

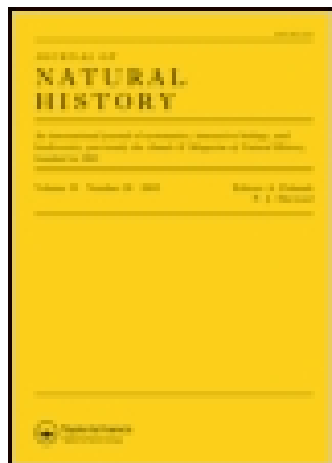
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XXXVII.—First series of supplementary notes to a former paper, entitled “An account of some shells and other invertebrate forms found on the coast of Northumberland and of Durham”

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ridges of that vast country ; for great would be my pleasure to learn, that through the application of Cornish skill, such regions should be converted into a British "El Dorado."

Requesting you to pardon this little digression, which after all may be turned to profit, and hoping that you will be as proud as I am of the connexion which is now established between Cornwall and Siluria,

Believe me to be, my dear Sir Charles,

Yours most faithfully,

R. I. MURCHISON.

XXXVII.—*First series of Supplementary Notes to a former Paper, entitled "An Account of some Shells and other Invertebrate Forms found on the coast of Northumberland and of Durham*."*

By WILLIAM KING, Curator of the Newcastle Museum.

HAVING lately read with some attention Professor Edward Forbes's highly philosophical paper on "The Geological relations of the existing Fauna and Flora of the British Isles," published in the first volume of the 'Memoirs of the Geological Survey of Great Britain,' &c., I have been induced to make a few remarks on the depth of habitat of certain species and varieties living on the coasts of Durham and Northumberland.

Professor Forbes divides the bottom of the British seas into four regions or zones according to depth of water and biological peculiarities. "The first or Littoral zone is that tract which lies between the high and low water marks," and inhabited by some common species of *Fucus*, *Littorinas*, *Purpura lapillus*, &c. "The second or Laminarian zone is that land-encircling belt which commences at low water mark and extends to a depth of from seven to fifteen fathoms. The great tangle sea-weeds form miniature forests in this region," which is also tenanted by *Rissoas*, *Lacunas*, *Patella pellucida*, *Pullastras*, &c. The third is the *Coralline zone*, the vertical range of which is from "fifteen to about fifty fathoms ; its chief development between twenty-five and thirty-five

I would specially direct attention, now that its true characters have been opened out to geographers and naturalists by the undaunted and able explorations of Dr. Leichhardt. Some of the tracts recently passed through with so much zeal, by the Surveyor-General of the colony, Sir Thomas Mitchell, may also prove valuable in gold, though they lie further from the axis of elevation. In the mean time, gold ore has been found on the other side of the Australian continent, in the ridges which extend northwards from Adelaide towards the scene of the adventurous and toilsome journey of Major Sturt. These gallant geographers, the pioneers of civilization, are explaining to us the condition of tracts which thousands of our countrymen may soon colonize with the best effects.—London, April 12, 1847.—R. I. M.

* Annals and Magazine of Natural History, vol. xviii. pp. 233—251.

fathoms." It is so termed, because "in it we find the greatest variety and abundance of the corneous zoophytes—arborescent animals, which seem here to take the place of plants. Here we find the great assemblage of carnivorous mollusca, the species of *Fusus*, *Pleurotoma*, *Buccinum*," &c. The fourth is the *deep sea Coral zone*, which ranges from "fifty fathoms to beyond one hundred:" it is "well-characterized by the abundance of the stronger corals," such as *Cellepora* and *Oculina prolifera*, "by a few peculiar *Mollusca*, and by peculiar *Echinodermata*," &c.

I am not aware that there is any extensive area of sea-bottom on our coasts so deep as the utmost limit here assigned to the *Coral zone*, but there is no doubt that we have the whole of the zones which have just been described.

Had I gone over Professor Forbes's paper when mine was in preparation, I should undoubtedly have given the depths of the severally described *species and varieties*, in accordance with this gentleman's views; for it is remarkable, how strictly their vertical distribution is regulated by the bathymetrical laws he has pointed out.

It will be recollected that most of the forms which I described were stated to be from "deep water;" and that I defined the term in a foot-note as follows: "By the expression 'deep water' must be understood a depth ranging from forty to eighty fathoms. The greatest depth given in Norrie's chart of the North Sea for the trough separating the coasts of Northumberland and Durham from the Dogger and Great Fisher banks, seldom exceeds eighty fathoms." Now this "depth ranging from forty to eighty fathoms" nearly corresponds with Professor Forbes's *Coral zone*.

My former paper contained a description of "two strongly marked varieties" of *Fusus antiquus*: the "thin, short and tumid" variety I have invariably procured from the *Coral zone*, where it lives on *soft ground*; the "thick and elongated" variety inhabits *hard ground** in the *Coralline zone*: they appear to graduate into each other by a form living at an intermediate depth. The thin tumid variety of *Fusus islandicus* is also from soft ground in the *Coral zone*; and the "thick, long and narrow" variety belongs to the *Coralline zone*, where it occurs on both kinds of sea-bottom. *Panopæa arctica*, *Natica grænlandica* and *Retepora Beaniana* appear to be confined to the *Coral zone*. The variety *pelagica* of *Mya truncata* lives in the same region; the normal variety is peculiar to the *Littoral* and *Laminarian zones*; and an intermediate form inhabits the *Coralline*. *Fusus norvegicus*, *F. Turtoni*†

* The terms "hard ground" and "soft ground" are in common use among the fishermen; the former for a *gravelly, pebbly, or rocky bottom*, and the latter for one that is *muddy or sandy*.

† I regret that my paper contained no allusion to Mr. W. Bean being the

and *F. berniciensis* have only been procured from the *Coral zone*, or where it merges into the *Coralline*.

Two of the four varieties I mentioned of *Buccinum undatum* are remarkable instances illustrating how different depths of water influence modifications of form: the varieties *magnum* and *pelagicum* are both from soft ground; but the former "lives at depths varying from fifteen to forty fathoms," and consequently belongs to the *Coralline zone*; the latter lives in from forty to eighty fathoms water, and therefore inhabits the *Coral zone*. These variations of depth induce a most remarkable difference in the form of this species: thus *pelagicum* is thin, finely threaded and corded, and in general slightly waved; it has the spire elongated, the epidermis thin and finely ciliated, and the anterior part of the outer lip expanded beyond the termination of the columella*: whereas *magnum* is a thicker, a shorter, and a more tumid shell; it is strongly threaded and corded and prominently waved; its epidermis is thick and clothly; and its columella extends as far forward as the anterior part of the outer lip. Through the kindness of Mr. Pickering of London, I have lately become possessed of a specimen from Newfoundland, the same as the shell which Dr. Gould identifies with the *Buccinum ciliatum* of Fabricius: I cannot but consider it as only a variety of *B. undatum*, and closely allied to *pelagicum*, if not the same: it agrees with the latter in being thin, slightly waved, and in having the anterior part of the outer lip expanded beyond the termination of the columella; but the spire is somewhat less produced, and the whorls are merely threaded: the last character is more strongly marked than in the "simply striated" specimen from Ireland I have spoken of elsewhere (vide *Annals*, vol. xviii. p. 248). Were I sufficiently acquainted with the *Buccinum ciliatum* of Fabricius, and the *B. Donovanii* of Gray, and writing a general account of the varieties of *Buccinum undatum*, it is

first discoverer of *Fusus Turtoni*: this is an omission which remained undiscovered until after my paper was published.

* It is stated by Mr. Albany Hancock, in his "Notes on *Buccinum undatum*" (vide *Annals* for March), that his variety 1. "is occasionally very thin and delicate, and has the spire sometimes considerably produced and the whorls much-rounded. The *B. undatum* of Brown (Illustr. Conch. 2nd ed. pl. 3. fig. 2) is an example of the extreme form of this state, which occurs not unfrequently on the Dogger-bank." Variety 1. is the same as my *magnum* (Mr. Hancock's specimens were procured from the Cullercoats' cobbles that usually fish in from thirty to forty fathoms water; occasionally deeper); and the "occasionally very thin and delicate" shells referred to belong to my *pelagicum*, of which hundreds of specimens have now passed through my hands, and all, without exception, were obtained from the *Coral zone*. The Dogger-bank, which is shallow, and in parts rocky, yields forms as thick and rugged as those inhabiting the *Coralline zone*.

highly probable that I should be induced to regard these and *pelagicum* as so many forms of the deep-water or *Coral zone* variety: in this case the earlier name of Fabricius would have to be used instead of mine.

But *depth* is not the only element inducive of a varietal difference: the nature of the sea-bottom, whether hard or soft, as is well known to fishermen and many naturalists, exercises a marked influence in this respect. In my paper, as it was read at the Southampton Meeting of the British Association, another variety was described under the name of *crassum*, and which I am disposed to think is represented by the shell figured in Pennant's 'British Zoology,' pl. 73. One of the principal differences between it and *B. magnum* is in the general absence of an epidermis, which, when present, has somewhat the appearance of network, or it assumes the character usual in *littorale*: moreover, it is a thicker, narrower and smaller shell; the whorls are more angulated and more numerous, the aperture is considerably smaller, the canal is narrower, the waves are closer together, more rugose and more angulated, occasionally showing a tendency to become biciplicated on the middle of the whorls; the cords are thicker and closer to each other, and the intervening furrows are narrower, rarely having more than one or two threads. Notwithstanding these differences, I have seen specimens which it was difficult to say whether they belonged to *B. crassum* or *B. magnum*. The colour of this variety is generally reddish brown externally, and yellowish white internally; occasionally the outside of the shell is marked with dark brown bands on a light-coloured ground. My largest specimen, which has nine whorls, is $3\frac{1}{4}$ inches long and 2 broad. I possess an interesting specimen (one of the doubtful forms just alluded to) 5 inches long and $2\frac{5}{8}$ broad, and having nine whorls: the first seven whorls have all the characters general to *crassum*; while the last two are covered with an epidermis, and, in other respects, agree with those of *magnum*: I look on this specimen as having been a *crassum* for so long of its existence, and afterwards, perhaps through migrating to *soft* ground, to have become changed into a *magnum*! The variety *crassum* is common on *hard* ground in the Laminarian and Coralline zones on the coasts of Northumberland and Durham, where it ranges from seven to thirty fathoms: it also occurs on the Yorkshire coast; but I apprehend it will be a scarce shell further south, where soft ground is prevalent. I am not yet sufficiently acquainted with rock-inhabiting forms from deeper water, including the *Coral zone*: from what has passed under my observation, however, I am induced to believe that they approximate more or less to *magnum* and *pelagicum*.

The variety *littorale* lives on hard ground* in the *Littoral* and *Laminarian* zones. It is now my opinion that I was wrong in formerly limiting it to grounds "laid bare at low tides." For some years I have been acquainted with a form of *Buccinum*

* I have been charged with committing "an error" in stating that the variety *littorale* is only found "on pebbly bottoms and rocks." Mr. Albany Hancock, in his "Notes on *Buccinum undatum*," published in the last Number of the 'Annals,' avers, that it "occurs between tide-marks on rocks and mud." The statement which I gave is based on my own observations: when living at Sunderland, I often observed specimens of this variety between tide-marks, opposite the Moor, burrowing among pebbles, sand and gravel, and sheltering themselves behind stones and in the crevices of rocks; but I have never seen any on a muddy bottom: that specimens *may occasionally* occur on mud I do not deny, but that such is a regular habitat I am very much disposed to question; for these reasons, that a bottom of this kind, "between tide-marks," could neither afford them shelter from the surge of the shore, nor objects to which they could attach their spawn. Even the *sea-bottom*, inhabited by *magnum* and *pelagicum*, cannot strictly be called *soft ground*, as from the number of stones, and masses of *Modiola vulgaris* that are continually being brought up by the fishing lines, its roughness must vastly exceed that of a "*mussel scarp*."

With reference to Mr. Hancock's other charges, I feel it necessary to state the following particulars:—

While Librarian of the Literary and Philosophical Society of Sunderland, and Curator of the Museum in the same town, that is, from 1834 to the close of 1840, I devoted especial attention to the study of recent and fossil shells. By carefully examining for that purpose the cobbles and decked boats, and frequently visiting Hartlepool and the whole coast from the Tyne to the Tees, as also joining for some days in a dredging excursion, I procured a great variety of shells, some of which were rare: my finest *Panopæa* was got in 1839. Nor was *Buccinum undatum* overlooked: it was a shell which I always held in particular favour, inasmuch as I believed its various modifications illustrated an early and a favourite speculation of mine as to the genesis of species. I repeatedly procured the dwarf whitish variety (*littorale*) at low water opposite Sunderland; the red rock-inhabiting variety (*crassum*) from the crab and in-shore fishing cobbles of Sunderland and other places; the large thick-skinned strongly-waved variety (*magnum*) from the Brat nets of the Hartlepool fishermen; and the small thin variety (*pelagicum*) from the decked boats that frequented our deep far-off fishing grounds.

Was it possible then for any one to be thus procuring these widely different forms without being struck with their differences—without knowing something about "their localities and general habits?"—points, which Mr. Hancock, availing himself of the current knowledge of the fishermen as to the depth at which they lived and the nature of the ground they inhabited, "*soon ascertained*" of the varieties which he collected "*during a short residence at Cullercoats in 1841.*"

In 1841, having been previously appointed Curator of the Newcastle Museum, I became acquainted with Mr. Hancock, who appeared to be as much interested with the various forms of *Buccinum undatum* as myself. He was then inclined, he stated, to regard the three forms he had collected at Cullercoats as distinct species; but more particularly his variety 2. (*crassum*); for this reason, that with only a single exception, he had never seen it but without an epidermis. He further stated to me his intention of pub-

undatum with an unusually thin shell, a remarkably short spire, and very tumid whorls, inhabiting a "mussel scarp" at a depth of from a foot to about two fathoms below low water mark, within the entrance of the river Tees. I have hitherto been disposed to regard this form as a distinct variety; and probably it would have been described as such in my paper had not circumstances prevented me: I now consider however that it is merely a thin form of *littorale*; and hence my reason for extending the vertical range of this variety to the *Laminarian zone*.

The Tees form of *littorale* is exceedingly interesting on account of its confirming an opinion of Mr. J. E. Gray, that "the shells of *Buccinum undatum* and *B. striatum* of Pennant have no other difference, than that the one has been formed in rough water, and is consequently thick, solid and heavy; and the other in *still water of harbours*, where it becomes light, smooth, and often coloured*." It cannot be denied, that the ocean at great depths is "still," and that it is inhabited by thin varieties, *pelagicum* for example: whether the shell figured by Pennant as the *Buccinum striatum* was obtained from the "still water" of the ocean or "of harbours," I cannot say; but I am quite certain, that the

lishing on the subject, as soon as he became satisfied as to the correctness of his views: *it was on this contingency that I understood his publishing to depend*. What I was unacquainted with at the time, was the negative character just mentioned of the variety *crassum*—having been previously led to think that the epidermis was worn off: *this is the only point I will concede to Mr. Hancock, and as such it is duly acknowledged in my paper*.

Five years after the subject had been introduced between us, and finding it necessary to describe my new acquisitions, and conceiving that my views respecting the *number* of varieties of *Buccinum undatum* belonging to our coasts, and the essential characters of these varieties, were different from those I had seen or heard described, I commenced my paper, without ever thinking, that in publishing these views I should be interfering with the publication of Mr. Hancock's, particularly when the publication of the latter depended on a contingency which I saw little or no chance of ever happening. My surprise is certainly great, that Mr. Hancock, after my paper was published, and after leaning to a contrary opinion for nearly six years (up to last August for a certainty), should now "feel satisfied" that his three varieties are "mere varieties."

My paper, as it was read at the British Association, contained the description given in the text of the variety *crassum*, also an acknowledgement to the effect that it was Mr. Hancock to whom I was indebted for the information of its generally being without an epidermis: the descriptive part, I regret, was afterwards cancelled: I was very reluctant to do this at the time, as I felt that this gentleman had no more exclusive right to describe this variety than he had to describe *littorale* and *magnum*, inasmuch as all three had been previously either described or figured by Lister, Pennant, Dr. Johnston and others: nor could I conceive, that his informing me of the general absence of the epidermis in the case of *crassum* prevented me describing it or any of the others.

* Philosophical Transactions, 1833, p. 784.

"still water" of the river Tees is tenanted by a form of *Buccinum undatum* as light and thin as most of the specimens I procure from the depths of the *Coral zone*.

The most obvious difference between the Tees shell and *pelagicum* consists in this, that in the latter the spire is "very long" in consequence of the whorls slowly increasing in diameter; while it is remarkably short in the former, owing to the rapid augmentation of the whorls. It is singular, while *Buccinum undatum* decreases in tumidness in proportion as its depth of habitat increases, that the two species, *Fusus antiquus* and *F. islandicus*, should, on the contrary, become more and more ventricose.

It affords me much pleasure, before concluding the present notes, to mention, that I have lately procured a young specimen of *Buccinum ovum*, Turton (vide *Zoological Journal*, vol. ii. p. 366. pl. 13. fig. 9). It was brought up by the fishing lines off the coast of Northumberland, from soft ground, in the *Coral zone*. The specimen is half an inch long, and has four whorls, the first two of which have a truncated form: the shell is white, faintly spirally striated and covered with a greenish epidermis. Considering the numerous varieties existing of *Buccinum undatum*, it would not surprise me, if the crag fossil *B. Dalei*, Sowerby, should prove to be the same species: the principal difference between them seems to be in the latter being more strongly spirally striated. Mr. Morris, however, informs me, that the striation of *B. Dalei* is a variable character, which is proved by some unpublished figures of this species that he has kindly favoured me with. An examination of more specimens, than I possess, of both forms is necessary, however, before deciding as to their specific identity. Probably, the ordinary specimens of *B. Dalei* lived in the *Coral-line zone*, which will account for their being thicker than those of *B. ovum*, judging of my specimen, and the one figured by Dr. Turton. In both forms, the termination of the left side of the canal is slightly tongue-shaped.

BIBLIOGRAPHICAL NOTICES.

Outlines of Structural and Physiological Botany. By ARTHUR HENFREY, F.L.S. &c. 12mo. Van Voorst, 1847. Pp. 245, 18 plates.

MUCH has been done of late years in this country to aid students in the prosecution of botany. The valuable Introductions of Lindley and Gray are now in the hands of all, and when combined with Babington's excellent 'Manual' they form a complete text-book for the British botanist. Nevertheless we hail the appearance of Mr. Henfrey's work as one which has been ably executed, and in a manner somewhat different from that adopted by the other authors