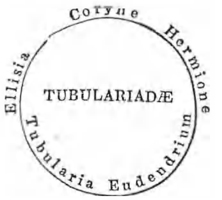
stock of a grafted tree should have wood formed round it like the graft; but this was not the case, as the wood of the stock remained the same.—Dr. Bossey thought the views of Du Petit Thouars were beset with objections, besides those which Mr. Lankester had brought forward. The oriental plane shed its bark from increase in the wood of the trunk: if this wood was formed by the leaves, the shedding of the bark would take place from the upper part of the stem first, and not from the middle and lower portions, as it was now found to do.

'Notice of Zoological Researches in Orkney and Shetland during the month of June, 1839,' by Edward Forbes and John Goodsir.

Mr. Forbes commenced by stating that, in the month of June last, he and Mr. Goodsir visited the islands of Orkney and Shetland, with a view to the investigation of the marine zoology of the northernmost district of Britain. Though their stay was limited to three weeks, and though the season was unfavourable to the examination of such animals as are brought up by the deep-sea (*Haaf*) fishing lines, their success proved greatly beyond their anticipations; and they brought forward their short notice before the Section, as much with the view of inducing others to investigate a district at once accessible and abounding in objects of discovery, as for the purpose of making known the additions to the British Fauna resulting from their excursion. Having directed their attention almost exclusively to the invertebrate animals, Mr. Forbes stated that, in regard to the mollusca, they had found five species of the genus Eolida. Of these, four are undescribed, the other being *Eolida papillosa* of authors, which abounded in Shetland, under stones at half tide, whither it appeared to resort for the purpose of spawning. Along with it occurred a nearly allied, but very distinct species, which they proposed to name *Eolida Zetlandica*. In shape, it nearly resembles the *Eolida papillosa*, but is smaller. The latter species has twenty or more rows of branchiæ on each side, whilst the new species has only twelve or thirteen rows of lateral branchiæ, six or seven in each row. The colour of the *Eolida Zetlandica* is also much darker. The thread of spawn is arranged in a similar manner, but is much narrower, and easily distinguishable. The other three new species belong to a different section of the genus. One is nearly allied to the *Eolida pedata* of British authors. Mr. Forbes stated that they had named it *Eolida coronata*. Body linear, white branchiæ arranged in five or six lateral fasciculæ, purple tipped with white, and lineated with blue. Superior tentacula yellow, each with eight broad membranaceous wings. Inferior linear, white; length, one inch. *Eolida foliata*—a minute species, having six rows of leaf-shaped branchiæ, two in each row. Tentacula, simple linear. *Eolida minima*—a minute species, having seven long contractile branchiæ on each side. Its oral tentacula in the form of broad lobes. Of these three Eolidæ, the authors stated that the first is found under stones at low water, and that the other two were obtained by dredging in seven fathoms water;—all from Shetland. They found no Eolidæ in Orkney. Of the genus Euplocamus, they found one species, allied to the *Euplocamus pulcher* (*Triopa clavigera* of Johnston), but differing from that species, in having its branchiæ, both lateral and dorsal, tipped with yellow. Its back is white, spotted with yellow. Of the genus Doris, they found two species, one the *Doris pilosa* of Müller, and the other *Doris bervicensis* of Johnston. The latter belongs to the same division of the genus with *Doris nodosa* of Montague, and should constitute with it a separate genus, or at least subgenus, which might be called Goniodoris. They found only one new testaceous mollusk, a species of Velutina; it has an ovate oblong shell, covered with a fine woolly epidermis, not ridged longitudinally. Spine very small, depressed. Aperture large, ovate, margin of columella, and upper part of outer lip, thickened. Shell, horn-coloured. Animal, orange. The authors have named it *Velutina elongata*. Ascidiæ abound in the north; the more common species is the *Ascidia intestinalis*. Along with it they found three species, which, there is reason to believe, are undescribed. The first is a very beautiful species, globular, white, covered with spinous processes, ending in a star of five cartilaginous filaments; the orifices are bright rose colour. It is about an inch in diameter, and is not uncommon in rather deep water. The authors propose to name it *Ascidia echinata*. The other two are equally distinct. The first—*Ascidia rugosa*—is red, opaque, elongated, its surface warty. The second—*Ascidia rubens*—is red, translucent, elongated, with distant apertures, and grows to the length of eight inches. They are both from Orkney. Of Annelides, the authors found great numbers; such as they collected they intend submitting to Dr. Johnston, as the best British authority on that class. They observed the Planariæ in great numbers. Among others, was the beautiful *Planaria atomata* of Müller, not before recorded as British. Among the Radiate animals they were especially successful. The genus Holothuria holds its British court in Shetland, and the king of them is an enormous species, which the authors name *Holothuria grandis*. This splendid animal is fully two feet long, when extended; it is of a deep purple colour; it has ten triangular frondose tentacula, purple spotted with white; its body, between the rows of suckers, is almost smooth. The other new species of this genus observed were—2. *Holothuria fucicola*—body ovate, purple, smooth; tentacula ten, deep brown, ovate; suckers numerous in each row; size, three inches; on the stems of Laminariæ, in seven fathoms water—Shetland. 3. *Holothuria brevis*—body ovate, arcuated, very short, pinkish white; suckers few; tentacula long, pinnate at their extremity, varying in number; length, half an inch. 4. *Holothuria fusiformis*—body linear, white, rough; suckers numerous; tentacula ten, short, triangular. 5. *Holothuria lactea*—body cylindrical, angular; milk white; suckers few; tentacula ten, short, ovate. 6. *Holothuria pellucida* of Müller. Along with Holothuriæ, the authors dredged the *Priapulus caudatus*, and *Sipunculus strombi*. They found no Holothuriæ or Priapuli in Orkney. Of the sea-urchins, they found only the *Echinus esculentus*, and a form which appeared to be the *Echinus neglectus* of Lamarck. The star-fishes observed were *Asterias aranciaca*, and an allied form, probably the *Asterias bispinosa* of Otto, *Stelloniæ rubens* and *violacea*, *Luidia fragillissima*, *Solaster popposa*, *Ophiura albida* and *texturata*, *Ophiocoma bellis*, *granulata*, *roseola*, *neglecta*, and a new species. The Medusæ doubtless abound in these islands in August, their proper season, but when the authors of the paper were there, they observed only *Cyanæa capillata*, *Medusa aurita*, a new Dianæa, a new Oceanea, a new Ciliograde, of the genus Alcynoë of Rang, and a minute animal, the type of a new genus among the Acalephæ. Sponges of the genus Grantia and Holochondria abound in Shetland. From deep water, the authors obtained several specimens of *Tethya cranium*, and kept them alive in salt water, but could observe none of the contractions stated to have been seen in that species by some of the French naturalists. The most beautiful contribution to the British Fauna from the Orkneys, is a zoophyte of the family Tubulariadæ, new both as a species and genus, and the largest known form of its tribe. This beautiful animal is about four inches long, and its stem half an inch in diameter. This stem is rounded, solid, flexible, moving at the will of the animal, and somewhat contractile. It is translucent, of a pinkish white colour, lineated with brown longitudinal lines, arranged in pairs. When young, the stem is shorter, and is inclosed in a delicate, brown, corneous tube, which becomes deciduous as the animal grows larger. The lower part of the stem is broader than the upper, and roots in sand by means of a fusiform termination, sending out corneous filamentous roots. At the upper extremity, the stem becomes suddenly contracted, and the lines terminate; it then expands into an ovate head, terminating in a long pyramidal, pink trunk, at the end of which is the mouth. Round the thickest part of the head, is placed a row of about forty long, white, uncontractile tentacula, which wave about in all directions, and are not ciliated. Immediately above the circle of tentacula, is a circle of about twenty-five ramified orange processes, probably ovarian, having no voluntary motion. Above this, the trunk is covered with numerous white tentacula, very much shorter than the outer circle. Within this head, is a simple digestive cavity, not extending down so far as the large tentacula. Every other part of the animal is solid, and no part is ciliated. Beautiful and delicate as these animals appear, they are very tenacious of life. We dredged them in considerable numbers, on a sandy bottom, in about ten fathoms water, at Stromness, Orkney. The position of this animal is between Tubularia and Coryne, on the relations of which genera its discovery throws much light, as well as on the polypes in general. We propose to consecrate the genus to that great British zoophytist, Ellis, calling it Ellisia, and giving the species the appropriate name of *Flos maris*, as it may well be regarded, from its extreme grace and beauty, as the flower of the British seas. The relations of Ellisia to Tubularia, may be exhibited by the following diagram:—



Coryne—Tentacula scattered, of one kind; no tube.
Hermione—Tentacula scattered, of one kind; tube.
Eudendrium—Tentacula of one sort, regular; branched tube.
Tubularia—Tentacula of two sorts, regular; simple tube.
Ellisia—Tentacula of two sorts, regular; deciduous tube.

Mr. Gray observed, that the name Ellisia had been already applied by Brown to a genus of plants.—Prof. Jones inquired if Mr. Forbes was certain with regard to the deciduous nature of the tubes of Ellisia. It was a circumstance of an extraordinary kind, and required close investigation.

Mr. W. R. Wilde exhibited three drawings of a Peruvian Mummy, showing its different states of developement; and mentioned, that he read some time since a series of papers on the subject before the Royal Irish Academy.

Mr. Lankester then made some observations on the preparation of fishes for museums. He exhibited several specimens, which, after having taken away one side, he had allowed to dry, and assume their natural state, and then placed them on paper. The process consisted in drying the fish, then taking away their soft parts, then drying the skins, keeping them in shape by pieces of stick and cork, and, finally, varnishing them with mastic varnish, by which they become stiffened, and their colours preserved.

Mr. Gray stated, Mr. Lankester's process was not new. His uncle adopted it many years ago at the British Museum, by modelling wax and resin to the shape of the fish. A carpenter's boy had also prepared a great number, by skinning the fish, and filling it with bran, and when dry it retained its original shape. He hoped soon to have a very fine collection open for inspection at the British Museum. He thought the fish were better sewed on to the paper than glued. The preserving the colour of fish and reptiles was a great object; he had attained this by soaking them in brine, and drying them before they were put in spirit. He condemned the use of the oxymuriate of mercury in the preparation of animal substance.—Dr. Macartney recommended pyroligneous acid, instead of corrosive sublimate. In reply to a question from Mr. Forbes, Dr. Macartney observed, that Medusæ might be preserved by putting them into a solution of alum and nitre in spirit; they lost little of their size thus, and could be kept in no other way.—Mr. Forbes had seen several specimens of reptiles in Dr. Knapp's possession, which retained their original colouring. They had been preserved in spirit two months, and then taken out and dried, and placed upon cork.—Dr. Macartney observed, that solutions of alum preserved the colour of animal substances best; and Mr. Gray stated, that reptiles might be preserved by pressing, as plants, or by skinning, and filling with sand.

Section E.—Medical Science.

President—Dr. Yelloly.
Vice-Presidents—Dr. Johnstone, Dr. Roget, Dr. Macartney.
Secretaries—Dr. G. O. Rees, Mr. F. Ryland.
Committee—Drs. Blakiston, Booth, G. Bird, Mr. W. S. Cox, Drs. Evans, Foville, B. Fletcher, Hastings, T. Hodgkin, Mr. J. Hodgson, Drs. J. Johnstone, Pritchard, Mr. J. Russell, Drs. R. S. Sargent, Vose, Mr. R. Wood, Dr. Wale.

After an introductory address from the President, one of the Secretaries read a paper, communicated by Sir David Dickson, containing, 'Abstracts of a the tubes. Mr. Lyell, therefore, inferred, that the excavation and filling of the pipe proceeded contemporaneously and gradually, and that the flint nodules, when removed from their chalky matrix, subsided so as to rest upon sand and gravel which had previously sunk. As proving that the contents of the sand pipes came into their present position by slowly subsiding, the author mentioned the fact of strata of gravel elsewhere horizontally bending downwards into the mouth of a pipe, so as to become for a short space quite vertical within the pipe. Mr. Lyell is of opinion, that the tubes, at least of some of the larger and deeper ones, were caused by springs impregnated with carbonic acid, which rose upwards through the chalk. But afterwards, when these springs ceased, the descent of rain-water, percolating the gravel, carried fine particles of sand and clay downwards, and deposited them at the bottom and sides of the tube, at all those points where the water was absorbed by the surrounding chalk. Some of the finer particles being carried into the chalk itself, caused the impurity and discoloration of that rock near the pipes.

Mr. De la Beche mentioned that similar appearances are observed in other formations, as in green sand, near Charmouth. But water charged with carbonic acid must have different effects on different rocks; so that the same explanation could not be applied to fissures in siliceous, as to those in calcareous strata. Water from above, and which is always impregnated with carbonic acid, may have taken up the chalk, and then, from the porosity of that rock, have oozed downwards, carrying with it the displaced material, with the exception of the small quantity of clay and silex contained in all chalk, and which remained behind as the lining of the cavities.—Mr. Phillips assented to the supposition that these fissures were not the result of mechanical violence; similar openings occur in the oolites, with layers of clay. There might have been originally a commencement of the fissure by the action of large stones on one another, as we see in waterfalls and on the sea shore.—Dr. Buckland alluded to the large sand pits in the hills near Beaconsfield, as instances of a similar kind. At Shotover, near Oxford, the oolite has pits of a like kind, under Kimmeridge clay, with a thin stratum, still clayey, of a different nature. Near Caen, in Normandy, appearances such as those described by Mr. Lyell occur, only that, in place of flints, there are nodules of chert. At Shotover there seems to be a beach on the surface of the oolite, bearing the marks of watery action, grinding the stones together.—Mr. Strickland mentioned that, in the Greek islands, where there are no argillaceous rocks, the fissures in the limestones are found to contain clayey matter.—Mr. Yates alluded to the *organ pipes* at Maestricht, which, however, have not been fully examined.

Mr. J. E. Marshall exhibited a section across the Silurian Rocks in Westmorland, from Shap Granite to Casterton Fell. He remarked, that the rocks to the south of Shap Fell, and the heads of Windermere and Coniston lakes, have been classed by Prof. Sedg wick as belonging to the Silurian system; and the boundary between them and the Cambrian rocks is described as accurately defined by a remarkable band of fossiliferous limestone, running from the Shap Granite to the flank of Black Comb. Mr. Marshall was induced to examine these rocks more minutely, by the recommendation of Mr. Murchison, who had expressed his opinion, that the rocks near Kirkby Lonsdale are decidedly upper Silurian. A number of fossils were collected from the Coniston limestone, proving it on examination to be of the age of the Caradoc sandstone; and others from Benson Knott, near Kendal, were identified with those of the Upper Ludlow rock. The following may be taken as a sketch of the rocks overlying the Coniston limestone.

Llandeilo Flags, or Caradoc Sandstone.	1. Coniston Lime.	1. Dark blue limestone in thin beds interstratified with slates, and having many fossils..100 to 300 feet.	
		2. Soft black slate with numerous joints ..300 to 700 feet.	
		3. Compact blue flag-stone, with iron pyrites in the seams..600 to 800 feet.	
	2. Bluish Slates.	Hard gray siliceous slates, with uneven cleavage, and frequently with stripes of a lighter colour, containing veins of quartz	4000 to 5000 ft.
		Containing at foot of Coniston Lake a weak band of calcareous slate, with fossils	

With respect to the subordinate beds at Bowness and at Potter Fell, they are suddenly thrown up on edge, and dislocated; between Ambleside and Kendal they may be observed nearly in a vertical position. A narrow stripe of carboniferous limestone overlies conformably the old red sandstone breccia; but at its termination is cut off and thrown on edge by a fault ranging in an E.N.E. direction. The cliffs of breccia at Casterton, in the course of the Lune, where the river runs along the chasm formed by a great fault, dip at moderate angles to the S.E. Casterton Fell consists of an anticlinal ridge of slate running N.N.E., with a S.E. dip on its eastern, and a N.W. one on its western side, at various angles. The carboniferous strata do not therefore conform with the Casterton slates. By the great fault in the valley of the Lune, the strata are depressed on the eastern side, and shifted northwards in a lateral direction. Near Kendal the tilestone may be seen cropping out in an abrupt escarpment; and the Benson Knott, or Upper Ludlow rock, rising conformably from beneath it. This last rock is a hard arenaceous slate, with many fossils, and much jointed. A great fault ranges down the valley of the Kent, bringing the carboniferous limestone into contact with the lower part of the Benson Knott rock. A great transverse fault ranges E.N.E. down the course of the Mint, cutting off this rock suddenly; and at about a mile distance from this river, the breccia and limestone are again cut off by another fault, parallel to the first. The remarkable contortions seen near the top of the principal ascent of Shap Fell, appear to be in the upper beds of the Coniston Flag, a portion of which is metamorphosed into syenite and felspar porphyry. Mr. Marshall noticed, at the end of the memoir, a singular contrast in the direction of the cleavage of the upper Silurian rocks, compared with that of the lower Silurian or Cambrian. In the two last it is most uniformly about N.N.E., but in the upper Silurian and tilestone W.N.W.

Prof. Phillips stated, that he had first called the attention of geologists to the occurrence of fossils at Kirkby Lonsdale. He advocated the comparison of Silurian rocks in different districts, as variations should be found in the proportion of the different members of that system. It is possible that no Wenlock limestone occurs in Westmorland, although the fossils from Coniston Head may, on careful examination, be found to resemble those of that rock. He considers there is great difficulty in tracing a fault in the valley of the Lune.—Mr. Murchison considered that it is doubtful if the upper Ludlow occupies all the space marked in the section. In this part of England he thinks it unlikely that there is any disruption between the Silurian system and the tilestone, although Prof. Sedgwick is of an opposite opinion.—Prof. Phillips conceived, that in the case of the fault in the valley of the Lune, a disturbance may have taken place in the ancient bed of the sea, which caused an alteration in the arrangement of the strata, but that there is no real fault.—Mr. Murchison observed, that Casterton Fell must be upper Silurian, from its containing a peculiar species of orthoceratite. It has frequently a hardened, altered appearance in its rocks, from their being penetrated by trap.

Mr. Strickland read the following queries, on which he solicited information. They relate to the superficial gravel in the neighbourhood of Birmingham.

1. Does the gravel near Birmingham ever contain chalk flints, fragments of oolite, &c. which may indicate a southern origin, or is it wholly of northern extraction?

2. Does it ever contain marine shells?

3. Are these shells of existing or extinct species?

4. Does it ever contain bones of terrestrial mammalia, or fresh-water shells?

5. What are the circumstances of position, material, &c. of the gravel in which mammalian bones or fresh-water shells are found? and is it distinguishable in any respect from the gravel in which marine remains are found?

6. Are mammalian remains ever found in company with marine shells?

The object of these inquiries will be best understood by referring to Vol. VI. of the Association's Reports.

Section D.—ZOOLOGY AND BOTANY.

President—Professor Owen.
Vice-Presidents—Mr. J. E. Gray, Dr. Graham, G. B. Daubeny, M.D.
Secretaries—Messrs. E. Forbes, R. Patterson, W. Ick.
Committee—Mr. C. Babington, Rev. W. T. Bree, Barker, B. Blood, F. Bossey, M.D., Messrs. G. Bowman, D. W. Crompton, J. R. Corrie, M.D., Messrs. W. Bowman, J. E. Goodsir, J. Hodgson, G. Webb Hall, G. B. Knowles, Messrs. J. E. Lankester, B. Maund, L. Parker, F. Ryland, Prof. Rymer Jones, Messrs. R. Taylor, F. Russell, H. E. Strickland, N. A. Vigors, M.P.

A paper was read, 'On the Formation of Woody Tissue,' by Mr. Lankester.

The tissues of plants, for the sake of convenience, are divided into five, but the origin of these may be all traced to the simple cell. How they are formed from the simple cell is an undecided question, especially with regard to woody tissue. Du Petit Thouars supposes, that woody fibre is formed by the buds and leaves, and sent down by them between the bark and wood of the tree, whilst other writers suppose that it is formed from the bark or wood. The most prominent features of woody tissue are its length, and the hard nature of the secretions deposited in its interior. These points do not constitute an essential difference between this and cellular tissue, as we find the latter lengthened in the form now called Pitted tissue, and hardened in the endocarps of Amygdalæ, &c. If by the term woody tissue, all hardened lengthened tissue be included, then we find it present in many instances, where neither buds, leaves, nor bark can be said to exist, as in Cryptogamia, especially Boleti. Again, it is found in many parts of Phanerogamous plants, as the pericarps of the cocoa, beech, and other plants, which in those parts are destitute of leaves. The author had also found woody tissue in abundance in the leafless Monotropa, and in many species of Cactaceæ. Other objections may be urged against the theory of Du Petit Thouars, as the fact of wounds in trees being filled up at their lower as well as their upper lip. In trees that had been felled, the author had observed the production of fibrous tissue, independent of leaves or buds: specimens of this were exhibited to the Section. The author then detailed the appearances he had observed in several trees that he had ringed in the spring, when the sap was rising, and had cut down in August. In these trees he found that woody tissue was connected with a cellular formation, in both the lower and upper edges of the wound. The woody tissue being evidently formed subsequent to the ringing. The last occurrence to which the author directed attention was, the existence of knobs of wood in the bark of beech and other trees. These excrescences are of all sizes, and when first formed are cellular; they gradually harden, and at last present layers of contorted woody fibre. They have a regular bark of their own filled with sap during the spring, and present concentric circles of woody tissue, representing their yearly growth. Many of them put forth buds, and some few leaves, but by far the greater number have neither buds nor leaves. Sometimes they congregate together in a mass, each nucleus having a separate series of concentric layers surrounding it. Although from rapid growth the compound knobs are found in contact with the wood of the tree, the single knobs are seldom found in this position. These knobs have been called by Dutrochet, embryo-buds, and used by him as an argument against Du Petit Thouars' theory, and Dr. Lindley admits their existence to be one of the greatest objections of which he is aware. The conclusions to which the author came, from taking a view of all the facts which we are in possession of at present, on the formation of woody tissue were:—1. That the requisites for the formation of wood are a living tissue developing elongated fibres, a tissue forming and depositing secreted matter, and exposure to the influence of external stimuli. 2. That the secreted matters are more easily brought under the influence of external stimuli in the younger tissues; hence the importance of leaves. 3. That neither bark nor leaves are essential to the formation of woody tissue.

The paper was accompanied by several preparations and specimens, which were exhibited to the Section.

Mr. Babington was glad to find, that the knobs in trees had excited attention. He believed that they afforded evidence of the unsoundness of Du Petit Thouars' theory. He had never been inclined to adopt the view of wood being a descending fibrous formation of the leaves. If this were the case, the