and by degrees they are elongated, until their length is much greater than their breadth; they also expand laterally to a certain extent after their first formation; but this growth ceases, so that the rootlet has a fixed diameter. The cell-division seems to be repeated in these cells in the direction of their length after they have attained their full diameter. While young, near the tip of the root, they are densely filled with protoplasmic substances; as they expand they appear clearer, and contain only a moderate quantity of protoplasm, with abundant watery cell-sap. The rudimentary cells developed in the very centre of the point of growth become cells of much less diameter and more elongated form, and constitute the rudiment of a fibro-vascular cord running through the centre of the rootlet; at a little distance from the point, traces of spiral markings may be detected on the walls of some of these cells, which are becoming *vessels*,—the distinguishing marks of the fibro-vascular bundles. Higher up in the root, the central fibro-vascular cord is clearly recognizable, surrounded by parenchymatous cells, themselves enclosed by a continuous layer of delicate epidermal cells. In these roots the epidermal cells do not grow out in hairs (radical fibrils).

"Roots of this kind show very clearly that the elongation of roots takes place by increase at the point only. This is seen by noticing the relative dimensions of the cells in the different parts; but it may be proved still more evidently by marking the roots, when of some length, at equal distances, with touches of Indian ink. When we watch the further growth of a root thus marked, we see that the spots on the upper part of the root do not become removed to a greater distance from each other, but new structure is added on below the marked parts. The same important law of growth is illustrated by the natural marks made by branches arising from the roots, which remain permanently at their original distance apart, as may be clearly seen in the transverse streaks on the surface of the root of a carrot."

XX.—*Additional Gleanings in British Conchology.*

By J. Gwyn Jeffreys, Esq., F.R.S.

In continuation of my notices on this subject, I have only occasion to make a preliminary remark, that, although I have at present no new species to describe, the communication of any facts which may serve to increase our knowledge of already known species is not less valuable or interesting than the publication of novelties.

Acephala Lamellibranchiata.

Teredo megotara, *Forbes and Hanl. Brit. Moll.* vol. i. p. 77.

Dr. Lukis kindly sent me specimens from Guernsey in which the tube is semiconcamerated at its narrower end or opening, as in *T. Norvagica*. They were found in deal and teak wood.

T. malleolus, i. 84. In cork, Plymouth Sound (*Mr. Webster*); and with the last, in a log of deal balk which was cast up on the shore at Guernsey (*Dr. Lukis*). Some of the valves sent me by Dr. Lukis measure $\frac{2}{3}$ths of an inch in length, and are so similar in every respect to those of *T. bipennata* that I am much inclined to doubt their being distinct species, notwithstanding the difference in their calcareous styles or pallets. So little is known of the œconomy of these appendages, that it is possible that the very aberrant forms which they exhibit in these two so-called species may be only a modification of the same organ, depending on a difference of climate or habitation.

Pholadidea papyracea, i. 123. This local and curious shell has been found by Capt. Bedford in lumps of indurated clay which were brought up on fishermen's lines from clayey ground, at a depth of about 25 fathoms, near Lismore on the west coast of Scotland. One of the specimens has the dried remains of the animal in it. In the same matrix which contained the *Pholadidea* are firmly imbedded fossil specimens of *Nucula decussata*, some of which retain their epidermis. The last-named species is found living in the same locality. This association of species, which, in their recent state, are regarded by some conchologists as being respectively characteristic of northern and southern latitudes, is somewhat remarkable; though I believe the *Pholas Viboneusis* of Philippi (Enum. Moll. Sic. ii. p. 46, t. 13. f. 5) is the young of *Pholadidea papyracea*, while the other species has been described and figured by Bronn as well as Philippi under the names of *Nucula sulcata* and *Polii*—the first species as a pleistocene fossil, and the last both as recent and fossil. The lumps of clay appear to have been consolidated by a calcareous deposit or infiltration, and they are as hard and compact as many kinds of stone. Dr. Capellini informs me that an equally compact kind of stone, which is considered to be pleistocene, and contains fossil shells of that period, occurs at Leghorn, and is extensively used for building. I have now (August 23) found the *P. papyracea*, as well as the dwarf variety mentioned in the 'British Mollusca,' alive, in small lumps of triassic sandstone which were dredged up from a depth of 80 fathoms in the Irish Sea, off the coast of Antrim. I may take this opportunity of observing that all the shells and other animals which I took with the above have their colour quite as vivid as the same species which inhabit a much less depth, or even the seashore. Such is the case with *Trochus zizyphinus*, *Tapes virginea*, *Natica nitida*, *Munida Rondeletii*, *Pandalus annulicornis*, and a small streaked *Actinia*. It appears to be a popular error, that at depths exceeding 50 or 100 fathoms, colour becomes less bright or even evanescent.

Sphænia Binghami, i. 190. Not uncommon in rolled pieces of chalk, as well as among the roots of *Laminaria digitata*, on the north-eastern coast of Ireland. I much doubt its having the power

of "burrowing," or excavating the stones and shells in which it is often found. Sometimes adult specimens have their shells strangulated, and more or less distorted, so as completely to fit the cavities in which they are enclosed; and I believe this mollusk, like *Kellia suborbicularis*, only uses the excavations which had been previously made by Annelids. I suspect the same to be the case with *Cliona perforans*, and that this curious Sponge only occupies deserted galleries.

Mya truncata, i. 163. A young specimen was taken alive in 80 fathoms water, by dredging off the coast of Antrim, at a distance of about ten miles from the shore. This species, as is well known, is usually found between tide-marks.

Poromya granulata, i. 204. A comparison of our shell with a specimen of the *Embla Koreni* of Lovén from Upper Norway induces me to confirm the surmise made by the authors of the 'British Mollusca,' that they are one and the same species. Nyst's specific name, however, has precedence in date.

Thracia convexa, i. 229. A young specimen was taken by Mr. Barlee in Zetland last year.

T. distorta, i. 231. I believe this is only an abnormal form of *T. villosiuscula*, and that they constitute but one species. The former name has, of course, the priority, although it is not so generally appropriate as the other. The first lines of growth are evidently the same in each; and it is only after the habitat is changed that a marked difference appears. The *Anatina truncata* of Turton may be regarded as an intermediate form. An analogous difference, occasioned by the habitat being free or enclosed, occurs in *Tapes pullastra* and its variety *perforans*, which was formerly considered a distinct species.

Lyonsia Norvegica, i. 214. St. Martin's Bay, Guernsey (*J. G. J.*); St. Catherine's Bay, Jersey (*Rev. A. M. Norman*).

Solecurtus candidus, i. 263. In dredged sand from Belfast Bay.

Psammobia costulata, i. 279. With the last.

Syndosmya tenuis, i. 323. Gronville and St. Catherine's Bays, Jersey (*Rev. A. M. Norman*).

Mactra elliptica, i. 356. I am much inclined to doubt this being anything more than a deep-water variety of *M. subtruncata*, having intermediate specimens from Guernsey and Ardrossan, in the last of which the transverse sulci only appear in the later period of growth.

Tapes pullastra, i. 382. A large, but worn, single valve, which belongs to the form named by me *Venus plagia* (described in the 'Annals of Natural History,' ser. 2. vol. xix. p. 313), has been found by Mr. Hyndman at Larne in Belfast Bay, and was obligingly presented by him to me. It measures $2\frac{2}{3}$ inches in length, and $1\frac{2}{3}$ in breadth. The peculiar obliquity of its shape and greater breadth, as well as the acute angle in which the anterior extremity terminates, incline me to retain my former opinion that it is not a variety of *T. pullastra*. In some respects it resembles *T. virginea*.

T. aurea, i. 392. Southend, Essex.

Circe minima, i. 446, var. latior et complanata. Belfast Bay.

Astarte compressa, i. 464. I found single valves of the smooth variety, with *Astyris Holböllii*, by dredging off Larne on the north-eastern coast of Ireland, in about 25 fathoms. The ribbed and convex form (*A. globosa* of Möller) occurs as a pleistocene fossil in the neighbourhood. See notice (*post*) of *Margarita cinerea*.

A. triangularis, i. 467. The non-crenation of the margin does not depend on age (as supposed by the authors of the 'British Mollusca'), for I possess specimens which are evidently adult and of the same size, some of them having the margin quite plain, while in others it is strongly crenulated.

Cardium edule, ii. 15; var. ovalis, compressa, margine antico subrecto. Herm (*Dr. Lukis*). This variety is as remarkable as the *C. rusticum* of authors.

C. punctatum (*C. nodosum*, ii. 22). Gorey, Jersey; very fine (*Rev. A. M. Norman*).

C. fasciatum, ii. 25. Some specimens from Zetland show decided punctures in the interstices of the ribs, which are apparently caused by the concentric wrinkles being more than usually crowded together in this part.

C. pygmæum, ii. 29. Gorey, Jersey (*Rev. A. M. Norman*).

Lucina borealis, ii. 46. There are two distinct forms or varieties of this species: one is compressed, with few and distant ribs; and the other is gibbous and smaller, with the ribs more numerous and close together. The last variety has been taken by Mr. Norman in Bantry Bay, and by myself in Guernsey.

L. leucoma, ii. 57. Jersey, at low water (*Rev. A. M. Norman*).

Sphærium rivicola (*Cyclas rivicola*, ii. 111). Beeston Brook, near Liverpool; Surrey Canal; Minchinhampton; Devizes (*Mr. Webster*).

S. ovale. M. Bourguignat, in his Monograph on the French species of *Sphærium* (p. 31, pl. 6. f. 6), refers this species, which was founded by Férussac, to the *Cyclas lacustris* of Draparnaud,—the *Tellina lacustris* of Müller being a different species, and identical with the *Cyclas calyculata* of Draparnaud. It is the *Sphærium pallidum* of Gray.

Dreissena polymorpha, ii. 165. Mr. Barlee informs me that it abounds in the river Witham in Lincolnshire, five miles from the sea; and that the river is not navigable by vessels above half a mile from Boston, where there is a sluice and lock to keep out the tide. It is more than probable that this species is indigenous to Great Britain, and was not originally imported from the Continent.

Mytilus edulis, ii. 170. The epidermis in young individuals is clothed with short hairs, which in after-growth appear to fall off. This is another link which unites the genus to *Modiola*.

Modiola radiata (*M. tulipa*, ii. 187). Jersey (*Rev. A. M. Norman*). The large variety from Falmouth has been lately figured by Mr. G. B. Sowerby, in his very useful work entitled 'Illustrated Index of British Shells' (pl. 7. f. 7), as a distinct species, under the provisional name of *Modiola ovalis*. If the normal form be found with it, the distinction may be a good one, as I am not aware that any intermediate variety has been discovered.

M. barbata, ii. 190. Guernsey (*J. G. J.*); Jersey (*Rev. A. M. Norman*).

M. cuprea, *Ann. Nat. Hist.* 3rd ser. vol. iii. No. 13. p. 40; *Sow. Ill. Ind.* pl. 7. f. 11. The indigenousness of this species is somewhat doubtful, as it now turns out that Mr. Bean's specimens were taken by Mr. Alfred Roberts, a bird-stuffer at Scarborough, from the crop of a *Brent-goose* (instead of a Sanderling) which had been shot there during the severe winter of 1855. Roberts appears to have had good cause for remembering the circumstance, from having lost his Sunday dinner. Having heard that the Brent-goose was "an excellent-eating bird," he depended upon this, and bought nothing on the Saturday; and, to his disgust, when his wife attempted to prepare it for the spit, the *ulva* on which it had fed smelt so very "loud," that bread and cheese had to be substituted. The Brent-goose is a northern bird, and an occasional visitant to this country. The shells retain all the original brilliancy of gloss and colour, and they may certainly have been picked up on the British coast.

Crenella rhombea, ii. 208. Gronville Bay, Jersey (*Rev. A. M. Norman*).

Arca lactea, ii. 238. In dredged sand from Belfast Bay.

Pecten furtivus, *Lov.* (*P. striatus*, var., ii. 284). A single valve occurred to me in dredged sand from Belfast Bay; and I have since found it alive, and not unfrequently, in the Irish Sea, off the coast of Antrim.

P. opercularis, ii. 299. The very young have a rhomboidal form, and the lower or flat valve is much smaller than the other (which overlaps it) and is perfectly smooth. The ribs do not at first appear on the larger valve, but are preceded by a shagreen reticulation.

Anomia ephippium, ii. 325. Specimens which I found many years ago in Swansea Bay, on a mussel bed which was uncovered at a very low spring tide, present the anomalous character of having the foramen in the lower or flat valve closed by a series of convex layers of thin shelly matter. They were alive, and attached to the mussels by the byssal threads of the latter mollusks; and it appeared to me that, having been detached from the oysters or stones to which they were originally fixed, and thus deprived of their plugs, they filled up the openings in the above manner for the sake of protection against whelks and other enemies, being securely held by the mussel moorings.

Gasteropoda Prosobranchiata.

Chiton gracilis, *Ann. Nat. Hist.* 3rd ser. vol. iii. No. 14. p. 106. Gronville Bay, Jersey, with *C. discrepans*; rare (*Rev. A. M. Norman*).

C. Hanleyi, ii. 398. In deep water on the north coast of Ireland, with *Pholadidea papyracea* (*J. G. J.*). It is recorded in the 'Journal de Conchyliologie' as having been taken at the Antilles.

C. cancellatus, ii. 410. With the last, at low water (*Rev. A. M. Norman*). Irish coast, off Larne, in about 18 fathoms (*J. G. J.*).

Calyptræa Sinensis, ii. 463. At Helford River, Cornwall; most abundant and fine, both at low-water mark and dredged (*Mr. Webster*).

Puncturella Noachina, ii. 470. Belfast Bay.

Emarginula reticulata, ii. 477. The fry closely resembles a *Scissurella*, and has a regular Trochoidal spire, with the edges of the slit inflected.

E. rosea, ii. 479. Jersey (*Rev. A. M. Norman*).

Haliotis tuberculata, ii. 485. Dr. Lukis informs me that in Mrs. Collings's collection is a specimen, about an inch and a quarter in length, in which the perforations were absent from the very earliest period of growth, being quite a congenital deformity. And he adds that, although the demand for ormer shells, as articles of commerce, is on the decline, one merchant had (in February last) at least fifteen to twenty tons weight in store; that at sorting-time every shell is separately examined, and that the best lots fetch on the spot for exportation about seven shillings and sixpence per hundredweight; and that the quantity brought to this merchant varied, in the season, from four to nine tons. It appears to be found in Alderney, and also (though rarely) in Jersey.

Trochus alabastrum, ii. 497, var. alba. Zetland (*Mr. Barlee*).

T. exiguus, ii. 505. Jersey (*Rev. A. M. Norman*).

T. striatus, ii. 508. In dredged sand from Belfast Bay.

T. Montagui, ii. 511. Jersey (*Rev. A. M. Norman*). An exquisite scalariform variety has been found by Mr. Waller and myself, by dredging off the north-eastern coast of Ireland; but it is very rare. The animal does not differ from that of the usual form.

Margarita exilis (*Skenea? Cutleriana*, iii. 164). Falmouth, rare (*Mr. Webster*); Fowey, abundant in dredged sand (*Mr. Barlee*).

M. cinerea, *Gould, Inv. Mass.* 252. Mr. Waller and myself have each found a specimen in dredged sand from the Turbot Bank in Belfast Bay. They appear to be recent, although not in good condition. Mr. Hyndman has kindly furnished me with some shells (principally *Astarte sulcata*) which were taken from a pleistocene bed near Belfast, lying about 90 feet above the present level of the sea. All of them want the transparence and gloss which distinguish the shells supposed to be of Arctic origin and lately dredged in Belfast Bay. Although the latter are not pleistocene, there may still be a question whether they are not *post*-pleistocene, or the relics of the glacial epoch, like *Leda pygmæa*, *Arca raridentata*, and other species, which apparently survive only in a few, but widely separated, parts of that extensive region which was once subject to an Arctic temperature. Lovén has recorded *M. cinerea* as occurring in Finmark. I have since found and examined a bed of pleistocene fossils lying by the road-side about half-way between Larne and Glenarm, about 80 yards from high-water mark, and 15 feet above it. It is situate about ten English miles from the Turbot Bank. All the shells contained in this bed appear to be decidedly of an Arctic character, and include *Hypothyris Psittacea*; but few of them, and those having an extensive range of geographical distribution, have as yet

been detected in the adjacent sea. In texture and appearance, all these fossils are very different from the shells taken on the Turbot Bank. Local information has satisfied me that none of the last-mentioned shells could have been brought from any distance by marine currents; and indeed I have found nearly all the species living in the immediate locality.

M.? costulata (*Skenea? costulata*, iii. 167). Mr. Waller found two specimens with the last, and in the same condition, one of which he has obligingly presented to me. Mr. Barlee has also taken a small specimen in dredged sand from the Shetlands.

Adeorbis subcarinatus, ii. 541. The supposed operculum of this unknown mollusk (p. 543) is the *Spirillina perforata* of Williamson (Mon. Brit. Rec. For. in the publications of the Ray Society, p. 92. f. 202), and belongs to the *Foraminifera*.

Bithynia Leachii, iii. 16. Neighbourhood of Boston (*Mr. Barlee*); var. minor, Northamptonshire (*J. G. J.*).

Littorina littorea, iii. 29. On the shore of the Thames, at South-end, nearly all the specimens are more or less eroded, and so much so in some cases as to appear distorted. This cannot, I think, be owing (as supposed by some naturalists) to the admixture of fresh water with the sea, because in the same locality, where a small stream empties itself into the Thames, none of the specimens are similarly affected, while on the sea-shore at Tenby, where there is no flow or infiltration of fresh water, dwarf specimens of *Mytilus edulis* (var. *incurvatus*) are partially eroded, and the limestone rocks are fretting away from apparently the same cause. On the opposite coast of North Devon the *Purpura lapillus* presents a similar case of erosion; and the *Chthamalus punctatus* derives its specific name from such marks. Other instances of the same kind will doubtless occur to many of my readers. I believe this erosion is caused by the action of carbonic acid, which is evolved by sea-water in considerable quantities under certain conditions, aided by the gyratory motion and reflux of the tide.

L. fabalis, iii. 49. This variety of *L. littoralis*, is found with the young and an intermediate form of the typical species on the shores of Larne Lough, in the north-east of Ireland; and it confirms my former impression that these two so-called species ought to be united. A similar intermediate gradation of form occurs in the same place with respect to *L. rudis* and its variety *L. tenebrosus*.

Lacuna labiosa, *Lov.* iii. 66. In dredged sand from Belfast Bay; a single specimen.

L. crassior, iii. 67. Specimens from Guernsey and Belfast Bay have a distinct canal or groove in the columella, evidently showing its generic position. I am now enabled to add a note of the animal, which settles the question. It is of a yellowish-white colour, having two subulate and slender tentacles, with the eyes placed on short peduncles at their external base; proboscis long and narrow; two rather long caudal filaments, one on each side of the operculigerous lobe. The creature is active in its habits, and seems fond of crawling out of water.

Assiminea Grayana, iii. 70. I have traced this peculiarly local species along the banks of the Thames from Greenwich (its original locality) to about two miles below Gravesend, being a distance of more than twenty miles.

A. littorea (*Rissoa? littorea*, iii. 132 and iv. 265), var. pallida. Weymouth.

Rissoa calathus, iii. 82. In dredged sand from Belfast Bay.

R. cimicoides (*R. sculpta*, iii. 88). Cork Harbour (*Mr. Wright*).

R.? fulgida, iii. 128, var. efasciata. South Devon (*Mr. Webster*).

R. subumbilicata, *Ann. Nat. Hist.* 3rd ser. vol. iii. No. 14. p. 108. Southend (*J. G. J.*); Clevedon (*Rev. A. M. Norman*); Birkenhead (*Mr. Webster*). The last whorl of the shell is never keeled, as in *R. ulvæ*.

R. Barleei, *Jeffr. Ann. Nat. Hist.* vol. xix. p. 310 (*R. ulvæ*, var., iii. 143). In deep water, Plymouth (*Mr. Webster*). A dwarf and thin variety occurs in Arnold's Pond, Guernsey, associated with *R. ventrosa*, to which latter species (instead of *R. ulvæ*) I would refer the shells mentioned in the 'British Mollusca,' vol. iii. p. 143. I much doubt if *R. ulvæ* is found in Guernsey, as that island is destitute of any estuary into which a river flows, which is, I believe, the invariable habitat of that species.

R. castanea (*R. ventrosa*, var., iv. 266), *Sow. Ill. Ind.* pl. 14. f. 11. Mr. Pickering found this species about two miles below Gravesend, and not at Grays, as stated in the 'British Mollusca.' It is singular that he has not been, any more than myself, successful in rediscovering the species, although we have both at different times searched the exact spot for it. It can scarcely be questioned that it is specifically distinct from *R. ventrosa*, which is abundant in the same locality.

R. ventrosa, iii. 138, var. minor. Loughor Marsh, Glamorganshire, with *R. ulvæ*. I am not aware of any other instance in which these species have been found associated together. *R. ventrosa* usually inhabits brackish water, in ditches and ponds which communicate with the sea, but receive an accession of salt water only when the tide is at its full, while *R. ulvæ* affects the mud flats of estuaries which are quite covered by the sea at the same period. The habit of the above variety appeared to be different from that of *R. ulvæ*, inasmuch as all the specimens which I noticed of the former were swimming (or rather creeping) underneath the surface of the water, with their shells in an inverted position, while those of *R. ulvæ* were crawling at the bottom, or attached to sea-weeds. Mr. Alder says, with respect to the linguædental apparatus of these species, "I have examined the tongues of *R. ulvæ* and *R. ventrosa*, and I find the difference between them so slight as to be scarcely appreciable. The principal one is the greater length of the central denticle of the central tooth in *R. ulvæ*. There are also some slight differences in the form of the other teeth; but the general character is the same."

Skenea planorbis, iii. 156. A small variety occurs on the shores of Larne Lough, in Ireland, which has a more convex spire; and it

appears to bear the same relation to the typical form that the *Helix rupestris* of Continental authors does to our *H. umbilicata*.

S. striata (*Valvata? striata*, Phil. i. 147, t. 9. f. 3, and ii. 122). Two specimens have been found by Mr. Waller at Bundoran, in the North of Ireland, one of which he obligingly presented to me. It cannot be mistaken for the young of any British species of *Trochus*. My specimen is nearly one-tenth of an inch in diameter. Although Philippi provisionally assigned it to the genus *Valvata* because he found it in a fossil state, associated with *Cyrena gemellaris* as well as with marine shells, he subsequently thought it might with equal propriety be referred to his genus *Delphinula*. Mr. Searles Wood has, in his 'Crag Mollusca' (Univ. p. 137, tab. 15. f. 7), referred to Philippi's species some fossil shells under the name of *Adeorbis striatus*; but I am not satisfied that there are sufficient generic characters for distinguishing *Adeorbis* from *Trochus*, taking *Adeorbis subcarinatus* as the type.

Skenea? lævis, iii. 165. Mr. Barlee has found another specimen in dredged sand from the Shetlands. I do not believe it is the *Delphinula lævis* of Philippi; and if it proves to be distinct, I would suggest that the specific name of *nitida* be given to our species.

Euomphalus? (Omalogyra) nitidissimus (*Skenea? nitidissima*, iii. 158). On *Zostera marina*, between tide-marks on the shores of Larne Lough, Ireland.

E.? (Omalogyra) rota (*Skenea? rota*, iii. 160). Serk (*Mrs. Collings*).

Cæcum glabrum, iii. 181. It is possible that the *Serpula incurvata* of Adams, instead of being the fry of this species (according to Mr. Clark), may be a species of *Bifrontia*. I possess apparently very young specimens of *C. glabrum*, which merely show a greater curvature of form with a less diameter than the adult, and present the same relative differences that exist between the *Dentalium imperforatum* and *trachea* of Montagu.

Cerithium niveum, *Jeffr. in Ann. Nat. Hist.* Mr. Waller has found specimens of different ages (but more or less imperfect) by dredging on the north-eastern coast of Ireland. It is a true *Cerithium*.

Stylifer Turtoni, iii. 226. Mr. Leckenby informs me that a fine specimen (three-eighths of an inch in length!) was found a year or two ago at Filey by Miss Backhouse. In a note which I have received from Mr. Howard Stewart, as to this rare and interesting species, he says, "Amongst my numerous dredgings for the British *Echinoderms* on the Plymouth coast, I have carefully looked over vast numbers of sea-eggs, &c., for the *Stylifer Turtoni*, but have never found it except on *Echinus miliaris*. In October or November 1855, I found six *Stylifers* on one *Echinus miliaris*, but only one of these was adult; and on another specimen of *E. miliaris* I obtained an adult specimen of the mollusk, and the ova of the same. The ova were so far advanced as to be seen swimming about by means of coarse cilia under the microscope with a low power, and the shells were perfectly formed." Mr. Stewart has since obligingly presented me with these ova, which are disposed in two clusters (probably

separated in their removal from the *Echinus*), and altogether contain 200 or 300 fry. The shells appear to correspond with the first whorl of the style.

Chemnitzia simillima, *Ann. Nat. Hist.* 3rd series, vol. ii. p. 128; *Sow. Ill. Ind.* pl. 16. f. 3 (nom. *C. pusilla*). St. Catherine's Bay, Jersey (*Rev. A. M. Norman*). The *C. gracilis* of Philippi does not appear to have been hitherto found in Great Britain, although a small and slender variety of *C. elegantissima* may have been mistaken for it. This variety has been figured by Sowerby (pl. 16. f. 2) under the erroneous name of *C. simillimus*, referring to Montagu and the *C. gracilis* of Philippi. The true *C. gracilis* is an exquisite shell, and when taken alive it glitters in the sun like a bright needle. In size and diameter it is less than *Eulimella acicula*.

C. rufa, iii. 245. In dredged sand from Belfast Bay.

C. fenestrata, iii. 249. St. Catherine's Bay, Jersey (*Rev. A. M. Norman*).

Odostomia turrita, *Jeffr. in Ann. Nat. Hist.* 2nd ser. vol. ii. p. 339 (*O. striolata*, iii. 267). Bantry Bay (*Rev. A. M. Norman*).

O. acuta, iii. 269. St. Catherine's Bay, Jersey; very large (*Rev. A. M. Norman*).

O. alba, iii. 278, var. gracilior et carinata. Belfast Bay (*Mr. Waller*).

O. Lukisii, *Jeffr. in Ann. Nat. Hist.* 3rd ser. vol. iii. p. 112. South of Devon (*Mr. Webster*).

O. glabrata, iii. 283. With the last; but very rare. It has somewhat the aspect of a young *Rissoa vitrea*.

O. diaphana, *Jeffr. in Ann. Nat. Hist.* 2nd ser. vol. ii. p. 341; *Sow. Ill. Ind.* pl. 17. f. 23. In dredged sand from Zetland; rare. Mr. Sowerby justly remarks that this species is "manifestly distinct" from *O. obliqua*.

Eulimella clavula, iii. 314. Guernsey; very rare.

Natica Helicoides, iii. 339. I found a young specimen in dredged sand from Belfast Bay.

N. pusilla, iii. 341. Mr. Barlee has taken this species alive in the Shetlands.

Trichotropis borealis, iii. 361. In dredged sand from the Turbot Bank, Belfast Bay; and I have lately found it alive in the same part of the Irish Sea.

Cerithiopsis pulchella, *Jeffr. in Ann. Nat. Hist.* Mr. Waller has taken this unmistakeably distinct species on the north-eastern coast of Ireland. It has been recorded in the Report of the Belfast Dredging Committee (furnished to the British Association in 1857) under the name of *Cerithium metula*.

Nassa pygmæa, iii. 394. Belfast Bay (*Mr. Waller*).

Buccinum Dalei, iii. 408. The operculum proves that this species is a true *Fusus*; and the shell wants the columellar fold of *Buccinum*.

B. fusiforme, iii. 412. Mr. M'Andrew procured two specimens (one of them being nearly adult, and the other younger) by dredging off the coast of Finmark; and the operculum, as well as the absence of a columellar fold, clearly show that this species must also be re-

moved from *Buccinum* to *Fusus*. The operculum in this and the last species is unguicular, and has a terminal nucleus. The apical whorls of this shell closely resemble those of *Fusus Berniciensis*. As the present specific name is manifestly inappropriate, I would venture to suggest that it should be changed to *Broderipi*, as a slight testimony to the memory of its late lamented discoverer.

Fusus Berniciensis, iii. 421. Among the results of Mr. Barlee's last dredgings in Zetland is a remarkably solid and evidently very old, though recent shell, which I must provisionally assign to this species. It is nearly four inches in length, and not quite an inch and a half in breadth, being therefore of a more slender form than *F. Berniciensis*. But the peculiarity of this specimen consists in the apical whorls not being blunt and symmetrical, as in *F. Berniciensis*, but pointed and mammillary, as in *F. Islandicus*. The outer lip is of equal thickness with the rest of the shell, and is strongly ribbed on the inside near the mouth. I at first suspected that the difference in the form of the apical whorls might be sexual, and that the same relation might subsist between this variety and *F. Berniciensis* as between *F. Islandicus* and *F. propinquus*; but I have since ascertained that male and female individuals of *F. antiquus* do not exhibit any variation in this respect.

F. Norvegicus, iii. 428. Mr. Barlee procured a very young specimen of this shell in his last Shetland dredgings.

Trophon clathratus, iii. 436, var. alba. With the last (*Mr. Barlee*).

T. Barvicensis, iii. 442. Not uncommon on the north-eastern coast of Ireland.

Triton cutaceus, iii. 446; *Sow. Ill. Ind.* pl. 18. f. 1. Dr. Lukis informs me that a full-grown and perfect specimen was taken alive in February last (1859) by Mr. John Rougier from a large flat stone in the south-west of the island of Lihou, while he was engaged in gathering ormers (*Haliotis tuberculata*) at the extreme verge of the lowest spring tide. It is now in the public museum at Guernsey.

Mangelia Trevelliana, iii. 452. In dredged sand from Belfast Bay; very rare.

M. rufa, var. Ulideana, iii. 457. Mr. Norman says he has lately taken, in St. Catherine's Bay, Jersey, a magnificent and living specimen of this pretty variety with the typical form. I have also found it at Tenby. It may be a distinct species.

M. teres, iii. 462, var. alba. West of Ireland and Scotland (*Mr. Barlee*).

M. Leufroyi, iii. 468. In dredged sand from Belfast Bay (*J. G. J.*); var. pallida. Zetland (*Mr. Barlee*).

M. lævigata, Phil. (*M. nebula*, var. iii. 480). St. Catherine's Bay, Jersey (*Rev. A. M. Norman*).

Gasteropoda Opisthobranchiata.

Cylichna mammillata, iii. 514. Falmouth (*Mr. Webster*).

Scaphander lignarius, iii. 536, var. alba. West of Ireland and Zetland (*Mr. Barlee*).

Philine quadrata, iii. 541. A small specimen has occurred in our dredgings off the north-eastern coast of Ireland, in 80-fathom water.

P. pruinosa, iii. 549. Plymouth Sound (*Mr. Webster*).

Gasteropoda Pulmonifera.

Arion flavus, iv. 9. On horse-chestnut leaves near Norwich (*Mr. Bridgman*).

Helix nemoralis, iv. 54, var. nana. Zetland (*Mr. Barlee*).

Pupa Anglica, iv. 99. Brombro' Wood, between Birkenhead and Chester; first found there by D. Cameron, Esq. (*Mr. Webster*).

P. minutissima, iv. 104. Mr. Leckenby informs me that this species has been found rather plentifully upon the magnesian limestone near Pontefract. Mr. Howse had also taken it on the same soil near Sunderland.

Achatina acicula, iv. 130. From the circumstance that the tentacula are destitute of eyes, M. Bourguignat has, in his "Aménités Malacologiques" (published in the 'Revue et Magasin de Zoologie'), proposed for this and a few other allied species the generic name of *Cæcianella*. It may be observed that *Testacella* and some of the *Helicidæ* have the same subterranean habit.

Limneus glaber, iv. 178. Near Bowness (*Mr. Webster*).

Acme lineata, iv. 204. In tufts of *Hypnum triquetrum*, Headington-wick Copse, near Oxford (*Mr. Whiteaves*).

Sepia biserialis, iv. 241. Mr. Norman informs me that he has lately taken a bone of this rare and peculiar cuttle-fish at Jersey. I found an imperfect specimen many years ago at Rochelle.

London, August 1859.

P.S. *Pholadidea papyracea*.—I have just received the following note from my friend Dr. Capellini, with reference to the claystone which Captain Bedford found perforated by these mollusks, and in which the *Nucula decussata* had been previously imbedded. It will, I think, be found interesting in a palæontological point of view.

"Amico carissimo,—Ho veduto con molto interesse gli esemplari di roccia con fossili identici a quelli trovati da Philippi nel pleistocene di Sicilia; e riguardo all' origine della roccia stessa non dubito punto che essa sia argilla resa più o meno compatta dalla presenza del carbonato calcare.

"In uno degli esemplari che ha avuto la bontà di mostrarmi, si vedeva chiaramente il passaggio dall' argilla al calcare argilloso, e quel frammento mi ricorda che ho avuto occasione di osservare un fatto analogo nelle argille mioceniche della Val di Magra, a poche miglia dalla Spezia.

"Non conosco per mie proprie osservazioni la Sicilia ed Ischia, ove probabilmente sono roccie pleistoceniche simili ai suoi esemplari, ma, a Livorno, una delle più interessanti località per lo studio del pleistocene in Italia, le roccie spettanti a quel periodo e che si distinguono nel paese coi nomi di tufo e panchina, hanno tutt' altro aspetto delle sopra citate; poichè l'una è un calcare grossolano molto spugnoso,

con abbondanti resti di conchiglie littorali, l'altra è una specie di conglomerato.

"Da tutto cio ella vede non esser possibile basarsi sui caratteri litologici per segnare l'età di una formazione, perchè roccie di aspetto e di composizione identica si trovano spesso in terreni che spettano ad epoche svariatissime; dippiù potrei citarle roccie che sono attualmente in via di formazione e che pure presentano compattezza ed aspetto da confondersi con roccie di terreni molto antichi.

"La litologia non può servire che a sincronizzare terreni i quali geograficamente sono a non troppa distanza gli uni dagli altri; in caso contrario, il geologo si trova subito nell' impossibilità di fare a meno della paleontologia.

"Senza conoscere gli altri fossili che si troveranno nelle roccie da Lei presentatemi, e senza aver notizia delle loro condizioni stratigrafiche non oso pronunziare sull' età loro il mio giudizio, come ho fatto per il loro modo di formazione; *benchè per conto mio sia persuaso, come Ella, trattarsi di un terreno pleistocenico analogo a quello studiato da Lyell ad Ischia*: ivi pure sono argille turchine con conchiglie che vivono anche attualmente nel vicino mare.

"Mi creda, &c.

Londra, 10 Agosto, 1859. "Dr. G. Capellini."

XXI.—*Researches on the Cellular Formations, the Growth, and the Exfoliation of the Radical and Fibrillar Extremities of Plants.* By MM. Garreau and Brauwers*.

In a series of researches undertaken by one of us, with the view of acquiring a knowledge of the causes which preside over the distribution of mineral matters in the different organs of plants, we had occasion to remark that when seeds germinated at a temperature of 68° to 78° Fahr., the points of the radicles, and subsequently the fibrillar extremities of the roots, frequently bore, very soon after their emergence from the axis, more or less marked traces of a cellular exfoliation, or a tear-shaped enlargement of a viscous consistence, although both were placed in media suited for the regular accomplishment of their physiological functions.

As these facts seemed therefore to depend on their normal development, it became interesting to examine them with care. Prof. Link, in an essay only too concise, distinguished by the accuracy of the optical observations it contained†, directed the

* Ann. Sc. Nat. 4 sér. x. p. 181; translated by A. Henfrey, F.R.S.

† Ann. des Sc. nat. 3 sér. xiv. 5. Besides this work of Link, readers interested in this subject should refer to a memoir by M. Gasparrini (Ricerche sulla Natura dei Succiatori e la Excrezione delle Radice, &c.), published at Naples in 1856, and referring to the question which has been the object of the investigations of MM. Garreau and Brauwers.—*Note of* Ed. *of* Ann. des Sc. nat.