, that the dragon which was dissected contained three eggs in each oviduct, a circumstance which may be connected with the existence of this particular pigment. It appears that there is a difference between the *Draco fuscus* and the *D. viridis* with regard to the termination of the intestinal canal, and particularly with respect to the peculiarities of a cœcum which is found at a little distance from the anus. These considerations lead the author to limit more correctly the division into great and small intestines. Lastly, M. Sebastian announces the discovery of a free prolongation which exists in the elbow joint, and that of a ring formed of cartilaginous plates in the ocular apparatus.—*Bull. des Sci. Nat.* Oct. 1830.

Lachrymal Capsule of the Geckos.—M. Jean Muller, Professor at the University of Bonn, to whom anatomy is indebted for many important works, informs us, "that he has lately observed that the eye of the gecko is provided anteriorly with the same lachrymal capsule as was described by Jules Cloquet in serpents. The geckos are the only species among the Sauria which have as yet been shewn to possess this character."—*Ann. des Sci. Nat.* Dec. 1830.

M. Fohmann on the Distribution of the Absorbent Vessels.—Professor Fohmann of Liege, whose labours occupy a prominent place in the recent history of the absorbent system, (communicated to the Meeting of Naturalists in Heidelberg, in 1829,) has been lately occupied in investigating the mode of origin, and distribution of the absorbent vessels, within the various textures and organs of the body.

The researches of Professor Fohmann respecting the mode of termination of the absorbent vessels, and their connection with the venous system, have been some time known to the public. The following are the general results of his inquiries into the condition of the absorbent system as it exists within the different textures and organs of the body:—

1. The lymphatic vessels are present in much greater number, and have a larger share in the composition of organs, than anatomists have hitherto been inclined to admit.

In many parts, such as the heart, diaphragm, the digestive and urinary organs, what is held to be cellular tissue, entirely disappears after a successful injection of the absorbent vessels.

The tissue by which the serous and mucous membranes are attached to the adjacent surfaces, and which is usually held to be cellular membrane, is in fact nothing more than a vast multitude of absorbent vessels, and can no longer be detected as an independent substance, after a successful injection of these vessels.

2. The absorbent vessels do not arise, as many suppose, in the form of branches, which afterwards unite together to form larger trunks, but, at their origin or termination in the substance of organs, form a plexus, or network, which is interwoven with the blood-vessels, and, in membranous parts, extends nearer to the surface than blood-vessels, so that it constitutes the most superficial layer of the skin, and of serous and mucous membranes. In such situations, the network becomes extremely fine, and so close, that it is impossible to insert a pin's point without wounding an absorbent vessel.

3. The absorbents do not commence with open mouths, at least not with orifices such as the puncta lachrymalia, or as Lieberkuhn imagined he had observed in the intestines. They are not furnished with separate inhaling radicles, but the vessels which enter into the formation of the network absorb through their parietes. Whether these are perforated with special inhaling orifices, cannot yet be decided with perfect certainty. Professor Fohmann has never seen any such, and is therefore of opinion, that if they really exist, they are of such a nature as not to be perceptible by the senses. —*Isis.*

Four-spined Stickleback.—A variety of the stickleback, (*Gasterosteus aculeatus,*) with four spines on the back, was discovered in a pond in the Meadows, by Mr John Stark, in September, 1830. The common three-spined stickleback was numerous in the same pond; and, of a number taken in a net at random, about one in ten or twelve proved to be of the four-spined variety. This variety (or, perhaps, species) does not appear to have been previously noticed. It is somewhat smaller than the common three-spined stickleback when full grown, the specimens procured not exceeding one-fourth of an inch in length. The arrangement of the spines is also different, being placed in twos, at regular distances, corresponding to the length of the spines. The two anterior spines are much longer than the other two; the second longest.—Stark, *in Edin. New Phil. Jour.* Mar. 1830.

New Genus of Marine Worms, (Notospermus;) *described and figured by* M. Huschke.—The author found two individuals of this genus on the coasts of Sicily, near Trapani, among the stalks of the officinal coralline. Both were from three to four inches long, by about two lines broad. When alive, they were slightly flat, but in alcohol they became strongly contracted, and assumed a cylindrical form. This worm, whose body has neither rings nor appendages, is quite smooth, and externally presents nothing particular but its colours. It crawls like the snail; although sometimes, when in water, it exhibits undulatory motions.

The animal has about sixteen green bands surrounding its body, each of which is nearly two lines in breadth. These bands are separated from one another by white bands, which are narrower. The two green bands, which are the most anterior, surround the head: the head is flat near its extremity, where there is an orifice by which a tentaculum, supposed by M. Huschke to be the male organ of generation, is protruded. The mouth opens below, in the second green band; it has the form of an elongated fissure, the circumference of which is coloured red. The anus is at the posterior extremity of the body. On the sides of the head there is a small groove, along which are found from seventeen to twenty ocular points.

This animal has a great analogy with the genus *Meckelia,* recently established by M. Leuckart. The author calls this species *Notospermus drepanensis.* (*Notospermus* from νωτος, *dorsum,* and σπεϱμα, *semen,* because there is in the interior of the back an organ which M. Huschke considers as the spermatic duct. (Isis, 1830.)—*Bull. des Sci. Nat.* Nov. 1830.

New species of Anatifa.

Anatifa Mauritia.— Desjardins. *Anatifa striata.*— Auct.

A. testa compressa, valvis substriatis; majores utrinque punctatis.

A. with shell compressed, valves substriated; the largest punctuated on each side.

This shell has five valves, and is much more elongated than the known species. The two largest valves are trapezoid; and, as in all the other valves, there are five lines of growth which give the striated appearance. There are also seen, on these valves, other oblique striæ extending from the anterior angle of the base of the large valves, and uniting with similar striæ, which are on the two middle valves; a line formed of sunk points is remarked on each large valve; it follows the same direction as the striæ just spoken of, and is more or less apparent in certain individuals. The dorsal valve passes beyond the base about a line in the large individuals, and forms at this place, that is to say, at its extremity, a small hook. The middle valves are subtriangular, and truncated at the end. This shell, which is about thirteen lines in length, and seven lines in breadth, is not quite three lines in thickness. The valves are white when the animal is dead, and have a light violet tint when it is alive. The peduncle, of a beautiful crimson red colour, is one inch and more in length. By this part, the animal is strongly attached to pieces of wood.

On the 21st October, 1829, when walking along the shore of the *Quartier de Flacq,* (Island of Mauritius,) between the post and the *Quatre-Cocas,* I found on the sandy beach a piece of wood covered by these anatifæ: they were all dead and dried. There were parts of the wood where they were heaped together in hundreds; their ciliated tentacular arms were in some protruded and dried.—Julien Desjardins.—*Ann. des Sci. Nat.* Dec. 1830.

Physaliæ.—In an excursion made on the sea coast, more than a month ago, I found, in that part of our island (Mauritius) called *Quartier du Grand-Port,* the coast covered for several miles with *Physaliæ, Velellæ, Janthinæ, Spirulæ, Glaucus,* &c. but few of the latter. Having taken one of the *Physaliæ* into my hand, I was soon obliged, by the pain which it occasioned, to let it go. This was in the morning: I suffered until night, and the next day I still felt it, but especially during two hours after touching this animal, I felt an acute pain throughout the whole arm, and particularly in the axillary glands.—Julien Desjardins.—*Ibid.*

Janthinæ.—Among the *Janthinæ,* I found the two species described by Lamarck, and one which I think is a distinct species. I know that M. de Blainville has described several of them, which you admit in your *Dictionnaire Classique* only as *varieties.* I send you a description of one which I found in very small quantity: it is true that I did not distinguish this third species until my return from my excursion, although, on collecting them on the coast, their *facies* struck me. I here transcribe the description written in my manuscript *Fauna* of the Mauritius.

Janthina Mauritiana, Nob.—I take it upon me to give a name to this species, which is particularly distinguished by the following characters from the two already cited. The columella, instead of exceeding the right margin of the opening, is, on the contrary, shorter, and the base of the opening next it is a little reflected outwards; the aperture is almost oval, and notched on the right side; the rounded spire forms a deeper suture; the violet colour always occupies the lower part, but it is not so suddenly separated from the colourless portion; on the contrary, it disappears insensibly. Without this violet colour, and the locality, I should have taken this shell for the *Lymnæa auricularis*, Lamk.; but the animal, which was still partly in the shell, enabled me afterwards to distinguish this so well characterized genus. In this, the length of the shell exceeds its diameter.

Found at the end of May, 1829, at *Pointe-aux-Feuilles*, (Isle of Mauritius.) — JULIEN DESJARDINS. — *Ibid.*

Animal of the Belemnite. — M. de Blainville recently presented to the Academy of Sciences of Paris, a memoir by M. Henry of Perpignan, on the molluscum to which the belemnite belongs. M. Henry has found, in the commune of Saint Michel de Vas, in the department of Tarn, the body, together with all the parts, of the fossil known under the name of belemnite. He sent to the Academy some pieces of the rock where these remains are contained, and very accurate drawings which he had made on the spot. He also adds a geological chart of this canton. MM. de Blainville and Brongniart are intrusted with the examination of the memoir.

On the Mode in which Insects deposit their Eggs. By M. Vallot.—The knowledge of the form and disposition of the eggs of insects is of the greatest importance in entomology, as it will enable the observer to decide immediately on the insect to which any eggs he chances to meet with belong. It would even be desirable for naturalists to collect carefully all that may occur to them on this subject, as a means of preventing the havoc committed by many insects on our fruit trees.

The red hairy masses situated on the trunk and lower surface of the branches of the linden tree, mark the eggs of the *Bombyx dispar.* The red hairy masses on the leaves of hedges and fruit trees contain the eggs of the *Bombyx Chrysorrhœa;* the small caterpillars spin together, and form those white bags so common on the trees during winter. The grayish hairy masses, disposed spirally around the branches of trees by the female of the *Bombyx lanestris,* are very apparent after the fall of the leaves, and may be collected during winter. We also see in winter the ring formed by the union of the smooth eggs disposed circularly around the branches of fruit trees by the *Bombyx Neustria.* The *Bombyx* of the willow tree applies its eggs against the trunk of the willow and poplar, and covers them with a layer of gray varnish to protect them during winter. The solid silken shell, armed at one point, in which the eggs of the great *Hydrophylus* are contained, is known; as also the almost cylindrical mass, with a serrated crest, in which the eggs of the *Blatta orientalis* are enclosed. There is also frequently found in quarries a yellowish ovoid mass, of large size, like parchment, and divided into small cells; this is a collection of the eggs of the *Mantis oratoria.* Sometimes there are met with on the stalks of vegetables, and on the leaves of the thistle, brown or even black masses, the granulated surface of which may be compared to that of the *Sphæria digitata*; these masses are formed by the eggs of locusts, deposited in the air instead of in the bosom of the earth. The female much pressed to rid herself of her eggs, lays them on the first object she meets with; the viscid substance surrounding them is soon dried, the mass blackens in the air, the action of which being too rapid, destroys the organization of the eggs, which are therefore never hatched. In speaking of locusts, M. Vallot mentions a disease to which these insects are subject; it consists of an increase in the size of the belly; the abdomen, prodigiously distended, induces such a state of weakness, that the animal dies on the walls or vegetables on which it is placed. The red cabbage bug, *Pentatoma ornata*, Latr. which destroys this plant, is distinguished by its eggs, constantly twelve in number, being deposited alternately on two parallel lines, one of the extremities of which passes beyond the other. The female of the gray *Pentatoma* lays globular eggs, of a golden green colour, collected into a mass, and about thirteen in number; the cover being raised by the exit of the little one, discloses in the interior a partition in the form of the letter T. There are sometimes found on the leaves of plants brilliant eggs, isolated, or two together, placed by the side of each other, shining, ovoid, and dotted (when examined by the microscope,) from which the author has seen the larva of a bug, the species of which he could not determine, come out. The eggs of the *Aphides* are known by their black colour, and their accumulation on buds. Those of the *Aleyrodes Chelidonii* are distinguished by the white layer on which they are placed. Those of the green *Cassida* are covered by a brownish membrane. The eggs of the *Nepa* are placed together by their ends, and terminated by two threads. Those of the *Hemerobius perla*, supported on a long filament, have been taken for a cryptogamous plant. Those of the *Hemerobius lutarius*, Linn. are found in the month of May in brown plates on aquatic plants. Those of the *Aslcaaphæ* are white, and applied in two lines upon the stalks of vegetables. Those of the yellow Ichneumon, *Ophion luteus*, adhere to the bodies of caterpillars by means of a long and very slender pedicle. The eggs of the *Culex* are agglomerated in the form of a boat. Those of the *Aranea diadema* are disposed in a ball, surrounded by a silken tissue; a disposition which is also remarked in the eggs of several other species. The *Theridion benignum* has its eggs collected in a silken lenticular envelope, of a shining white. The ova of the *Tenthredo*, deposited on the leaves, or on the young sprouts of vegetables, under the epidermis of which the female insinuates them, have the property of increasing in size after they have been laid.—*Bull. des Sci. Nat.* Sept. 1830.

Luminosity of the Ocean.—An extract was read from a letter addressed by Daniel Sharpe, Esq., to Mr Bennett, in which the writer describes the luminous appearance of the ocean as observed by him on several nights during his passage to Lisbon. A considerable sparkling was visible in the water close under the vessel's side, particularly in the spray just thrown off from the bow, and also occasionally when a wave broke; it gradually vanished as the water became quieter. The appearance was that of a number of small sparks not brighter than the smallest stars. When a bucket full of the water was taken up, nothing was visible until it was stirred or shaken, when it was instantly filled with spangles, which disappeared as the water settled: the most elegant effect was when the waves or spray broke over the deck, which then became covered with stars for a few minutes. Mr Sharpe states that he collected a great quantity in a glass, and examined them carefully with a microscope the next morning, in the expectation of observing minute *Crustacea*, &c. to which the appearance he describes has frequently been attributed. He could, however, detect nothing but an abundance of small fibres and shreds of, apparently, animal matter, and did not find even one entire animal. Hence he is disposed to infer, that, in some instances at least, the phosporescence of the sea arises from the quantity of particles of dead fishes, &c. always floating on its surface; although he confesses himself unable to explain the reason why these shine only when the water is disturbed.

It was remarked that Commerson and others have attributed the phenomenon described to the putrefaction of animal matters: and M. Bory de St Vincent has declared that marine *animalcula* take no share in it. Sir Joseph Banks, Dr Macartney, and others, on the contrary, have referred it to the presence of marine animals, principally *Crustacea*; and the existence of such, as the cause of this appearance, has been recently insisted on by

Mr J. V. Thompson. Dr M'Culloch has also attributed it to the latter cause; and states that every marine animal that he has examined is luminous. Assuming the observations of M. Bory de St Vincent and those of Dr M'Culloch to be equally correct in the instances which fell under their notice, it is worthy of inquiry whether any, and what, differences exist in the luminosity of the ocean, when it is occasioned by marine animals, or when it is owing to other causes.—*Proceedings of the Zoological Society.*

Thompson's Zoological Researches.—We lately mentioned, that Mr Thompson was delaying the publication of his *Zoological Researches and Illustrations,* until he had secured a sufficient number of subscribers to indemnify him from loss. We have not yet learned whether the work will be continued; but we think that the modest desire for 150 subscribers to such a work can never be expressed in this country in vain. Lest, however, there should be any doubt as to the continued importance of the work, we give the following list of memoirs, which will appear in future numbers, if the publication be continued:—

1. Structure, Natural History, and *Metamorphosis* of the Caligi of Entomostraca.
2. *Double* Metamorphosis discovered in the Brachyura of the Crustacea.
3. *Metamorphosis* discovered in one of the marine Univalve Testacea.
4. Metamorphosis of the second type of the Cirripedes, or Lepas, their beautiful and singular Larva—totally different from that of the Balani.
5. Extraordinary structure and *Metamorphosis* of some Epizoaria, new and singular animals of this class.
6. Metamorphosis in the Paguri of the Crustacea, symmetry of the young of these animals.
7. *Single* Metamorphosis in the Macroura, their Larva, with its changes of a totally different kind from those of the Brachyura, exemplified in the Shrimp and Prawn.
8. Detail of the curious structure of several species of the newly instituted genus Condylura. (Cancer. Scorpionurus of Montagu.)
9. Animals of some Alcyonii of the newly instituted genus Sarcodendron, with descriptions of four new species and their animals.
10. Animals of some Cellariæ, Tubuliporæ and Flustraciæ, proved to be Polyzoæ.
11. Natural History, detailed structure, and metamorphoses of the genus Artemis of the Entomostraca, the only living type of the Entomolithi paradoxi.
12. Details of several genera of the compound Ascidiæ found in the Harbour of Cove.
13. Structure and *Metamorphosis* of the genus Porcellana of the Crustacea, with its new and singular Larva.
14. Structure and Metamorphosis of some of the Marine Cyclopes, singular varieties in the organization of different genera, &c.
15. *Metamorphosis* in Gegarcinus Hydrodomus, and other genera of the Land Crabs.
16. Discovery of the Ova in several indigenous Spongia, anterior to Dr Grant.
17. Structure of the Sertulariæ and their animal inhabitant, exemplified in the indigenous species of the genus Companularia, with new species.
18. Natural History and Metamorphosis in Pinnotheres, its Larva a new type of Zoea.

BOTANICAL COLLECTIONS,

INCLUDING VEGETABLE PHYSIOLOGY.

Alismaceæ.—Most botanists now agree in uniting *Alismoideæ, Butomeæ,* and *Juncagineæ* as sections of *Alismaceæ,* all being supposed to have either a homonotropous, or orthotropous embryo, without albumen. In *Alismoideæ,* and part of *Butomeæ,* the seed is campulitropous, and the embryo curved like a horse shoe, and, according to Mirbel, (*Ed. Journ. of Nat. and Geog. Sc.* New Series, p. 185,) every such seed has the radicle at the apex of the seed, although by its curvature it may appear close to the hilum. If this view, then, be correct, the limits of the above sub-orders are not yet understood. *Alismaceæ* ought to consist of *Alismoideæ,* to which might be attached *Limnocharis,* and the other genera of *Butomeæ,* with a campulitropous seed; with perhaps the addition of *Potameæ,* which equally wants albumen, and has the radicle pointing to the apex of the seed; that is, to the extremity most remote from the hilum; this (the *Potameæ*) would, however, differ by the anatropous and not campulitropous seed. *Butomus,* the type of the *Butomeæ,* having an orthotropous embryo, and no albumen, would agree in these respects with *Juncagineæ;* and it would be a matter of doubt if their difference of placentation be sufficient to keep them distinct. (W-A.)

Maize.—Maize, or Indian corn, so important to the agricultural interests of the United States, appears to be of uncertain origin. Fuchs very early maintained that it came from the East; and Mathioli affirmed that it was from America. Regmir and Gregory have presented fresh arguments in favour of its eastern origin. Among them is the name by which it has been long known in Europe, *Blé de Turquie;* and varieties, it is said, have been brought from the Isle of France, or from China. Moreau de Jonnés, on the contrary, has recently maintained, in a memoir read before the Academy of Sciences, that its origin was in America. The name *Blé de Turquie* no more proves it to be of Turkish origin, than the name of the Italian poplar proves that that tree grew wild in Italy. It can only signify that it spread from Turkey into the neighbouring countries. Its general cultivation in southern Europe, and the production of some new varieties, proves nothing with regard to the country of the species. In favour of its American origin, is the fact that it was found in a state of cultivation, in every place where the first navigators landed: in Mexico, according to Hernandez, and in Brazil, according to Zeri; and that in the various countries it had proper names, such as *maize, flaolli,* &c.; while in the Old World, its names were either all of American origin, or names of the neighbouring region, whence it was immediately derived; and that, immediately after the discovery of America, it spread rapidly in the Old World, and soon became common, a fact not reconcileable with the idea of its former existence there. To these proofs Aug. de Saint Hilaire has added another. He has received from M. de Larranhaga of Monte Video, a new variety of maize, distinguished by the name of *Tunicata;* because, instead of having the grains naked, they are entirely covered by the glumes. This variety is from Paraguay, where it is cultivated by the Guaycurus Indians, a people in the lowest scale of civilization, and where, according to the direct testimony of one of them, it grows in the humid forests as a native production.—*Edin. New Phil. Journ.* March, 1831.

Structure of the Coniferæ.—The structure of the coniferæ differs so widely from that of the true dicotyledons, that a single glance will in general enable us to distinguish the one tribe from the other. In the coniferæ there is only one regular system of pores, resembling a piece of the most delicate network. Each mesh is bounded by straight lines crossing each other at nearly right angles, and the concentric lines of the meshes almost always approximate each other at the outer edge of each annual layer of the wood. This structure is uniform throughout the whole tribe of coniferæ, the only perceptible difference consisting of the dimensions of the meshes, trees of slow growth, as Taxus Baccata, having the finest texture. It may be right to mention, that in some of the coniferæ, (not in all,) there are occasionally circular openings to be seen, known to botanists under the name of Lacunæ. These, however, are very irregular in their distribution, sometimes occurring frequently, at other times not at all.

The structure of the true dicotyledons consists of a system of vessels, separated from one another by masses of cellular matter. The vessels, or pores are always bounded by curve lines. In some trees they are circular, in others they are elliptical, and the degree of eccentricity of the ellipses in different trees is remarkably different. The elliptical pores are sometimes divided by one or two transverse partitions. In some trees the vessels are empty, and in other trees they are filled with a resinous or gummy-resinous matter. The size, form, number, and arrangement of the vessels, or pores differ so widely in different trees, that one species may be as clearly distinguished from another by the organic structure, as by the shape of the leaves or the florification. As in the coniferæ, the vessels generally become smaller as they approach the outer edge of the annual layers. In some kinds of trees the vessels are numerous, in other kinds they are sparingly bestowed; and it is worthy of note, that, in some kinds of wood of great strength and durability, as the oak, they are not only numerous, but also of very large dimensions.

The cells constituting the cellular portion of dicotyledonous trees, have different forms and different dimensions in different kinds of wood. In the coarser kinds of mahogany, for instance, the cells have a rhomboidal form. In some trees they are spherical, and in others the form is very irregular; but however the form may differ, it will in general be found that the smaller the cells, the greater will be the strength of the timber. This is very strikingly the case with regard to the different kinds of elm. In the Scotch elm, the cells are smaller than in the English elm, and these, again, are smaller than in the Dutch elm; and it is generally known the timber of the Scotch elm is better than that of the English, and that the Dutch elm is good for nothing.—*Ibid.*

Euphorbia retusa.—Two apparently different species are confounded under this name. The one is *E. retusa,* Cav.; this has the seeds white, prismatical, and marked with six deep longitudinal grooves; the glands of the involucre are red; the leaves obcordate. The other is *E. retusa,* D.C.; this has the seeds of a gray colour, four angled, tuberculated, or almost transversely wrinkled; the lower leaves retuse; the glands of the involucre are also red as in the other. The plant of D.C. agrees in almost every point with *E. exigua,* and is surely only a variety; that of Cavanilles appears to be distinct: both grow about Montpellier. *Eu. rubra,* Cav. (not D.C.) is perhaps identical with *E. terracina,* and scarcely differing from *E. provincialis*; it has little relation to *E. retusa,* with which it is often confounded. (W-A.)

Flora Virgiliana.—" Having been requested by some literary friends to furnish the botanical names for the plants mentioned in Virgil, particularly in the Eclogues and Georgics, I send you the following. I ought to observe, that it is a subject of considerable difficulty, as the allusions to the plants by the poets are generally very vague; and, indeed, some of the species are supposed to be entirely poetical, and never to have existed except in the brains of the authors. I have not been able to see a work on this subject, published a few years ago by Tenore at Naples; and, therefore, have chiefly had recourse to Dioscorides, Pliny, Matthiolus, and some others of the old school, aided by a knowledge of what the flora of Italy contains. Notwithstanding that I give the modern names, I hope never to see a boy translating *Cytisus* by Tree-medick, or any such barbarous English-Latin names."—G. A. W-A. to Mr Cheek.

Abies, Ecl. vii. 76; G. ii. 68, *Pinus Picea.*
Acanthus, (mollis,) E. iii. 45; G. iv. 122 and 137, *Acanthus mollis.*
——— (semperflorens,) G. ii. 119, *Acacia vera.*
Aconitum, G. ii. 152, *Aconitum Napellus.*
Æsculus, G. ii. 15, *Quercus Robur?* Botanists, however, have usually referred it to *Q. esculus,* while Quercus they consider to be the true *Q. robur.* From Pliny's saying that the Esculus, or Æsculus, has the largest fruit of all, and that it was sacred to Jove, we think our supposition correct; it is, then, difficult to say what is the Quercus of old writers. Most likely several varieties of the common oak were known by these different names. It is singular, that while Æsculus was the tree sacred to Jupiter, the walnut, (Jovis glans, or Juglans,) was the fruit dedicated to him.
Alga, E. vii. 42, supposed to be *Zostera mediterranea.*
Allium, E. ii. 11, *Allium sativum.*
Alnus, passim, *Alnus glutinosa.*
Amellus, G. iv. 271, *Aster Amellus.*
Amomum, E. iv. 25, and iii. 89, *Cissus vitiginea.*
Anethum, E. ii. 48, *Anethum graveolens.*
Apium, E. vi. 68; G. iv. 121, *Apium graveolens.*
Arbutus, E. iii. 82, vii, 46; G. ii. 69, *Arbutus Unedo.*
Avena, E. v. 37; G. i. 154, *Avena sterilis.*
——— G. i. 77, *Avena sativa.*
" Aureus et foliis et lento vimine ramus,
" Junoni infernæ dictus sacer:"—Æn. vi. 137, *Viscum album.*
Baccar, E. iv. 19, *Valeriana celtica.*
Caltha, E. ii. 50, *Calendula officinalis.*
Carduus, passim, applied to several species of *Carduus* and *Cirsium.*
Carex, G. ii. 231, *Carex acuta.*
Casia, E. ii. 49; G. ii. 213, iv. 30, *Daphne cneorum.*
Castanea, E. i. 82, &c. *Castanea vesca.*
Cedrus, G. ii. 443, iii. 414, *Pinus Cedrus.*
Centaurea, G. iv. 270, *Centaurea Centaureum.*
Cerasus, G. ii. 18, *Cerasus vulgaris.*
Cerinthe, G. iv. 63, *Cerinthe major.*
Cicuta, E. ii. 36, x. 85, *Cicuta virosa;* so generally supposed; but Pliny's description seems rather to refer to *Conium maculatum.*
Colocasia, E. iv. 20, *Arum Colocasia.*
Cornus, G. ii. 247, *Cornus mascula.*
Corylus, passim, *Corylus Avellana.*
Crocus, G. iv. 181, *Crocus sativus.*
Cyparissus, G. ii. 84; Æn. ii. 680, *Cupressus sempervirens.*
Cytisus, E. ii. 64, x. 30; G. iii. 394, *Medicago arborea.*
Dictamnus, Æn. xii. 412, *Origanum Dictamnus.*
Ebenus, G. ii. 116, *Diospyros Ebenum.*
Ebulus, E. x. 27, *Sambucus Ebulus.*
Edera, E. iii. 39, iv. 124, vii. 39, viii. 13; G. ii. 258, iv. 125, *Hedera helix.*

Elleborus, G. iii. 451, *Helleborus fœtidus.*
Ervum, E. iii. 100, *Ervum Ervilia.*
Fagus, E. i. 1, &c. *Fagus sylvatica.*
Ferula, E. x. 25, *Ferula communis.*
Fraxinus, passim, *Fraxinus excelsior.*
Galbanum, G. iii. 415, iv. 264, *Bubon Galbanum.*
Genista, G. ii. 12, *Spartium junceum.*
Hibiscus, E. ii. 30, x. 71, *Althæa officinalis.*
Hordeum, E. iv. 36, &c. *Hordeum sativum.*
Hyacinthus, E. iii. 63; G. iv. 183, *Gladiolus communis,* which, on account of its peculiar stigma, explains the passage—"Dic quibus in terris," &c. E. iii. 100.
Ilex, E. i. 18, vii. 1; G. ii. 453, *Quercus Ilex.*
Intubum, G. iv. 120, *Cichorium Endivia.*
——— G. i. 120, *Cichorium Intybus.*
Juniperus, E. vii. 53, *Juniperus oxycedrus?*
Lappa, G. i. 153, *Arctium Lappa.*
Laurus, passim, *Laurus nobilis.*
Ligustrum, E. ii. 18, *Ligustrum vulgare.*
Lilia, E. ii. 45, x. 25; G. iv. 131, *Lilium candidum.*
Linum, G. i. 77, *Linum usitatissimum.*
Lolium, E. v. 37; G. i. 154, *Lolium temulentum.*
Lotus, G. iii, 394, *Lotus corniculatus.*
——— (genus Laudunum,) G. ii. 84, *Zizyphus Lotus,* and *Diospyros Lotus.*
Lupinus, G. i. 75, *Lupinus albus.*
Lutum croceum, E. iv. 44, *Reseda Luteola.*
Mala, (hesperidum,) E. iii. 71, vi. 61; G. ii. 126, *Citrus medica.*
——— E. ii. 51, viii. 37, *Pyrus Cydonia.*
Melisphyllum, G. iv. 63, *Melissa officinalis.*
Myrica, E. iv. 2, viii. 54, x. 13, *Tamarix gallica.*
Myrtus, passim, *Myrtus communis.*
Narcissus, E. ii. 48, *Narcissus poeticus.*
Nemora, (Æthiopum molli canentia lana,) G. ii. 120, *Gossypium arboreum.*
Oliva, E. iv, 16, viii. 16; G. ii. 3 and 85, *Olea europæa.*
Orchades, G. ii. 86, *Olea europæa,* var.
Ornus, E. vi. 71; G. ii. 111; Æn. ii. 626, *Fraxinus Ornus.*
——— G. ii. 71, *Pyrus aucuparia;* so at least I presume; but, indeed, the whole passage upon engrafting, from line 69 to 72, is very obscure; nor does Pliny throw much light on the subject. Either we must be very ignorant of the trees meant, or they ignorant of ingrafting: no "malus," that I know, can be ingrafted on the "Platanus," whether the latter be the maple or plane, unless we suppose the Malus, like the three black crows in *Peregrine Pickle,* means here something round like an apple, which applies to the fruit of *Platanus orientalis.* May not, in the same passage, "Glandemque sues fregere sub ulmis" apply to *Carpinus Betulus?*
Paliurus, E. v. 40, *Zizyphus Paliurus.*
Palma, G. ii. 670, *Phœnix dactylifera.*
Papaver, G. i. 78, 212, iv. 131, 545, *Papaver somniferum.*
——— E. ii. 47, *Papaver Rhœas,* as I think.
Pausia, G. ii. 86, *Olea europæa,* var.
Pinus, E. vii. 65, *Pinus Pinea.*
Pirum, G. ii. 72, &c. *Pyrus communis.*
Platanus, G. ii. 73, iv. 146, *Platanus orientalis;* see Ornus, *supra.*
Poma, E. vii, 54, *Pyrus Malus.*
Populus, E. ii. 66, vii. 61, ix. 41, *Populus alba.*
Prunus, E. ii. 53, *Prunus domestica.*

Prunus, G. iv. 145, *Prunus spinosa.*
Quercus, E. i. 17; G. ii. 16, *Quercus Esculus?* so, perhaps, this may be reckoned, if Esculus be the true oak.
Radii, G. ii. 86, *Olea europæa,* var.
Rosa, G. iv. 119, *Rosa damascena.*
Rubus, E. iii. 89, *Rubus fruticosus?* but I suspect Virgil to have been a better botanist than the moderns, and that he did not distinguish the Italian Brambles from each other.
Sardoa herba, E. vii. 42, *Ranunculus Philonotis.*
Salix, G. iv. 183, *Salix argentea.*
—— E. i. 55, v. 16, *Salix vitellina.* A similar remark may be made on Virgil's Salix, as upon Rubus.
Scilla, G. iii. 451, *Scilla maritima.*
Serpyllum, E. ii. 11; G. iv. 31, *Thymus Serpyllum.*
Thymbra, G. iv. 31, *Thymbra spicata.*
Thymus, E. v. 77, *Thymus vulgaris.*
——— E. vii. 37; G. iv. 270, *Satureja capitata.*
Tilia, G. iv. 144 and 183, *Tilia europæa.*
Tribulus, G. i. 153, *Centaurea Calcitrapa.*
Turea virga, G. ii. 117, } *Amyris Kataf.*
Turifera arbor, G. ii. 139, }
Vaccinia, E. ii. 18 and 50, *Delphinium Ajacis.*
Verbena, E. viii. 65, *Verbena officinalis.*
Viburnum. E. i. 25. *Viburnum Lantana.*
Vicia, G. i. 75, *Vicia sativa.*
Viola, E. ii. 46, iv. 38, *Matthiola incana.*
Ulmus, E. i. 59; G. ii. 83, &c. *Ulmus europæa.*
Ulva, E. viii. 87; G. iii. 175, *Typha latifolia.*
Volemus, G. ii. 88, *Pyrus communis,* var, " Quod volam manus impleat."

The passage, " Velleraque ut foliis depectunt tenuia Seres," G. ii. 121, on comparison with Pliny, evidently alludes to the culture of mulberry trees and silk worms by the Chinese.

Notice of an Indian Palm, apparently identical with Hyphæne Coriacea Gaert.—Lieutenant-Colonel Bowler lately communicated to the Linnæan Society an account of a curious species of palm, apparently identical with the Doum palm of Upper Egypt (*Hyphæne coriacea* of Gœrtner,) found in the Cutcherry Compound, at Masulipatam, and also near Kongaram in the Teloogoo Compound, both in the government of Madras. The trees were from eighteen to fifty feet high, with their stems generally twice forked, but some were found with an elongated simple stem having as many as six heads. The fronds are used by the natives for thatching, and the hard fibrous nuts, when steeped in water and beaten, are made into brushes for white-washing their houses. Colonel Bowler observes, " The Sunasies, whenever they can procure them, carry the stalks of the fronds in their hands, and impose upon the ignorant natives, by attributing to them many surprising virtues, and pretending they cut them from a curious tree which was in a large forest at an incalculable distance.

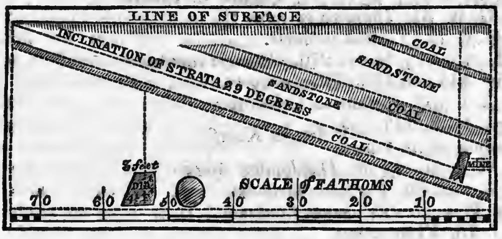
" The inhabitants of Kongaram and the neighbouring hamlets look upon this tree as the guardian of their jungle, and hold it in some degree of veneration; conceiving it has (as I am told its Sanscrit name *Kulpa Vroochum** implies) the power of fulfilling the desires and wishes of mankind, at least such as from firmness of heart and morals have faith in its supposed virtues."

* A holy tree in the gardens of Indra. It is said in the Pooranas to have been found in the ocean when Krishna churned it, and that it was given to Indra, telling him that it would grant the wishes of all beings.

GEOLOGICAL COLLECTIONS,

INCLUDING MINERALOGY.

Fossil Tree near Dalkeith.—In our last Number, we noticed a fossil tree which has been recently discovered in the coal mines belonging to the Marquis of Lothian, in the parish of Newbattle. We are now enabled, through the polite attention of the editor of the *Edinburgh Literary Journal*, (a delightful work, "*quod miscuit utile dulci,*") to insert a cut which gives a sufficiently accurate idea of the position of the tree.



This tree was found by the workmen while piercing the strata in a horizontal or level line 23 fathoms beneath the surface. It traverses the dip of the strata nearly at right angles—about 6 inches in the first $5\frac{1}{2}$ feet off the perpendicular line. The base of the part exposed is $4\frac{1}{2}$ feet in diameter, tapering in a conical form, as represented in the cut, to a diameter of 3 feet at the top.

Petrified Forest on the Banks of the Missouri.—On the western bank of the Missouri, some miles above its junction with the Yellow Stone, and about 48° lat., the summits of the mountains, at about 500 feet above the surface of the river, exhibit a remarkable phenomenon: The surface is covered with trunks, roots, and branches of petrified trees. Some of the trees appear to have been broken off at the roots, others at some feet above the surface of the ground. One trunk was measured, whose circumference exceeded 15 feet.—*Bull. de la Soc. Géog.* Jan. 1831.

The Gold Mines of Western Transylvania.—Of all countries in Europe, Transylvania was reckoned, until lately, the richest in gold, and the most favourable for the discovery of new mines of this precious metal. The recently ascertained richness of the Ural chain, has placed it on a par with the mountains of Transylvania; and it may eventually prove more rich, since its auriferous soils have not been dug up and impoverished, as in the latter country. On the other hand, if the discovery of the ancient mines of the Ural is owing to chance, the new auriferous deposits have been examined according to the most approved rules of art, while in Transylvania this last means of research has too often been neglected. The auriferous soils are, for the most part, abandoned to washers, more or less ignorant, or to wandering troops of enrolled Bohemians, who dig the soil without rule, and do not avail themselves of all its riches; or who, naturally idle, are contented with finding the quantity of gold for which they are individually taxed, and return immediately to their vagabond life.

The districts have not been at all studied; none of them has been geologically examined; and even the superficial researches have not been made generally throughout the mountains, the geognostical constitution of which seems to indicate the treasures they contain. On the contrary, several of the richest mines have been discovered by accident, as that of Nagyag, which a shepherd, or, as some say, a pig, first brought to light.

Vorospatak is one of the most auriferous spots in Transylvania; the mode of working the mines at this place will illustrate the defects of the present system.

The heights surrounding this village have long been public property. Any person, for a trifle—from ten to twenty shillings—obtains permission to dig, on condition that he do not deviate, on either side, more than seven fathoms from his main gallery, and that he stop whenever he meets the workings of another. If these mountains were poor, this singular mode would be attended with few inconveniences, for then few persons, and these chiefly miners, would venture to engage in excavating them; but here the richness is such, that every body, even the most ignorant peasant, is tempted to try his fortune. Every one excavates and digs for himself, often without any rules of art, so that these mountains actually resemble, on a great scale, the surface of a country crowded with molehills. There are veins wrought out, partially or entirely, in their upper parts, and the walls of which, left without support, have remained in some places standing, in others have crumbled away. In other places, large tunnels, or heaps of fragments, indicate more considerable workings, proofs of the richness of the spot from which they have been excavated. Peasants, it is true, when they have become rich, sometimes send their sons to study the art of mining at Schemnitz; but, on their return, they are unable to put in practice the precepts of art, because it would be necessary to operate upon a surface already turned up, and belonging to a multitude of proprietors, whose interests must be respected; and because the funds are wanting for piercing into the bowels of the mountain.

Formerly the government engaged also in mining; but it was cheated by its agents, and has therefore given it up. It derives more profit by buying up the gold of the mines at a sufficiently low price. The government had pushed a long gallery into the *Orlaer Gebirge,* and had crossed 113 veins, in an extent of 300 or 400 fathoms. The value of these veins has not been examined.

As the mere mining of this celebrated place is in the hands of ignorant men, the mode in which the gold is extracted is absolutely bad. Who would imagine that the proprietors of every mine make a daily division, according to their respective shares, of the minerals that have been raised; not a quantity of gold proportioned to the capital advanced, but a heap of crude ore, of a certain size, so that it may happen, after the extraction, that one receives much more, and another much less, than he ought to receive? Again, the miner does not wash his ore, but has recourse to a third party. A few washing stations would suffice for all the mines, whereas there is a crowd of them placed one higher up the hill than another, and so badly constructed, that when the water is abundant, the auriferous clay, or particles of gold, are carried down from the higher to the lower washings, and there are some people who gain their livelihood by washing what descends from the other stations. The spirit of combination is a thing so little known among them, that probably every one would melt his own *schlich* (washed ore,) if the government did not require it to be sent to the Royal Founderies of Zalathna.

One of the government officers residing at Vorospatak had a very just idea of the advantages which might be derived from this metalliferous locality; but, as a public functionary, he could only conform to the orders he received. As the greater part of the mass of five auriferous mountains is metalliferous, he conceived it practicable to mine the whole by open quarrying, and by an inclined plane to convey the ore to the Arangos, a river which would admit of the establishment of large washing stations, at a small expense.

It would be as difficult for the government to limit this liberty of mining, or to enlighten the people as to their true interests, as to change so many other customs and laws, which form part of a constitution made only for the nobles, and eminently opposed to the moral improvement of the people, and the increase of the riches of the country.

The richest mines of Transylvania are in the districts of Carlsburg, Hunyad, and Zarand. There are 303 mines of gold, 21 of silver and gold, 7 of silver, 2 of lead and silver, 6 of cinnabar and native mercury, and 4 of lead. The metals sometimes form a network of little threads, sometimes in threads of greater extent, as those of gold and silver. Besides, there is the gold which is obtained by the washing of the sand in general, and that which is extracted only from the sand of rivers.

The government of the King of Hungary has four mining districts, namely, Draiska, the hills of Kirnik, near Abrudbanya, of Kapnik, and of Ohlalapos. The national government of Transylvania,—a separate administration from the preceding,—mines the districts of Nagyag, Boicza, and Radna; the district of Abrudbanya, is in the hands of private persons.

The principal gold washings in the deposits of sand and pebbles are at Olapian, Korosbanya, and Nagy-Aranyos.

The cinnabar is found massive, with quartz, in small veins of a schist, associated with limestone, ten leagues north of Zalathna, in the mountains of Baboja and Dombrava. In this latter place the schist, varying in hardness, and slightly siliceous, and the gray compact limestone, have the appearance of an intermediate schist, though we are by no means certain that they are really of that age.—*Journal de Géologie*, Vol. II. p. 267.

True position of the Quicksilver Mines of Idria. By A. Boué.—In the Alps, mercury has been long known at Idria, near Neumarkt, in Carinthia, at Visdende on the Po, according to M. Catullo, on the Wallersee, at a place called Urfelde, near Fussen, on the left bank of the Lech, opposite the end of the Salzoberberg in Bavaria, near Radein in the Grimmerjoch in Tyrol, at the foot of Wuchselstein in the Hollenthal, a lateral valley of the Partnach near Partenkirchen, at Zalz on the Reiting, and at Erzberg. This mineral is either native, or in the state of cinnabar. It is found in this latter state at Neumarkt, and near Partenkirchen. The fluid mercury lies disseminated in *black indurated marls* (Leberstein, liverstone,) which are slightly bituminous, or mixed with anthracite, as at Idria, while the cinnabar is in large nodules, called Lebererz (liver ore,) in these same marls, and in little interlaced threads in the calcareous rocks.

These marls, which resemble the saliferous marls, but which occur in general only in the inferior beds of the Alpine limestone, have been found in various parts of the Alps; but they are rarely metalliferous. The most celebrated locality is that of Idria; and when one has been at the place and in the mines, one cannot help feeling astonished that the true position of this deposit should have been so singularly misunderstood.

Idria is situated in a valley, and on the declivity of the metalliferous mountain. This mountain stands almost isolated towards the south; is separated from the neighbouring hills on the east by the river Idritza, and on the west by the ravine of Spickel-Bruch. It is connected in the north to the Vogelsberg, and to Schirmischerberg. It is composed of beds, bent irregularly into arches, the convexity of which is downwards, and the greater part of the calcareous and marly beds cross out at the Spickel-Bruch. The general composition of the mass is as follows, commencing at the surface:—

1. Marls, hard, black, schistose, containing nodules of black limestone.
2. Similar marls in beds, containing nodules of gray compact limestone, fluid mercury, and cinnabar.

3. A thick bed of gray compact limestone, which assumes the aspect of a false breccia, owing to a multitude of deeper coloured portions, and to little veins of cinnabar. This vein varies in thickness from 5 to 30 feet, and both its upper and its under surface yield cinnabar.

4. Below some sandy brownish black limestones the marly schist reappears, mixed with anthracite, and containing mercury. It is called *silberschieffer* by the miners, who are so unskilful as to lose a great part of the fluid metal. These marls contain also calcareous masses, and, particularly on the under part, very rich nodules of cinnabar.

5. This is followed by a calcareous marl, and by a second thick bed of brecciform limestone, containing little veins of cinnabar.

6. This black bed rests upon a marly black sandstone, the black metalliferous and other marls followed by a compact brecciform limestone.

7. The whole rests on magnesian rocks, rent and bleached, similar to those of Baden in Austria.

Lastly, a few leagues from Idria, the valley of Polanschiza presents red sandstones, and non-porphyritic conglomerates, which alternate with limestones, resembling these last, and probably support the whole deposit of Idria.

The mercury of Idria therefore is found in a transition schist, and in similar schists are found the cinnabar of Larbuch, of Dombrawa in Transylvania, and of Szlana in Hungary, and the mercury of Schwartzleogang, of Salfenberg near Brixen, and of Schmidtenthal in the Pinzgau. The cinnabar sandstone of the Alpine limestone of Malachau in Hungary will have the same position.—*Journal de Géologie,* II. No. 5.

Gold Mines in the Uralian Mountains.—The produce of the Ural mines amounted, in 1827, to £651,420; in 1828, to £672,416. Gold is also found in the Rhine; but the quantity is so scanty, that the washer considers it a good day's work, if he succeed in collecting to the value of five or six shillings. From the official accounts of the yearly produce obtained from that stream in the Grand Duchy of Baden, we observe that the value was, in 1821-2, £603; 1826-7, £808; 1827-8, £943. The last produce, small as it may appear, for it scarcely exceeded 17 pounds in weight, shewed so considerable an increase upon preceding years, that a great impulse was given to this branch of industry in Baden, and the harvest has become still more productive.—*Ed. New Phil. Jour.* April, 1831.

Diamond in the Coal Formation.—The diamond is said to have been found in the coal formation in India.—*Ibid.*

Splendid Specimen of Megatherium.—A perfect skeleton of the megatherium, exceeding in size the splendid specimen preserved in the Cabinet of Natural History in Madrid, has been lately discovered 126 miles south of Buenos Ayres. This remarkable specimen of antediluvian zoology is now in the possession of Woodbine Parish, Esq. Consul-General at Buenos Ayres, who intends to bring it with him to Europe.—*Ibid.*

Fossil Oxen of Russia.—Professor Fischer of Moscow has described two new species of fossil oxen from Siberia. The *Bos latifrons,* with a large forehead, horns straight at the base, palate much dilated; and the *Bos canaliculatus,* having horns very close together at their base, and separated by a straight deep channel.—*Jour. de Géol.* II. No. 7.

Immense quantity of Fossil Bones in Siberia.—M. Hendeström, who was appointed, in 1808, by the Russian government to visit the coasts of the Icy Sea, from the Lena to the Colyma, states, that he has seen in the ice thousands of mammoths, rhinoceroses, buffalos, and other fossil animals.—*Ibid.*

Frog Embalmed in Amber.—Dr Kastner states that he saw, in the possession of M. Krause, at Sumimunde, in the isle of Rugen, a piece of amber containing a frog!—*Ibid.*

Vanadium, a new Metal.—The following extract of a letter from Berzelius to M. Dulong, is given in the *Annales de Chimie*, vol. xlv. p. 332:—

Professor Sefström, director of the School of Mines at Fahlun, in examining a species of iron remarkable for its extreme flexibility, found in it a substance, the properties of which differed from those of all known substances, but in quantity so small, as to require much labour and expense to procure enough of it for examination. This iron came from the mine of Taberg, in Snioland; and M. Sefström having found that the ore contained the new substance in larger quantity than the metal extracted from it, was induced to examine the slag, which he found much richer, and from which he procured as much as enabled him to study its properties.

We have not yet definitely fixed the name of this substance; we have called it for the present *Vanadium*, from *Vanadis*, an ancient Scandinavian deity.

Vanadium forms with oxygen an oxide and an acid.

The acid is red, pulverulent, and fusible, and assumes the crystalline form on cooling. It is slightly soluble in water, reddens litmus, gives *yellow neutral salts*, and *orange bi-salts*. Its combinations with the acids, or the bases, in solution in water, possess the singular property of losing often all at once their colour, which they reassume as they become solid; and if they are again dissolved, they preserve their colour. This phenomenon appears to have some analogy with the two distinct states of the phosphoric acid and the phosphates.

Hydrogen gas reduces the vanadic acid to a red white; there remains a coherent mass, emitting a slightly metallic sound, and conducting electricity well.

Vanadium thus obtained does not combine with sulphur, even when heated to redness in an atmosphere formed by the vapour of this substance.

The oxide of vanadium is brown, almost black; it dissolves readily in acids. The salts are of a very deep brown colour, but by the addition of a little nitric acid, an effervescence takes place, and the colour becomes a very fine blue.

Sulphuretted hydrogen, and even nitrous acid, reduce the vanadic acid, in combination with another acid, to that blue matter which seems to be a compound of vanadic acid with the oxide of vanadium, analogous to those formed by tungsten, molybdenum, iridium, and osmium. The acid and oxide give also combinations of a green, yellow, and red colour, all soluble in water, without the assistance of another acid.

The oxide of vanadium, prepared in the moist way, is soluble in water and the alkalis,—the presence of a salt in the water renders its solution impossible; a property from which is derived a method of precipitating it.

The vanadates dissolved in water are decomposed by sulphuretted hydrogen, which transforms them into sulpho-salts, of a beautiful red colour.

The chloride of vanadium is a colourless, very volatile liquid, giving off in the air a thick red vapour.

The fluoride is sometimes red, sometimes colourless, but always fixed.

Before the blowpipe, vanadium gives, like chromium, a beautiful green bead.

The memoir of M. Sefström will present a more complete history of this substance.

Vanadium discovered in Brazil.—The following additional notice we extract from Jameson's Journal:—Humboldt presented to the Institute specimens of vanadium, the new metal recently discovered in the iron of

Estersholm by Mr Sefström, and which also exists in Mexico in a brown ore of lead of Zimapan. M. del Rio, Professor in the School of Mines of Mexico, had extracted from that ore a substance, which, to his apprehension, resembled a new metal, to which he gave the name of *Erythronium.* M. Collet Descotils, to whom he sent a specimen, could not agree in erythronium being a simple substance, and believed he had demonstrated that it was an impure chrome. It would appear that Professor del Ris agreed in this opinion, and there was not longer any idea of its being a new metal. But since the discovery of Sefström was known to Voller, he, struck with the resemblance which exists between the properties of vanadium and that which the Mexican chemist attributes to his erythronium, has repeated the analysis of the brown ore of lead of Zimapan, and from which he has obtained a simple body, perfectly identical with that of the iron ore of Esterholm. It is worthy of remark, that so rare a metal should have been discovered in two places so far asunder as Scandinavia and Mexico.

Analysis of the Chalybeate Water of Vicar's Bridge.—This powerful chalybeate has a specific grav. at 62° F. of 1.04893, being higher than that of any sea water, with the exception of the Dead Sea. According to Mr Connell, an imperial gallon contains—

Persulphate and protosulphate of iron, .	3037.84
Sulphate of alumina, . . .	580.64
Sulphate of magnesia, . . .	277.20
Sulphate of lime, . . .	43.68
Chlorides of sodium and potassium, . .	2.4
	3941.76 grs.

Ed. New Phil. Jour. March, 1831.

Bones of Anoplotherium *and* Palæotherium *in the Lower Fresh Water Formation of the Isle of Wight.*—Mr S. P. Pratt lately discovered, in the lower and marly beds of the quarries of Binstead, in the Isle of Wight, and which belong to the lower fresh water formation, a tooth of an *Anoplotherium,* and two teeth of the genus *Palæotherium,* animals characteristic of strata of the same age in the Paris basin.

These remains were accompanied, not only by several other fragments of the bones of *Pachydermata* (chiefly in a rolled and injured state,) but also by the jaw of a new species of *Ruminantia,* apparently closely allied to the genus *Moschus.* From the occurrence of the latter fossil, the author infers that a race of animals existed at this geological epoch, whose habits required that the surface of the earth should have been in a very different state from that which it has been supposed to have presented, in consequence of the frequent discovery of the remains of animals who lived almost entirely in marshes.—*Ann. of Phil.* Jan. 1831.

Bones of Fossil Tortoises.—M. Julien Desjardins has found fossil vertebræ, a pelvis, and bones of the extremities of the tortoise, in the Mauritius; thus corroborating a discovery made by Dr Guch, of some fragments of bones of this animal. Dr Guch's specimens were found in a hard limestone, from which it was impossible to obtain them entire. M. Desjardins has been more fortunate in meeting with them in a whitish marl, from which he was able to dig them out with his hand.

The Island Rodrigo also contains fossil bones of tortoises and birds.

NOTICES AND ANALYSES OF NEW BOOKS AND PAPERS.

View of Ancient and Modern Egypt, with an outline of its Natural History. By the Rev. MICHAEL RUSSELL, LL. D. pp. 480, with a Map and ten Engravings by Branston. Oliver and Boyd, Edinburgh.

This is the third volume of the Edinburgh Cabinet Library, and fully sustains the reputation of that work.

Under the general heads of Physical Properties and Geographical Distribution of Egypt; Civil History of Ancient Egypt; Mechanical Labours of the Ancient Egyptians; The Literature and Science of the Ancient Egyptians; Remains of Ancient Art in various parts of Egypt; Civil History of Modern Egypt; The Actual State of Egypt under the Government of Mahommed Ali; The Oases; Ancient Berenice and Desert of the Thebaid; Manners and Customs of the Egyptians; and Natural History of Egypt,—is associated a body of information on the history of this ancient people, which combines all the qualities requisite for the professed historian and the general reader. The only objection we can find to this volume arises from the meagre and unprofitable chapter on natural history, which, if it could not have been properly done, had better have been altogether omitted.

A Map of the Basin of the Tay; including the greater part of Perthshire, Strathmore, and the Braes of Angus, or Forfar; a part of the Mearns, or Kincardine; and a portion of the County of Fife.

Topography of the Basin of the Tay. 12mo, with three plates. Vol. I. published. Anderson, jun. North Bridge Street, and Hunter, Hanover Street, Edinburgh.

The talents of Mr Knox have already passed the ordeal of public examination, and been favourably received. The Map of the Basin of the Forth reflects the highest credit upon both the author and the engraver.

We now have a map of the Basin of the Tay, which rivals the excellencies of its predecessor. To those who know the value and importance of accurately laid-down roads, this map will be most acceptable. If we had any fault to find with it, we should say, that it contains too much. It is crowded with a profusion of seats of peers and gentlemen, plantations, ruins, and antiquities, public and private roads, rivers, rivulets, lines of canals and railways, hills, soundings, and islands, with the line of low water-mark in the Firth of Tay, and the boundary lines of the different counties and parishes.

The Map includes that portion of Scotland extending from Cupar in Fife to Schihallion, Rannoch, the Forest of Atholl, and the Braes of Angus and Mearns, to Laurencekirk; and the coast from St Andrews to Montrose, inclusive.

As a companion to this Map, Mr Knox has prepared the *Topography of the Basin of the Tay*, in the first volume of which are comprised the antiquities,—a review of the ancient history,—the ancient topography of the districts of country contained in the Map; with a full account of all the interesting Roman works, camps, stations, &c.; also the Druidical, Pictish, and Celtic antiquities. Volume Second, which is in preparation, will, we understand, contain the modern topography, including scenery, gentlemen's seats, &c.; with an account of the state of agriculture, manufactures, commerce, table of the heights of mountains, &c.

Though a long list of subscribers already appears in the work, we would still recommend it to the attention of those who are in any way concerned with this interesting tract of country.

On the Musk Deer. By M. Jobst.—*Ibid.*

At the last meeting of German naturalists, at Heidelberg, M. Jobst presented the skin of a male deer, with the musk bag. He obtained it at London. It had been sent from Mongolia. According to M. Eschscholtz, this skin belongs to a new species, characterized by two white lines on the neck; he calls it *Moschus Altaïcus.*

Ornithological Biography, or an Account of the Habits of the Birds of the United States, accompanied by Descriptions of the Objects represented in the Work, entitled the Birds of America, and interspersed with Delineations of American Scenery and Manners. By John James Audubon, F.R.SS. L. & E. &c. Edinburgh, 1831. 8vo.

This work consists essentially of descriptions of the objects represented in the first volume of the "Birds of America," which is remarkable chiefly for the beauty and elegance of the attitudes in which the feathered warriors and songsters are presented. It is not our intention to enter into any criticism of M. Audubon's splendid pictorial performances, which can scarcely be of much use to the student of ornithology, on account of their great price, but which, as introducing a new style in the representation of objects of natural history, and exhibiting the power of depicting even the passions of animals, must necessarily be productive of benefit to science. In the descriptive work before us, we find a full account of the manners, migrations, dispersion, and characteristic peculiarities of the 99 species of birds already represented by the pencil of the American ornithologist. In most cases, the descriptions agree with those of Wilson, of which they may be considered as corroborative; but they also contain many particulars, of which that writer, being less acquainted with the country, was not aware. They refer more especially to the manners of the different species, the mode of flight, and other circumstances, which authors generally overlook, contenting themselves with the descriptions of the forms and colours of the exterior. Of these latter, the *Ornithological Biography* contains many which we might point out as models. The birds are not arranged in any order, but occupy each an insulated position, which has prevented the author from presenting his views respecting the grouping of species, and the affinities, discrepancies, and contrasts, which form the most difficult department of ornithology. In the descriptions also there is a want of method, which some persons may find pleasant in perusing the work, but which renders it less useful to him who searches in it for scientific information. In fact, Mr Audubon seems to have addressed himself more particularly to the general reader, than to the student of zoology; and to the former we should conceive the work must be highly acceptable, more especially as it contains, in the form of distinct sketches, interspersed at regular intervals, a good deal of interesting information respecting the scenery and inhabitants of the American States, those receptacles of the superabundant population of Europe. As the author has announced his intention of producing a general synopsis of the birds of North America, a work, the execution of which will afford a better test of his ornithological knowledge, we may expect in it the anatomical details and scientific ordinations which have been excluded from the present work. The style, some specimens of which will be found in our *Zoological Collections,* is easy, generally graceful, often lively, and never of that dull and formal character into which naturalists, destitute of imagination, are apt to run. In short, we have perused the work with much pleasure, and congratulate its author upon his having so successfully established his claim to rank as an ornithologist, after having already enjoyed so splendid a reputation as a painter. The present volume is the first of a series of five, which will be necessary to include all the species of birds that occur in the United States, and of which Mr Audubon has himself been the discoverer of a considerable number previously unnoticed.

American Ornithology; or the Natural History of the Birds of the United States. By Alexander Wilson, and Charles Lucian Bonaparte. Edited by Robert Jameson, Esq. F.R.S. E. & L. F.L.S. M.W.S. &c. In four volumes. Vol. I. Constable. Edinburgh, 1831.

The publication of Wilson's classical work in Constable's Miscellany is a happy idea, and we congratulate the publishers on their good taste. Great parade has, however, been made of the advantages which would be derived from the superintendence of the learned editor; and however little disappointment we have experienced in the examination of this first volume, we cannot but remark with surprise that it contains but one meagre "note," or "addition." It must be remembered, that the following preparatory engagement was entered into by the publishers of this reprint long enough prior to the appearance of this first volume, to admit of the partial fulfilment of their undertaking. "This edition," say the oft-repeated advertisements, "will be increased in value by numerous additions and improvements by Professor Jameson." But we suspend any remarks until we see the last volume, and run the risk of an Appendix.

All that is claimed for the editor in the preface to this portion of the work, is the scientific arrangement of the descriptions, (the original edition having been published as Wilson could procure specimens of the birds, and, consequently, without any regard to order,) and references to the American birds contained in the Edinburgh University Museum, which, it is hoped by the publishers, will render their work a sort of guide to that department of the collection.

These gentlemen seem to have got an idea, (and in truth it is a very natural one,) that access to this "splendid cabinet of natural history" is as easy as the purchase of their delightful work; but we can assure them, however extraordinary the intelligence, that their whole Miscellany might be bought up with the sum which would be requisite to obtain for the naturalist a very cursory examination of the specimens to be mentioned in their edition of Wilson. Once within the walls, however, we fear that this "companion, or guide," will not conduct the steps of the inquirer to any given bird, merely because it is mentioned as being in the "Edinburgh College Museum." These are rather wide words. We shall have to recur to this subject; and in the interim, merely remind the publishers of the Miscellany of the fable of the dog Tray, and recommend them in future to "*look* before they leap." We by no means charge them with the intention to deceive.

British Oology, Illustrations of the Eggs of British Birds, with Figures of each Species. By William C. Hewitson. No. I. April, 1831.

Mr Hewitson has commenced the publication of a work, the subject of which, if it cannot be said to be of very high pretensions, is nevertheless of much interest to the observing naturalist. This first number contains figures of the eggs of the lapwing, butcher-bird, common bunting, yellow hammer, black cap, and sea swallow; which are accompanied by useful notices of the materials and situation of the nests, &c. The figures, though rather flat, give a very good idea of the different eggs, and, what is most important, are well coloured. No arrangement is pursued in the publication of the figures, but a proper index will be given at the conclusion of the work. We consider the execution of the whole to be creditable to Mr Hewitson, and recommend it to the support of our readers.

Architecture of Birds; forming Vol. IX. of the Library of Entertaining Knowledge.

This is a more elaborate work than the preceding, which will indeed form a favourable companion to it. Professor Rennie has a talent for collecting that kind of curious information which natural history offers to the popular reader, and which, without affording a very high opinion of the author's scientific attainments, is not the less valuable, as placing information, diffused through scientific works, in an accessible form.

Systematische Darstellung der Fortpflanzung der Vögel Europa's. Systematic Description of the Generation of European Birds, with the Figures of their Eggs. By F. A. L. Thienemann, in conjunction with MM. Brehm and G. A. W. Thienemann. Leipsic.

The third part of this beautiful work has appeared. The plan of the work is, to describe the amours of different species, their nests, sitting, and the form and colour of their eggs; avoiding all other zoological details. At the head of each family of birds, we have the general characters it presents, in respect of the nature of the eggs, and the construction of the nest.

On Kidneys in the Mollusca, and Uric Acid which is secreted by many of these animals. By L. L. Jacobson. *Det köng. danske Videnskab, selskabs naturvidenskab, og mathemat. Afhandlinger;* Tom. III. p. 324.

The author has observed, that the secreting organ of the mucus, or what naturalists call the calcareous sac, has the function of kidneys in snails. Chemical analysis of the matter secreted by this organ, has led him to discover in it uric acid, ammonia, a calcareous salt, and water. His experiments were made on the great snail, (*Helix pomatia.*) He was unable to discover any trace of uric acid in any other part of the animal. And, as in the superior animals, the kidneys are the only organ which, in a state of health, secrete uric acid; and, as the calcareous sac of the snails has many other anatomical relations with the kidneys, M. Jacobson concludes that this sac represents the kidneys, and must be so considered in all the mollusca which are provided with it.

A Century of Birds, hitherto unfigured, from the Himalaya Mountains. By John Gould, A.L.S. No. II. and III. Imperial folio. London.

This work improves; the present numbers excel the first both in drawing and colouring. The contents are as follows:

Bucco grandis—*Phasianus albo-cristatus*—*Lanius erythropterus*, male and female—*Enicurus maculatus*, (are there not specimens of this species in the East India House?)—*Garrulus striatus*, (of a remarkably sombre brown, and entirely wanting the bright plumage so common in this tribe; the feathers streaked with white along the shafts)—*Otis Himalayanus*—*Picus Hyperythrus*—*Garrulus bispecularis.*

Description des Plantes de Guinée. Description of the Plants of Guinea. By F. C. Schumacher. *Köng. Videnskab selskabs natur. og math. Afhadl.* Tom. III. p. 23.

Professor Schumacher, in a preface, points out the works to which he has had recourse,—Brown's Appendix to Captain Tuckey's Voyage, to Denham and Clapperton's Journey, &c. and mentions that the plants he describes were principally collected by Thonning, who spent three years in Guinea; that the specimens have been inspected by Vahl and Hornemann, and compared by the author himself in the herbarium of Isert. The plants are arranged according to the Linnæan system; but it is to be regretted that no reference is given to the natural orders in which the new genera must be placed, for the time will soon arrive when no plant will be considered understood unless its affinities be explained. The new genera published are:—1. *Staurospermum.* 2. *Octodon.* 3. *Cephalina.* 4. *Phallaria.* 5. *Benzonia*, all among the *Rubiaceæ*, and already adverted to by D. C. in the 4th volume of his *Prodromus.* 6. *Wormskioldia*, " Calyx tubulosus, 5-dentatus, deciduus. Corolla 5-petala. Stamina 5. Stylus 1. Capsula linearis, 3-valvis seminibus, unico serie," founded on the *Raphanus pilosus*, Willd. The stamens are perigynous; the embryo is in the axis of a fleshy albumen. D. C. places it in Cleome; Guillemin near Hypecoum in Papaveraceæ. The only species known is *W. heterophylla.* 7. *Byrsicarpus,* "Calyx 5-fidus. Corolla 5-petala. Stamina 10. Styli 5. Pericarpium coriaceo-carnosum, univalve, sutura longitudinali dehiscens, 1-spermum:" scarcely distinct from Zanthoxylum. The author has not yet gone farther than the end of Decandria.

Ueber den Zustand, &c. Letter on the Botany of Japan. By M. DE SIEBOLD. *Nov. Act. Acad. Nat. Cur.* Tom. XIV. p. 673.

This sketch is extremely interesting. M. Siebold reforms the character of *Gonocarpus* as follows:—*Calyx persistens, sepala* 4. *Corolla* 4-*petala, petalis linearibus cum calyce alternis concavis. Stamina* 6, *calyci inserta. Stylus nullus. Stigma sessile,* 4-*fidum. Fructus ut apud Gærtnerum.* The genus *Weigelia* he states to be different from *Selago,* and to have a 2-celled, 2-valved polyspermous capsule; but this has been long understood, for it does not even belong to Choisy's order *Selagineæ.*

Litteraturæ Botanices Japonicæ specimen. On the Botanical Literature of Japan. By M. SIEBOLD. *Nov. Act. Acad. Nat. Cur.* Tom. XIV. p. 693.

M. Siebold here gives the titles of ten works on botany, published in Japan, which tend to shew the attention paid to that science in the country; some of them are accompanied with figures. The titles of the works are *Soo-Kwa-Sj'uu,* by Ho-tei, (1810); *Kitsu-Hin,* by Roo-Kwa-Tei, (1797); *Wehono-Samagusa,* by Hokk'joo-Hoo-koku, (1808); *Oo-hin,* by Matsuwoka-Gentats, (1697); *Bai-hin,* by the same, (1655); *Kuwadan-Azagawo-dsue,* by Kotendo, (1816), on the species of *Ipomoœa; Soo-kwa-rjak'-guwa-siki,* or a short method of painting plants, by Kiesai, (1814); *Kooweki-tsikin-s'joo,* by Owek'ia-skee, (1800), a work on horticulture; *Jaku-m'joo-S'jook,* a manual of pharmacology, by Motabara-soosin, (1824); *Jamato-honzoo,* or a Flora of Japan, by Kaibara-Toksin, (1697).

Voyage autour du Monde, du Capitaine de Freycinet; Partie Botanique. Botanical Part of Freycinet's Voyage round the World. By M. CH. GAUDICHAUD. Paris, 1830.

This work is now completed. The plates are accompanied by careful dissections. M. Gaudichaud's observations on the *Cycadeæ* are instructive. Perhaps the great fault of the work—and it is a fault not peculiar to it, but shared by most modern productions of the same kind—is the too great division of species and genera; many of the new ones being certainly formed on too slight grounds.

1. Account of the discovery of Bone-Caves in Wellington Valley, about 210 miles west from Sidney, in New Holland. (From the Sidney Gazette.)

2. Additional information illustrative of the Natural History of the Australian Bone Caves and Osseous Breccia. Communicated by Dr Lang.

3. On the Fossil Bones found in the Bone Caves and Bone Breccia of New Holland. By PROFESSOR JAMESON.—*Ed. New Phil. Journ.* March, 1831.

We some time ago noticed the discovery of a quantity of fossil bones by George Rankin, Esq. of Bathurst, in a limestone cave in Wellington Valley. A number of these remains have since been sent to Professor Jameson, in order that it might be determined to what animals they had belonged,—we are now favoured with the results of the examination.

It appears, that, in conjunction with Dr Adam, the Professor was able to refer some of the teeth to the wombat, some to the kangaroo, and others he was unable to determine, for want of means of comparison. Under these circumstances, the collection was sent to Mr Clift of London to be described, (because there was no anatomist in Edinburgh equal to the task?) and he has returned a report to the following purport:—

The collection contains a bone approaching very nearly in form to the metacarpal bone of an ox, but much larger. It also bears a great resemblance to the *radius* of the hippopotamus. It does not belong to the elephant, being too large for its length.

The great bulk of the collection is composed of bones of the dasyurus, wombat, and kangaroo; but several of the specimens are stated to be "doubtful."

From the geological characters of the caves and bone breccia, the mode of distribution of the bones in the caves, and the nature of the teeth and bones themselves, Professor Jameson draws the following conclusions:—

1. That these caves agree in character with those in Europe.
2. That the bone breccia exhibits the same character as the varieties of that rock found in different parts of the European continent and islands.
3. That New Holland was, at a former period, distinguished from the other parts of the world, by the same peculiarities in the organization of its animals, which so strikingly characterize it at the present day.
4. That the large bone resembling the radial bone of the hippopotamus, shews that Australia formerly possessed animals much larger than any of the present existing species, equalling, or even exceeding in magnitude the hippopotamus: a fact of high importance, when we recollect that the quadruped population of New Holland is at present but meagre, the largest species being the kangaroo.
5. That the bone caves and bone breccia contain, along with animals at present known, others that appear to be extinct, as is the case with the caves and breccia of Europe.
6. That the same agent or agents that brought together the remains of animals met with in bone caves and bone breccia in Europe, operated on New Holland.
7. Lastly, that the animals in the Australian caves and breccia were destroyed, and became fossil, if not at the same precise time as the European, during a similar series of geological changes.

On the Horns of the Fossil Stag. By MM. Sternberg and Schottin.—*Isis*, 1830.

These horns, two in number, were found in the gypsum quarries, near Koestritz, and were presented last year to the meeting of German naturalists at Heidelberg. They are distinguished by having at their base two tuberculated rings, and by having only one branch, which is more elevated than usual, and which is united at a right angle with the body of the horn. These characters would perhaps be sufficient to authorize the creation of a new species; the authors have, however, refrained from doing this, thinking it better to wait for farther information.

The authors give, moreover, the figure of another pair of fossil bones, which are very small, quite simple, and destitute of tubercular rings. They do not know to what species to refer it.

Writings of Count Thunberg.

WORKS.

Flora Japonica, sistens Plantas insularum Japonicarum, secundum systema sexuale emendatum. Lipsiæ, 1784, with 39 plates.

Om Japonske Nationen. On the nations of Japan. A discourse delivered at the termination of his presidency. Stockholm, 1784.

Resa uti Europa, Africa, Asia. Travels in Europe, Africa, and Asia, in the years 1770—1779. 4 vols. with 11 plates. Upsal, 1788—1793; translated into French by Lamarck and Langlès, 1796, in 4to. and in 8vo.

Aaminnelse-tal öfver assess. och provinc. medicus, L. Montin.—Notice of Dr Montin. Stockholm, 1701.

Prodromus plantarum Capensium, annis 1772—1775 *collectarum*, T. I. & II, with 3 plates. Upsal, 1794—1805.

Icones plantarum Japonicarum quas in insulis Japonicis 1775 *et* 1776 *collegit et descripsit*, etc. Decas I—V. Upsal, 1794—1805.

Beskrifning paa Svenske Djur.—Description of the animals of Sweden. Class I. Mammifera. Upsal, 1798.

Tal vid invigningsacten, etc.—Discourse delivered at the foundation of the new botanical garden of the Academy, of the orangery and rooms of collection, for the celebration of the secular feast of Linnæus. Upsal, 1807.

Flora Capensis, sistens plantas promontorii Bonæ Spei Africes, secundum systema sexuale emendatum. Vol. I. fasc. 1. 3. Upsal, 1807—1813. Vol. II. fasc. 1. Copenhagen, 1818. A new edition by Schultes appeared at Stuttgard in 1823.

MEMOIRS,

Published in the Journal of the Royal Academy of Stockholm.

1773. An error committed by administering cerussa as food. (The crew of the vessel in which M. Thunberg embarked was poisoned by cerussa.) Description of the plant *Hydnora Africana.*

1775. Description of the insect *Pneomora.*

1776. Description of the plants *Rothmannia, Radermachia.*

1777. Addition to the description of the *Hydnora Africana.*

1778. On the *Bezoar equinum.*

1779. Description of the plant *Ehrharta.*

1780. Observations on the cinnamon cultivated at Ceylon. Description of the plant *Weigelia japonica.*
1781. Description of some thermal waters of Asia and Africa. Description of two new insects. Description of the silkworms of Japan.
1782. Notice of two species of true mace trees of the Isle of Banda. Some ornithological notes. Description of the plant Fagræa ceilanica. On the Cajeput oil, and on its employment in medicine. Nipa, a new genus of palm tree. Of the palm tree in general, and particularly of the palm *Licuala.*
1783. Notice of the *Houtuynia cordata.* Note on the asteriæ.
1784. Of the minerals and precious stones of Ceylon. Of the birds of the genus *Loxia* of the Cape of Good Hope.
1786. Notice and description of the vegetable genus *Albucæ.* Note on the vegetables called *Orchidiæ.*
1787. Notice of some unknown lizards. Description of three tortoises.
1790. Description of the vegetable genus *Willdenovia.* Description of two fishes of Japan. Description of the plant *Wahlbomia indica.*
1791. Description of the *Gobius patella,* and of the *Silurus lineatus.*
1792. Description of two fishes of Japan. Notice of some unknown fishes of the genus *Perca.*
1793. Notice of some new species of perch, of Japan. Description of the *Ostrea gigas.*
1794. Description of the vegetable species *Cyanella.*
1796. Of the *Toxicodendron,* or poison tree of the Cape of Good Hope.
1797. Of the genus of insects *Cordylus.* Of some nocturnal butterflies.
1798. Notice of some birds of Sweden.
1799. New species of mace.
1800. *Œdmania,* new genus of vegetables.
1804. *Triacus,* new genus of insects.
1806. Two new genera of insects, the *Ptyocerus* and the *Ripidius.*
1807. Description of two varieties of the *Boa variegata.*
1808. Description of two varieties of three birds of Sweden. Supplement to the description of the *Hydnora Africana.* Note on the *Sphex figulus.*
1809. Description of a Testaceum called *Placenta.*
1810. New species of the genus *Pneumora.* New species of the genus *Blatta.*
1811. Description of the *Antilope monticola.* Description of the *Viverra feliva.*
1812. Observations on the swallows which build gelatinous and edible nests.
1814. Description of two new genera of insects, the *Gnatocerus* and *Taumacera.* On the plant *Gladiolus Sparmanni.*
1815. On the Swedish lynx, *Felis borealis.*
1816. Four new species of the genus *Bruchus.* Farther description of the *Platalœa pygmœa.*
1818. Delineation of a new species of *Tænia,* from Brazil. On the *Tetrapterix capensis,* new genus of birds. Description of the *Mydas gigantea.*
1819. Description of the *Simia albifrons.*
1820. Description of *Hyæna brunnea.*
1821. Description of the *Brachiurus,* a new genus of birds.

(*To be concluded in next Number.*)

NOTICES AND PROCEEDINGS OF SCIENTIFIC SOCIETIES.

EDINBURGH.

Royal Society.—*April* 4. Professor Hope in the chair. A paper was read by Mr Witham, containing an account of the farther exposure of the fossil tree, described in our last number. The author stated, that several radicles had been laid bare, apparently broke off abruptly; which, with other appearances, warranted the conclusion, that the tree had been carried along by a current of sand and water, and left in the present position as the strata consolidated. Mr Witham stated, that a branch had been found in another part of the quarry, shewing, when sliced, concentric rings, and a very large pith.

A paper was then read by J. D. Forbes, Esq. F.R.S.E. on the horary oscillations of the barometer near Edinburgh, deduced from 4415 observations made in the years 1827-28-29-30, with remarks on the present state of knowledge connected with this phenomenon.

Wernerian Society.—*April.* A paper was read by the Rev. Dr Scott of Corstorphine, on the carob tree of the Scriptures. A verbal communication was made by Professor Jameson on the bone caves of Australia; and, also, a notice of the position of fossil trees recently discovered in this part of the country, which the Professor still thinks are not *in situ*.

[Our reports of the London societies are necessarily delayed till next Number.]

GREAT SCIENTIFIC MEETING AT YORK.

In our last Number, we announced an intended meeting, similar to that of the German naturalists, to be held at York at the latter end of July, or beginning of August next. We earnestly request the attention and support of scientific men to this felicitous proposal. No part of the united empire could have been fixed upon more suitable in every respect for the first of a series of *national meetings* for the purposes of science. Central in its situation, great amongst cities, and classical in the history of the country, York is the precise spot which would have been fixed upon, had the scientific men of Great Britain simultaneously wished to transport themselves out of the smoky, execrable haunts of the money-changers, and meet together in another region, where all is calculated to promote enthusiasm, and to lead the mind from the traffic of the world to the contemplation of the sublimities of science, and the interchange of truth with kindred minds.

The sittings will continue for a week; and the authorities of the city have offered their willing aid. In short, every thing is ready, and the only thing requisite will be the presence of the philosophers of Great Britain. Lest there should be found any well-meaning persons who do not at once see the utility of such a meeting as is proposed, and who, in their slavery to the *cui bono*, would doubt of its propriety, we give the following summary of its objects from an excellent paper by our friend Mr Johnston, descriptive of the *Meetings of German Naturalists*, published in the last number of Dr Brewster's Journal:

"The first object of these meetings is to promote an acquaintance and friendly personal intercourse among men of science; but other great, and, perhaps, more important benefits, grow spontaneously out of them. They draw public attention to science and scientific men, and make people inquire concerning both them and their pursuits. They exalt science in general estimation, and with it those who devote themselves to its advancement; and, above all, they spur on the governments of the different States to examine into and ameliorate the condition of their scientific institutions; and to seek for men of true science to fill the chairs of public instruction. Such and similar benefits have already resulted from the meetings in Germany. Might not similar results, in our own country, be looked for from a similar institution?"

Scientific individuals who propose to attend, or to become members of the association, are requested to communicate their intention to John Robison, Esq. Secretary to the Royal Society of Edinburgh, who has undertaken to act as secretary till the association be constituted. Such communications will of course be post paid.

FOREIGN.

[Having brought down our reports of the Geographical Society of Paris to the present date, we shall now give an abstract of the labours of the Academy of Sciences in the department of natural history, &c. since our last volume.]

Academy of Sciences of Paris.—May 17, 1830. The President announced to the academy the death of M. Fourier, one of the most illustrious *savans* of the age.

May 31. MM. Latreille, Dumeril, and Cuvier, made a report on a memoir of M. Milne Edwards, concerning a particular disposition of the branchial apparatus in some crustacea.

MM. Latreille and Cuvier presented a report on the work of M. Milne Edwards, relating to the organization of the mouth in the sucking crustacea.

June 7. M. de Humboldt addressed a memoir on the inclination of the magnetic needle in the north of Asia, with corresponding observations on the horary variation in different parts of the earth. The academy proceeded to the election of a perpetual secretary in the room of M. Fourier. Out of 44 votes M. Arago obtained 39; MM. Poinsot, Beudant, Puissant, Molard, and Biot, one each. M. Arago was consequently declared perpetual secretary for mathematical science.

June 14. M. Heron de Villefosse made a favourable verbal report on the German works of M. Will. Müller, relating to inundations which took place on the coasts of the North Sea, the 3d and 4th February, 1825.

June 21. MM. Geoffroy St Hilaire and Serres made a report on a child with two heads, recently born in France, at the foot of the Pyrenees. The conclusions were adopted.

June 28. M. Henri de Cassini, in the name of a commission, made a report on the second manuscript edition of the *Botanical Glossary* of M. de Théis.

M. Arago communicated a notice relative to a series of triangles, comprising 8° of latitude, of 52° to 60°, in the governments of Wilna and Grodno. He also announced, that the meridian of Dorpat was to be prolonged. The north part will be executed under the direction of M. Struvo. It will commence at the Island of Hogland, in the Gulf of St Petersburg, will traverse the whole of Finland, and will rejoin the degree of Laponia near Torneo. M. Struve has already made a detailed examination of the soil, and sees no obstacle to the measure.

July. MM. Geoffroy St Hilaire and Serres made a report on a notice by Dr Dupourquet, concerning a double infant, of the genus *Ischiadelphia*, born at Salias, (Lower Pyrenees,) at the end of March. This monster appears to be two infants united together on a circular line, which extends from the anus over the pubes, in such a way, that the skin of the two bellies, by adhering, has hidden the sexual organs, and thus the two children seem to have only one common abdomen, and only one umbilical cord.

July 12. M. Arago presented to the Academy a Memoir on Mathematical Geography, by M. Pentland, containing the longitudes and latitudes of the most remarkable points of Upper Peru, now called Bolivia.

M. Cuvier read a memoir on some fossil bones, apparently belonging to a bird, the species of which has been extirpated only two centuries since. (See p. 30, *supra*.)

M. de Blainville observes, that, for several years, he has been engaged with a work on the Dodo, for which he has had three plates prepared, which he exhibited to the Society.

Dr Fontaneilles sent two insects passed by stool by one of his patients after the exhibition of purgative pills. "Having observed these two insects through the microscope," says this physician in his letter, "they appear to me to have the characters of a species of caterpillar at the commencement of its metamorphosis into a chrysalis; they are nearly an inch long. Their skin is rather hard and shining; the snout is round, and resembles that of a silkworm. I think I can distinguish six rows of inferior feet." MM. Cuvier and De Blainville made a report on the memoir of M. Dugès, containing some new observations on the *Planariæ* and neighbouring genera. This work possesses much interest, and will be printed in the *Récueil des Savans Etrangers*.

July 26. *Prizes decreed.*—The subject of the great prize for natural science was an anatomical description of the nerves of fishes. The academy only received one memoir, written in Latin, and accompanied with drawings representing the distribution of the nerves in the *Perca lucioperca*, the *Esox lucius*, and the *Petromyzon marinus*. This memoir contained excellent observations, and a history almost as complete as it was possible to attain, of the nerves of the two first species; but the history of the third species was much less perfect. Nevertheless, the academy, with the view of contributing to the perfection of this work, and to its publication, awarded the author the whole sum of 4000 francs, dedicated to the proposed prize.

The Monthyon prize of experimental physiology was awarded to the work of M. Leon Dufour, entitled "Anatomical and Physiological Researches, on the *Hemiptera*, accompanied with considerations relating to the natural history and classification of these insects, with an atlas of plates." The academy made honourable mention of the work of M. Fourcaud, entitled "Laws of the Living Organism," or the application of physico-chemical laws of physiology.

Prizes proposed.—The great prize for natural science. The academy offers 4000 francs to the author of the best memoir on the following subject:—"To determine by anatomical researches, and by means of accurate figures, the order of the development of the blood-vessels, and the principal changes which the organs of circulation in the vertebrate animals generally undergo, before and after birth, and at the different periods of their life."—1st January, 1831.

Prize founded by M. Alhumbert.—The academy proposed a prize of 1500 francs to the best memoir on the following question:—"To determine by observation, and to demonstrate by anatomical preparations, and accurate drawings, the modifications which the batrachian reptiles, such as frogs and salamanders, present in their skeletons, and in their muscles, on passing from the state of the larva to that of the perfect animal."

After the adjudication of the prizes, M. Cuvier read an eulogium on Sir Humphry Davy, and M. Arago one on Fresnel.

August 4. M. Peschier, pharmaceutist of Geneva, announced that he had sought in what species of the willow, salicine is found most abundantly. The *Salix incana*, and the *Salix monandra*, variety *helix*, are the two species which contain most of it. The physicians of Geneva have stopped the progress of intermittent fevers, by administering the salicine, in the dose of 15 or 18 grains in the interval of the accession.

M. Geoffroy St Hilaire made a report on an anatomical model made by M. Auzoux, in pasteboard. The reporter regards this branch of industry as being very useful in the teaching of anatomy in colleges and establishments where dissection is impossible; he thinks that M. Auzoux has perfected this art, and that he deserves the thanks of the academy. (Approved.)

August 9. M. Henri de Cassini made a very favourable verbal report on the *Monograph on the Campanulaceæ*, recently published by M. Decandolle, jun. M. Geoffroy St Hilaire read a memoir on a hermaphrodite goat; female as to its external parts, and male in its internal organs. (See p. 106. *supra.*)

August 16. M. Geoffroy St Hilaire gave an account of a memoir by M. Courbebaisse, veterinary surgeon at Aurillac, relative to a bicephalous calf. The calf having two heads, and also double anterior extremities, was born on the 20th August, 1827, at Cantal. The academy decreed that thanks should be returned to M. Courbebaisse, and that the beautiful drawing of it which he sent should be engraved in their memoirs, together with the report of M. Geoffroy St Hilaire.

August 30.—In the name of a commission, M. de Blainville made a report on the Memoir of M. Deshaies, relative to the analysis of the genus *Helix putris*. "It results from the work of M. Deshaies, that the organization of the animal presents differences sufficient to confirm to a certain degree, the establishment of a genus *Succinea*, such as Draparnaud had defined it, from the consideration of the shell alone; and that these differences depend essentially on the generative apparatus. It would be interesting to see if the genera *Achatina*, *Bulimus*, *Puppa*, *Carocolla*, &c. also dismembered from the *Helices*, present as considerable differences, although this is improbable, at least for several of them.

M. Dumeril gave an account of his examination of the two larvæ of insects which Dr Fontaneilles sent to the Academy, and which had been passed by stool by a lady after the use of Scotch pills. The reporter thinks that these larvæ, or caterpillars, had been swallowed either with the stalks of cauliflower, or of salads, or with turnips, or some other kind of pot-herb.

We find in authors many observations of this kind, which, in most cases, have been, like this, considered as the expulsion of intestinal worms. But the knowledge we possess on the structure of insects compared to that of intestinal worms, may, in most cases, direct the observing physician.

(Approved) M. de Blainville read the Memoir on the Dodo or Dronte, which he had announced at the sitting of the 19th of last July.

M. Savart read a memoir on the sensibility of the organ of hearing. Madame Eude, midwife, announced that she had received, on the 10th of July, a boy which had double posterior extremities; she proposed to shew it to the Academy. M. Geoffroy St Hilaire engaged to inform Madame Eude that the Academy accepted her offer with pleasure. M. Geoffroy hoped to be able to present next Monday a chicken which also had double posterior extremities.

September 6. M. Geoffroy St Hilaire read a memoir on the child exhibited to the Academy by Madame Eude. M. Gay Lussac announced, that M. Braconnot of Nancy had discovered the substance called *salicine* in the poplar, as well as another substance, which he regarded as new, and which he named *populine.* MM. Cuvier and Dumeril reported on the memoir of M. Breschet, relative to the organ of hearing in some fishes. MM. Gay Lussac and Serullas made a report on the memoir of M. Lecanu, on the colouring matter of the blood, or hematosine. This matter is a combination of albumen and a peculiar colouring substance, which M. Lecanu proposes to name *globuline.* MM. Gay Lussac, Flourens, and Navier reported on the memoir of M. de Chabrier, relative to the means of progression through the air, and to a new theory of the motions of animals.

September 20. MM. Latreille and Dumeril made a report on the monograph of MM. Percheron and Gaury on melitrophilous insects. M. Fred. Cuvier read an essay on the natural classification of the bats, with descriptions of several new species.

September 27. MM. Henri Cassini and Mirbel reported on the observations on vegetable anatomy and physiology which Dr Schultz had presented to the Academy; from which it results, that vegetables possess a circulation, in some respects analogous to that of animals.

Oct. 11. M. H. Cassini, in the name of a commission, reported on a manuscript by M. Fee, entitled, " Monograph on the genus *Trypethelium.*" M. Geoff. St Hilaire presented to the Academy a continuation of his anatomical researches, the third article of which was entitled " On the form of the Post-Cranial Bones in the Crocodile, and the identity of the same organic conditions in the *Teleosaurus.*" M. Cuvier, whose opinions differ in many respects from those developed by M. St Hilaire, announced that he would read a memoir on this subject at a future meeting. M. de Humboldt read a notice of his travels in Siberia; he gave also an analysis of the labours of his companions, MM. Gustavus Rose, and Ehrenberg. (See p. 162, *supra.*)

Oct. 4.—M. Cordier communicated some observations made by M. Rozet, on the geological constitution of the part of the kingdom of Algiers which was occupied by the French troops. MM. Chevreul and Serullas reported on the monograph by MM. A. Plisson and Henri, junior, on *Asparagine.* M. Alexander de Humboldt presented a copy of his Memoir, in German, on the mountain chains and volcanos of the interior of Asia, and on a new eruption of the chain of the Andes; accompanied by a map of Central Asia. M. Geoffroy St Hilaire read a memoir on the great *Sauria* found in a fossil slate, near the coast of Lower Normandy, attributed at first to the crocodile, but since determined under the names *Teleosaurus* and *Stenesaurus.* M. Latreille read an extract from a memoir entitled, " General Views on the *Arachnida quadripulmonata;* Notice of some New Species of the Genus *Mygale* of Walcknaer."

Society of Natural History of the Mauritius.—Twenty-seven members compose the society, founded at the Mauritius. M. Charles Telfair is the president, MM. Delisse and Bojer, vice-presidents, and M. Julien Desjardins, secretary. A monthly meeting takes place for the reading of memoirs, dissertations, or notes on indigenous productions. The object of the society is, to be able one day to present to the friends of the natural sciences, a catalogue raisonnée of all the different objects spread with so much magnificence over the mountains of the Mauritius, in its forests, and on its coasts. Its ulterior object is to give a physical description of the island, without neglecting the improvements in agriculture and rural economy. The president, M. Bouton, and the secretary, read three discourses at the first meeting; and M. Delisse, sen. a memoir on the introduction of *Cassia alata* into the island; and on the properties of that plant, commonly known under the name of *Caleping.* He informed the society, that he first cultivated it in this colony. M. Delisse, jun. read a description of a fish, the species of which are very common in those seas. He presented to the society a drawing of one; it is a chætodon, remarkable for its colours.

This first sitting, remarkable for the great zeal shewn by the members, justifies the hope that this society, the first of the kind established in the island, will enjoy great prosperity, and will become known by works, the results of which will have a demand on the public interest. It particularly relies on the activity of the president and his extensive knowledge.

The second sitting of this society took place on the 22d of November, at the president's house. Four papers were there read, in the following order: 1. Professor Bojer, who is acquainted with every branch of the natural sciences, read an introduction to the science of ornithology; and in order to make this study easy to young members of the society, and even to those who do not belong to it, he presented a large table of the classification of birds, in which he developed, by means of many figures made with care and accuracy, the different characters of the orders and families which compose this class of animals. 2. M. Bouton read a memoir on the distribution of vegetables in the island; he gave an interesting exposition of the different families of plants which grow at more or less considerable heights; he spoke of those which thrive on the madreporic shores of the coasts, and of those which only flourish on the basaltic summits. 3. M. Julien Desjardins presented to the society an adder caught alive in the town on the 10th of last month. The description of this reptile was preceded by an introduction, in which he described the method adopted by naturalists in the classification of these animals. A black caught this animal at Caudan, in presence of several witnesses; it lived for thirty-six hours. Its length is nineteen inches and a half. It is a very harmless species. The adder is common in India; and it is probable that this individual had been brought from thence three years ago among some leeches. Such a discovery is interesting; and without the existence of the Society of Natural History, it would have been unknown that this island, for the first time, harboured serpents of India, and it is clearly proved that it is not unfavourable to them. They may multiply here as elsewhere; they find here nourishment, and on this account it would be proper to prevent the introduction of these animals into the island. The fourth paper was read by M. Liénard on a molluscum of the genus *Dolabella,* which was found in the island at the Tonneliers, in large quantities. He gave a detailed description of this animal.

The members who have presented objects of natural history are MM. Liénard, sen. and jun. Dury, Lemaire, Johnston, and Dr Robert Egall.

MISCELLANEOUS INTELLIGENCE.

An Association for the encouragement of Literature is this year established in London, with the object of " bearing the expense of publishing works of merit, in whatever branch of literature, whose authors may be unable to do so themselves, or to effect agreements elsewhere; or generally, who may be desirous of placing themselves in the hands of the association." Such an institution has been long wanted for the publication of costly *scientific* works; and will be the only means of rescuing from thraldom that unfortunate tribe called " booksellers' drudges."

Mineralogical Survey of Scotland.—The following manifesto appears in the last number of Professor Jameson's *Journal*, under the report of the proceedings of the Wernerian Society:—" The Professor laid on the table a copy of a return to an address of the House of Commons relating to sums of money granted for mineralogical purposes in Scotland; from which it appeared, that no part of the money had been granted to this society, nor to the Edinburgh Museum, although the printed parliamentary votes had mentioned the Mineralogical *Society* of Scotland, and the newspapers had stated that part of the money was for the Edinburgh Museum; but that the whole sum, amounting to upwards of £7000, had been paid to Dr John Macculloch of Woolwich, for the mineralogical survey of Scotland, never *until now* * heard of by men of science in Scotland. It was remarked, that it would be desirable in government to cause to be published forthwith the results of this expensive, and it seems only *partial survey* of Scotland."

If the " men of science" in Scotland had never before heard of this mineralogical survey, *we* had chanced to become acquainted with its appointment, and had heard the job attributed to a very different person from poor Dr Macculloch; a charge which we did all in our power to remove in our last number. We reserve our remarks on the unprecedented proceeding which has thus been brought to light, until we have an opportunity of hearing the other party; for we cannot conceive so nefarious and barefaced a fraud—as this would be, were all we see at present unimpeachable—unmitigated by a shadow of excuse.

University of Munich.—The number of students frequenting the University of Munich, during the winter session, amounted, in the middle of December last, to 1844, independently of the pupils of the clerical seminary; but, including the latter, the total number is 1903.

University of Edinburgh.—A petition has been addressed to the Houses of Parliament by the Royal Medical Society of Edinburgh, praying that the University of Edinburgh be put on an equality with the English and Irish Universities, with respect to representation in Parliament.

Lindner's Cabinet of Natural History.—M. Denis Lindner, at Bamberg, who possessed a cabinet of natural history valued at 100,000 florins, has made a present of it to his native town, and has funded a capital of 5000 florins to increase it, and ensure proper care being taken of it after his death. —*Lit. Gaz.*

Lieutenant Holman.—A second letter from our remarkable friend, mentions his leaving Canton on the 13th of December; and his intention of sailing from Macao about the end of the week for Van Diemen's Land and New South Wales, in the Merope. He speaks indignantly of the conduct of the Chinese authorities, and deplores the submissiveness shewn on the part of the Company.—*Ibid.*

Scientific Societies.—It is estimated that there are above fifteen hundred learned and scientific societies in the world; above half of which are occupied in the encouragement of agriculture, manufactures, and commerce.—*Ibid.*

* In italics in the original.

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ORIGINAL ARTICLES.

Art. I.—*Description of Two New Species of Marine Algæ.* By Robert Kaye Greville, LL.D. F.R.S.E. F.L.S. &c. (*With a Plate.*)

Scaberia. *Grev. Alg. Brit.* p. xxxvi.

S. Agardhii, Grev. Alg. Brit. l. c. *Polyphacum? verrucosum* Grev. et Ag. MSS.

Hab. On the coast of Swan River settlement, New Holland.—*Fraser.*

Root absent in my specimens. *Stem* one or two feet long, simple, or once or twice dichotomous, about the thickness of a blackbird's quill, rigid, wiry, naked and rugose in its lower part, (where it is also set with the remains of scattered, remote, nearly horizontal, branches,) terminating at the extremity in a fasciculus of branches, several inches in length, each bearing a second, very rarely a third, series of smaller ones. These branches are densely imbricated on all sides with minute carnoso-coriaceous squamiform ovate *leaves,* about a line and a half long, sessile, but peltate in their insertion, smooth beneath, clothed above with minute shortly pedicellate warts. *Vesicles* numerous, spherical, intermixed with the leaves, and scattered along the whole length of the branches, about the size of the seeds of *Lathyrus odoratus,* thickly clothed with warts. *Fructification* unknown. *Colour* livaceous, changing to black when the plant is dried.

Plate IX. Fig. 1.—Portion of a plant of *Scaberia Agardhii*, nat. size. 2. A leaf seen in profile. 3. A leaf as seen from beneath. 4. A leaf shewing its upper and warty surface. 5. Warts.—*Magn.*

Among the many singular marine productions already described from the coasts of New Holland, the present alga stands conspicuous. At first sight, it has more of the aspect of a *Salicornia* than of any known cryptogamous plant; and even the vesicles, generally so characteristic in other individuals of the family, look rather like the fruit of a more highly organized vegetable. The fructification of this most extraordinary marine plant was unfortunately not discovered by Mr Fraser; and our account must therefore be necessarily imperfect. At the same time I am not aware of any plant with which it can be generically associated. My friend Agardh, indeed, was of opinion that it might possibly be ranked along with *Polyphacum proliferum* (*Osmundaria prolifera*, Lamour.) Of that plant, indeed, we know but little; but that little is, I conceive, sufficient to keep it apart, the habit being totally different, and the frond destitute of vesicles. The only circumstance in which they accord, is the curious wartiness of the surface.

GRACILARIA.—*Grev. Alg. Brit.* p. 121.

G. pumila; fronde cylindrica filiformi cartilaginea dichotoma, ramis divaricatis obtusis, capsulis immersis solitariis subterminalibus.

HAB. Coast of the Swan River settlement, New Holland.—*Fraser.*

Plant, tufted and parasitic upon the larger algæ. *Root,* a minute disk, throwing out occasionally one or two fibres. *Fronds,* many from the same base, one to two inches long, terete, filiform, repeatedly branched in a dichotomous manner; the branches divaricated, obtuse. *Fructification:* 1. *Capsules* imbedded in the substance of the frond, mostly at the summit of each ultimate division, and containing a spherical mass of roundish-ovate seeds: 2. Simple or compound (never ternate) *granules,* imbedded in the swollen apices on distinct individuals. *Substance,* cartilaginous, somewhat transparent. *Colour,* a pale pinkish red, becoming darker when dried.

Fig. 1. A plant of *Gracilaria pumila*, nat. size. 2. Summit of a branch, with capsule. 3. Seeds. 4. Summit of a branch, with imbedded granules. 5. Portion of a horizontal slice, with imbedded granules. 6. Granules both simple and compound, (never ternate.)—*Magn.*

This little plant, in its outline and general appearance, when dry, is very like *Microcladia glandulosa* mihi; but in its recent state, has the semitransparent succulent aspect of the *Laurentiæ* and *Gracilariæ*. From *Gigartina concinna*, to which also it bears some resemblance, it is at once distinguished by its much smaller size and more regularly dichotomous frond; by the solitary subterminal imbedded capsules, and by the granuliferous swollen apices of such specimens as do not produce capsules.

The granules in this species being not all of them simple, but many of them oblong, and transversely parted into four or five portions, are opposed to the character I have given of them in the *Algæ Britannicæ.* In this respect, the character will have to be modified. *Ternate* granules, however, do not exist in any of the species.

ART. II.—*Notice regarding Vanadium and the Vanadiate of Lead, a New Mineral Species.* By JAMES F. W. JOHNSTON, A.M. &c. &c.

WHILE at Alston Moor, in December last, I purchased some specimens of a mineral called *new,* and sold by Mr Couper as *muriate* of lead, and of which he afterwards sent some fine specimens to Edinburgh, and sold them at high prices. This mineral, on examination, I found to be merely an arseniate, containing, as most of the imperfectly crystallized arseniates do, about two per cent of muriatic acid. For the sake of comparison, I took up a *supposed* arseniate of lead, from Wanlockhead, and found it also to contain about two per cent of muriatic acid; but the result of my experiments was, that this supposed arseniate was a new mineral species, and that it contained a new metallic substance.

Thus far I had proceeded: but, afraid of committing myself by publishing as new what might prove ultimately to be only an impure chromium, I suffered the matter to lie over till I should make myself more perfectly acquainted with the phenomena exhibited by the latter metal and its compounds; and I had again resumed the subject, when the letter of Berzelius, in the *Annales de Chimie,* came under my observation, and I found the new metal I had discovered to be identical with the *vanadium* of Sefström. I soon after announced the circumstance to the Royal Society of Edinburgh, and exhibited specimens of the new substance. I have only to regret, that since it has fallen to the lot of Sefström to give a name to a metal, discovered nearly at the same time in three different and distant countries, he should have chosen one so barbarous and unwieldy; and which, instead of reminding us of some characteristic property of the substance, turns back our thoughts to the heathen rites of a local and degraded superstition. To propose another now, however, would be only to cumber the science with useless terms.

The vanadiate of lead, from which I obtained the metal, was recognized, some years ago, at Wanlockhead, by Mr Rose, and pronounced by him to be an arseniate of lead. Under this name it is to be found in several collections.

Externally, it has much resemblance to arseniate of lead, from some varieties of which it is not easily distinguished. It resembles also some molybdates. It is opaque, of a straw yellow, or brownish yellow colour; brittle; scratched by the knife, giving a white streak; its cross fracture is slightly conchoidal; externally it is dull, or has only a faint lustre; the lustre of broken surfaces is resinous. Its specific gravity is 7.23. It occurs in six-sided, but more frequently in four-sided, truncated, nearly rectangular prisms. The prisms are longitudinally striated, sometimes occurring singly, but generally grouped together into globular forms. When the individuals are exceedingly minute, they constitute perfectly round striated mamillæ of various sizes, from that of a pin's head to that of a pea. When the individuals are larger, the prisms appear superimposed longitudinally, overlying one another in the direction of one of the longitudinal diagonals of the underlying prism; so that the edge of the superincumbent crystal nearly coincides with that diagonal.

Before the blowpipe in a pair of forceps it decrepitates and fuses, retaining its yellow colour; but it soon changes entirely into a steel grey porous mass, which, with soda and charcoal, gives immediately globules of lead. With the other fluxes it shews the same reaction as chromium.

It is soluble in the nitric and muriatic acids, giving, at first, a brown solution, which, by standing, or by dilution, becomes a beautiful green. Treated with dilute nitric acid, the lead is first dissolved out, and the vanadic acid separates in beautiful red scales, which are afterwards taken into solution.

This mineral is found at Wanlockhead, in the lead veins, associated with galena, calamine, and peroxide of manganese. The quantity hitherto brought to the market is small; but, since its value is now discovered, it is to be hoped that a more abundant supply may be procured.

Portobello, 21*st May*, 1831.

Art. III.—*A Sketch of the Distribution of Animals and Plants in the Southwestern extremity of Great Britain.* By J. F. Kingston, Esq.*

A general sketch of the southwestern extremity of Great Britain, as respects its physical characters, the number, and

* We regret that the author has not increased the value of this paper by giving a fuller list of the *species* of animals; as the object of instituting a comparison with other districts can only be successfully accomplished upon such data. It would also have been desirable that the modern nomenclature had been adopted. The species of the botanical department Mr Kingston has already enumerated in conjunction with the Rev. J. P. Jones, in the *Flora Devoniensis.* — Editor.

relative proportions of organized forms, and their geographical distribution, is, perhaps, capable in itself of forming a paper not devoid of interest; but I have thrown the following materials together, rather with the hope that it may induce some one to draw up a similar account of the opposite extremity of our island, for the purpose of comparison, and thus give to these details a far greater practical value and interest than they can of themselves be made to possess. The results contained in this paper comprise the summary of many years continued, and tolerably extensive, personal examination, together with the information derived from the specimens and notes, furnished from time to time by scientific friends engaged in similar pursuits, *con amore*, like myself; and I trust that I may hazard the statement, that this paper has been drawn up from sufficiently copious details to make it an approximation, at least, to that accuracy which would be required for the comparison I wish to see instituted. And, farther, though the different localities are perhaps not far enough apart to furnish any very striking differences, yet, a careful investigation may shew more than at the first glance might be expected; and, as it is only by minutely tracing the alterations in the relative proportions of the different types, and natural assemblages of organized bodies, that correct general principles can be established in this, the most philosophical part of natural science, such investigations can scarcely fail of throwing some light on the subject.

The southwestern peninsular portion of Britain, comprising the two counties of Devon and Cornwall, and bounded by those of Dorset and Somerset, on one side, and by the British and the Bristol Channels, on the others, may be considered as forming an irregular triangle, or rather, Devon may be called a trapezium, with Cornwall as an isosceles triangle attached to it. This district is included between 51° 13′ and 47° north lat., and 2° 50′ and 5° 40′ west long., having a surface territory of about, (or, at least, very nearly,) 4000 square miles; and, though no where rising to a mountainous elevation, it is almost every where hilly and unequal, a plain of a few miles in circumference being scarely met with. But a brief sketch of its geological character may be useful in illustrating the more immediate subject of this paper.

The central and most elevated portion of the district is composed of granite; it occupies the whole of the wild and barren tract known by the name of the forest of Dartmoor, which may be considered as an extensive table land, having a mean height of about 1700 feet above the sea level. The surface boundary of this formation presents a very irregular and indented outline, but its general direction is northeast and southwest, commencing with Dartmoor, and terminating in the sea, at the Land's End, between which two points it is interrupted, at three or four considerable intervals, by superincumbent strata of primitive schist. Its elevation decreases gradually in the same direction, Cosson beacon, the highest point of Dartmoor, being 1792 feet above the sea level; whilst Rippon Tor, Brown Willy, Carn Bee, and Cape Cornwall, the most prominent points on the general line, in proceeding southwest towards the Land's End, are 1549, 1368, 697, and 229 feet successively. With the exception of the tors scattered over this formation, some possessing a bold and massive character, others with broken irregular outlines, not unlike castellated ruins, and all formed of rhomboidal masses, more or less rounded at the edges, the inequalities it presents are of an undulating and gradual character, often forming more or less rounded hollows, or basins, which retain water, and, as a consequence, have more or less extensive beds of peat formed in them. The most elevated and extensive deposit of this kind, is that of Craumere Pool, the source of most of the principal streams of Devon, both on the east and west sides. As it is not our present purpose to enter, with any minuteness, into the peculiarities and mineral characters of any of the formations, it will be sufficient to state, that the texture of the granite rock is very various, as well as the relative proportions and mode of arrangement of its different constituents: sometimes their distribution is very equal and regular, sometimes the reverse; and sometimes it has a porphyritic character, from the larger crystals of felspar dispersed through the mass; and at others it assumes the character of true porphyry. The colours are red, gray, or rusty yellow, &c.; and the major part of it, near the surface, is of a coarse, open, decomposing character; its superincumbent soil, for the most part, sandy or peaty, or a mixture of both, usually thin and poor; and on the whole, the tract included in this formation may be considered the least favourable to vegetation in the district, though fertile and sheltered vales, of considerable breadth and beauty, may occasionally be met with in it.

Under the general denomination of schist may be included the formations incumbent on the granite, and surrounding and sloping away on either side of it, with the same general direction. Their highest elevations do not exceed 1200 feet, and, for the most part, are not beyond 800 or 900 feet above the sea level. They occupy a considerable portion of the district, and are of very various character. Strictly speaking, they are referable to two distinct formations, that nearest the granite, and immediately incumbent on it, being primitive, and the remainder, transition, or greywacke schist; and, in a general view, the former may be considered as the least, whilst the latter is the most fertile. The South Hams on one side, and the neighbourhood of Barnstaple on the other, are proofs of this fact; the formation at these places having a decomposing friable texture, favourable to vegetation. There are, however, considerable anomalies and exceptions to this rule. Interposed between this and the granite, rocks of a sienitic character occasionally occur; and connected with the same formations we must notice the serpentine, which occupies a limited district on both sides of the Lizard, on the southern coast of Cornwall. Transition limestone is the next formation: it occurs in discontinuous and limited ranges, resting on the primitive, or interstratified with the greywacke schist. This formation, in which polypiferous fossils are of frequent occurrence, is limited to Devonshire; a small portion of limestone, met with on the northern coast of Cornwall, being, I believe, connected with the more recent formations of the opposite coasts of Wales.

The red sand comes next in order of superposition; it appears to be referable to two distinct members of the secondary class of rocks, the old and the new red sandstone, (1st and 3d sandstones of Humboldt,) but the limits of each have not, I believe, as yet been very accurately traced. They constitute, on the whole, perhaps the most uniformly fertile portion of the district, forming the cliffs on the southern coast, from beyond Sidmouth to Torbay; and sweeping round the base of Haldon, comprise what is termed the Clist district, around and beyond Exeter. This rock seldom reaches a greater elevation than from 150 to 200 feet. We may also note, that intervening between this and the former strata, a limited range of amygdaloidal trap occurs. The green sand occupies a tract in the eastern part of Devon, contiguous to Dorset, of which Black-down forms the most conspicuous part; it is traceable also, with considerable interruption, on the Woodbury downs, above the Exe on one side, and Haldon Hill on the other, and also on Milburn down, above the Teign, which is the last place in that direction where it occurs. Thin strata of chalk flints are usually found incumbent on the summits of the hills of this formation, which rise to a height of from 800 to 900 feet. In point of fertility this can only rank with the poorer portions of the granite. Neither of the two last formations extend into Cornwall, nor do they occupy any of the western or northern parts of Devon, but are limited to the eastern and southern portions of the latter county. There are but few tracts on the whole that can be termed alluvial; those along the course of the Exe are probably to be ranked amongst the finest and most extensive of the few that do occur.

Over this tract, so diversified in its geological character, about 780 indigenous species of phænogamous plants are distributed, about 190 of which, belonging to fifteen natural orders, and forming rather less than one-fourth of the whole, are monocotyledonous; and about 150 belonging to 66 or 67 natural orders, and forming rather more than three-fourths of the whole, are dicotyledonous. I must here premise, that many genera that have been unphilosophically admitted as indigenous, in some of our British Floras, but whose introduction from a foreign source, can be traced, are excluded, such as the *Datura, Leucojum, Alyssum, Calendula, Œnothera, Chrysocoma, Carum,* &c. It is also necessary, in a sketch of this kind, to exclude many, that though undoubtedly British, and occasionally met with in the district, cannot, in a strict sense, be considered indigenous to it. Such are the different species of *Pinus*; for, though fragments of trees, obviously referable to this genus, occur on Dartmoor and elsewhere, deeply immersed in peat, and especially in the remarkable formation of Bovey heath, the chief part of which consists of imperfectly mineralized wood of this description, and furnishes proof of the *Pinus* being indigenous, previous to the existing state of the surface,—I do not think this circumstance can affect the history of the present race. The lime, and some other trees and shrubs, I also deem it necessary to exclude, in the same way. With these restrictions, the following is the relative distribution and number of species, belonging to each of the principal natural orders.

MONOCOTYLEDONES.

	Species.		Species.
Gramineæ, . . .	75	Aroideæ, . . .	8
Cyperaceæ, . . .	48	Asphodeleæ, . . .	5
Junceæ, ...	16	And referable to 8 other natural orders, . . .	13
Orchideæ, . . .	13		
Fluviales, . . .	10		

DICOTYLEDONES.

	Species.		Species.
Compositæ, . . .	72	Chenopodeæ, . .	15
Cruciferæ, . . .	44	Boragineæ, . .	13
Leguminosæ, . . .	39	Primulaceæ, and Lentibulariæ,	13
Umbelliferæ, . . .	38	Geraniaceæ and Oxalideæ,	14
Rosaceæ and Pomaceæ .	36	Rubiaceæ, . .	11
Labiatæ, . . .	35	Hypericineæ, . .	9
Scrophularineæ and Orobancheæ,— . . .	31	Sempervivæ, . . .	9
Caryophylleæ and Lineæ,	31	Solaneæ, . . .	8
Corylaceæ and Salicineæ,	28	Euphorbiaceæ, . .	8
Ranunculaceæ, . .	20	Papaveraceæ, . .	7
Polygoneæ, . .	18	And referable to 39 other orders, 113 more species.	

Thus, the grasses form nearly two-thirds of their own class: and, together with the composite, one-fourth of the whole of our phænogamous plants; whilst the cruciform, leguminous, umbelliferous, rosaceous, and labiated, form together one-fourth more.

ACOTYLEDONES.

	Species.		Species.
Lycopodineæ, ...	2	Hepaticæ, . .	35
Marsiliaceæ, ...	1	Characeæ, ...	3
Equisetaceæ, ...	5	Algæ, ...	150
Filices, ...	23	Lichenes, . . .	150
Musci, ...	174		

Of the lower orders of acotyledonous plants, my materials are too incomplete to furnish any adequate view; nor, perhaps, depending, as so many of them do, on the existence of the superior orders, is it for the present purpose of much importance. I have made out about 200 species, but am aware of many more that I have not examined sufficiently to say any thing about them; and I have every reason to suppose our district very rich in these lower departments.

The following are the principal phænogamous genera belonging to more northern, or more Alpine districts, in which we are deficient.

Sessleria	Convallaria, 4 sp.	Azalea	Trollius
Hierochloë	Pinus	Menziesia, 2 sp.	Oxyria
Tofieldia	Taxus	Andromeda	Swertia
Anthericum	Juniperus	Arbutus, 3 sp.	Trientalis
Eriocaulon	Empetrum	Subularia	Impatiens
Malaxis	Selinum	Hesperis	Linnæa
Corallorhiza	Ligusticum	Sibbaldia	Rhodiola
Cypripedium	Pyrola, 5 sp.	Cherleria	Erigeron, 2 sp.
Goodyera	Polemonium	Dryas	Cotoneaster

We also possess but one species, (*S. tridactylites*,) out of above a dozen, that are British, of the genus *Saxifraga*.

The other genera, in which the district is believed to be deficient, are,—

Fritillaria	Asperugo	Frankenia	Limosella
Paris	Hottonia	Aristolochia	Lathræa
Hippuris	Phyteuma	Monotropa	Astragalus
Tillæa	Atropa	Actæa	Lactuca, 3 sp.
Hippophaë	Thesium	Delphinium	Prenanthes
Buffonia	Athamanta	Adonis	Cineraria, 2 sp.
Isnardia	Cicuta	Stratiotes	Bryonia
Buxus	Parnassia	Sagittaria	

Of the genera we possess, those in which the greatest deficiency in British species is found, are, I believe,—

Carex
Juncus
Veronica
Vaccinium
Rubus
} In these it is chiefly Alpine species that are wanting.
Campanula
Dianthus
Silene
Salix

Of this last genus, I am not competent to speak with sufficient precision. Fourteen species, undoubtedly distinct, I have found in the district; and some that appear to me only as varieties, though ranked at present amongst the British species.

Amongst the Cryptogamia, the genera in which we are deficient, in the principal natural orders, are as follows:—

Filices,	Woodsia (of Brown) and Botrychium.
Marsileaceæ,	Isoëtes.
Hepaticæ,	Riccia.
Musci,	Diphyscium — Conostomum — Zygodon — Buxbaumia. I may also note that I have found but one (S. ampullaceum) out of several species of the genus Splachnum.
Lichenes,	Solorina and Urceolaria.

Amongst our more peculiar plants, perhaps, may be enumerated,—

Iris fœtidissima	Melittis Melissophyllum	Anagallis arvensis; the blue var. and also the white, with a purple eye
Schœnus albus	Corrigiola littoralis	Hymenophyllum tunbrigense
Melica uniflora	Clematis Vitalba	Schistostega pinnata
Butomus umbellatus	Sibthorpia europæa	Bryum Tozeri
Hyoscyamus niger	Lathyrus Aphaca	Anthoceros punctatus
Herniaria glabra	Lotus diffusus	Targionia hypophylla
Lavatera arborea	Euphorbia peplis	
Diotis maritima	——— portlandica	
Reseda fructiculosa	Danaa aquiligefolia	
——— lutea	Tamarix gallica	
Erica vagans	Illecebrum verticillatum	
——— ciliaris	Oxalis corniculata	

As peculiarities, we may note, that the cowslip, (*Primula veris,*) and the *Campanula rotundifolia*, of common occurrence in the adjoining counties, are but rarely met with in this district. *Erica vagans* is chiefly restricted to the serpentine formation; *Iris fœtidissima* and the elm, affect the red sand; the *cisti, clematis,* and *conyza squarrosa*, the limestone; the oak, the schist formation. With these exceptions,—and even these must not be taken by any means in a strict sense,—the distribution of the different species of plants, appears to be quite independent of the different rock strata. The most striking local differences in the character of the Flora of the district, will be found in the exposed central portion, chiefly composed of granite and schist, as contrasted with the more sheltered tracts and sea cliffs on either side of it. In a general view, certainly, these offer very marked differences, resulting from the elevation and unreclaimed state of a large portion of the first, as compared with the cultivated state of the others, and their proximity to the sea.

In the lower classes of animals, as in those of plants, my data are necessarily very incomplete. I shall, therefore, only state those that I am quite safe in claiming.

Of the Radiated Type.

ECHINODERMATA.

	Species.		Species.
Echinus,	4	Asterias,	3
Holothuria,	3	Sipunculus,	3

ACALEPHA.

	Species.		Species.
Actinia,	4	Medusa,	3

ZOOPHYTA.

	Species.		Species.
Pennatula,	1	Cellepora,	1
Gorgonia	1	Flustra,	3
Corallina,	2	Cellularia,	5
Alcyonium,	2	Sertularia,	10
Spongia,	4	Plumularia,	2
Millepora,	2	Campanularia,	1
Tubipora,	1	Tubularia,	1
Discipora,	1	Hydra,	1

Of the Annulated Type.

Crustacea.

Of these, I have notes of about eighty species, amongst which, perhaps, those included in the genera *Pirimela, Portunus, Pinnotheres, Gonoplax, Pisa, Maja,* and *Gebia,* Leach, are most worthy of enumeration.

INSECTA.

Of these I have little or no knowledge, nor am I aware that any attempt has been made, as yet, to shew their geographical distribution over this tract. Judging from the collections I have seen, formed within the district, and from conversations I have had with good entomologists, I infer that it is very rich in this department.

In the Molluscous type, (of Lamarck's and Turton's arrangement,)

ANNELIDES.

20 Species belonging to the genera Dentalium, Cæcalium, and Serpula.

CIRRIPEDES.

11 Species.

CONCHIFERA, (comprehending the bivalve shells.)

140 Species; of which we may note, as among the more remarkable, Sphenia, 2 species; Pinna ingens, and P. papyracea; Ostrea tenera, Donax Irus, Venus pallida.

Mollusca, (including the Univalves.

110 Species; Bulla Halistoidea, B. membranacea, Buccinum carinatum, and ovum, Pileopsis ungarica, Haliotis tuberculata and Nucula glycymeris, common on the opposite French coast, are occasionally thrown up on the southern ones of this district; and specimens in a living state, of the genera Spirula and Janthina, were thrown up near Teignmouth, during a winter gale, four or five years since.

In the Vertebrated Type.

Of the Cartilaginous Fishes we have—

Petromyzon fluviatilis, entering our rivers early in the year, and returning to the sea in summer.

Squalus, 6 species, occasionally frequenting the coasts, of which the most remarkable are S. maximus, S. glaucus, visiting us in the mackarel and pilchard season, and S. vulpes.

Raia, 5 species. R. Torpedo, R. pastinaca, R. clavata, R. microstella, and R. Batis, the common skate.

Acipenser Sturio, as an occasional straggler, is found wandering into our rivers.

And, in the different divisions of the Osseous Fishes,

APODES.

Anguilla vulgaris, common in the rivers; migrating to the sea in the autumn to spawn. A. Congor, amongst the rocks on either coast; growing to a large size; usually caught at night.

Ophidium imberbe, on the southern coast.

Ammodytes tobianus, common, burrowing in the sands on the coasts.

JUGULARES.

Gadus morhua, G. æglefinus, G. molva, all frequent. G. merlangus, in large shoals, chiefly in the spring. G. pollachius, on the rocky parts of the coast. G. merluccius, caught in great abundance, chiefly in summer; it forms an important article of food for the poor.

Blennius ocellaris, B. Gattorugine, B. Galerita, all on the southeast coast.

THORACICI.

Pleuronectes maximus and P. Rhombus, both frequent. P. Solea and Platessa, both common. P. flesus, at the entrances of the rivers; a leftsided variety is not of unfrequent occurrence. P. Limanda, P. Hippoglossus.

Mullus Surmuletus.

Scomber vulgaris, in large shoals, approaching the shores in the spawning season. S. trachurus, common. S. Thynnus, occasionally occurs off the coasts.

Zeus Faber, frequent.

Gasterosteus aculeatus, frequent in several of the rivers and smaller streams; spawns in April.

Sparus Pagrus, S. lineatus.

Trigla Gurnardus, T. Cuculus, both common. T. lævis, T. lineata, on the southern coast.

Cottus Gobio, in several of the rivers. C. Scorpius, on the rocky parts of the coast.

Gobius niger, G. minutus.

Cepola rubescens, on the southern coast.

ABDOMINALES.

Mugil Cephalus, common.

Atherina Hepsetus, occasionally in the rivers.

Cyprinus Brama, C. Leuciscus, C. Rutilus, C. Cephalus, C. Phoxinus; these occur in the different rivers.

Clupea Harengus, in large shoals, chiefly on the Devon coast. C. Pilchardus, chiefly on the Cornish coasts; approaching the shores in summer, and remaining till late in autumn; the fry of this and the last congregate together on the coast, and enter the mouths of rivers; they are often thrown, in large quantities, on the beaches, after a gale. Of late years, they have become much less abundant, approaching the shores later, and retiring earlier. C. Alosa.

Salmo Fario, common in most of the streams. S. eperlanus, spawning in March, near the entrances of the rivers. S. Thymallus, the grayling, enters the rivers early in spring, returning to the sea before winter. S. Trutta, S. Hucho, S. Salar. Salmon, as appears from old records, were formerly most abundant in the rivers of the district; but they have now become scanty, and somewhat of a rarity, though there are still fisheries let at moderate rents on several of the rivers.
Specimens of the genera Xiphias, Centriscus, Exocetus, and Centronotus have occasionally been captured off the coasts.

Of the Reptiles, we possess—

Lacerta agilis; four or five varieties, or species as they have I think incorrectly been considered, are of frequent occurrence on the dry heathy downs.
Anguis fragilis, frequent.
Natrix torquata, common in marshy situations.
Vipera communis, in most of the woods.
Triton palustris, and T. aquaticus, in most swampy situations.
Rana temporaria, and R. esculenta, the latter the least frequent of the two.
Bufo vulgaris.
Testudo imbricata; this we can only claim as an accidental straggler.

BIRDS.

Of land birds belonging to the different orders, we have—

Gallinadæ.

Tetrao Tetrix, confined I believe to Dartmoor and its immediate vicinity, and by no means abundant there. T. Perdix, common. T. Coturnix, only as a rare and accidental visitant.

The pheasant is naturalized in some of the woods and covers of the district, and a fine white variety of it occasionally occurs.

Columbadæ.

Columba Palumbus, common in the woods, and stationary, congregating in winter. C. Œnas, also common. C. Livia, occurs on the rocky parts of the southern coast, migrating to the north. C. Turtur, not unfrequent, leaving the district in September, returning in the spring.

Accipitres.

Falco Buteo, F. æruginosus, F. Milvus, F. Nisus, F. cyaneus, F. Pygargus, F. Tinnunculus, all resident and frequent. F. Subbuteo, migrating at the end of October. F. Œsalon, arriving about the time the hobby leaves. F. Haliætus, and F. Peregrinus, occasional and rather rare visitants.
Strix flammea, S. stridula, both common. S. passerina, a very rare visitant.

Passeres.

Lanius Excubitor, an occasional winter visitant. L. Collurio, breeding in the district, but migratory; arrives in May, leaves in September.
Corvus Corax, C. Corone, C. frugilegus, C. Monedula, C. Pica, C. glandarius, all common. C. Graculus, confined to the Cornish coasts. C. Cornix, an occasional, though rare winter visitant.
Ampelis Garrulus, a rare winter visitor in small flocks.
Sturnus vulgaris, a common winter visitant. I have known them breed, but rarely, in the district.
Alcedo Ispida, on the banks of most of the streams.

Turdus Merula, T. viscivorus, T. musicus, T. Cinclus, all common and stationary. T. torquatus, breeds on Dartmoor and its vicinity, arriving in the spring, and leaving late in the autumn. T. pilaris, T. iliacus, both common winter visitants. T. roseus, a very rare and accidental one.

Sitta europæa, common in the woods.

Upupa Epops, an occasional summer visitant, and has been known to breed in the district.

Certhia familiaris, common.

Loxia Chloris, L. Pyrrhula, both common. L. Curvirostra, an occasional summer visitant, and L. Coccothraustes, an occasional winter visitant.

Emberiza Miliaria, E. Citrinella, E. cirlus, E. schœniclus, all common and stationary. E. nivalis, an occasional winter visitant.

Fringilla domestica, F. Carduelis, F. Linota, F. Linaria, common and stationary. F. Spinus, a regular summer, and F. Montifringilla, winter visitant. F. cannabina, an occasional winter visitant in the more exposed parts of the district.

Alauda arvensis, A. arborea, A. pratensis, common and stationary. A. Petronia, on the coast. A. minor, a summer resident.

Motacilla alba, M. boarula, M. flava, the latter leaves us late in the autumn.

Muscicapa Grisola, M. Atricapilla, summer residents; the former common, the latter rare.

Sylvia Rubecula, S. modularis, S. Regulus, S. Troglodytes, all common and stationary. S. Locustella, S. Phœnicurus, S. sybillatrix, S. salicaria, S. Atricapilla, S. cincua, S. Trochilus, S. Hippolais, S. arundinacea, all summer residents, arriving mostly in April, and leaving in autumn.

Saxicola Œnanthe, common, arriving in March, leaving in September. S. Rubetra, S. Rubicola, common on all the open downs.

Parus major, P. cæruleus, P. ater, P. caudatus, P. palustris, all common. P. biarmicus, a rather rare bird, frequenting marshy situations.

Hirundo rustica, H. riparia, H. urbica, H. Apus, common summer residents.

Caprimulgus europæus, common summer resident.

Our most remarkable deficiency in this order is the nightingale, which, though common in the neighbouring counties, is not met with in the district, or at least only very rarely, and accidentally. The pratincole (Glareola austriaca,) breeds in the Dorset cliffs, adjoining the southeastern coast of this district; but I am not aware of its occurring within it.

Scansores.

Cuculus canorus, common, ariving in April, leaving in July; the young birds stay later.

Yunx Torquilla, a rare bird in the district.

Picus viridis, P. major, P. minor, the first common, the other two scarce.

Of the division Grallæ, or Waders.

Otis œdicnemus, breeds on Dartmoor, and migrates southwards in winter. O. Tetrax has occurred as an incidental summer straggler.

Tringa (of Linnæus) Vanellus, stationary. T. Hypoleucos, a common summer visitant; and T. alpina, and T. Interpres, winter ones. T. Ocrophus, T. Glareola, T. macularia, T. pusilla, and T. minuta, also occur, though more rarely and irregularly, as winter visitants.

Phalaropus lobatus; this is a rare winter visitor.

Charadrius Pluvialis, stationary within the district. C. Calidris, and C. Hiaticula, common winter visitants. C. Himantopus, a very rare straggler, has been shot in the district.

Hæmatopus Ostralegus, an occasional visitant on the beaches of the southern coast.

Ardea cinerea, stationary. A. stellaris, an occasional, though rare winter visitant. A. minuta, though very rarely, has occurred.

Numenius arquata, stationary within the district, breeding on Dartmoor, frequenting the seacoast in winter. N. Phæopus, less frequent than the last, and only a winter visitant.

Scolopax (of Linnæus) Gallinago, stationary. The following are all winter visitants, though instances occasionally occur of their breeding in the district: S. Rusticola, S. major, S. Gallinula, S. Ægocephala, S. rufa, S. Glottis, S. Totanus.

Rallus aquaticus, stationary. R. Crex, a common summer visitant.

Gallinula chloropus, common.

Fulica atra, less common than the water-hen.

Anseres.

As nearly the whole of these are winter visitants, I shall note those only that are exceptions.

Podiceps cristatus, occasionally. P. auritus, frequently. P. minor, common through the year.

Uria Troile, common. U. Alle, occasional.

Colymbus glacialis, rare. C. arcticus, occasional.

Alca Torda, common. A. arctica, somewhat rare on the coasts; a summer visitant.

Sterna Hirundo, a summer visitant. S. nigra, occasionally in winter. S. minuta, do.

Larus marinus, rare. L. argentatus, frequent. L. canus, breeds in the district. L. ridibundus, latter part of summer. L. Rissa, common; breeds here. L. minutus, a rare winter visitant.

Cataractes parasiticus occurs occasionally, but rarely on the coast.

Procellaria glacialis, occasionally. P. pelagica, in stormy weather. P. Puffinus, frequent in summer.

Mergus Serrator, M. Merganser, M. Albellus, occasionally, but rarely visit us in severe winters.

Anas Cygnus, the wild swan, occurs, in severe winters, in flocks of from twelve to twenty. During the last winter, many were shot within the district. A. Anser; this is also of frequent occurrence in severe winters, as well as A. erythropus, A. Bernicla, and A. Brenta. A. nigra, A. Tadorna, A. marila, A. acuta, A. Clangula, A. ferina, A. Fuligula, not unfrequent. A. Glaucion, A. mollissima, A. clypeata, rare; and A. Boschas, A. Penelope, A. Crecca, regular winter visitants.

Pelicanus Carbo, and P. Graculus, belong to the district; and P. Bassanus has occurred as a solitary unfrequent winter visitant.

Of Mammalia,—

Cheiroptera.

Vespertilio Ferrum-equinum, in the limestone caverns. V. minutus, ditto. V. murinus, common. V. auritus, frequent. V. Barbastellus, in the southern parts of Devon. V. pygmæus, in the vicinity of Dartmoor. V. Noctula, occasionally in Devon.

Carnivora.

Erinaceus europæus, common.

Sorex araneus, ditto. S. fodiens, frequent in marshy situations.

Talpa europæa, common.
Ursus Meles, in the larger woods; it is not very frequent.
Mustela vulgaris, M. Erminea, common. M. Putorius, occasional. M. foina, and M. martes, in the Devon woods; frequent.
Lutra vulgaris, in most of the rivers.

Glires.

Mus Musculus, M. sylvaticus, M. Rattus. The latter is now a scarce animal, having been superseded by that intruder of Indian origin, M. decumanus.
Sciurus vulgaris, not abundant.
Lepus timidus, L. cuniculus.
Myoxus avellanarius, common in the woods.
Arvicola aquatica, A. agrestis, common.

Cetacea.

Delphinus Phocæna, on various parts of the coast at all seasons, occasionally entering the rivers.

Two or three instances of the larger cetaceous animals having entered our rivers, or been thrown on the coast, are on record; but excepting the porpoise, none can be considered other than rare accidental stragglers.

ART. IV.—*Description of a Fossil Crustaceous Animal.* By John Scouler, M.D. F.L.S. Professor of Natural History in the Andersonian University, Glasgow. (*With a Plate.*)

Crustaceous animals are of comparatively rare occurrence in a fossil state,—a circumstance which may be accounted for, by their delicate structure; and the determination even of the genus to which a specimen may belong, is often extremely difficult, from the facility with which they lose their characteristic organs, or from these being concealed in the rock in which the specimen is imbedded. The specimen of which we have given a figure, is far from being complete; but there is enough of it preserved, to enable us to ascertain its characters with some degree of certainty.

The body is divided into two portions,—the anterior shell, or head, consisting of a single piece, and the posterior part, or tail, (abdomen,) composed of several articulations. The shell, or anterior part, is of an orbicular form, very convex, rounded anteriorly, and on the sides, and terminating posteriorly in a straight line, where it is united to the tail; while the sides are prolonged a little beyond it into an obtuse angle. On several parts of the surface, the epidermis is still observable; it is of a black colour, and when viewed through a lens, has a slightly granular appearance, similar to that of the epidermis of the [illegible] common.

Ursus Meles, in the [illegible] woods; it is not very frequent.

Mustela vulgaris, M. [illegible] common. M. Putorius, occasional [illegible] foina and M. [illegible] in the Devon woods; frequent.

Lutra vulgaris, in most of the [illegible]

[illegible]IRES.

Mus Musculus, M. sylvaticus, M. Rattus. The latter is now a scarce animal, having been superseded by that intruder of Indian origin, M. decumanus.

Sciurus vulgaris, not [illegible]

Lepus timidus, L. [illegible]

Myoxus avellanarius [illegible]

Arvicola aquatica, A. [illegible]

[illegible]

Delphinus Phocoena [illegible] ous [illegible] at all seasons, occasional [illegible] entering the [illegible]

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The body [illegible] shell, head, consist[illegible] (abdomen [illegible] shell, anterior [illegible] rounded anteriorly [illegible] in straight [illegible] sides prolonged [illegible] sever[illegible] parts of the [illegible] it is of a black colour [illegible] a slightly granular appearance [illegible] that of the epidermis of [illegible]

Eidothea, a new genus of Fossil Crustacea.

W.H.Lizars sculp.t

Cancer Leachii, found in the London clay. Near the middle of the shell, we observe three tubercles; two internal, situated within the concavities of two crescent-shaped eminences, and a central one, placed in a depression between the convexities of the same crescents. The central tubercle is the smallest, and does not exhibit a reticulated, or granular surface; and hence we have not sufficient evidence for considering it an organ of vision. The two lateral tubercles have their extremities broken off, and have an annular appearance. We may consider these bodies as eyes, especially as they are very nearly in the same situation as the eyes of *Limuli*. Behind the eyes, the shell becomes more convex than it is anteriorly, and has its surface covered with numerous little spines.

The posterior part, or tail, is divided into segments; but as this part is imperfect, their number cannot be ascertained. Two are represented in the figure; and we have a detached fragment, which indicates at least two more. The posterior margin of the shell, as well as the anterior margins of the articulations of the abdomen, are crenated.

The inferior surface of this specimen is very indistinct, as it is almost entirely imbedded in a mass of limestone. Indications of feet are, however, visible. On the left side, near the posterior part of the shell, there is a fracture of the limestone, in which a part of a foot is observable. On the opposite side, the evidence is much more satisfactory; for we readily detect the three last joints of a foot, and the terminal articulation forms a flat swimming appendage. On one side we also observe, beyond the margin of the shell, a number of granular bodies, which are of the size and thickness of the finger, and appear to have been either branchiæ or parts of one.

Length of the specimen, including a detached portion, which is not figured, .	9 inches.
Breadth of the shell, . . .	9 inches.
Length of the shell, . .	6 inches.
From the anterior margin of the shell to the eyes, ...	$3\frac{3}{4}$ inches.
Between the exterior margins of the eyes,	2 inches.

After a careful examination of this animal, I think we can have little hesitation in considering it as belonging to the order *Entomostraca*; but it differs from any of the living genera of that type, in several important characters. In the *Limuli* the shell consists of two distinct pieces; while, in our specimen, it is entire, and exhibits no vestiges of any division. The body of the *Limuli* terminates posteriorly in a long ensiform appendage; while, in the fossil animal, there is a tail consisting of several articulations. It approaches nearer in structure to the genus *Apus*; but differs from it in the position of the eyes, which, in that genus, are placed at the anterior part of the shell, and are sessile, while, in the fossil specimen, they are placed on peduncles, though probably very short. The form of the body approaches nearest to that of *Cyclops*, but in this genus there is but a single eye.

We may therefore consider it as forming a new genus, which may be called *Eidothea*.

The specimen was found in a limestone quarry at Bathgate, where it attracted the attention of the workmen, from the resemblance which they fancied it to possess to a human head; and it was obtained from them by Mrs Watson, of this town, who presented it to our Museum.

With the exception of the *Trilobites*, I am not aware that any crustaceous animals have been found in the mountain limestone; and although I have not visited that part of the country, yet, as it is situated in the vicinity of coal-fields, I think there can be no mistake in thus fixing on the geological position of this specimen.

Glasgow, May, 1831.

Art. V.—*On some New Species of Portulaceæ.* By G. A. Walker Arnott, Esq. A.M. F.L.S. and R.S.E. &c.

The following plants I have received from Dr Gillies, along with the *Loaseæ* described in the last number of this Journal. They do not constitute the whole of the *Portulaceæ* discovered by him, of some of which I have not yet obtained specimens from him, although they have been already described in the *Botanical Magazine*, and other works.

Trianthema.

T. americana.—Caulo herbaceo diffuso, ramis teriti-compressis, foliis lineari-spathulatis, floribus brevi pedunculatis solitariis polyandris trigynis.

T. americana. *Gill. mss.*

Hab. Near Laguna del Arbolito on the west side of Rio del Saladillo, forming the western limit of the Pampas. (November to March, 1821.)

This may ultimately prove to be a variety of *T. polyandra* Blum. which, however, I only know by the specific character given in De Candolle's *Prodromus*. The branches are, however, there said to be terete, and the flowers (I presume longitudinally) pedicellate.

Talinum.

T. polygaloides.—Caule fruticoso erecto subramoso, ramis striatis angulatis, foliis planis linearibus mucronatis, (siccitate margine revolutis angustissimis,) pedunculis basi bibracteolatis fructiferis arcuato-deflexis axillaribus racemum simplicem æmulantibus, capsula globosa, stylo filiformi, stigmatibus, 3 patulis.

T. polygaloides. *Gill.* MSS.

Hab. In the Jarillal, and along the foot of the mountains near Mendoza; elevation above the sea from 3000 to 4000 feet. (October to February, 1822.)

Flowers about a fourth of an inch in diameter, yellow, becoming red, as in some species of *Œnothera*, by drying. Placenta stipitate, central. Seeds numerous, cochleate, or almost reniform, longitudinally furrowed: as they are not sufficiently mature, we have not observed their internal structure. The stem is brittle; it appears to be not at all carnose, but rather woody, if one may judge of it in the dried state.

Calandrinia.

1. *C. cistiflora.*—Tota glabra, caule adscendente suffructicoso, ramis basi foliosis versus apicem nudiusculis, foliis lineari-lanceolatis acutissimis, racemo terminali paucifloro, pedicellis elongatis, bracteis minutis foliaceis, sepalis ovatis acutis, staminibus plurmis.

C. cistiflora. *Gill.* MSS.

Hab. On the Andes of Mendoza and Chile, at the following stations:—El Portezuelo del Valle Hermosa, La Quebrada de Fray Carlos, La Cuesta del Inga, El Alto del Chueco de San Pedro Nolasco; elevation above the sea from 9,000 to 10,000 feet. (March, 1826.)

The flower is pretty large and purple. This species appears to me to rank next *C. lingulata* D.C.

2. *C. affinis.*—Glabra acaulis, foliis elongatis linearibus obtusis in petiolum attenuatis, petiolis in basin induratam inbricatis dilatatis, pedunculis radicalibus unifloris nudisfolio dimidio brevioribus, staminibus 15.

C. affinis. *Gill.* MSS.

Hab. On the Andes of Chile at El Cerro de San Pedro Nolasco, April, 1826.

This is closely allied to *C. acaulis* H.B.K.; but in addition to other characters, seems to differ materially in the number of stamens: it was, however, very difficult to see how many there were in the specimen I possess of *C. affinis;* there are certainly more than ten, and in one flower I observed fifteen.

3. *C. diffusa.*—Caulescens glabra diffusa, ramis basi foliosis superne nudiusculis 1-2-floris, foliis spathulato-lanceolatis acutis integerrimis, floribus terminalibus, sepalis orbiculatis margine integerrimis.

C. diffusa. *Gill.* MSS.

Hab. On the Andes of Chile near El Paso de los Peuquenes; elevation above the sea about 10,000 feet. (March, 1826.)

We have only seen this plant in fruit: the number of stamina is thus uncertain.

4. *C. cæspitosa.*—Cæspitosa glabra acaulis, foliis lineari-spathulatis, pedunculis radicalibus unifloris nudis folio triplo longioribus, sepalis late ovatis, floribus oligandris, stigmatibus 4-5, capsula 4-5-valvi.

C. cæspitosa. *Gill. MSS.*

HAB. On the Andes of Mendoza and Chile at the following places:—The eastern ascent to the Cumbre, El Cerro de la Polcura, eastern ascent to Paso de los Peuquenes, La Cuesta del Inga, La Quebrada de Rios; elevation above the sea from 9000 to 11,000 feet. (March and April, 1821.)

This and the two preceding may be arranged between *C. acaulis* and *C. glauca* of De Candolle's Prodromus.

5. *C. picta.*—Caulescens parce ramosa perennis tota glabra, foliis obovato-spathulatis basi in petiolum attenuatis glaucis, corymbo cymoso terminali, pedicellis bracteas rotundatas membranaceas purpureo-marginatas multo superantibus, sepalis rotundatis purpureo-reticulatis, staminibus plurimis.

C. picta. *Gill. MSS.* Nom. vernac.—*Reynillo.*

HAB. On the Andes of Mendoza at the following places:—Las Hoyadas, El Cerro de los Manantiales, and mountains near the gold mines of Uspallata; elevation above the sea from 10,000 to 10,500 feet. (January to March, 1825.)

This is a perennial species, and one of the most beautiful with which I am acquainted: it ought to follow *C. glauca.*

6. *C. conferta.*—Caulescens perennis glabra, ramis ex radicis collo multiplici simplicibus basi foliosis sursum subnudis, foliis anguste spathulatis glaucis, racemis confertis terminalibus, pedicellis bractea vix longioribus, sepalis late ovatis, floribus oligandris (3-4.)

C. conferta. *Gill. MSS.*

HAB. On the Andes of Mendoza at El Portezuelo del Valle Hermoso, March, 1827.

This species, in a systema, may follow the last.—Besides the above, I have received also from Dr Gillies, *C. umbellata* D.C, collected on the Andes of Mendoza and Chile, at an elevation of 10,000 feet, where it is said to be abundant.

GEOGRAPHICAL COLLECTIONS.

Discovery of the Termination of the River Niger. — We have stopped the printing of this sheet to insert the following important intelligence: —

Our readers will remember, that in the first Number of this Journal, (Vol. I. p. 33,) we entered into a brief investigation of the speculations, which had been from time to time advanced respecting the course of the mysterious Niger. Though inclined to a particular opinion, we did not then see sufficient evidence for committing ourselves in the expression of any theory; and in these faithless times, we may perhaps now claim some small credit for confessing that our opinion has been proved to be wrong. The brothers Lander, one of whom was the servant of the unfortunate Clapperton, have just determined a geographical problem, which has long puzzled the wise heads of Europe, and not the least Sir Rufane Donkin, through whose labours in the good cause of elucidating difficult questions, we were originally led to speak on this subject. What will Sir Rufane say now?

We have not time nor space to give more than the following letter, which we extract from the *Literary Gazette* of last week. The authenticity of the information is established by the name which is appended to the communication, being that of the assistant surgeon who accompanied Captain Parry in his first voyage in search of a northwest passage, and the author of the narrative of the result. Mr Fisher is now surgeon of the *Atholl.*

His Majesty's Ship *Atholl,* at Sea, Bight of Biafra.
Feb. 2, 1831.

" Dear Sir, — I take the opportunity of writing you a few lines by a vessel that we have just now met on her way to England. My object in writing in this hasty manner is to acquaint you that the grand geographical problem respecting the termination of the Niger is at length solved.

" The Landers, after having reached Youri, embarked in a canoe on the Niger, or, as it is called there, the Quorra, and came down the stream, until they reached the sea, in the Bight of Biafra. The branch by which they came to the coast is called the Nun, or Brasse River, being the first river to the eastward of Cape Formosa. On their way down the river, they were attacked by the Hibboos, (a fierce nation that inhabit its banks,) and made prisoners, or rather captives; but the king of Brasse happening to be in that couutry buying slaves, got them released, by giving the price of six slaves for each of them. In the scuffle that ensued at the time they were taken, one of them lost his journal.

" Whilst at Youri, they got the Prayer-book that belonged to Mr Anderson, the brother-in-law and fellow-traveller of the celebrated Mungo Park. They were upwards of a month at Fernando Po, whence they embarked, about ten days ago, in an English merchant vessel bound to Rio Janeiro, on their way to England. From their taking that circuitous route, I am in hopes that this will reach you before they arrive, by which you will probably have it in your power to give the first news of this important discovery. Dear Sir, &c. ALEXANDER FISHER."

Death of Captain Foster. — We have, with great regret, to record the untimely fate of Captain Foster, of his Majesty's ship *Chanticleer,* who had been employed for the last three years on a scientific expedition in various parts of the globe, and was about to return to this country. Captain Foster had left his ship, for the purpose of making a series of rocket observations on the Isthmus of Panama; and on his return down a small and shallow river in a canoe, he fell overboard, and was drowned. It was, however, for some time suspected that this gifted and meritorious officer had been treacherously murdered; a supposition which has been since proved to be unfounded.

Captain King's Travels in South America.—In a paper on South America, communicated on the 8th of last month to the Royal Geographical Society, by Captain King, the author observed, that, considering the vast extent of sea coast that comprises the southern part of this continent, it is not a little surprising that, during the last century, it should have been so frequently passed by without being examined or explored. To both English and American sailors the intricacies and windings of its various channels are well known; but, with the exception of Mr Weddel's voyage, geography has profited little by their knowledge of them. He gave a concise account of the various authorities from which the charts of the coast have hitherto been constructed, and remarked that those of Sir John Narborough and Cardova are the most correct. Of the southern coast of the archipelago of Tierra del Fuego, little is known, except from the accounts of the Dutch Admiral Hermite, Captain Cook, and Mr Weddel. The celebrated voyage of Sarmiento, which was performed at a time when the whole western coast was quite unknown, was mentioned in terms of admiration by Captain King, for its correct description. The perseverance through all difficulties which was displayed by Sarmiento in this dangerous coast, in the old fashioned and clumsy ships of his time, with the mutinous crew he had to deal with, has certainly never been surpassed.

The cordillera of the Andes, which extends from the northern to nearly the southern extremity of the continent of South America, decreases in elevation as it reaches the higher southern latitudes. In the neighbourhood of Quito, the mountains Chimborazo and Pinchincha rise to a height of nearly 22,000 feet. Near St Jago, in Chili, the Andes are not higher than 14,000 feet. At Conception, farther south, they are still lower, and at Chiloe they average about 6000 feet. Between Chiloe and the Strait of Magalhanes, the height is about 3000, with some mountains in one or two places, between five and six thousand feet high.

The Guaianeco Islands, which form the southern shore of the Gulf of Penas, formed an interesting subject for the investigation of Captain King, having been the place where the Wager, one of Lord Anson's squadron, was formerly wrecked. The precise situation of the wreck, Captain King observes, had hitherto been very vaguely known. A careful perusal, however, of Byron's Narrative and Aguero's account of the missionary voyages in 1779, will be sufficient to point out the place within a few miles. Captain King considers it to have been on the north side, and near the western end of the easternmost of the Guaianeco Islands, and which he consequently named Wager Island. At Port Santa Barbara, seventeen miles to the south of this group, a very old wormeaten beam of a vessel was found, which was supposed by him to have once belonged to that vessel. It was of English oak, and was thrown up above the high water mark upon the rocks at the entrance of the port. The missionaries established there have frequently found broken glass bottles, and other evident traces of the wreck of the Wager.

Among the principal discoveries made by Captain King, are two spacious lakes, which extend to a considerable distance inland from the western shore of the continent. One named the "Otway Water," is a large inland sea of salt water, about 50 miles in length: this communicates by a narrow channel with another, named the "Skyring Water," about 34 miles long and 20 wide. Another opening extended to the northwest from Skyring Water, which Captain King had not time to explore. The tracks of horses were noticed in many places on the shores of these lakes, and the bones of Guanacoes were scattered about. The mountains near the middle of the Strait of Magalhanes are generally about 3000 feet high, although some attain the height of 4000 feet. The line of perpetual snow in the strait was found to be about 3500 to 4000 feet above the level of the sea. Captain King observed, that those mountains whose height does not exceed 3000 feet, are frequently during the summer free from snow, excepting in their recesses, where a large quantity is accumulated by drifting, and by being protected from the sun.

Captain King mentions a circumstance relative to the temperature of the climate, which is very remarkable. During the summer, he has been employed at his observatory the greater part of the night, when the thermometer has been as low as the freezing point, both within and outside of it, and, although not warmly clad, he felt no sort of inconvenience from the cold; and, in the winter time also, the thermometer has been at 24, without any inconvenience being felt. He attributes this to the peculiar stillness of the atmosphere on the coast, although at a short distance at sea in the offing, the wind was high. There are other peculiarities in this climate, which also attracted the attention of Captain King. One is the extraordinary warmth of the sea near its surface, compared with the state of the atmosphere. In the month of June, a difference of 30 degrees was found between the temperature of each; the consequence of which is, that the sea is covered with a cloud of steam, and this may, in some measure, account for the prevalence of fogs. Another extraordinary circumstance relating to the climate is, that parrots and humming birds, generally the inhabitants of warm regions, are numerous in the southern and western parts of the strait; they were even observed on the wing during a snow shower, and after a constant succession of rain, snow, and sleet; the latter have been seen sipping the sweets of the fuschia and other flowers, while the thermometer was at the freezing point.

The Patagonian Indians have a peculiar custom of visiting the graves of their dead annually, for the purpose of collecting the bones, to be conveyed to the family sepulchres. The coast between the latitudes of 41° and 51° is frequented by them for that purpose. Near Port Desire, Captain King stated, that he had seen the graves of these Indians on the summit of hills, but the bodies had been removed, probably by their relatives, for the above-mentioned purpose. When placed in the sepulchre, they are adorned with beads, and as many ornaments as can be collected for the purpose; the ceremony being performed by certain women of the tribe, whose peculiar office it is to attend to these rites.

A Visit to the Pyramids of Teotihualcan, from Mexico.—Lieut. Glennie, who has transmitted to the Royal Geographical Society an account of his journey to these pyramids, places the village in lat. 19° 42′ N. and lon. 98° 51′ E.; the variation of the needle 9° 49′ E.; and its elevation 7492 feet above the sea. The pyramids are distant about a mile and a half from the village, the largest of which was found to be 727 feet square at its base, and height 221 feet, with two of its sides parallel to the meridian. A rampart, of about 30 feet in height, surrounds this pyramid, at the distance of 350 feet from its base, on the north side of which are the remains of a flight of steps, with a road leading from them in a northerly direction, covered with a white cement. The remains of steps were also found on the pyramids, which were also covered with the same sort of white cement, as well as broad terraces extending across the sides. The number of pyramids surrounding the large one were estimated by Mr Glennie at above 200, varying in their dimensions. They are all constructed with volcanic stones, and plaster from the adjacent soil. They are coated with white cement, and the ground between their bases seems formerly to have been occupied as streets, being also covered with the same sort of cement. A smaller pyramid than that above described was covered with a kind of broken pottery, ornamented with various figures and devices, and, in the neighbourhoods of these edifices, abundance of small figures were found, such as heads, arms, legs, &c. moulded in clay, and hardened by being burnt. They are collected by the Indians, and sold to persons who visit the pyramids.

The *Mineral del Monte* was visited by Mr Glennie, after proceeding through the town of *Zempoala*, which is in ruins. This place, according to the observations of Captain Vetch, is in lat. 20° 8′ N. and lon. 0° 28′ E. of Mexico. Its height above the sea is 9052 feet.

Mr Glennie thus describes a visit to one of the mines called El lomo del Toro, near Zimapan. It belongs to the Conde de Regla, and is one of those which are worked by the Real del Monte Company, for the purpose of procuring lead for smelting the silver ore obtained from a mine hard by. The situation of this mine is very extraordinary. It is on one of the perpendicular sides of a ravine about 400 yards deep, and so narrow, that at 200 yards above the river, which flows in the bottom of it, stones could easily be thrown against the opposite side. A succession of stairs, built against the side of the ravine, enabled the mules to descend about 200 yards, when they became too steep, and the rest were descended on foot. The ores obtained from the mines are shot into the river, where they are washed, and carried up again on men's shoulders, to be taken away by mules.

The Public Baths of Tiflis.—The mineral waters of Tiflis are situated to the south of the town. Near them are constructed spacious baths of stone, with vaulted roofs. The waters are sulphureous, very warm, and efficacious, especially in diseases of the skin. The people pass many hours a-day in them. Grand entertainments are given in them, and Asiatic songs are echoed along the vaults. The women particularly delight in these baths, setting apart one day in the seven to be spent there, and remaining there from morning to night. This is their luxury; and the rich, and young, and beautiful are the great frequenters of the baths. They go there in great state, sometimes in drouskis, sometimes on foot, always accompanied by a maid, (*Bischo,*) and a numerous suite of chambermaids, (*Gandeli,*) with linen, carpets, rouge in shells of mother-of-pearl, dyes to tint the hair and eyebrows, eatables, and wine. Arrived in the anti-chamber of the bath-hall, the domestics take possession of a place according to the rank of their mistresses; they then display their carpets and embroidered garments, and undress their mistresses, who prepare to enter the baths. These baths are of stone, and sufficiently large to accommodate one person. The belles of Tiflis generally pass twelve hours in them; two hours are occupied in rubbing the body and dressing the hair; four hours are passed in entering twice into the bath, and taking repose each time, after having re-arranged the hair, whitened the neck and breast, and rouged the cheeks; two hours more are spent in dressing; and then they pass four hours in society at table.

A man employs only a quarter of this time. After having remained for a quarter of an hour in the bath, he sits down on a wooden bench which surrounds the hall; the bathing man extends and twists about his limbs, and employs friction with a rubber. When he is sufficiently twisted and rubbed, the bathing man gives him a slap on the hand without saying a word; this is the signal for the patient's return; and he is then soaped, and enters again into the bath. When he leaves it, the bathing man cries out, *Tschodra*, (the cloak.) This is the first and the last word that has been spoken, the most profound silence being observed throughout the whole operation. The cloak being brought, the patient is covered with it, and retires to his anti-room, where he sits down on a large divan, and dresses.—*Bull. de la Soc. de Géog.* No. xci. p. 242.

Civil Administration of Java. — The rich and fertile island of Java, "one of the finest and most precious colonies in the world," is divided into nineteen provinces, or residences, named as follows, from west to east: — 1. Bantam; 2. Batavia; 3. Buitenzorg; 4. Crawang; 5. The Regencies of Preanger; 6. Cheribon; 7. Tagal; 8. Pekalongan; 9. Samarang; 10. Kadou; 11. Djocjokarta; 12. Sourakarta; 13. Japara; 14. Rembang; 15. Grisse; 16. Surabaya; 17. Passarouang; 18. Besoukie; 19. Banjouwangui. To these may be added the neighbouring island of Madura, which forms the residences of Madura and Sumanap.

The general administration of each of these provinces, most of which are as populous, and some more so than the provinces of the Low Countries, is confided to a civil governor, who has the title of resident, and is assisted by a secretary, and as many sub-residents (*assistent residenten*) and inferior officers, as are necessary for the public service. Some of these residences have, however, been recently united, with a view to economy. The residences are subdivided into regencies, the administration of which, especially the police, is intrusted to Javanese regents, who have also the rank (better known amongst the Indians) of *Tommongon*, *Adipathi*, or even of *Panguerang*, if they be of high birth, or have performed any great service.* The regents are nominated and paid by government; they are generally individuals of the highest class, and of the first families in the country; and, on their death, if there be no particular reason for the contrary, the government generally names one of their children to the vacant place. Under the regents are other Javanese of an inferior rank, as principals of districts, cantons, villages, &c. who have the same relation to the government, and complete the administration of the colony. — Hogendorp, *Coup d'œil sur l'Ile de Java*, &c.

Geography of Siberia. — M. Hansteen has determined the longitude of the town of Yenisseisk in Siberia, by astronomical observations, to be 92° 10′ 59″ east of Greenwich. He has connected, by the transposition of two chronometers, other places with this town, and thus determined their geographical position, of which we give the following ones: —

Places.	Latitude.	Longitude.
Town of Yenisseisk, . .	58° 27′ 19″	92° 10′ 59″ East.
Mouth of the Elotchikha, . .	61 29 51	90 11 0
Town of Touroukhansk .	65 54 56	87 32 25

Petersburgh Transactions, 1831.

Climate of England. — In a paper recently published in the Transactions of the Horticultural Society of London, Mr Knight says, that he entertains no doubt whatever but that our winters are generally a good deal less severe than formerly, — our springs more cold and ungenial, — our summers, and particularly the latter parts of them, as warm, at least, as they formerly were, — and our autumns considerably warmer. In accounting for these changes, our author observes, that within the last fifty years, very extensive tracts of ground, which were previously covered with trees, have been cleared, and much waste land has been enclosed and cultivated; and by means of drains and improvements in agriculture, the water from the clouds has been more rapidly carried off. From these circumstances, the ground becomes more dry in the end of May than it was formerly, and it consequently absorbs and

* In the residency of Batavia, where, more than a century ago, all the lands were alienated by government, and where most of the superior proprietors are Europeans, there are no regents or native chiefs; but the police is superintended by Europeans, who have the title of *Schout* and *Onderschout*. In this residency, and in that of Buitenzorg, which together formerly constituted the *Omme* and *Bavenlanden*, (environs of Batavia,) all the lands, constituting about one hundred and sixty estates, belong to individuals; some of these estates are very extensive, containing a population of from ten to twelve thousand souls.

retains much more of the warm summer rain than it did in an uncultivated state; and as water in cooling is known to give out much heat to surrounding bodies, much warmth must be communicated to the ground, and this cannot fail to affect the temperature of the autumn. The warm autumnal rains, in conjunction with those of summer, operate powerfully upon the temperature of the winter, and, consistently with this hypothesis, Mr Knight asserts that he has observed, that, during the last forty years, when the summer and autumn have been very wet, the succeeding winter has been mild; and that when northeast winds have prevailed after wet seasons, the winter has been cold and cloudy, but without severe frost, probably owing to the ground upon the opposite shores of the Continent being in a state similar to that on this side the Channel.

Supposing the ground to contain less water in the commencement of winter, on account of the operation of the drains and improvements before mentioned, more of the water afforded by dissolving snows and cold rains in winter will necessarily be absorbed by it; and in the end of February, however dry the ground may have been at the winter solstice, in the end of February, it will almost always be found saturated with water; and as the influence of the sun is as powerful on the last day of February as on the 15th of October, and it is the high temperature of the ground in the latter period which occasions the difference of temperature in those opposite seasons, Mr Knight thinks it cannot be doubted, that if the soil be rendered more cold by the absorption of water at nearly the freezing temperature, the weather of the spring must be, to some extent, injuriously affected.—*Trans. Hort. Soc. Lond.* vol. vii. p. 4.

African Colony of Liberia in 1830:—The principal establishment and capital of this colony is *Monrovia,* situated under 6° 21′ N. lat. and 10° 30′ W. long., about a quarter of a mile above the mouth of the river Monserado, and three quarters of a mile from the point of the cape which bears the same name. The river St Paul empties itself into the sea a very short distance from Monserado.

For the first two years, the colonists inhabited little thatched cabins; about five years ago, the first wooden houses were built on the site of the present town, in the midst of a dense forest, so desert, that tigers were killed on the thresholds of the houses. As in all similar establishments, the first inhabitants had great difficulties to overcome; but they have now surmounted them, and their efforts are crowned with success.

There are at this time ninety houses in Monrovia, two places of worship, and a court of justice; many of these houses are handsome, and all are commodious. The site of the town, which occupies more than a square mile, is at an elevation of about 70 feet above the level of the sea; it contains 700 inhabitants. The streets are in general a hundred feet broad, and placed at right angles with respect to each other. The colonial company have appointed an agent and a medical man.

The agent is the principal magistrate of the colony, and the surgeon is his assessor. No white is permitted to reside there, either for purposes of trade, or for the exercise of any mechanical art, since the object of the establishment is exclusively in favour of men of colour. The secretary, the collector, the surveyor, and the constables, are paid by the agent. The sub-agent, the sheriff, the treasurer, and all the other civil officers, are chosen by election of the inhabitants.

The court holds its assizes on the first Monday of every month; the jury is constituted in the ordinary manner, and its jurisdiction extends over all the colony. The most common subjects for trial are thefts, committed principally by the natives. It may be said, to the honour of the emigrants, that since 1827, only five of them have been convicted, and these of minor crimes.

Two kings, with their subjects, (to the supposed amount of 10,000,) live under the protection of the colony, and are ready to make common cause with the inhabitants, in case of their being molested by the natives,—which, however, is not to be feared.

The village of *Caldwell* is about seven miles from Monrovia, on the river St Paul, and contains a population of 560 husbandmen. The soil is very fertile, the situation agreeable, and the inhabitants appear to be contented and happy.

Millsbury is twenty-five miles from Monrovia, on the river St Paul. It has several constant streams, sufficient to feed a hundred mills; and in the neighbourhood, wood to serve for half a century, if it were cut up in saw mills. There are 200 inhabitants.

The island of *Bushrod*, which lies between the Monserado and the river St Paul, is seven miles long, and three in its greatest breadth, and is very fertile. It is at the distance of five miles from Monrovia, and is inhabited by thirty families from the Carolines. All the above colonists, amounting together to at least 1500, are emigrants from the United States. The redeemed Africans are established towards the left bank of Stockton Creek, near Bushrod Island; 250 were sent by the government of the United States, and 150 came from the Spanish factories. The agents of the latter having seized some of the redeemed slaves, and refusing to give them up, the colonists not only rescued them, but brought away all whom they could meet. These 400 blacks are good husbandmen, and appear well satisfied with their lot. All the above establishments contain about 2000 individuals, and are in a very prosperous state.

In answer to the question, Whether there be any danger of the natives attacking and destroying the colony? we may reply by the following facts:—

When the colonists had only thirty effective men to defend them, and when the forest was not a pistol shot from their houses, they were attacked on three different points, by many thousands of the natives, armed with muskets, and other instruments of war; one division of the assailants took one of the two cannons which defended the colony; but, instead of making use of it—if, indeed, they were acquainted with its use—although it was charged and ready to be fired, they shook it, and embraced it, crying, "Fire, cannon! Fire, cannon!" until the other piece, being judiciously directed against them, forced them to retreat, and immediately the captured cannon was retaken and directed against them. This affair disconcerted them so much, that they have not again ventured upon hostilities. Many of them have since made barters with the colonists, but without letting it be known that they were engaged in the attack. More recently, however, when they thought they might safely speak of it, they confessed that there were from 70 to 80 men killed, whilst the colony only lost two or three men.

The present means of defence consists of 20 pieces of ordnance, with muskets and amunition for 1000 men, not including private arms. There are at Monrovia a company of infantry, a company of artillery, and one of carabineers; at Caldwell, a company of infantry, and one of artillery; and a company of carabineers at Millsbury. All these volunteers are in uniform. There are, moreover, a number of militia-men, not clothed, and many natives, whom the government could arm if it were necessary. These forces are more than sufficient to repel any attack.

Cape Monserardo is guarded by a fort which commands all the environs, and has recently saved an English vessel under chase by a privateer. The troops are commanded by Major Barbour; but the agent of the company is commander-in-chief.

The inhabitants of Monrovia are very hospitable, and have in general much morality and religion. The two places of worship of which we have spoken, belong, one to the baptists, the other to the methodists; the former having three and the latter five preachers, all well-informed and intelligent men of colour, residing amongst the colonists, and engaged in trade: nothing is paid by the people for religious instruction. Five German missionaries, some ministers and teachers also reside there, and sometimes preach in the methodist chapel.

A commercial institution is established at Monrovia, with a capital of 4000 dollars, and with the agreement that there shall be no dividend until the capital is raised to 20,000 dollars. In a single year the stocks rose from 50 to 75 dollars.

It has been stated, that the climate is very unhealthy,—which is indeed true with respect to the whites, but not to the men of colour. Those of the northern and southern states have what is called the disease of the climate, that is to say, they are generally attacked by fever during the first month of their residence; but this leads to no bad result, owing to precautions which have been taken for their reception. The emigrants from Georgia, the two Carolines, and the southern parts of Virginia, escape this inconvenience, or are but slightly affected. Deaths are not more frequent than elsewhere; and the chief agent, Dr Mechlin, has even assured me that the number of deaths were proportionally inferior to that of Baltimore, Philadelphia, and New York.—Warden, *Bull. de la Soc. de Géog.* xv. 1.

Morocco.—Lieutenant Washington, R.N. communicated to a late meeting of the Royal Geographical Society, a geographical and topographical memoir on the empire of Morocco, and the result of observations made by him in October—December 1829, when accompanying a mission to the court of the Sultan, headed by Mr Drummond Hay, his Majesty's consul-general in the empire. The route was first along the sea-shore as far as Azamor, near Cape Blanco, and thence across the country direct for the imperial city, where the mission was hospitably and respectfully received, and lodged in one of the sultan's palaces for a month. On returning, Mr Drummond Hay obtained permission to ascend the Atlas as far as might be practicable for the snow; and this forms, accordingly, the chief deviation from the ordinary route pursued by all travellers who have made this journey. But great attention was paid throughout to the determination of positions and heights; noting at the same time minutely the geological character of the country. And thus, aided by a careful incorporation of the best materials at home, (particularly the charts of the coast constructed by the late Captain Boteler, of the navy, who was employed to survey it,) Mr Washington is persuaded that the map accompanying his memoir, and also presented by him to the society, with a perpendicular section annexed to it, shewing the level, is very much the most correct which has yet been compiled of this empire, the physical features of which are sufficiently remarkable. From the sea to the foot of Mount Atlas, the land stretches away above 150 miles, apparently on about a dead level; but at the city of Morocco, 16 miles distant from the mountains, the height was ascertained to be 1200 feet; and on an attentive examination, three different steps, or breaks, in the continuity of the plain, may be detected, by which altogether, although the ascent is in each easy, the above height is attained. The soil is light and dry, being chiefly sandstone, and the aspect is generally parched and barren. Wherever water runs, however,—and there is abundance of it, were it but distributed,—the most exuberant fertility is found; and there can be no doubt, that, properly cultivated, its productiveness would be very great. But at present the returns are limited, though all of excellent quality, grain, fruits, and vegetables of all sorts. The wood is generally stunted, not warranting Pliny's accounts of it, and tropical in its character quite to the base of the Atlas, with the eternal snows of which it thus presents a striking contrast. The ascent of the mountain itself is extremely steep and difficult, and the greatest height attained was only 6400 feet, the travellers being then stopped by the snow. In summer, however, this ascends higher; and an aboriginal tribe, the Shellahs, who neither speak nor understand Moorish nor Arabic, thickly people the clefts and ravines, intermingled, to the extent of almost a fourth, with Jews, individuals of whom take refuge here when singled out for particular oppression by the caprice or tyranny of the Moors below. The mountain, where thus ascended, was chiefly composed of limestone, schist, and sandstone, only transition and secondary rocks,—no traces of primitive, except boulders of granite, or rather gneiss, in the valley below, and veins of foliated quartz among the schist. The tendency of the formation also is to table-land, and ridges and rounded summits, not to sharp or alpine peaks. The highest point in sight was ascertained to be 11,400 feet in elevation.—*Lit. Gaz.*

Excursion to the Mountains near Ladak. By J. C. Gerard. (Read before the Asiatic Society of Calcutta, Jan. 27, 1830.)—This excursion was full of disappointments and disasters, and made by the most frightful roads, but interesting even in the grandeur of the obstacles. Many of the company were lost through the rigour of the climate; the chief himself, M. Gerard, fell ill, and had nearly sunk under it. The first misfortune which occurred was on crossing the Paralassa, at the height of 16,500 feet. A man perished at noon, with his pack on his back, and whilst the rays of the sun were darting on the snow by which he was surrounded. Another loss was experienced at the passage of the chain of mountains which shuts in the valley of Speetee on the east,—a severe trial for the most hardy of the travellers. They had rested at an elevation of 15,700 feet, in the bed of a rivulet, and commenced to ascend, under a temperature of 10° C. without a single ray of the sun to warm them. The *porteur* could not support the accumulated torments of fatigue, and cold, and disease, and he died in the snow. M. Gerard's *mussalchis* sank also; he spoke, and even laughed, some minutes before expiring, and sighed out his last breath as one who is surprised by sleep.

The check which M. Gerard experienced on arriving at Lehpro, arose principally from the jealousy of the government, which stopped him on the frontier of a desert country, where the *wuzeer*, before his arrival, had crossed the last mass of rock which separates the two districts. Our traveller found himself at the height of 16,000 feet, surrounded by Tatars, with their black tents, and horses, and dogs; whilst on the elevated ravines of the neighbouring mountains were flocks of yaks and shawl-goats, reaping abundant nourishment from land which theorists had imagined to be covered with perpetual snow. M. Gerard and the wuzeer soon became good friends, drank tea, ate beef, and smoked together. His official message had not by any means altered his particular sentiments; but, although he shewed neither jealousy nor arrogance, he appeared very anxious to see the traveller depart. He accepted every thing which was offered to him, and was very anxious to obtain a musical snuff-box, a toy with which M. Gerard had unfortunately not provided himself, never supposing that an article of this kind would be known, much less desired, in these wild countries. During the night, the cold was extreme; the thermometer, the day before M. Gerard met with the wuzeer, having been at $13\frac{1}{2}$° C. at sunrise.

In crossing the Lartche-Long chain of mountains, which succeeds that of Paralassa, M. Gerard found some shells at the height of above 16,500 feet. The plain which crowns the Rodpshoo offers little for scientific observations, except its physical configuration and majestic height. There are no other inhabitants than tribes of shepherds, who live in the valleys under black tents, at a mean height of 16,000 feet. The whole country is formed of mountains of varied elevations, and offers no other continued surface to the eye but that of lakes; group after group succeeds, until the farthest stretch of vision is interrupted by a mountain chain covered with snow, from whose declivities the waters flow into the Indus.

On the 20th September, M. Gerard lost his way on the banks of a salt lake, and passed the night in a sheep-fold without shelter or food. "The next day," he says, "we were covered with snow, from which we despaired of escaping until the sun should appear to melt it. We discovered the camp in a pass at an elevation of 16,000 feet. Here my situation became more alarming. I was confined to my bed, and all around me was snow; on our flanks and in front we were hedged in by enormous mountains, the lowest plateau of which was Lake Chumorell, nearly 15,000 feet high. It is a beautiful sheet of water, and we journeyed along its banks for nine hours. Another lake was covered with wild-fowl, which screamed like sea birds on the approach of a tempest. The borders of the lake were scattered over with the black tents of Tatar shepherds, who wander from pasture to pasture with their flocks.

"I cannot conveive what they do during winter. In the day they have to contend against a burning sun, and at night against a temperature which varies from 7° to 18°, and sometimes 13° under the tents, at a height of 17,700 feet. We were often surrounded by wild horses; but they would never permit us to come so near as to catch them. They are of a singular species between the mule and the ass, resembling the deer in their spotted colour as well as their habits, for they spring from peak to peak with much agility. I am inclined to consider them as a species of Zebra. The snow line is often 20,000 feet at least; to the northeast, however, we occasionally see white summits of an incomprehensible size and height, at the contemplation of which the imagination wanders, inspired by the indefinite nature of the objects. I was within three days' journey of the Indus, and I shall always regret the circumstances which prevented me from beholding this solitary and inaccessible river. But I durst not quit the great route. I had hired the men who carried our baggage; and our stock of provisions, laid in for twelve days, already began to be scanty."

At one place, under the Chinese government, M. Gerard was closely watched, and obliged to keep the house, which annoyed him very much, as the ground was covered with fossils. At another place, lower down than Ladak, he was more fortunate, and pursued his researches without any difficulty. During his travels, he amassed together a magnificent collection of shells, and specimens of the rocks which contain them, between the elevations of 15,000 and 16,000 feet. His route, in descending the valley of Speetee, was by no means devoid of interest: he visited many monasteries, and was well received, and treated with tea and beer. The situation of the monastery of Ranum, from whence his letter is dated, appeared to him delightful in comparison with the bleak and icy regions of Ladak: he was surrounded by vines, and apple and other fruit trees. The heat was scorching during the day, but the nights were very cold. —(*Cal. Gov. Gaz.*) *Bull. des Sci. Géog.* xxiii. 463.

New Town in the Caucasus. — Last year, the Emperor of Russia gave his sanction to a project of the ministerial committee of the mineral baths of the Caucasus, to build a town which should be named Piatigorsk, and where administration and courts of justice (except the ecclesiastical tribunal) for the province of Georgia should be established.

New Brunswick. — A correspondent mentions to us, that, with the exception of some slight accidents, Lieutenant Garden is making favourable progress with his observations on the coast and in the interior of New Brunswick, which he is conducting with a view to the rectification of the maps. Lieutenant Garden was the companion of Captain Parry.

ZOOLOGICAL COLLECTIONS.

Ateles Frontalis, *a new species of Spider-Monkey.*—At a late meeting of the Zoological Society, Mr Bennett gave this name to a species, which he considers to be new, and an individual of which is at present living in the Society's garden. Its character is thus given,—*At. ater, macula frontali semilunari alba, statura At. atri,* F. Cuv.

By the white patch on the forehead, and the radiation of the hair from the back of the neck, this monkey approaches the *At. hybridus,* described in the *Dictionnaire Classique d'Histoire Naturelle,* by M. Isidore Geoffroy St Hilaire. In the latter, however, the colours of the body are varied, and generally light, the darkest tint which is mentioned as occurring on the specimen described, being the pure brown of the head, and anterior limbs. In the Society's individual, on the contrary, the whole of the hairs, with the exception of the frontal patch, are jet black; the naked parts of the skin are also black, except a flesh-coloured space on the face, including the eyes, nose, and lips. It has been suspected, that as the lighter coloured species of *Ateles* advance in age, they acquire the black which is so generally prevalent in the group; but this change of colour yet remains to be proved. —*Ann. of Phil.* May, 1831.

Mongrels between a Dog and a She Wolf.—Dr A. F. Wiegmann, jun. relates the following circumstance as occurring at the Isle of Peacocks, near Potsdam. A setter dog copulated with a she wolf; and she afterwards gave birth to three female pups, differing very much from each other. One, which died, resembled a wolf more than the two others, particularly in the hair, having, on the anterior parts of the legs, the black line which characterizes that animal. The second also resembled the mother, excepting in the position of the eyes, which was the same as in the dog. The third was, properly speaking, a setter dog, but imperfect in some respects; its character was gentle, whilst the others had a ferocious appearance. The father was white, with brown spots; of the little ones, on the contrary, the first had the hair and colour of the wolf; the second was white on the throat, cheeks, and on the sides of the neck, and black on the back; and the third had a white band on the fore part of the neck, and between the legs, the back of the same colour as the second, and the ears rounded, pendent, and of moderate length. The tail was not erected in any of the three.—*Isis.*

Observations on the Hyacinthine Maccaw. By E. T. Bennett, Esq.—The Hyacintine maccaw was first described, in 1790, by Dr Latham, in his *Index Ornithologicus,* under the name of *Psittacus hyacinthinus,* from a specimen in Parkinson's, otherwise the Leverian, Museum. In the Museum Leverianum, under the date of 1792, and afterwards in his *Zoological Miscellany,* Dr Shaw described and figured it as the *Psittacus augustus,* quoting Dr Latham's synonyme, and preserving it in the English name. Subsequently, the bird was fully characterized, with an interesting account of its habits, under the name of *Guacamayo azul,* by another observer of the close of the last century, M. d'Azara; in the French translation of whose work, M. Sonnini added a note, pointing out the resemblance between D'Azara's bird and that of Dr Latham. In the second edition of the *Nouveau Dictionnaire d'Historie Naturelle,* M. Vieillot considered the former as a distinct species, and named it *Macrocercus glaucus;* but, in his *Galerie des Oiseaux,* he corrected this error, and united the two birds under the name of *Macrocercus hyacinthinus,* which the species now bears. In his *Conspectus Psittacorum,* published in 1820, M. Kuhl quotes to the *Psittacus hyacinthinus* of Latham no other synonyme but that of Shaw.

This species is figured in M. Spix's work as the *Anodorhynchus Maximiliani*; but, as far as I have been able to discover, entirely without description. A second bird, differing from it, not only in its comparatively diminutive size, but also in having its cheeks bare, as in the typical maccaws, although not quite to the same extent, is figured and described by the same author as the *Arara hyacinthinus.* To the latter, M. Spix refers the *Guacamayo bleu* (*azul*) of D'Azara, and states, that it has been improperly confounded by Sonnini and Dr Latham, with the *Anodorhynchus Maximiliani Augusti.* That the *Arara hyacinthinus* of Spix is not Dr Latham's *Psittacus hyacinthinus,* is clear from the characters given of the latter, which is described to have its chin and orbits only naked, in opposition to the other maccaws, which are characterized as having naked cheeks. The identity of Shaw's bird with that of Dr Latham, is proved by its being figured with the same characters, and from the same museum, at a time when the specimen was said to be "perhaps the only one known to exist at present in Europe." A comparison of the characters given by D'Azara, with those of Dr Latham and Dr Shaw, and with the figure of the latter, will at once remove any doubt of the fact that the *Guacamayo azul* is the same bird; and its size and feathered cheeks immediately distinguish the latter from the *Arara hyacinthinus* of Spix. In fact, the *Psittacus hyacinthinus* of Dr Latham, the *Psittacus augustus* of Shaw, the *Guacamayo azul* of D'Azara, the *Macrocercus glaucus* of Vieillot, the *Macrocercus hyacinthinus* of the same author, and the *Anodorhynchus Maximiliani* of Spix, are one and the same species. The *Arara hyacinthinus* is totally distinct, but forms, by its near approach in colouring, and by the smaller extent of its naked cheeks, an evident link between the hyacinthine and the common maccaws.—Loudon's *Mag. of Nat. Hist.* May, 1831.

Relative Dimensions of the Bones of Animals.—A memoir was lately communicated to the Linnæan Society, by Dr Walter Adam of Edinburgh, with whose labours in the Museum of our University we have long been charmed. Dr Adam seems to have discovered, under the auspices of his gracious master, that the philosophy of zoology lies in comparative length and breadth, and we can bear testimony to the unwearied and incessant attention with which he has pursued this great principle to its development. Dr Adam has at length obtained the splendid result, that "zoology is susceptible of a classification established on the fixed basis of number, and that the tissues by which the bones are moulded are also of determinable proportions."

It was lately stated, with the sagacity of precognition, by one who might have been in the secret, that (to quote from memory) "we seem at this moment to be on the verge of some great discovery, from which a grand leading principle shall be deduced;" and have we not here the fulfilment?

This our Edinburgh school of zoology can certainly now no longer be held in derision. We labour hard and long; we are blessed with a kind teacher to direct us in the profitable paths of inquiry; and we offer this numerical law of osseous development as the gauge by which our scientific worth may be meted.

We give the following notice of Dr Adam's paper from the *Annals of Philosophy*:—

The objects of this elaborate paper are, to state minutely the dimensions of the several bones of a large quadruped, the Camel, having been selected to illustrate the general type of its class, on account of its size; to trace the mutual relations of these dimensions; and thus to exemplify the general osteological form in animals of similar configuration. The bones are described in accordance with the nomenclature of Dr Barclay. After a brief exordium stating the objects of the paper, as just described, and an explanation of some of the terms employed, the author proceeds to detail the proportionate dimensions of the bones constituting the entire skeleton of the Bactrian camel, in the following order, viz.: the head; the vertebræ, classified in the usual manner; the sacrum; the tail; the ribs; the cavity of the thorax, and the sternum; the scapula; the pelvis, and the limbs. The height, the breadth, and the basilar length of the cranium, Dr Adams states, are very nearly in the proportion 1, 2, 4. The common difference in the palatal, the coronal, the basilar, and the extreme length of the cranium, is the breadth of the cranium at the temporal fossæ: these lengths, in the animal examined, being, respectively, 12, 15, 18, 21 inches. The lateral extent of the atlas is equal to the distance between the inner margins of the orbits. The greatest elevation of the spine is at the third dorsal vertebra; the extreme length of that bone equalling the greatest extent of the pelvis towards the mesial plane. The longest of the twelve ribs are the seventh and the eighth; their length equals the greatest extent of the scapula. The sum of the lengths of the twelve ribs is about ten times that of the longest rib. The dimensions of the cavity of the chest agree with those of the separate bones of the body; thus, the greatest width of the chest is equal to the greatest length of the head. The breadths of the pelvis, *rostrad*, (measured towards the front,) from the acetabula, are even numbers of proportional parts. The breadths, *caudad*, (measured towards the tail,) from the acetabula, including the acetabular breadth itself, are odd numbers of proportional parts. The chief dimensions of the pelvis are identical with the chief dimensions of the head; thus, for example, the greatest dimension of the pelvis, being through the mesial plane, is equal to the greatest length of the head. The lengths of the four long bones of the atlantal (fore) limbs, independent of processes and elevations, are consecutively as the numbers 22, 28, 20, 6,—sum, 76. The similar lengths of the four long bones of the sacral (hind) limbs are consecutively as the numbers 28, 23, 20, 5,—sum, 76. The author observes, in conclusion, that, from the exposition given in the paper, it appears that, throughout the dimensions of the bones of the Bactrian camel there is such an agreement, that many of the dimensions are continued proportionals, and that the mutual relations of nearly all admit of a very simple expression; and he states that corresponding relations have been found to prevail in the bones of every species of animal he has examined. From the full verification of these observations in the osteology of other animals, it will result, he infers, that zoology is susceptible of a classification established on the fixed basis of number, that the tissues by which the bones are moulded are also of determinable proportions, and that, consequently, the development of the parts of organized bodies, &c. afford a wide scope for numerical as well as for physiological inquiry.

The various proportions are minutely exhibited in twenty-eight folio tables; the first column of each giving the actual dimensions of an individual camel, and those measurements being in the next column adjusted to the normal proportion, on the assumption, that the aberrations in the form of an individual animal, from the perfect form of its species, may be at least as great as the inequalities of the right and left sides of that individual itself. The numbers assigned to the normal proportions, however, are regarded merely as aproximations.

Note on the Ear of Birds.—At first sight, it might be supposed, that, in the tympanum of birds, there is only one orifice leading into the labyrinth; but it is not so; for this single opening is merely the entrance into a short canal, at the bottom of which are two holes, separated by a spiculum of bone, and corresponding to the fenestra ovalis and fenestra rotunda in the mammalia.

These, in the dry bone, both open into the vestibule, in consequence of the rudimentary state of the cochlea; but, in the recent ear of the bird, in which some of the deficiency of the osseous part of the cochlea is supplied by the structure of the soft parts, (these, in some, exhibiting a rudiment of a lamina spiralis,) there are, contrary to what is stated by M. de Blainville,* the same relations between the cochlea, vestibule, and tympanum, as in the mammalia; one rudimentary scala of the cochlea communicating with the vestibule, and the other, with the tympanum, by means of the fenestra rotunda, which is closed by a membrane.

Of course, I do not call the fenestra rotunda by that name, because of its shape, seeing that it is oval in birds, but because the analogous hole in man is round. — T. W. J.

Manganese in Human Blood. — Professor Wurzer, in analyzing human blood, according to Engelhart's process, by liquid tests, was led to suspect that he obtained a small quantity of manganese; not being, however, quite satisfied as to the correctness of his analyses, he was induced to repeat them in the following manner: The blood, which had been obtained by venesection, on the day before the experiment, was ignited in an open crucible, the incinerated mass oxidized by nitre, and then diluted with water; the residuum was dissolved in muriatic acid, and the iron precipitated from the solution by succinate of ammonia. As the precipitate contained also some phosphate of lime, it was again ignited, and then dissolved in muriatic acid; the phosphate of lime was separated from the solution by alcohol, the excess of the latter expelled by heat, and the iron precipitated by ammonia. By boiling the filtered liquid with carbonate of soda, the manganese was precipitated, and then dissolved in nitric acid, and again ignited. In two grammes of the incinerated residue, there was found 0.108 of oxide of iron, and 0.034 of protoxide of manganese.—*Ann. of Phil.* May, 1831.

On the Anatomy of the Hymenoptera; and, particularly, on the Organs of Motion of the Hornet. By M. H. Straus. — M. Straus has for a long time intended to give the anatomy of all the articulated animals, and to publish it in a series of monographs, each of which shall treat of a distinct group. In each of these groups he chooses the most typical species. He has thus given the anatomy of the *Coleoptera*, taking as a type the *Melolontha vulgaris*. In this way, also, he has commenced the anatomy of the pulmonary *Arachnida*, taking as a type the *Mygale avicularia*; and he has latterly submitted to the judgment of the Academy of Sciences the first part of his anatomy of the *Hymenoptera*, in which he treats of the skeleton and muscular apparatus. The hornet, (*frelon*,) has served him as a type in this last work.

It is generally thought, that little animals have a very simple organization, which is, indeed, partially true, but does not apply to insects, whose structure is, on the contrary, very complicated. In his monograph on the *Coleoptera*, M. Straus has described 235 solid pieces which enter into the composition of the skull of these animals, exceeding by four the number of bones in the human body. He has also enumerated 246 different muscles, and described a system of aëriferous vessels, as extensive as the sanguineous system of man; and a very complicated nervous system, and viscera as numerous as those of the large animals. In the hornet, whose organization is not more complicated than that of the other *Hymenoptera*, the solid framework is formed of 267 pieces, and the muscular system of 258 muscles, without counting those which are united together.

The organs in the mouth of masticating and sucking insects, presenting one of the most remarkable differences observed in the organization of the class, and the passage of these forms into each other taking place in the

* *Principes d'Anatomie Comparee*, Vol. I. p. 524.

Hymenoptera, the characters of these parts in this family are very interesting to the entomologist, as exhibiting the analogies of the mouth in two great divisions of the class.

The organization of the *Hymenoptera* is also remarkable in other respects. In insects which grind the food, the body is divided into four principal parts: the *Head, Corslet, Thorax,* and *Abdomen.* In the *Hymenoptera, Diptera,* and *Lepidoptera,* the corslet is rudimentary, and almost disappears, the thorax seeming to constitute the second part of the body. Entomologists have therefore improperly called this part the corslet,—a name which belongs to an entirely different part. This modification is best shewn in the *Hymenoptera.*

The two pairs of wings, which appear for the first time in the *Coleoptera,* the second order of insects, are differently developed in different orders. In the *Coleoptera,* the second pair serves only for flight, and the first, or the *elytra,* is composed of two solid scales, which protect the true wings, but do not contribute to flight. In the *Orthoptera* the elytra already begin to be veined and membranous, and, at the same time, take an active part in flight. In the next order, the *Neuroptera,* and particularly in the *Libellulæ,* the two pairs scarcely differ from each other. Then, the elytra continuing to be more and more developed, at length become more peculiarly the organs of flight, whilst the second pair of wings gradually decreases in development; thus, in the *Hymenoptera,* the first pair is more than twice as large as the second, and acts more efficiently in flying. This variation of size and function, which the two pairs of wings undergo in inverse directions, is also remarked in the two articulations of the thorax, which support them, and are subordinate to them.

A very remarkable fact in comparative anatomy is presented in the external form of the brain. Several physiologists have thought, that, in the higher animals, the degree of intelligence is in proportion to the number of convolutions of the cerebrum: an opinion which seems to find additional support in the *Hymenoptera.* These insects shew the highest intelligence of all their class, and are the only ones whose brain, so called, presents well marked convolutions.—*Bull. des Sci. Nat.* xxii. 347.

Electricity of the Caterpillar of Cerura vinula.—Animal electricity, (that is, the voluntary power of communicating electricity,) is one of the strangest phenomena in nature; and this seems to accord so much with the general sense of mankind, that any new fact of this kind is listened to with inattention, if not with incredulity. It has been allowed to be ascertained in some fishes, and in one insect, a beetle from Brazil. What I am going to relate establishes the existence of the power among caterpillars, at least to the conviction of my own mind.

Observing the leaves of a young poplar, of the species *P. canescens,* to be much destroyed, I was led to examine the cause. Two large sorts of caterpillars were feeding upon it, both to me, at that time, unknown; and the name of one of them I am still ignorant of: the other is now called *Cerura vinula.* I broke off two twigs, with one of each, and was carrying them home: the *Cerura* shewed decided symptoms of irritation, which particularly drew my attention. It began to contract itself, drawing itself closely together, and by degrees elevated and extended its bifurcated tail; and there were slowly protruded from each of the points bright red filaments, about one-eighth of an inch long, and irregularly bent to one side. In a short time I felt a sudden tingle along my arm, which made me stop with surprise. Suspecting, however, that this might be imaginary, I again proceeded; and, shortly after, I felt another shock, which made me almost involuntarily throw the twig with the creature upon the ground. As I was near the house, and one of the children with me, I sent her for a wine-glass, in which I put the caterpillar, which immediately drew in its tails to their original parallel position, and coiled itself in the bottom. On entering the house, I set the one in the glass on the chimney-piece; and, as the other was more lively, I passed a minute or two in examining it with a pocket lens. I then turned to the *Cerura* from which I had the electrical shocks; and as it had remained coiled together when I set it down, I was surprised to see the glass empty, and the insect gone: it had fallen upon the carpet; and I was sorely disappointed to find that the child had crushed it with her foot, displacing the intestines, and along with them a clear gelatinous matter, consisting of a great number of short cylinders. Upon attempting to lift one of these with the point of a pin, I found that I pulled more after it. They were attached to each other by small ligaments; and I was agreeably astonished to discover that they separated from the mass exactly after the manner that the links of a land-measurer's chain are extended, and had been so arranged in the body of the caterpillar, forming an organ, composed of these cylinders, at right angles with its length. I convinced myself that this apparatus had nothing to do with the viscera of the insect, and remain satisfied (not altogether philosophically, I must acknowledge) that they composed the electrical organ by which I received the shocks. — W. L. *in Loudon's Mag. of Nat.* May, 1831.

Observations on the Belemnites. By M. L. Voltz: — An extended memoir on the Belemnites has recently been published by M. Voltz, which forms an important addition to the works of Schlotheim, Miller, De Blainville, and Raspail. The author gives the following summary of his observations: —

Of the Alveolus. — The alveolus is a thin, laminar shell, of a conical form, open at the base, having its striæ of growth on the outer surface: its opening is oblique from the belly to the back, where it is terminated by a rounded lobe. This shell is partitioned off into small spaces, by means of very distinct transverse processes, which do not join together as was affirmed by Miller, (*Transact. of the Geological Society of London,* second series, vol ii. part i.) These partitions are very numerous, almost perpendicular to the axis of the cone, concave, and smooth, and each provided with a lateral appendage of the form of a hollow tube dilated in the middle: the series of appendages constitutes an articulated siphon, which traverses all the spaces. The siphonic side of the shell is called the *venter;* the opposite side, the *dorsum.*

The striæ of growth are of two kinds: on the middle line of the dorsum there is a suite of arches, whose summits are turned towards the opening of the shell; they are comprised between two straight lines placed symmetrically, and extending from the summit of the alveolar cone. I call these straight lines the *asymptotes,* and the space between them the *dorsal region;* the latter generally occupies about a fourth of the circumference of the alveolus. On the sides there is another series of striæ of growth ascending from the alveolar cone, along the asymptotes, and then bending towards the venter, round which they make a horizontal turn parallel to the suture of the partitions. I call that part of the sides where these striæ ascend towards the summit, and turn again to become horizontal, the *hyperbolar region.* The *ventral region* is the part where they turn round the venter horizontally.

Of the Sheath. — The alveolus is enclosed in a sheath, which forms the principal mass of the Belemnite, and whose structure is quite different from that of the alveolar cone. It is a conoid or spear-shaped shell, open at the base, and composed of laminæ of a transversely fibrous texture covering each other. One layer always projects beyond the preceding, not only at the summit, but also at the base: in this way, the layers form the alveolar cavity, in the interior of which are the striæ of growth. The opening is more or less oblique from the venter to the dorsum, which is the converse of that of the alveolus; it has more or less distinct sinuses in these two parts; that of the dorsum is commonly the deepest.

The successive line of the summits, generally called the axis, differs much from the geometrical axis of the sheath. I call it the *apicial line;* it is always eccentric, and closer to the venter than to the dorsum of the shell; and it is frequently arched. The summit of the sheaths often has very deep grooves more or less prolonged, which are always placed symmetrically; their number is never very considerable, being 1, 2, 3, 5, and 7. There are frequently, between these, other grooves in greater number, but much more shallow; I call these *plaits, (plis:)* at other times they are still more numerous and finer, and are nothing more than true striæ. The summit is sometimes terminated by a pore, or umbilicus, and when the successive umbilici do not close, there remains an *apicial canal* instead of an apicial line: the latter is quite independent of the siphon of the alveolus. The surface of the sheath frequently has a canal, or an incision along the venter, (the ventral canal,) beginning near the base, and extending towards the summit. The *apicial region* is the part of the sheath which corresponds to the apicial line, and the *alveolar region* that which corresponds to the alveolus.

Of the specific characters of the Belemnites.— The specific characters of the Belemnites are principally found in the ventral canal; in the position and form of the apicial line of the alveolus; in the position, number, and length of the latero-dorsal groove of the summit; in the *compression* of the shell between its sides, or the *depression* between the venter and the dorsum; in the general form, which is cylindrical, or conoid, or spear-shaped, or claviform; and, lastly, in the *spherule*, or globule, which sometimes terminates the summit of the alveolus. The more or less rounded, or pointed form of the summit, the ventral grooves, the plicæ and striæ which it frequently presents, commonly serve only to divide the species into varieties; as also do the small variations in the degree of compression or depression of the sheath, in the relation between the length of the apicial region and the alveolar region, or in the angle of the *ventro-dorsal profile* of the alveolus.

Of the growth of the Belemnites.—The membrane which secreted the sheath must have formed it successively, layer by layer, beginning evidently by the less extended layers, that is to say, the interior, and ending by the more extended, those which cover the others; it was, therefore, necessarily external to the shell. This fact was, indeed, indicated by the situation of the striæ of growth in the interior of the alveolar cavity, for the striæ of growth are found in all shells on the surface, opposite to the membrane which secretes them. It follows from this, that the Belemnite was an internal shell, like the *os sepiæ;* there was, therefore, invariable contact between the secreting organ and the secreted shell; and, although the secretion took place by enveloping layers, the exudation from each secreting pore proceeded in a continuous line, and produced a fibre indicating the course which the pore had followed during the whole growth of the animal; and, by this means, we may account for the fibrous structure of the sheath of the Belemnites.

The fibrous structure is more or less marked in all the bivalve shells, because in these shells there is also an invariable contact between the shell and the secreting organ. In the *Inocerami* and the *Trichites,* we see this fact very plainly. The fibres are lamellar, and collected in groups, or the laminæ all belong to a triple system of planes, parallel to those of a calcareous rhomboëdron, the axis of which is parallel to the fibres. This crystallization by groups is, perhaps, an effect of the petrifaction; for, in the shells of living *Pinnæ,* it is not seen, as I have assured myself since the printing of my work. The shell of these bivalves is composed of an assemblage of horny tubes, the interstices of which are filled with carbonate of lime, so that the earth of each fibre is not in contact with that of the neighbouring fibres; if it were a crystalline system, it would probably have been independent of the neighbouring fibres.

The formation of the Belemnites must have commenced by the summit of the alveolus, or by its spherule, when there is one; and, from that point the alveolus and sheath must have grown simultaneously, in such a way, that the extension of the base of the alveolus was always accompanied by new layers, deposited on the surface of the sheath. This mode of viewing the growth is opposed to that laid down by M. de Blainville, in his memoir on the Belemnites, where he supposes that the growth of the shell had three distinct periods: in the first, he considers that there was not yet any conical cavity, and the horns which composed the sheath were visible at the very base of the shell; in the second, there was a more or less deep cavity, and the striæ of growth were visible in the interior; and, in the third period, the cavity obtained the partitions.

Relations of the Belemnites with the Spirulæ.—The structure of the Belemnites has the greatest analogy to that of the Spirulæ, the shell of which is composed, 1st, Of a granulated cortex, which represents the sheath of the Belemnites, and is entirely calcareous; 2d, Of an internal shell, which represents the alveolus, and is composed of a horny matter, penetrated with carbonate of lime; 3d, Of partitions, with siphonic appendages, exactly resembling those of the Belemnites, and composed also of horny and calcareous matter.

Relations with the Belopteræ.—The Belemnites have also a close analogy with the *Beloptera belemnoïdea*, (Blainville,) which forms the passage from the Belemnites to the *Beloptera sepioïdea*, (Blainville,) for which, I think, a new genus should be made, and which I have named *Belosepia Cuvieri.* This last has a rostrum, which represents the *apicial region* of the Belemnites, and is also composed of concentric fibrous layers; the other part represents the alveolar region, and has, at the same time, the greatest analogy with the bone or shell of the Sepiæ, (*Sepiostarium.*) The siphon appears to be extremely wide in the *Belosepia.*

Relations with the Sepiostarium.—The sepiostarium is likewise formed on the same plan; the granulated crust of the shield represents the sheath, which is also granulated in certain Belemnites, and in the Spirulæ; it is composed of pure calcareous matter, as in these latter; below, there is a horny membrane, which probably also existed in the Belemnites, between the sheath and the alveolus: then comes a shell of horny and calcareous matter, which represents the alveolus; it has also its striæ of growth at the upper surface, as in the Belemnites and Spirulæ; then the mass, so improperly called the spongy matter, which is composed of partitions and cavities. The great cavity which is found in the interior of the shell towards the rostrum, represents the siphon, which is much wider than in the Belosepia; it is placed on the ventral side, as in the Belosepia, the Spirulæ, and the Belemnites. These partitions are of a horny and calcareous matter, as in the Spirulæ; but they are distinguished by being supported by a number of small pillars, a disposition which was necessary on account of the fragile nature of these partitions, and their great extent.

Relations with the Actinocamax.—The *Actinocamax*, a genus established by Miller, differs from the Belemnites in having sheaths without alveoli, and without any alveolar cavity; the enveloping and fibrous layers which have successively formed the shell, have extended it only at the summit, whilst at the base they always rest one on the other.

Zoological affinities.—It results from this, that the different shells which I have examined, are all constructed according to one plan of organization, and that their affinities may be represented by the following table:—

SPIRULA, LITHUITA? ORTHOCERA.
Shell partitioned, sheath indistinct, or imperceptible.

BELEMNITA, BELOPTERA.

Shell partitioned, with a very considerable sheath, more or less conoid, or spear-shaped, or claviform.

ACTINOCAMAX.

The sheath composes all the shell; the partitioned shell has disappeared.

BELOSEPIA, SEPIOSTARIUM.

Shell partitioned, covered with a sheath, the dorsum of which has a considerable expansion; its venter is bent outwards; the alveolus is enlarged and much depressed, and the siphon becomes very wide.

LOLIGO.

Horny rudimentary shell, without partitions.

Conclusions. — It is evident from what has been said, that the Belemnites belonged to the *Cephalopoda*, the organization of which was intermediate between the *Spirulæ* and the *Sepiæ*. They were consequently swimming mollusca, which could live in the deep sea as well as near the coasts. Hence it follows, that we may find these fossils as well in the soils of littoral formation, as in those which are oceanic; and that these last will be characterized rather by the absence of every species of shell, exclusively littoral, than by the presence of Belemnites, or other fossils which may have belonged to swimming mollusca.

The position of the shell in the animal must be analogous to that of the *Spirula* and *Sepiæ*, that is to say, the opening, or the base, towards the head; the summit on the opposite side; the venter, towards the interior of the animal; and the dorsum, towards its back. According to this, the natural position is either horizontal, with the base in front, which corresponds to the position of the animal when it swims; or vertical, which corresponds to the position of the animal when it walks at the bottom of the sea.

Anatomy and Natural History of the Earthworm, (Lumbricus terrestris, Linn.) By C. F. A. Morren. — The University of Gand proposed as a prize, at the *concours* of 1826, the anatomy and natural history of the *Lumbricus terrestris* of Linnæus. The memoir of M. Ch. Morren on this subject was approved of by the faculty of sciences. The work forms a volume in quarto of 280 pages, with thirty-two engravings.

The anatomy of the common earthworm was formerly examined by Willis and Redi, and more lately by MM. Montègre, Cuvier, De Blainville, Spix, Carus, Roth, Léo, and Home. Since the dissertation of M. Morren was deposited in the archives of the university of Gand, there have appeared in France the excellent observations of MM. Léon Dufour, and Dugès; and M. Morren has judiciously added to his book a preface, in which he connects his own labours with those of the French naturalists.

After having detailed the literary history of the class *Annelides,* the author gives a summary of all that ancient and modern authors have written on the *Lumbricus,* its manners, habits, mode of life, and habitation; the changes produced in it by differences of climate and season; its food, and the effects exerted on it by different substances; its geographical distribution; its culinary and medical uses; its employment as a bait for fishing, the time of catching it, its phosphorescence, &c. This chapter naturally leads to the varieties of the *Lumbrici,* or what some modern authors have called species. Far from adopting all those which M. Savigny has established under the generic name of *Enterion,* M. Morren even doubts if the divisions introduced into the genus by M. Dugès should be received. M. Savigny admits twenty species of *Enterion,* or of *Lumbricus;* M. Dugès, five only:

according to M. Morren, the latter should be still farther reduced; and he founds his opinion on the obvious changes which age, and even season, produces in the worm. The consideration of the *clitellum*, on which the principal character depends, is of no real importance, this organ being modified in a thousand ways, and sometimes entirely disappearing. M. Morren particularly describes these changes, and gives a plate of them. The principal differences occur in the organ being more or less extended; in its comprehending a greater or less number of rings; in its form, and in its variable colour. M. de Blainville thinks that the number of the rings in the earthworm varies from 100 to 140; Linnæus, from 117 to 133; Cuvier, from 120 to an indeterminate number; Fabricius numbers them at 143; M. Morren thinks that there are from 120 to 150; and their dimension is subject to as many varieties. Internally they are not so easily distinguished, as they are covered by the muscles; each of them is separated from the adjoining one by a membrane, which corresponds to an internal diaphragm, and which surrounds the intestinal canal.

Properly speaking, the *Lumbricus* has no head; the third, fourth, or fifth ring contains the brain, or principal ganglion. The mouth is composed of two lips, which move from above downwards, and present very remarkable varieties; the upper lip is very large compared with the lower, so that in the prehension of food, it is the principal agent, rolling backwards the little pieces of earth. In the perforation of holes, also, it is called into exercise, and it then moves from below upwards, and thus throws aside the earth, as the trunk, or anterior part of the body, advances like a wedge into the ground.

Willis discovered pores in the back, which, he said, lead into the tracheæ. MM. Montègre and Carus adopt this opinion, whilst MM. Home and De Blainville admit two lateral series of pores. M. Morren only finds a single dorsal series, beginning about the twelfth or nineteenth ring; and these he supposes to be the proper orifices of internal pulmonary sacs. Willis says that he introduced into these pores the extremity of a tube, and filled them with air; M. de Blainville thinks them destined to give exit to a secreted fluid, and thinks that the respiratory function belongs to the whole skin.

M. Savigny has particularly studied the locomotive organs of the *Annelides;* and all naturalists are acquainted with his organological classification of these parts. M. Savigny's views are very important, for it appears that the characters drawn from the bristles are, in the genus *Lumbricus*, the best adapted for the distinction of species. We owe the discovery of these organs to our countryman Ray, in what he called the apodal worms. M. Savigny gives the name of foot to a pair of these bristles; but M. Morren remarks, that we cannot comprehend, under a single denomination, organs which are actually distinct: he recognizes a double series, each composed of two rows of bristles, which are internal or external, and ventral or dorsal, according as they are viewed. Each bristle has its base attached to the bottom of a fleshy cone, which gives attachment to strong retracting muscles; its summit is a little curved, and the whole series is itself more or less arched; it is calcareo-horny, homogeneous, yellowish, and brilliant. These organs serve to support the animal in locomotion, and to fix it to the ground when it is copulating.

Two tubercles are found on the young worms, and four on aged individuals, each having a transverse fissure. The anterior occupy the sixteenth and seventeenth ring, or the one the sixteenth and the other the seventeenth; and the posterior the twenty-seventh and the twenty-eighth ring together, or the one the first and the other the second. The anterior of these papillæ correspond to the ovaries, the posterior to the stomach, or adjoining parts; the first serve for generation; the use of the second is unknown. These parts disappear in winter. Otho Fabricius, in his *Fauna Groënlandica,* noticed that the earthworms have sometimes a peculiar appendage on the twenty-fourth ring; he took it for a kind of penis. It seems that Montègre also remarked this organ, and Home has given very elegant figures of it in the *Philosophical Transactions.* Modern authors have discovered two of these organs, and M. Morren remarks that they are very irregularly developed; in general, they are found on the thirty-second or thirty-eighth ring, and their position is frequently alternate, like that of the generative papillæ. They are only found well developed at the breeding season, so that there is little doubt that they are connected with reproduction; the Belgian anatomist, however, could not discover any channel of communication between this generative appendage and the interior of the body.

The anal opening is formed of several rings, the functions of which can only be comprehended after the examination of the muscles.

Hitherto, longitudinal muscles only, to the number of two or four, have been mentioned in the *Lumbricus;* but the researches of M. Carus on the leech, have led M. Morren to examine if in earthworms the muscular system was not more highly developed than commonly believed. Besides the muscles discovered by M. Cuvier, to whom we owe our first information on this system in the genus *Lumbricus,* there are evidently transverse and oblique muscles for each ring. The bristles have, moreover, proper retracting and protruding muscles, as had already been shewn by the illustrious author of the *Règne Animal.* The mouth has several proper muscles, among which must be distinguished the constrictor, the proper muscle of the upper lip, the levator and depressor; and, for the lower lip, the proper and the retracting muscle. The anus has two muscles, the radiated and the sphincter. There are in all 772 muscles in this little animal.

In the *Leçons d'Anatomie Comparée,* mention is made of only a single pair of nerves, which proceed from each ganglion; but M. Carus, and, more recently, M. Roth, in an excellent dissertation on the nervous system of invertebrated animals, and Sir Everard Home, have shewn that the nervous system is more complex in this animal than was supposed. M. Morren has verified these observations, and added new ones. The brain and œsophageal circle give off cervical, pharyngeal, labial, and œsophageal nerves. At each ganglion of the great cord there is a pair of nerves on each side, and between the ganglions there is another pair. Some of the nerves are annular, others interannular.

The organs of sense are few; the skin is simple,—it is a translucid epidermis, having metallic colours in several cases, very easily detached from the subjacent muscular layer; a coloured mucous tissue occasions a brown line on the back. The absorption of odorous molecules is effected by the whole body; taste is probably very distinct; hearing and vision are entirely wanting.

Among the organs of the digestive apparatus, we remark the pharynx in front, in some a salivary gland; the œsophagus, which has frequently very remarkable glandular ducts, and, opposite the ovaries, two pairs of peculiar glands disposed like a cross, and very little understood. Moreover, in some worms there is found an elongated gland, white, and fusiform, which occupies the anterior part of the œsophagus; this may be presumed to be the true salivary gland. The gizzard is well developed, and varies much in form; it leads to the stomach, which is very muscular, and receives a great number of blood-vessels. The intestine has thick walls, and is composed of two tunics, the outermost of which is covered by papillæ, corresponding to the liver, which has very many lobes. According to Home, there are openings in each lobe, leading to the cavity of what is called *intestinum in intestino;* but M. Morren could see nothing of the kind. Nothing certain is known of this last organ, to which the author gives the name of *typhlosole.* MM. Home and Carus attribute to it the strange function of serving as a conduit for the escape of the young; and the former naturalist thinks that it furnishes their nourishment. Nothing, however, can be more erroneous; repeated observations induce M. Morren to think that it is an organ which contributes to digestion: it receives an infinite number of blood-vessels.

A yellow duct occupies the whole length of the upper part of the intestinal canal. It was first observed by Redi. De Blainville takes it for a mesenteric vein, and Sir E. Home for a canal which conducts the eggs and the young worms into the lateral cellules, regarded by almost all authors as respiratory organs. This duct, which M. Morren calls *chloragogene*, appears to him to belong to the digestive apparatus, and to be vicarious with the liver. Among the appendages of the intestinal canal are remarked the numerous diaphragms which unite it to the submuscular membrane.

The old opinion, that the earthworms respire by their whole skin, is still held by more than one naturalist. It was first professed when the infinite number of small membraneous sacs of these animals was unknown; but since their discovery, most anatomists have considered these sacs to be respiratory organs. Sir E. Home saw them for the first time in 1817, and took them then for what M. Morren also believes them to be, respiratory organs. Some time afterward, the former naturalist supposed them to be the receptacles of the young, which could pass out from them, and leave their chrysalidic cocoons at the outer orifice of the excretory canal; cocoons, which would thus form what less clear sighted authors have taken for feet!

Whatever M. Dugès may say, we owe to Willis the real discovery of the heart in the *Lumbricus;* but its structure was only well known after the observations of Home and Carus. M. Morren has farther perfected our knowledge on this subject, and has shewn that the heart is composed of a series of dilated and contracted rings, communicating with middle dilatations, which he compares to the ventricles, whilst the former would be auricles. Like M. De Blainville, he admits that the dorsal vessel is the principal artery, or aorta, and that the ventral vessel is the vena cava. It is true that M. Dugès has published quite a contrary opinion; but M. Morren does not adopt the ideas of the Montpellier professor. M. Morren gives an extremely detailed description of all the vessels, which he numbers at 1246. The blood does not appear to contain globules, but an innumerable quantity of bullæ, an appearance which the author thinks is owing to extravasation.

The generation of earthworms has been for a long time very obscure, and, when first examined, the subject gave origin to the strangest opinions. Here, however, as elsewhere, the first observations of the ancients are nearest the truth. Montègre, and after him Cuvier, suppose that the young pass out alive from the anus; Lyonnet, Dufour and Dugès, that the animal lays eggs; and M. Morren, that both opinions may be true. He has seen small living worms come out by the anus, as well as large eggs laid, which have produced young *Lumbrici.* These ova, however, which he calls capsules, are only true cocoons, analogous to those laid by leeches. M. Morren calls those black masses, so well figured by Home, *fœtiferous bodies;* and he also found in them calcareo—horny productions, and ova. He calls the former, in imitation of Sir E. Home, chrysalidic cocoons; but in his preface he says, that they might be the first states of the ovum more developed. The ova have, moreover, different characters before and after fecundation. When the chrysalidic cocoons are opened in the interior of the body, the young are born alive; when they are expelled closed, their development takes place in the earth, and they are then called oviparous worms, although they are really not so. M. Morren states, that a young *Lumbricus*, born on the 28th of September, three millimetres in length, was, on the 1st of April following, six centimetres. This observation was made in a chamber in which the temperature was never lower than 8° of Réaumur.

The concluding part of M. Morren's work is dedicated to the narration of experiments which the author made on the power which earthworms possess of regenerating parts of their organs. This faculty has been much exaggerated: thus, the inferior portion of the body never produces an entire individual, as has been said: the brain divided into two by a longitudinal section, which would separate the first rings, does not give origin to two heads, &c. The anterior part of the body alone, when cut at a certain distance from the *clitellum,* reproduces a posterior part; or the rings, bristles, and other organs which belong to the normal portion. This is also the case with the lips. M. Morren also states, that several individuals may be soldered together.

Observations on the Planariæ and several neighbouring genera. By M. Ant. Dugès.—The genus *Prostoma,* which M. Dugès has established for animals, partly new to naturalists, and partly confounded with the *Planariæ,* has been adopted by MM. Cuvier and De Blainville; but the latter separates it from the family of the *Planarieæ* to join it to the *Nemertes,* &c. and this transposition is entirely approved of by M. Dugès.

M. Dugès was at first acquainted with only one species, *Prostoma clepsenoïdeum;* he has since found three others, one of which had, however, been previously known as a *Planaria.* These species are,—*P. lumbricoïdeum,* inhabiting brooks; *P. candidum,* (*Planaria candida,* Müller;) and *P. armatum,* in the Mediterranean.

On this last species, M. Dugès has been enabled to extend his anatomico-physiological investigations, from the facility with which its body yields to compression. Thus, he has observed, that the exsertile portion of the mouth is furnished with two groups of hard points, (three in each group,) and, in the centre, with a horny process, terminated by a sharp point or dart. The groups of points probably serve to retain the *Annelides,* on which the *Prostoma* preys, and the dart to pierce them. M. Dugès could also observe, in the *Prostoma armatum,* a complete circulating system in the whole extent of the body. In the reproductive apparatus, the *Prostoma* presents peculiarities worthy of remark. All along the sides of the body is a series of pouches with a narrow neck, opening externally, and capable of being protruded by compression. In the *Prostoma lumbricoïdeum* these pouches enclose from three to four vesicles, containing a pulpy substance, and a transparent point or globule. This singular disposition reminds us of the ovaries of the *Tænia,* which have an opening externally for each segment of the body.

The genus *Derostoma,* well characterized by an unilocular alimentary sac, visible through the skin, with a single opening always inferior, ought, according to the observations of M. Dugès, to be divided into sections according to the situation of the mouth. Some, indeed, and the greatest number, the *Derostomata* proper, have this orifice situated near the anterior extremity; others have it, like the *Planariæ,* in the middle of the body, although they differ from these animals in the absence of an exsertile trunk, in the simplicity of their digestive cavity, and in their more or less cylindrical form. M. Dugès calls his second section *Mesostoma.*

To the first section belong *D. notops, leucops, squalum, lanceolatum, platurum, polygastrum,* described in a previous memoir of the author. To these must be added the following species, described by M. Dugès as new:—*D. mutabile, angusticeps, selenops, truncatum,* (*Planaria truncata?* Müller,) *griseum* (*Planaria grisea?* Müller,) and *megalops.* This last is the largest of the *Derostomata* which M. Dugès has met with; he has found it only once, in the rain water of a muddy ditch. The preceding were taken from rather pure but stagnant water.

The second section (*Mesostomata*) comprehends the following species:—*Derostoma grossum,* (*Planaria grossa,* Müller,) *D. viridatum,* (*Pl. viridata,* Müller,) *D. rostratum,* (*Pl. rostrata,* Müller,) and *D. fusiforme,* a new species.

In a great number of these species, M. Dugès has recognized genital organs analogous to those of the *Planariæ,* viz. a large penis, and an uterus, with two long oviducts, containing ovula and ova already formed. In *D. grossum,* he observed the laying of the ova, which are attached to submerged vegetables by a mucous exudation; and he saw individuals in the act of copulation, which is effected as in the *Planariæ.* The genital pore or point of communication between the two individuals during the coitus, is placed immediately behind the mouth.

With regard to the *Planariæ,* M. Dugès first observes, that *Planaria fusca* is identical with *Pl. torva.* He insists on the necessity of adopting a constant datum in the determination of the form of the body of these very soft and contractile animals, and he advises that they should be always examined when in motion, as at that time alone is their form regular and constant. The new species which he describes are:—1st, *Pl. vitta,* common in spring, in the brooks around Montpellier; 2d, *Pl. cæca,* a single individual of which has been found in a brook almost dry; 3d, *Pl. longiceps,* in salt ponds, on the *Ulva intestinalis;* 4th, *Pl. gonocephala,* in brooks of pure water; and, 5th, *Pl. viganensis,* in springs of very pure water.

A very remarkable disposition, which M. Dugès has discovered in the *Planariæ,* is a wide and easy communication between the circulating system and the genital apparatus. In several species he has seen the lateral vessels surrounded, in a considerable portion of their extent, with whitish vesicles forming a long bunch; and he has found that these vesicles are provided with a neck, opening into the lateral vessel. "Are not these," asks M. Dugès, "true ovaria analogous to those of the *Prostomata,* and to which the blood-vessels serve as oviducts?" He has dissected copulating individuals of the brown species, and has thus confirmed the double simultaneous intromission, and the great elongation of which the penis is susceptible. He has seen copulation take place in the same way in the *Pl. lactea,* and has examined the laying of the latter, and of the *Pl. nigra.* Their reddish rounded ova are not supported on a pedicle, like those of the brown species, but are glued immediately on the walls of the vessel in which the animals are kept. He could thus discover, (at least with regard to *Pl. lactea,*) generally five to six fœtus, represented at first by an elongated vessel, and containing a pulpy matter. At their birth, ($1\frac{1}{2}$ line long,) there could be seen in them a trunk, a gastric apparatus, lateral vessels, but no trace of genital organs. Sometimes two fœtus contract adhesions, and form synadelphous monsters.—*Ann. des Sci. Nat.* xxi. 72.

Digestive Canal of the Infusoria.—This canal, in the *Hydatina senta,* presents, at its commencement, a globular pharynx of a muscular nature, which is provided with two jaws, and which opens anteriorly in the mouth, in the middle of the wheels, a little nearer the ventral aspect than the dorsal. Each jaw is provided with six slender teeth, which are bifid. Posteriorly, the pharynx gives origin to a short and narrow œsophagus, which, without being dilated into a stomach, is continued immediately into the intestine. The intestine is very thick, and contracts sensibly towards the posterior extremity; it terminates along with the oviduct in a common cloaca. The opening of this cloaca is on the back of the animal, immediately above the eighth pair of vessels. In the *Zygotrocha nudas* the intestinal canal is thinner and turned spirally; the cloaca is very extensible, and allows of the accumulation of the execrements. At the commencement of the digestive canal of all these animalcules, there are seen two small bodies, considered by M. Ehrenberg as analogous to the pancreas.—*Isis.*

BOTANICAL COLLECTIONS,

INCLUDING VEGETABLE PHYSIOLOGY.

Vegetation of Brazil. — The most numerous natural order of plants in Brazil, (that is, from the tropic of Capricorn to the Equinoctial Line, the northern limit of my travels,) is the Compositæ. Then follow the Gramineæ, Rubiaceæ, Malvaceæ, Melastomaceæ, Myrtaceæ, Leguminosæ, Orchideæ, Terebinthaceæ, Euphorbiaceæ, Cyperoideæ, Aroideæ, Malpighiaceæ, Acanthaceæ, Bignoniaceæ, Convolvulaceæ, Apocyneæ, Scrophularineæ, Solanaceæ, Scitamineæ, Guttiferæ, Bromeliaceæ, Urticeæ, Salicariæ, Annonaceæ, Tiliaceæ, &c. These, though mentioned rather at random, will give you an idea of the botany of my Brazilian journey. It is remarkable, that I scarcely found a single representative of the order Cruciferæ. You have from all quarters heard the most animated descriptions of the luxuriance and richness of the vegetation of Brazil, and with them I warmly agree. But this is become almost a fashion; and, in Europe, it seems the general opinion, that the *whole* of that country is clothed with the most magnificent forests, and of gigantic growth. This idea, though correct with respect to all the maritime districts, the courses of the rivers, and the greater part of the country lying under the equinoctial line, is, however, not at all applicable to vast tracts in the provinces of San Paulo and Goyaz. There I have traversed boundless plains, or open regions, some of them covered with fine pasture, formed by a vast variety of the most interesting Gramineæ; others with grasses intermingled with small plants and shrubs of the fine leaved Melastomaceæ, the Malpighiaceæ, the herbaceous Rubiaceæ, and Compositæ; others with a varied clothing of annual and perennial flowers, (almost disappearing during the dry season,) faintly shaded or protected by extensive groves of low trees, of singular and stunted growth, rarely growing so close together as to form a thicket, or impede the traveller. These arid groves have sometimes reminded me of the acacia groves, so predominant over the plains in the interior of Southern Africa. Yet it is rarely that one can compare African with Brazilian botany; their character in many particulars differ so widely: but I was a long time in Brazil before I saw such large trunks of timber as I have observed in some of the forests of the Cape colony. I allude to the Podocarpi. These forests are indeed of no extent, compared to those of America; but they afford specimens of sylvan scenery for the painter, not less grand and beautiful; although they are generally deficient in that most splendid and noble feature, the Palms. When, however, we descend towards the low latitudes of Brazil, the glorious magnificence of the forests is truly astonishing, and none but those who are born in the midst of them can view such imposing productions of nature without a feeling of awe or respect. She overloads herself, and one object oppresses and smothers another in the general struggle for luxuriance. The *Bertholletia*, and some species of *Bombax*, far overtop their vegetable brethren, and the trunks of the latter are really stupendous, both in height and thickness. I say nothing of the great climbing plants, as they have been lately so often described; but we never can be silent with respect to the palms: they abound in every latitude and situation, and their variety is far greater than any one traveller can form an idea of. They are of every size, from that of an ordinary herbaceous plant to that of the highest tree of the forest; but I think none surpass the Buriti or Miriti, (*Mauritia vinifera*, Mart. t. 38,) in grandeur and imposing beauty, although the plate does not convey an idea of this character. Another plant, of most extraordinary aspect and magnificence, is the Araucaria; but this I never saw much to the northward of San Paulo. It is only found at a great elevation, and, I believe, is not known to exist in the provinces of Goyaz and Para. I have found but few *Barbaceneæ;* but the *Vellosiæ*, their nearest relations, cover whole plains, in different latitudes in the interior; never in the forests. They give a singular and strange character to the landscape, not to be represented but by the pencil; they resemble some *Dracenæ.* The Melastomaceæ are found every where, and in every situation. The Vochysiaceæ are numerous, and many are most beautiful flowering trees, and afford excellent timber. They also afford various localities, as likewise do the Myrtaceæ. The Laurineæ are numerous, particularly to the southward; but in Para are species producing the finest cinnamon, and a kind of nutmeg is also found there. — Burchell in *Bot. Miscell.* vol. ii. p. 131.

Eriophorum. In *E. polystachion* the stalks of the spikes are smooth, and evidently compressed. Except in the broader leaves, it hardly differs from *E. angustifolium.* It is very doubtful whether any real difference exists between *E. polystachion, angustifolium,* and *gracile.* I saw them all growing together in Wales, and sought carefully, but in vain, for characters. Assuredly none exists in the fructification, for they agree most exactly in every respect but the length of the seed-down. It is true that in *E. polystachion,* the root does not seem to creep as in the two others, but this is with difficulty determined, since the plant grows to a great depth in the bogs, and no ordinary methods will extract the root in a perfect state: it is not improbable that *E. polystachion,* if planted in a different soil, would throw out creeping shoots like the others. *E. pubescens* is often taller than *E. polystachion,* and the leaves always much broader in proportion, so as to be nearly lanceolate, with a very short triangular point. Stalk of the spikes furrowed, rough, but not downy, with the setulæ pointing forwards; glumes, very acute, with a strong mid-rib, reaching nearly to the summit, entire, and scarcely membranous in the margin. — W. Wilson, in *Bot. Miscell.* vol. ii. p. 135. [We have no objections to *E. angustifolium* and *E. polystachion* being united, but surely *E. gracile,* if reduced at all, ought to be joined with *E. pubescens:* the stalks of the spikes are rough in both, though not clothed with fine silky hairs, as Smith states of the latter; mistaking, as we have ascertained, a species of *Mucor* for this plant. Of course we allude above to the true *E. gracile,* that found in Britain being, as has been already noticed in this Journal, (vol. ii. p. 179,) merely *E. angustifolium.*]

Papier Végétale. — This, by far the best kind of tracing paper, permitting either the use of ink or black lead pencil, besides being of a purer colour than any other, is obtained in France from the root of the *Althæa officinalis.*

Morocco Leather. — The *Statice coriaria* is used for tanning goat's skin, to form what is called Morocco leather.

Russian Leather. — The *tar* extracted from the bark of the *Betula alba,* or common birch, by the common process, is what gives the peculiar smell to Russian leather; the mode of application is kept secret: neat or calf leather is employed.

Mode of preserving fleshy Fungi. — With a delicate scimitar-shaped knife, or scalpel, such as is found in a surgeon's instrument-case, I make a double vertical section, through the middle, from the top of the pileus to the base of the stipes, so as to remove a slice. This, it will be at once seen, shews the vertical outline of the whole Fungus, the internal nature of its stipes, whether hollow, or spongy, or solid, the thickness of the pileus, and the peculiarities of the gills, whether equal or unequal in length, decurrent upon the stipes, or otherwise, &c. There will then remain the two sides or (nearly) halves of the Fungus, which each in itself gives a correct idea, if I may so express myself, of the whole circumference of the plant. But before we proceed to dry them, it is necessary to separate the stipes from the pileus, and, from the latter, to scrape out the fleshy lamellæ, or gills, if an *Agaric;* or the tubes, if the *Boletus*. We have thus the Fungus divided into five portions ; a central thin slice, two (nearly) halves of the stipes, and the same sections of the pileus : these, after being a little exposed to the air, that they may part with some of their moisture, but not so long that they shrivel, are to be placed between dry blotting paper, and subjected to pressure, as other plants ; the paper being changed daily till the specimens are perfectly dry. When this is the case, the central portion, or slice, and the two halves of the stipes, are to be fastened upon white paper, together with the respective halves of the pileus upon the top of the latter, in their original position. Here will thus be three sections ; from which a correct idea of the whole plant may be obtained. The volva and annulus of such species as possess them, must be retained. The separate parts of the genera *Phallus* and *Clathrus* I fill with cotton : I keep them for a time exposed to a dry atmosphere, and then, after removing the cotton, subject them to pressure. The same may be done with the large tremilloid, *Pezizæ*. —Klotzsch in *Bot. Miscell.* vol. ii. p. 160.

Botanical Garden of St Petersburgh.—This enormous garden, containing about seventy English acres, is only part of it filled with plants : in 1828, one could walk under glass 515 arshines, each 7 feet English, or, in all, 3605 English feet, or upwards of two-thirds of a mile. The *Ulex europæus*, or common furze, to see which growing in the open air, Linnæus is said to have, on his first arrival in England, knelt, and thanked his Maker, is here confined to the greenhouse.

Weissia longirostris.—This plant, perhaps one of the scarcest in the British flora, has, we are happy to announce, been lately rediscovered at, or near the original locality in the Den of Campsie, near Glasgow, by Dr Hooker and Dr Greville. The fructification is produced in rather small quantity. It is now proved, a fact doubted for some time past by many bryologists, to be a perfectly distinct species.

Dried Specimens of Cape Plants.—Mr Ecklon, of Cape Town, has made a very extensive journey in South Africa, for the purpose of collecting plants. He travelled from Algoa Bay through the district of Uitenhagen and Albania, across the great Fish River, into Cafferland, prosecuting his journey to a distance of 150 German miles westerly from Cape Town, and to a country hitherto unexplored by any botanist. The vegetation is very different from that of the Cape, scarcely one in ten plants being similar; and the herbarium contains about 3000 species, and 10 to 20 specimens of each kind. This collection is deposited at Cape Town; for, wishing to add still further to it, Mr Ecklon set out in March, 1830, on a similar expedition to the north, to examine the district of Graaf-Reynet, the Schneeberge, and, if possible, to arrive at the Orange River. It was his intention to return to the Cape in January of the present year.

Dr Steudel, of Eslingen, has issued proposals for the formation of a society of botanists, who shall purchase this collection, and share it among them, according to the rate of their subscriptions ; the distribution to be made in the same manner, and with the same impartiality as is practised by the Unio Itineraria. Mr Ecklon estimates his plants at two guineas the Century of species ; and so numerous are the species, that a full set would cost from 60 to 80 guineas. No payment is required in advance, but a declaration from the person of his intention, and of the amount of his intended subscription ; and then, as soon as Mr Ecklon arrives in Europe, a fair offer will be made to him for the purchase of his collections, and notice will be sent to the subscribers.

It is desirable that no share should be of less amount than ten guineas.

Janipha Manihot.—Two kinds are especially cultivated in the colonies, the Sweet Cassada of *Browne's Jamaica,* (p. 350,) and *Lunan's Hort. Jam.* (vol. i. p. 163,) *Manihot Aipi,* Pohl, whose root is of a white colour, and free from deleterious qualities; and the Bitter Cassada, or Manioc, whose root is yellowish, and abounds in a poisonous juice. We shall confine our observations to the latter kind, which is the one here (Hooker's *Bot. Misc.*) figured and described. They seem not to differ in botanical character. When it is considered that the Manioc belongs to a tribe of plants, the Euphorbiaceæ, which is essentially distinguished by its acrid and poisonous qualities, and that the root of the plant itself abounds in a juice of this peculiar character, it cannot fail to excite astonishment in the minds of those who are not already aware of the fact, that it nevertheless yields an abundant flour, rendered innocent, indeed, by the art of man, and thus most extensively employed in lieu of bread throughout a very large portion of South America; and that even to our country it is largely imported, and served up at table under the name of Tapioca. Such is the poisonous nature of the expressed juice of the Manioc, that it has been known to occasion death in a few minutes. By means of it the Indians destroyed many of their Spanish persecutors. M. Fernier, a physician at Surinam, administered a moderate dose to dogs and cats, who died in a space of twenty-five minutes, passed in great torments. Their stomachs, on being opened, exhibited no symptoms of inflammation, nor affection of the viscera, nor was the blood coagulated, whence it appeared, that the poison acted on the nervous system; an idea that was confirmed, by thirty-six drops being afterwards administered to a criminal. These had scarcely reached the stomach, when the man writhed and screamed with the agonies under which he suffered, and fell into convulsions, in which he expired in six minutes. Three hours afterwards, the body was opened, but no alteration was found, except that the stomach was shrunk to less than half its natural size; so that it would appear, that the fatal principle resides in a volatile substance, which may be dissipated by heat; as, indeed, is satisfactorily proved, by the mode of preparing the root for food. By various processes, by bruising between stones, by a coarse rasp, or by a mill, the root of the Manioc is broken into small pieces, then put into a sack, and subjected to a heavy pressure, by which all the juice is expressed. What remains is Cassava, or Cassada, which, if properly dried, is capable of being preserved for a great length of time. In French Guiana, according to Aublet, cassava flour is made by toasting the grated root over the fire, in which state, if kept from humidity, it will continue good for twenty years. Cassava-cake, or cassava-root, is the meal, or the grated, expressed, and dried root of the Manioc, pounded in a mortar, passed through a coarse sieve, and baked on flat circular iron plates fixed in a stove. The particles of meal are united by the heat; and when thoroughly baked in this manner, form cakes, which are sold at the markets, and universally esteemed as a wholesome kind of bread. The Spaniards, when they first discovered the West Indies, found this in general use among the native Indians, who called it Cazabbi, and by whom it was preferred to every other kind of bread, on account of its easy digestion, the facility with which it was cultivated, and its prodigious increase. Again, in Guiana, Cipipa is another preparation from this plant, and is the name given to a very fine and white fecula, which, according to Aublet, is derived from the expressed juice of the roots, which is decanted off, and suffered to rest for some time, when it deposits an amylaceous substance, which requires repeated washing. I know not whether this is exactly analogous to our Tapioca. "The juice," says Sloane, "evaporated over the fire, gives the Tipioca meal." But

Lunan tells us, that from the "roots of the *Sweet* Cassada, Tapioca is made in Jamaica in every respect similar to that imported, which is done by grating them, washing and infusing them in water, and evaporating the liquor, so as to obtain a sediment like starch, which must be well dried in the sun." The root of the Manioc is also the basis of several kinds of fermented liquors; and an excellent condiment for seasoning meats, called *Cabion*, or *Capion*, is prepared from the juice, and said to sharpen the appetite. The leaves, beaten and boiled, are eaten after the manner of spinach; and the fresh root is employed in healing ulcers. From what has been above stated, it will appear, that the expression of the juice from the root deprives the latter of all its deleterious properties; and that the application of heat to these juices renders their residue also wholesome and nourishing. And whilst cassava bread is, as Sloane says, in the most general demand of any provision all over the West Indies, and is employed to victual ships, the use of tapioca is still more extended, and throughout Europe is largely employed for the same purposes as sago and arrow-root. —Hooker, *in Bot. Mag.* t. 1370.

Notes on Lathræa Squamaria.—In an able and interesting paper "on the parasitical connection of *Lathræa squamaria*, and the peculiar structure of its subterranean leaves," published in the *Transactions of the Linnæan Society*, vol. xvi. p. 399, and in a notice in *Loudon's Magazine*, vol. ii. p. 105, Mr Bowman has mentioned a plant which he considers as probably distinct from *L. squamaria* of Smith. I have also lately gathered and examined specimens of *Lathræa*, and had at first formed the same opinion; but I now have reason to believe, that this has arisen chiefly from variation in the plant itself, but partly from slight inaccuracies in the drawing in *Eng. Bot.* t. 50, and also in the description in *Flor. Brit.* The whole plant, excepting the bracteæ, and upper part of the segments of the calyx, is covered with scattered hairs, as represented, but too slightly, in the plate in *Eng. Bot.* The segments of the calyx in the young blossom are nearly equal; when more advanced, the two uppermost are the largest; they are thin and membranaceous, and not as stated by Smith, of the texture of the leaves, (or bracteæ,) which are succulent, and free from hairs.

In all the specimens which I have examined, the upper lip of the corolla is perfectly entire and truncate; in *Eng. Bot.* and *Flor.* it is drawn and described as deeply cloven; Mr Bowman, and G. E. Smith, in his *Catalogue of the plants of South Kent*, say, that it is entire, or sometimes slightly notched. The colour of the blossom inclines more to a pinkish-purple than in the figure in *Eng. Bot.* with which colour the upper part of the stem is also tinged. The flowers, in all that I have seen, are in four rows; Withering says in two or three, Bowman in three.

The style is often exserted, but sometimes included, as it is represented in the figure in *Flor. Dan.* t. 136.

The bracteæ are generally broadly ovate. Mr G. E. Smith has described a variety, in which they are lanceolate.

The figure in *Eng. Bot.* was taken from a plant gathered at Exton, near Stamford, from whence it would be desirable to obtain specimens, to ascertain whether that and the common *Lathræa* of other places are the same species.—W. C. Trevelyan. May, 1831.

GEOLOGICAL COLLECTIONS.

Notice of the Discovery of the Plesiosaurus *in Ireland.* By James Bryce, Jun. A.B.—It is well known to geologists, that the oolites,—that series of rocks which, in England, intervenes between the new red sandstone and the chalk,—are almost entirely wanting in Ireland. The only members of the formation which exist there, are the lias and the mulatto, or green-sand, and these occupy but a very limited extent of surface. They appear in the escarpment of the great basaltic area, which comprehends all Antriman d half of Derry. Encircling it, the chalk, with one or two exceptions, aways underlies the basalt. The mulatto generally accompanies it; but the lias is frequently absent. It occupies a narrow though unbroken zone from a few miles south of Belfast, to two miles north of Sarne,—a distance of about twenty miles; but in the remaining part of the escarpment it occurs only in detached patches of very small extent. Limited, however, as the formation is, it has been but partially examined, and until within the last few months it has not afforded any remains of the vertebrate animals, which have been found in such abundance in the same formation in England. Within that time, some vertebræ of the *plesiosaurus* have been discovered near Belfast.

These remains were found in the black clay of the lias which underlies the mulatto along the southern front of the low hills which connect the Cave-hill with Carnmoney-hill, at the distance of four miles northeast of Belfast. The stratum is beautifully exposed in section in a chalk quarry within a few perches of Carnmoney church: in this quarry the vertebræ were found. Twelve of them were lying in a straight line in groups of two or three together, which were separated from one another by an interval of about a yard and a half, thus shewing that they were remote parts of the same vertebral column. They were all carried off by the workmen; and, with the exception of one, which, after the strictest search, was recovered, they were all lost. Six more were afterwards found, under such circumstances as to render it highly probable that they belonged to the same individual as the former. These seven vertebræ are now deposited in the Museum of the Belfast Academy.*

Being acquainted with the discoveries of Sir Everard Home and the Rev. W. D. Conybeare, I suspected that they belonged either to the *Ichthyosaurus* or to the *Plesiosaurus;* but knowing no more of comparative anatomy than enabled me to comprehend the terms of a description, I had recourse to the memoirs published in the Geological Transactions, (vol v. part ii., and, second series, vol. i. parts i. and ii.) by Mr Conybeare, to whose sagacity we owe almost all our knowledge concerning these singular genera. On comparing the vertebræ with his drawings and descriptions, it was evident that they belonged to the *Plesiosaurus.* Two of them are cervical, four dorsal, and one lumbar. They were recognized by being slightly concave at both ends, by the proportions which obtain between the length of the side and the diameter of the articulating surface, by small dimples in the lower part of the body, and by a slight swelling in the middle of the circular area of the end, which is largest in the dorsal, and in the lumbar does not at all exist. The spinous processes are almost entirely broken off; so much of them remains as barely to shew the course of the

* They were presented to the Museum by Mr J. H. Smythe, of Carnmoney, to whom the credit of their discovery is due.

spinal canal. The following are the proportions between the side and the diameter of the end.

Cervical	Dorsal	Lumbar
$2\frac{4}{5}$ inches side.	3 inches side.	$2\frac{1}{2}$ inches side
$3\frac{2}{5}$ inches diam.	$3\frac{1}{2}$ inches diam.	$3\frac{1}{2}$ inches diam.

These proportions are sufficient to distinguish them from the vertebræ of the *Ichthyosaurus* and Crocodile. But they are larger in dimensions than any which Mr Conybeare seems to have met with, and appear to agree more nearly with those found in England in the Kimmeridge clay, than with those found in the lias.

I am informed by Dr M'Donnell, that single vertebræ of the same kind have been found in the lias near Sarne; and in the collection of William Temrent, Esq. of this town, there is one which was obtained from the lias of Colin-glen, and which, from its dimensions, appears to be an extreme caudal vertebra.

The discovery of this genus in our lias connects that formation most intimately with the oolites of England and France, and affords us reason to hope, that when fully examined, it will, though imperfectly developed, amply reward the labour of the inquirer, by the discovery of many singular remains, which may probably, like this *Plesioraurus*, supply us with new links in the chain of organic being. —*Ann. of Phil. May* 15, 1831.

Canobie Coal Field.—In a letter from Dr Macculloch, printed in the Correspondence relating to the Mineralogical Survey of Scotland, of which we have taken notice in preceding numbers, the following passage occurs:—

"I allude to the definition of a coal field, hitherto not known in Scotland as such, and no where wrought, except very partially near Canobie. This hitherto unsuspected tract reaches from Fanna Hill and the Carter Fell, all the way to Ardbigland, in Galloway, but it is very much broken, and apparently worthless westward of Langholm; while eastward, for a very wide and continuous space, it lies chiefly in the Duke of Buccleuch's lands, though I am not fully informed as to his boundaries. In the decidedly worthless part much money has been idly wasted; and to save this in future is to stop the diversion of the capital to unproductive purposes. At the other extremity it has not been known or understood, and thus reversely there may be gain from the knowledge, as the actual discovery of coal would improve a now very unproductive country. To mark the field is the fundamental step, and it is all of which my survey can take cognizance."

Seams of Coal in the Berwick District.— The seams of coal near the sea coast in this district, generally dip nearly due east, at an inclination of one yard in three; to the westward, their dip is to the southward of the east, with an inclination of one yard in ten or twelve.

1*st*, The Muckle Howgate seam is the first workable bed on the Scremerstone estate, and in its vicinity; it lies at various depths below the surface, and is about two feet six inches in thickness; it is considered an inferior coal in quality, and used only for burning limestone.

2*d*, The Caldside seam, supposed to be about sixty fathoms below the Muckle Howgate seam, is generally used for the same purpose, though rather of a better quality than No. 1.

3*d*, The Scremerstone main coal, supposed to be about sixty fathoms below the Caldside seam, is four feet in thickness, but with a thin band of stone near its bottom. This seam is reputed the best coal for house use, except the portion nearest the bottom, which is sold for lime burning.

4*th*, The stony coal lies from two to three fathoms under the Scremerstone main coal; its thickness is about four feet, including a band of stone of twelve inches in its middle. This seam of coal is not reputed so good as No. 3. It has been worked, but to no considerable extent, near Berwick.

5th, The cancer coal is supposed to be from twelve to fifteen fathoms below the stone coal, but the distance between them varies. The seam has not been worked in the eastern part of the district, lying at a considerable depth in that situation; but at Thornton, Shoreswood, Gatherick, and some adjoining places in the western part of the district, it is worked under the name of the main coal. Its thickness is from five to five and a half feet, and its quality is not good, the bed being traversed by thin bands of stone.

6th, The three-quarter coal lies at variable distances below the cancer coal, being in some places found at twelve, and at others twenty-two, fathoms deeper than that seam. Its usual thickness is two feet eight inches including a band of stone of ten inches; its quality is inferior to the better coals of the district.

7th, The Cowper Eye seam is generally met with about four fathoms below the three-quarter coal; it varies in thickness from two to three feet of saleable coal, having a stone band in its middle, unequal in thickness, but in some situations exceeding two feet. This seam is chiefly worked in the western part of the district, as at Murton, Thornton, Shoreswood, Felkington, Etal, Gatherick, Greenowalls, and their vicinity. In quality, it is considered equal to No. 3, Scremerstone main coal.

No. 8. The western coal seam appears to me to be the lowest worked in the district. It has been sunk to at Shoreswood, and there found at about fourteen fathoms below the Cowper Eye seam, but the quality being indifferent, it was not thought worth working. At Etal there is a mine carried on in it, though even there the coal is of inferior quality.

From the gradual rise of the strata to the westward, the first four seams mentioned in the section of the strata near Berwick, do not reach to Thornton, Shoreswood, Felkington, Etal, Gatherick, and Greenowalls. Nos. 5, 6, 7, and 8, are the beds worked at those coal mines. — N. J. Winch in *Trans. Nat. Hist. Soc. of Northumberland and Newcastle,* i. 129.

Value of Organic Remains in determining the Comparative Age of Formations. — In the papers, a brief analysis of which I have now placed before you, we have some new and striking proofs of the great importance of organic remains in determining the comparative age of remote and discontinuous formations. And we have seen, that in cases where we have few examples of specific agreement, we can, from the aspect of large groups of fossils, and the general resemblance of their generic types, form at least a probable estimate of the age of the deposits to which they are subordinate. Inferences of this kind would be altogether worthless, were they invalidated by the direct evidence of geological sections. But we deny that this is in any respect the case; and our conclusions are the more certain, because they are not only founded upon a wide induction of particulars, but are consistent among themselves.

There can be no doubt that, in the ancient ocean, as well as in the present, the distribution of organized beings was affected by many causes — by the temperature and depth of the waters, by the nature of the soundings, by the action of tidal currents, and by other unappreciable disturbing forces. Even among the old secondary groups, we can sometimes separate littoral formations from those of deep seas, not merely by their mineral structure, but also by their fossils; and, in all geological periods of the history of the earth, formations on the shores, and formations in deep seas, must have gone on together.

Again, our great formations may be subdivided into many distinct mineralogical groups of strata; and the large suites of organic remains, characteristic of the formations as a whole, may also be subdivided into many groups, the species being defined by the mineral structure of the beds to which they are subordinate.

All this is in harmony with the distribution of the animal kingdom in the existing seas. Some animals may be found, almost indifferently, on a calcareous, a sandy, or a muddy bottom, (for example, the floating Cephalopodes;) and the remains of ancient animals, of kindred organization, occur indifferently in calcareous, siliceous, and argillaceous groups of strata. Some animals have lived and propagated under the waters of a muddy shore; the remains of these occur abundantly in our secondary beds of shale. To the very existence of some shells, calcareous rocks are necessary; and, on banks of mud, or moveable sand, corals, and attached zoophytes, could find no proper resting place. Hence it is, that many species of shells and zoophytes are chiefly characteristic of limestone strata; and, if they exist at all in other beds, have probably been drifted there by the action of marine currents.

It follows from these remarks, that any great change in the mineralogical character of a formation must also be accompanied with a corresponding change in the accompanying forms of organic structure once subservient to life. In this way we may explain the great difference between the organic remains of the lower oolitic series of western and central England, and of the contemporaneous coal formation on the Yorkshire coast. And, in the same way, we may also explain an opposite fact, observed more than once by Mr Murchison and myself, during our traverses through the Eastern Alps, that wherever a secondary deposit of that great chain approaches the mineral type with which we are familiar in this country, it also contains an imbedded group of organic remains, very nearly resembling those we have been taught to regard as characteristic of the formation.

I believe that the subject to which I am now pointing is one of interest and importance; and I know no one who could do so much justice to it as Mr Lonsdale, whose admirable knowledge of recent and fossil species, and of the minutest subdivisions of our secondary groups of strata, (strengthened and improved as it is by the performance of the great task he has undertaken, so much to the advantage of this Society,) qualifies him to compose an essay which will throw the greatest light upon the physical causes affecting the distribution of organized beings during the long periods of geology.—*Professor Sedgwick's address to the Geological Society,* 18th Feb. 1831.

Progress of Geology in Germany and France.—We have, indeed, neither the time nor the power to slumber; and, in spite of ourselves, we cannot but partake of that forward movement by which all our neighbours are borne along. The continental press teems with admirable works on every department of natural history; and our subject has obtained, to say the least of it, its full share of consideration. Professor Hoffman's map, alluded to in my former address, will soon be illustrated by a work which promises fair to make the north of Germany once more the classic land of geology. The excellent Memoirs of MM. de Beaumont and Dufrénoy, will soon be followed by the Geological Map of France,—a great national work, to appear, I hope, before the expiration of this year. I select these subjects, not merely on account of their general importance, but because they have an immediate relation to the structure of this country, and to the best labours of our own body.

The organization of the Geological Society of Paris belongs to the history of the preceding year: and when we consider the incomparable collections of that capital, and the illustrious naturalists who are there assembled, we confidently look to this association for results which shall greatly affect the future history of our science. With ordinary fortune, it can hardly fail to become a great central point of union, where geologists, from all the nations of Europe, may, from time to time, meet together, with no rivalry but in the love of truth.—*Ibid.*

Diluvial Gravel, and the traces of a General Deluge. — Bearing upon this difficult question, there is, I think, one great negative conclusion now incontestably established, — that the vast masses of diluvial gravel, scattered almost over the surface of the earth, do not belong to one violent and transitory period. It was indeed a most unwarranted conclusion, when we assumed the contemporaneity of all the superficial gravel on the earth. We saw the clearest traces of diluvial action, and we had, in our sacred histories, the record of a general deluge. On this double testimony it was, that we gave a unity to a vast succession of phenomena, not one of which we perfectly comprehended, and, under the name diluvium, classed them all together.

To seek the light of physical truth by reasoning of this kind, is, in the language of Bacon, to seek the living among the dead, and will ever end in erroneous induction. Our errors were, however, natural, and of the same kind which led many excellent observers of a former century to refer all the secondary formations of geology to the Noachian deluge. Having been myself a believer, and, to the best of my power, a propagator of what I now regard as a philosophic heresy, and having more than once been quoted for opinions I do not now maintain, I think it right, as one of my last acts before I quit this chair, thus publicly to read my recantation.*

We ought, indeed, to have paused before we first adopted the diluvian theory, and referred all our old superficial gravel to the action of the Mosaic flood. For of man, and the works of his hands, we have not yet found a single trace among the remnants of a former world entombed in these ancient deposits. In classing together distant unknown formations under one name; in giving them a simultaneous origin, and in determining their date, not by the organic remains we had discovered, but by those we expected hypothetically hereafter to discover, in them; we have given one more example of the passion with which the mind fastens upon general conclusions, and of the readiness with which it leaves the consideration of unconnected truths.

Are, then, the facts of our science opposed to the sacred records? And do we deny the reality of a historic deluge? I utterly reject such an inference. Moral and physical truth may partake of a common essence, but as far as we are concerned, their foundations are independent, and have not one common element. And, in the narrations of a great fatal catastrophe, handed down to us, not in our sacred books only, but in the traditions of all nations, there is not a word to justify us in looking to any mere physical monuments as the intelligible records of that event: such monuments, at least, have not yet been found, and it is not perhaps intended that they ever should be found. If, however, we should hereafter discover the skeletons of ancient tribes, and the works of ancient art buried in the superficial detritus of any large region of the earth, then, and not till then, we may speculate about their stature, and their manners, and their numbers, as we now speculate among the disinterred ruins of an ancient city.

We might, I think, rest content with such a general answer as this. But we may advance one step farther: History is a continued record of passions and events, unconnected with the enduring laws of mere material agents. The progress of physical induction, on the contrary, leads us on to discoveries, of which the mere light of history would not indicate a single trace. But the facts recorded in history may sometimes, without confounding the nature of moral and physical truth, be brought into a general accordance with the known phenomena of nature; and such general accordance, I affirm, there is

* *Addendum.* — And I now, with the same publicity, and with inconceivably more satisfaction, pay a just homage to the Rev. Dr Fleming, by stating, that he has long and consistently laboured to burst the bonds of our old superstition, and that he will, after this my avowal, be always entitled to the tribute of honourable mention in connection with the overthrow of the diluvian hypothesis. — Ed.

between our historical traditions and the phenomena of geology. Both tell us, in a language easily understood, though written in far different characters, that man is a recent sojourner on the surface of the earth. Again, though we have not yet found the certain traces of any great diluvian catastrophe which we can affirm to be within the human period, we have, at least, shewn, that paroxysms of internal energy, accompanied by the elevation of mountain chains, and followed by mighty waves, desolating whole regions of the earth, were a part of the mechanism of nature. And what has happened, again and again, from the most ancient, up to the most modern periods in the natural history of the earth, may have happened once during the few thousand years that man has been living on its surface. We have, therefore, taken away all anterior incredibility from the fact of a recent deluge; and we have prepared the mind, doubting about the truth of things of which it knows not either the origin or the end, for the adoption of this fact on the weight of historic testimony.—*Ibid.*

New Molybdate of Lead.—In the Paramo Rico, near Pamplona, (South America), M. Boussingault found, in a decomposed syenite, at an absolute height of 12,460 feet, a heavy, greenish yellow substance, in the form of small concretions, and having a specific gravity of 6.00. Before the blow-pipe, on charcoal, it melts easily into a dark coloured globule, giving, with soda, a button of lead, and leaving an infusible scoria, which, by more soda, is fused, and disappears in the charcoal. When taken off the charcoal, rubbed in a mortar, and washed, a heavy gray metallic powder is obtained, which is molybdena. In acid, it dissolves with effervescence.

By analysis, the following composition was obtained:—

Protoxide of lead,	73.8	Or:—	
Molybdic acid	10	.. ...	
Carbonic acid	2.9	Molybdate of lead, (Pb^3 Mo.)	56.7
Muriatic acid	1.3	Carbonate do.	17.5
Chromic acid	1.2	Muriate do.	6.6
Phosphoric acid	1.3	Phosphate do.	5.4
Peroxide of iron	1.7	Chromate do.	3.6
Alumina	2.2	Gangue	7.6
Silica	3.7	Oxide of lead in excess	.7
	98.1		98.1

The common molybdate of lead, from Carinthia, according to the analyses of Klaproth, Hatchett, and Göbel, is a compound of atom to atom; this mineral of Boussingault may either be considered as a Tris-molybdate, or as a compound of one atom molybdate, with two atoms of protoxide of lead.

Analysis of the Mineral water of Paipa, near Tunja, (South America.)—The temperature of these springs varies from 133° to 164° Fahr. The water analyzed was of the latter temperature, and was taken from a spring having an absolute elevation of upwards of 8360 feet, and from which a copious stream of carbonic acid was constantly disengaged. 100 grains of the water were constituted as follows:—

Water	95.30
Sulphate of soda	3.29
Muriate of soda	1.33
Bicarbonate of soda	.07
Carbonate of lime	.01
	100.

In dry weather, the banks of the streamlet are covered with a crust of mixed sulphate and muriate of soda, called by the natives *Salitre*, and collected by them for the purpose of fattening the cattle. M. Boussingault suggests, that the produce of these springs might be advantageously employed for preparing soda, an article much wanted in New Granada, especially for the manufacture of soaps, which in that country are all made from wood ashes, and are consequently soft, bad, and high priced.—*Ann. de Chim.* xlv. p. 329.

M. Boussingault does not give the specific gravity of this water, but considers it the most powerful saline spring hitherto discovered, 1000 grains containing 47 grains of foreign matter. In our last Number, (p. 320,) we gave the analysis of a chalybeate spring from Vicar's Bridge, in Clackmannanshire, the specific gravity of which is 1.0489, and 1000 grains of which contain 52 grains of saline substances in solution.

Analysis of the Meteoric Iron of Lousiania.—M. Charles Upham Shephard has analyzed this aerolite, and found it constituted as follows:—

Iron . . .	90.020	Sp. grav. = 7.5
Nickel . .	9.674	
Loss . . .	.306	
	100	

This is almost identical with the composition of the meteoric iron from Santa Rosa, near Bogota, given in the *Ann. de Chim. et de Phys.* t. 25, from which M. Shephard concludes, that the two masses, notwithstanding the great distance, are fragments of one and the same aerolite.—Silliman's *Jour.* xvi. p. 217.

Analysis of several varieties of Argentiferous Native Gold from New Granada.—The object of M. Boussingault in examining these varieties of native gold has been to shew, that when native gold and silver occur in combination, they are generally in atomic proportions.

Gold from Vega de Supia consists of	Gold	6.20	= 5	atoms.
	Silver	1.36	= 1	do.
Quiebralomo ——	Gold	5.01	= 12	do.
	Silver	.44	= 1	do.
Marmato ——	Gold	7.55	= 3	do.
	Silver	2.60	= 1	do.
Giron ——	Gold	9.19	= 12	do.
	Silver	.80	= 1	do.
Bucaramanga ——	Gold	.98		
	Silver	.02		

Ann. de Chim. xlv. p. 440.

Telluret of Silver from Altai.—From the mean of two analyses, Mr Gustavus Rose obtains for this mineral the following composition:—

	Theory.	Experiment.
1 atom silver	62.63	62.37
1 atom tellurium	37.37	36.905
Iron, containing a little copper		.37

Poggendorf's *Ann.* vol. xviii.

NOTICES AND ANALYSES OF NEW BOOKS AND PAPERS.

Botanical Miscellany. By W. J. Hooker, Professor of Botany in the University of Glasgow. Parts IV. and V.

We cannot sufficiently express our satisfaction, that, after a considerable lapse of time, two Parts of a second Volume of this admirable work have made their appearance. The plan is somewhat altered: instead of 25 octavo plates to each number, 12 of which were coloured, and the price 15 shillings, there are 10 octavo uncoloured, with five quarto coloured plates, forming a fasciculus, to be bound up separately; and the whole price is 10s. 6d. The public is thus the gainer. In these two numbers we have a Biographical Notice of Captain Carmichael; a reprint of Jack's Malayan plants; Illustrations of Indian Botany, by Dr Wight; Botanical Excursion in Jamaica, by Dr Macfadyen; Notice of the late Mr Barclay; Burchell's Brazilian Journey; Observations on some British Plants, by Mr Wilson; Klotzsch's Method of Preserving Fleshy Fungi, *(cum tab.)*; Excursion from Lima to Pasco, by Mr Cruickshanks, with a description of the plants there collected, by Dr Hooker; Ledebour's Journey to the Altaïc Mountains, and descriptions and illustrations of several new, or rare plants. A more interesting series of papers we have seldom seen combined: selections from them will be found in our Botanical Collections.

The British Flora. By W. J. Hooker, Professor of Botany in the University of Glasgow. Second Edition.

Having had occasion to notice the first edition of this work, we regret that we must pass over the second very slightly. This contains several additions to the botany of our islands, which have been discovered within these last twelve months, and merits the continuance of the public favour, which, judging by the rapid and unprecedented sale, for a botanical work, has been so deservedly extended to the former edition.

Writings of Count Thunberg.

(Concluded from p. 329.*)*

MEMOIRS.

Published in the *Nova Acta Reg. Societatis Scientiarum Upsaliensis.*

Vol. II. *Cycas caffra.*

Vol. III. Kæmpferus illustratus; Pars i. *Cussoniæ* genus.

Vol. IV. Novæ insectorum species. *Curculio Zamiæ.* Kæmpferus illustratus; Pars ii.

Vol. V. Descriptiones insectorum Suecicorum. Observationes in linguam Japonicam.

Vol. VI. De *Brachycero.* Observationes in genus *Halleriæ. Hedysari* species 4. *Betula japonica.*

Vol. VII. De Coleopteris rostratis. *Philanthi* monographia. Plantæ Japonicæ nonnullæ. *Tellinæ* 3 novæ species. *Anthreni* monographia. *Acrydii* descriptio. Additamentum ad monographiam *Philanthi.*

Vol. VIII. Coleoptera Capensia, antennis fusiformibus. *Ovis Polyceratæ* variationes. *Alurni* 3 novæ species.

Vol. IX. Coleoptera Capensia, antennis filiformibus. *Tabani* novæ species. *Tanyglosæ* novæ species. *Truxalis* insecti genus. Aves monstruosæ. *Gelis,* insecti genus.

In the *Memoirs of the Physiographical Society of Lund.*

Vol. I. Description of a new genus of plants, *Retzia capensis.* Description of two new genera of plants, *Montinia* and *Papiria.* Notice on the preparation of gum from aloes in Africa. Description of *Aitonia capensis.*

In the *Journal of Economy of the Royal Patriotic Society.*

1782. June. On Dyeing Plants.

1802. September and October. Reply to the question proposed by the Society as the subject of a prize essay. "Is it possible, in those places where half of the arable land is left fallow every year, to employ a part of that land in the cultivation of leguminous and other plants used for forage, &c.?" (The memoir of Thunberg obtained the second best premium, or silver medal.)

In the *Annals of the Royal Academy of Agriculture of Sweden.*

1816. Memoir on some Trees and Shrubs naturalized in the Botanical Garden of Upsal.

In the *New Miscellany of Memoirs of the Royal Society of Sciences and Belles-Lettres of Gottenburg.*

Tom. III. Description of a New Genus of Birds called *Tapera Brasiliensis.* Description of a New Insect, *Pantophthalmus tabaninus.*

In the *Nova acta Physico-medica Academiæ Naturæ Curiosorum.*

Tom. VI. *Crassulæ* novæ species Capenses.

Tom. VIII. Append. *Mesembryanthemi* species novæ Capenses.

In the *Philosophical Transactions of the Royal Society of London.*

Vol. LXIX. *Sitodium incisum* et *macrocarpon,* ususque fructuum eorundem.

Vol. LXX. Extract from the Journal of a Voyage to Japan.

In the *Verhandlingen van de Holl. maatschappy der Wetenschappen te Haarlem.*

Vol. XIX. Parts 2 and 5. Thermometrical Observations made at Japan.

Vol. XX. Part 2. Description of two New Species of Plants belonging to the Family of the Palms.

In the *Schriften des Berlin. Gesellschaft naturforschender Freunde.*

Vol. IV. Descriptio generis *Dilatris* dicti.

In the *Magazin der Gesellschaft naturforsch. Freunde zu Berlin.*

First year, second quarter. *Penæa.*

In the *Transactions of the Linnean Society of London.*

Vol. I. *Dillenia.* Vol. II. Observations on the Japanese Flora.
Vol. VII. *Chironiæ* species Capenses. Vol. IX. *Lycia capensia.*

In the *Memoirs of the Society of Natural History of Copenhagen.*

Vol. II. *Dalia crinita.*

Vol. III. Description of some unknown Species of *Rohria.*

Vol. IV. Monograph of the genus *Gorteria;* and of the genus *Melanthium.*

Vol. V. Six species of the genus *Rohria.*

In the *Nova Acta Academiæ Scient. Imper. Petropolitanæ.*

Vol. IX. Descriptio *Cænopteridis.* Vol. XII. Four new species of *Fumaria,* from Japan.

Vol. XIV. Plantæ contortæ e Promontorio Bonæ Spei. *Hermas* plantæ genus.

Vol. XV. *Proteæ* species novæ

In the *Memoirs of the Academy of Sciences of St Petersburgh.*

T. I. *Galii* species Capenses.
T. III. Examen liliorum Japonicorum. Mammalia Capensia.
T. IV. *Campanulæ* Capenses. Coleoptera rostrata Capensia.
T. V. Hemipterorum maxillosorum genera.
T. VI. Coleoptera Capensia, antennis lamellitus sive clava fissili instructa. *Proteæ*, 4 species novæ.
T. VII. Coleoptera Capensia, antennarum clava, solida et perfoliata. *Ursus Brasiliensis.*
T. VIII. *Ichneumonidea*, insecta hymenoptera, pars i. *Pipræ* novæ species. *Trachyderes*, insecti genus. Species novæ insectorum, *Rutelæ* genere.
T. IX. *Ichneumonidea*, insecta hymenoptera, pars. ii. *Grylli* monographia.
T. X. *Blattarum* novæ species.

In the *Memoirs of the Imperial Society of Naturalists of Moscow.*

T. I. *Lucani* monographia.
T. III. *Poæ* Capenses.
T. V. Genera plantarum Capensia: *Samolus, Trachelium, Polemonium, Rœlla. Rhamni* capenses, 3 novæ species. *Solana* Capensia, *Lobeliæ* Capenses. *Graminum* Capensium species 4 novæ.

In the *Memoirs of the Royal Academy of Sciences of Munich.*

T. IX. Descriptions of some species of the genus *Felis*, which inhabit Scandinavia.

In *Rœmer's Archives of Botany.*

Vol. I. No. 1. *Connarus decumbens.*
Vol. II. No. I. Nova plantarum genera.

In *Schrader's Journal of Botany.*

Vol. I. No. 2. Genera 2 nova plantarum Capensium.
New Series, Vol. I. No. 3. E plantis asperifoliis species nonnullæ Capenses.

In *Weber and Mohr's Archives of Natural History.*

Vol. I. No. I. Plantæ nonnullæ Capenses quæ antea vel non vel incomplete botanicis innotuerunt.

In *Hoffmann's Phytographical Papers.*

First Year. Nova species plantarum Capensium.

In *Weber's Miscellany.*

Vol. II. Descriptiones plantarum e familia *Orchidearum*, in Capite Bonæ Spei collectarum.

There are also in the *Miscellany of the Society of Domestic Economy of Upsal*, eleven short memoirs by Thunberg on subjects of economy.

During his long professorship, Thunberg published fifteen academical programmata, and examined 293 academical theses, the greater number of which, according to a custom in the Swedish universities, were written by the master instead of the scholars. A choice collection of these theses was made by C. H. Persoon, and published in 3 vols, at Gottingen, in 1799—1801. Mr Salisbury published a new edition, in 1802, of the *Disputatio de Erica*, by the celebrated Swedish botanist.

NOTICES AND PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Meeting of Naturalists at York.—We are happy to inform our readers, that this meeting is likely to prove eminently successful. We understand that it has excited a considerable sensation in London; and the section of geologists, with R. I. Murchison, Esq. President of the Geological Society, at their head, is expected to be particularly strong. The time of meeting is not yet, we believe, *definitely* fixed, but the last week of September is that which seems to be the most convenient for the greater number of scientific men in this country, and is likely to be agreed upon. We again call the attention of our readers to this meeting; all who take an interest in natural science are invited to attend. Inquiries have been made by letters to John Robison, Esq. interim secretary to the meeting, regarding the rules or regulations of the proposed society: of course no regulations yet exist; it will be the first object of the meeting to frame such regulations.

It is desirable that such gentlemen as mean to attend, should send in their names either to John Robison, Esq. of Edinburgh, or to Mr Phillips of York; if by letter, post paid.

LONDON.

Royal Geographical Society.—March 28. W. R. Hamilton, Esq. V. P. in the chair. A paper was read on the ancient geography of the Euxine, and Sea of Marmora, communicated by Dr Goodenough.

C. M'Kenzie, Esq. and Captain T. Smith were elected members.

April 11. W. R. Hamilton, V. P. in the chair. A letter was read from Mr Jones, explaining the construction of a portable barometer, lately invented by him; it is made entirely of metal, and is consequently less liable to accidental injuries or destruction than the common glass one,—besides which, it possesses some other advantages. The height of the mercury, although enclosed in an opaque tube, is ascertained by means of a float on its surface, whose movements are indicated by a needle, which rises through a hole in the otherwise close cover of the tube. A double stop-cock, placed nearly in the neck of the siphon, either entirely closes in the mercury when the instrument is not in use, or varies its diameter at will when about to be consulted at sea, and when the motion of the vessel may render the use of the entire column inconvenient.

A geographical and topographical memoir on the empire of Morocco was communicated by Lieutenant Washington, R.N. and also the result of observations made by him in October—December 1829. (*Vide* Geographical Collections, *supra.*)

April 25. John Barrow, Esq. V. P. in the chair. Mr Washington's Account of Morocco was concluded; and a general view, communicated by Captain P. P. King, R. N. of his late survey of the Straits of Magellan and adjoining coasts, was begun.

The following intimation has been issued by the Society:—

Royal Premium.—The president and the council give notice, that his Majesty's annual premium of fifty guineas, for the year 1831, will be given to the author of the best memoir, accompanied by sufficient plans and views, which shall describe in detail any important and unpublished discovery made by the candidate, in any branch of geography, provided that the same be considered worthy of this distinction. The council consider as coming within the meaning of this proposition—a detailed account of any excavation or research made by the candidate, the result of which is the establishment of any lost site of antiquity, and the recovery of any object sufficiently important to history, science, or the arts.

The president and council also give notice, that his Majesty's premium of fifty guineas, for 1832, will be given to the author of the best work transmitted to the Society, of the following nature: — A Traveller's Manual — containing a clear and concise enumeration of the objects to which a geographer's attention should be especially directed; a statement of the readiest means by which the desired information in each branch may be obtained; a list of the best instruments for determining positions, measuring elevations and distances, observing magnetic phenomena, ascertaining temperature, climate, &c.; directions for adjusting the instruments, formulæ for registering the observations, and rules for working out the results; — adapted to the use, not of the general traveller alone, but also of him who, in exploring barbarous countries, may be obliged to carry, and often conceal his implements. Each candidate is requested to send his dissertation privately (without his name, and, if he chooses, transmitted by another person, but revised and pointed by himself) to the secretary, on or previous to the second Monday in March of the years 1822-3 respectively, with a motto written on it; and he is at the same time to send a paper, sealed up, with the same motto on the outside, which paper shall enclose another paper, folded up and sealed, with his name written within. The papers containing the names of those candidates who shall not succeed, will be destroyed unopened. And in all cases, the successful competitor will be at liberty to publish his communication on his own account, under the sanction of the Society.

The president and the council further give notice, that it is their intention at future periods to propose the following as prize subjects: — An essay on the actual state of geography in its various departments, distinguishing the known from the unknown, and shewing what has been, and what remains to be done in order to render it an exact science; together with an indication of the best processes to be adopted in order to supply the several desiderata. An extensive series of geographical tables, (with reference to authorities,) shewing the various names, written in the native language and character, by which the same places have been known, in different countries, and at successive periods of history. The best mechanical inventions for facilitating the acquisitions of geographical knowledge, or rendering it more available to the public. Under this head may be included the simplification of instruments, more compendious methods of determining positions, and all improvements in the art of drawing and engraving maps, whereby their precision and distinctness may be increased, and greater scope and expression given to what may be called the language of topography.

May 8. —— Greenough, Esq. President, in the chair. Captain King's paper on South America, was concluded. (*Vide* Geographical Collections, *supra.*) A letter was next read from Lieutenant Glennie, dated at Guanaxata, giving an account of a visit to the Pyramids of Teotihualcan, from Mexico. (*Vide* Geographical Collections.)

Royal Society. — March 3. Mr Lloyd's paper concluded.

March 10. His Royal Highness the Duke of Sussex in the chair. A description of a graphical register of tides and winds, by H. R. Palmer, Esq. was read.

March 17. A paper was read, entitled "Proposed Plan for supplying Filtered Water to the Metropolis and its Suburbs," by W. Wright, Esq. civil engineer.

And a paper, "On the Variable Intensity of Terrestrial Magnetism, and the Influence of the Aurora Borealis upon it;" by Robert Were Fox, Esq.

March 24. J. W. Lubbock, V.P. in the chair. Two papers were read: 1st. A description of Mr Robinson's mountain barometer, the column of which is divisible into two portions; communicated by Captain Kater. 2d. On water cements; by Colonel Pasley.

Meetings adjourned till after Easter.

April 14. Meetings resumed. His Royal Highness the Duke of Sussex in the chair. The reading of Colonel Pasley's paper was concluded. There was also read a paper "on Meteorological Observations, made at the Apartments of the Royal Society;" by J. W. Lubbock, Esq.

The Spanish Nautical Almanac, calculated for the meridian and parallel of the Royal Marine Observatory at Cadiz, for 1833, was presented by the King of Spain.

April 21.—Sir A. Cooper in the chair. A paper was read on the errors in the course of vessels, occasioned by local attraction, with some remarks on the recent loss of his Majesty's ship Thetis, by Peter Barlow, Esq. Professor Buckland presented his work on the occurrence of the remains of elephants, and other quadrupeds in the cliffs of frozen sand in Eschscholtz Bay, within Behring's Strait, and in other distant parts of the Arctic Seas.

May 5. His Royal Highness the Duke of Sussex in the chair. Three papers were read,—1. On the effects of hot water on the Batrachia, by Dr Marshall Hall. 2. An account of a new method of propelling vessels, by Mr W. Hall, communicated by Richard Penn, Esq. 3. Additional thoughts on the use of the ganglions in furnishing electricity for the production of animal secretions, by Sir E. Home, Bart.

Geological Society.—March 2. R. I. Murchison, Esq. president, in the chair.

A paper was read on the ripple marks and tracks of animals in the forest marble; by George Poulett Scrope, Esq. F.G.S. F.R.S.

The reading of a paper was begun, entitled, Description of a Series of Longitudinal and Transverse Sections through a portion of the Carboniferous Chain between Penigent and Kirkby Stephen; by Professor Sedgwick, F.G.S. F.R.S.

March 16. R. I. Murchison, Esq. president, in the chair.

Professor Sedgwick's paper was concluded.

March 30. W. J. Broderip, Esq. V.P. in the chair. A paper was read on the geology of Swan River and Garden Island, (*Isle Buache,*) by the venerable Archdeacon Scott, F.G.S. This memoir was accompanied by a series of specimens illustrative of the general structure of the country, and particularly of the modern calcareous form, which constitutes so great a portion of the western coast of Australia.

There was likewise exhibited a new species of *Delphinula,* (*D. lamellosa,*) which occurs in a recent state on the beach of Garden Island, and was also found fossil in digging a well, on the main land, one mile from the shore, at the depth of 84 feet, imbedded in the calcareous sand.

April 13. Roderick Impey Murchison, Esq. President, in the chair. A paper was read on the limestone caves at Wellington Valley, New South Wales; and on the fossil bones which have recently been found there; by Major Mitchell, F.G.S. Surveyor General in the colony. The memoir was illustrated by numerous drawings, and a large collection of specimens of the breccia in which the bones, belonging to the wombat, kangaroo, koala, dasyurus, and phalangista, were found.

The tibia of a gigantic Saurian reptile, found in the Tilgate strata, was exhibited by Robert Trotter, Esq. F.G.S.

April 27. R. I. Murchison, Esq. president, in the chair. An extract was read from a letter of the Rev. G. Greg, explanatory of certain subterraneous sounds occasionally heard at Nakoos, near Tor, in Arabia. A paper was then read on some effects of the atmosphere in wasting the surface of buildings and rocks; by John Phillips, Esq. curator of the Yorkshire Philosophical Society.

Linnæan Society.—*March* 1. Read, a letter from James Lindsay, M.D. describing the *Helix obvoluta,* found in Hampshire.

The author, last May, met with this along with the other *Helices,* such as *nitida* and *rufescens,* amongst the moss and roots of trees in Debbam wood, near Brinton, Hampshire, and along the north side of the South Downs. There are smooth tooth-like processes on the inner side of the lip, of which Lamarck takes no notice. The aperture is triangular, mouth a little reflected, forming a distinct sinus externally, and altogether answering to the Lamarckian description.

Read also, a communication on the recent *Nautilaceous Mollusca* of Great Britain, by J. G. Jeffreys, Esq. F.L.S.

March 15. Mr Jeffrey's paper continued.

April 5. A paper was read entitled, "On the Osteological Symmetry of the Camel, *Camelus Bactrianus* of Aristotle, Linnæus, and Cuvier. By Walter Adam, Fellow of the College of Physicians of Edinburgh." (*Vide* notice in Zoological Collections, *supra.*)

April 19. Mr Jeffrey's paper continued.

May 3. A. B. Lambert, Esq. V.P. in the chair. The Supplement to the Descriptive Catalogue of New Holland Birds in the collection of the Society, and published in the fifteenth volume of the *Transactions,* compiled by Mr Vigors and Dr Horsfield, was read. A catalogue of the rarer plants growing in the neighbourhood of Tring, Hertfordshire, by Richard Chambers, Esq. was likewise read: the paper was accompanied by a drawing of the true *Orchis militaris.*

As we have found it impossible to devote the space to this section, which would be requisite for full Reports of the Proceedings of the different Scientific Institutions of this country, it may be serviceable to our readers to mention, that ample reports of the meetings of the Zoological and Astronomical Societies will be found in the *Annals of Philosophy;* and of the Royal Institution, in the *Journal of the Royal Institution of Great Britain.* Many interesting notices of provincial societies are, from time to time, given in Loudon's *Magazine of Natural History.*

MISCELLANEOUS INTELLIGENCE.

Ornithorynchus paradoxus. — A correspondent in the *Hobart Town Courier* states, that on dissecting a female *Ornithorynchus,* he found an udder under the skin, to the discovery of which he was led by seeing a small quantity of milk oozing out when he compressed the body.

Andersonian University, Glasgow. — This institution is going on most prosperously, particularly in the medical classes. The summer course of comparative anatomy is, however, given up for want of pupils. It is humiliating to observe so much apathy in the modern candidate for medical honours, who will not improve himself with one idea that is not absolutely required of him.

The Dugong. — From a conversation we have recently had with Dr Knox, it appears probable that the Dugong will have to be altogether separated from the *Cetacea,* and to be classed nearer the *Walrus* tribe, notwithstanding its external resemblance to the former family.

Two-Headed Lizard. — At a meeting of the Academy of Sciences on the 28th of February last, M. Beltrami announced, that in a recent excursion over the Pyrennees, he found a two-headed lizard, with five paws, four of which were naturally formed, but the fifth, which was placed between the two heads, had nine toes.

The Sturgeon. — MM. Brandt and Ratzeburg, of Berlin, have lately completed a very minute monograph on the genus *Acipenser,* of which they describe fourteen species.

Tides in the Atmosphere. — Mr Murphy, of London, has recently communicated to the Academy of Sciences, through M. Arago, a variety of observations, tending to prove that there exists an analogy between the lunar influence on the tides and the atmospheric temperature.

Elephant. — A noble male elephant, in perfect health and condition, has reached the Zoological Gardens, after a nine months' voyage from Madras *via* China.

Living Orang Outang. — Two of these extraordinary animals have arrived in this country, and from their apparent good health, it is said, are likely to survive. They are, the one from the island of Borneo, (the large brown orang,) and the other from the River Gambia, (the black chimpanzee.) Their manners are stated to be extremely mild. They are intended for public exhibition.

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