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1842.

	Cor. Crag.	*Red Crag.*	*Mam. Crag.*	*Recent.*
2. Conovulus myosotis (Auricula myosotis, *Drap.* pl. 3. f. 16, 17).		Sutton.	Bramerton.	France.

Only three specimens from the red crag: Capt. Alexander has found it in the mammaliferous crag near Southwold.

1. Lymnæus palustris, *Gray* (*Edit. of Turt. Man.* p. 239. t. 7. f. 107).		Bulcham.	Britain.
2. — pereger, *Gray* (*Edit. of Turt. Man.* p. 233. t. 7. f. 101).		Bulcham.	Britain.
1. Planorbis corneus, *Gray* (*Edit. of Turt. Man.* p. 258. pl. 8. f. 95).		Bulcham.	Britain.
2. — vortex, *Gray* (*Edit. of Turt. Man.* p. 258. pl. 8. f. 91).		Bulcham.	Britain.
3. — marginatus, *Gray* (*Edit. of Turt. Man.* p. 258. pl. 8. f. 88).	Butley.	.....	Britain.

This is the only genuine freshwater shell that I have seen from either the red or cor. crag. I have but one specimen, procured from undisturbed crag five feet below the bottom of the incumbent sand.

Pl. V. f. 12. is an enlarged representation of a very minute sinistral shell, not more than $\frac{1}{4}$th part of a line in diameter, somewhat resembling in outline *Planorbis corneus*, but too small to be the fry, I think, of that species; moreover it has the appearance of a spire more elevated and a deeper umbilicus than in any species of that genus that I am acquainted with, and is probably a marine shell. Three other specimens of about the same size were in my cabinet six years ago, but are now unfortunately lost.

1. Infundibulum rotundum (Patella rotunda, *List.* Patella Sinensis, *Mont. Test. Brit.* p. 489. t. 13. f. 4. Infundibulum rectum, *Min. Con.* t. 97. Infundibulum clypeum, *Woodward, Geol. of Norf.* t. 3. f. 2).	Sutton.	Sutton.	Bramerton.	Britain.
var. β. depressa.	Sutton.	Sutton.		
var. γ. spinosa*.		Walton Naze.		
2. — subsquamosum, n. s.	Ramsholt.			

[To be continued.]

L.—*Catalogue of the Marine Zoophytes of the neighbourhood of Aberdeen.* By John Macgillivray, Esq.

The increasing importance attached by naturalists to the class of Zoophytes may seem to justify any attempt, however humble, tending to elucidate their local distribution. I feel, therefore, encouraged to submit to the readers of this Journal

* One row of imbricated spines.

a few notes upon the Zoophytes of a portion of the Aberdeenshire coast; the same which, nearly a century ago, furnished Ellis with that portion of the materials for his great work on Corallines, which he derived from the contributions of his friend Dr. Skene.

With few exceptions, the names here used are those employed by Dr. Johnston in his 'History of British Zoophytes;' and I cannot allow the present opportunity to pass without offering my humble testimony to the great merits of that work; possessing too a double interest in the eyes of those who, like myself, have had their attention first directed by its means to a class of objects yielding in interest to no other throughout the whole range of the animal kingdom. The arrangement followed throughout is also that of the work alluded to above. Occasional assistance has been afforded in the determination of the species by Dr. Fleming's 'History of British Animals,' as well as by the published researches of Mr. Hassall, recorded in the sixth volume of this periodical.

Coryne squamata. On *Halidrys siliquosa*; also on a dead valve of *Cyprina Islandica* from deep water.

Echinocorium clavigerum, Hassall; *Alcyonidium echinatum*, Flem., Johnst. Of frequent occurrence on *Buccinum undatum*, *Fusus antiquus* and *F. corneus*, brought up by the fishing-lines.

Tubularia indivisa. Shells and stones from deep water; common.

T. Larynx. Both the varieties mentioned by Johnston are abundant on this part of the Aberdeenshire coast.

T. ramea. Don-Mouth; a single specimen.

Thoa halicina. Deep water; not rare, but generally of small size.

T. muricata. This very rare and remarkable species was sent to Ellis by Dr. Skene, who appears to have been its discoverer. I procured a single specimen an inch and a half in height, with numerous vesicles, in one of the fishing-boats, attached to a dead valve of *Pecten Islandicus.*

Sertularia rugosa. On *Flustra foliacea*; occasional.

S. rosacea. My Aberdeenshire specimens do not exceed an inch and a half in height; indeed are generally much less, always of a delicate white colour, pellucid, and with the free portion of the cells much longer than they are represented in Dr. Johnston's figure. The branches too, though generally alternate, are not unfrequently opposite. Very plentiful on corallines, shells and ascidiæ.

S. pumila. On *Fucus serratus* and *F. nodosus*; also once on *Tubularia Larynx*; common.

S. pinnata. Small-sized specimens are not unfrequent, growing upon *S. Abietina.*

S. nigra. Found many years ago upon some part of our coast by the celebrated Robert Brown, "Botanicorum facile princeps." Fragments of this very distinct species have several times occurred upon the beach at Don-Mouth, and a little to the north of Aberdeen pier.

Sertularia Tamarisca. Don-Mouth; attached to a fragment of *Cyprina Islandica.*

S. abietina. Extremely abundant.

S. Filicula. Plentifully thrown upon the beach at Don-Mouth, also between that and the harbour.

S. operculata. Sometimes the cells have one of the lateral teeth abortive or wanting; in the latter case the remaining tooth is often as long as the mucronated tip, which thus appears bifid. On a small specimen before me presenting the above arrangement, a solitary, somewhat obovate, compressed, truncated, and operculated vesicle has its lateral margin so sinuated as to present three distinct notches. Forming large tufts upon the stem of *Laminaria digitata*; abundant.

S. argentea. Presenting great differences in texture and habit as well as in the form of the cells and vesicles. Thrown plentifully upon the beach.

S. cupressina. The only specimen which I have seen, and which is almost entirely encrusted with *Alcyonidium parasiticum,* exhibits great differences in the form of the cells: the aperture is sometimes patulous, occasionally with two distinct teeth—the typical form; at other times the orifices are contracted, the cells being somewhat acutely pointed, thus exhibiting one of the characters of *S. argentea*; both modes of formation existing upon the same branch. Don-Mouth.

Thuiaria Thuia. Branched specimens are by no means rare. Thrown upon the beach in great abundance; also brought up by the fishing-lines, attached to stones and shells; of the latter, especially dead valves of *Pecten Islandicus.*

Antennularia antennina. The branched variety, described and figured by Mr. Hassall*, who conjectures its identity with the *A. ramosa* of Lamark, is here still more common than the normal (undivided or sparingly branched) state of *A. antennina.* My specimens agree with Mr. Hassall's one in arising from a *single* trunk which divides into numerous branches, which again subdivide; nor in them have I been able to detect any of "the small tubular cells placed between the larger ones," which are never absent upon the unbranched polypidom. The absence of these cells, together with the peculiar *habit,* seem to justify Mr. Hassall in considering *his A. ramosa* as a good species. At the same time it would appear that there is *another* (slightly) branched state† of *A. antennina,* which is unquestionably a mere accidental variation, being provided with "the small tubular cells" above alluded to, as I have ascertained by the examination of several specimens. Deep water; abundant.

Plumularia falcata. Often much branched, and attaining a large size. Extremely abundant.

P. pinnata. My specimens are horn-coloured; they agree with Dr. Johnston's description in every other respect. Upon various corallines from deep water; not rare.

* Ann. and Mag. of Nat. Hist. vi. p. 168. pl. v.

† Johnst. Hist. of Brit. Zooph. pl. 15. fig. 2.

Plumularia setacea. Don-Mouth; a single tuft growing upon *Modiola barbata.*

P. Catherina. Often brought up by the fishing-lines from deep water.

P. myriophyllum. Deep water; a single specimen.

Laomedea dichotoma. Generally attached to *Buccinum undatum, Fusus antiquus* and *F. corneus*; brought up abundantly by the fishing-lines.

L. geniculata. On *Fucus nodosus* and *Laminaria digitata*; plentiful.

L. gelatinosa. Don-Mouth; a single specimen.

Campanularia volubilis. Don-Mouth; met with only once.

C. integra. Stem a single tube, filiform, creeping; cells on long slender annular pedicles, campaniform, with the rim entire; vesicles ———?.—J. M^c^G.

This species, which I believe to be new, differs from the preceding in having cells with the rim *entire*, and not serrulated, as in *C. volubilis*. With *C. Syringa*, the only other British species of the genus which has a single tube for a stem, it can never be confounded; the "denser corneous texture, cylindrical tubular cells, and short pedicles" of *C. Syringa* are perfectly distinctive. Don-Mouth; parasitical on *Tubularia indivisa*; has occurred only once.

C. Syringa. Don-Mouth; on *Plumularia falcata*; apparently rare.

C. dumosa. Both varieties are here abundant; of that mentioned first in Dr. Johnston's work, I have a specimen covering a surface of six inches square.

Alcyonium digitatum. The red variety, supposed to be identical with the *A. rubrum* of Müller, I have frequently met with here. Mr. Hassall* regards this as a distinct species, apparently on the sole ground of not having "been able to detect any gradations of colour between it and the common kind, as might be expected were it a mere variety." Mr. Hassall further states, that, "having obtained both growing upon the same shell, each possessing its own peculiar colour," he considers this circumstance "a strong fact in favour of its distinctness, as the great difference in colour could not be accounted for by a reference to any external causes, both specimens being subjected to the same influences." This argument, however, I am afraid, is hardly tenable; to be consistent, Mr. Hassall ought to separate as so many distinct species those *Sertulariæ* which are occasionally found of a bright pink colour, and make two species out of *Laomedea geniculata*, of which Dr. Johnston has "often observed coloured and colourless specimens growing upon the same stone†, both being subjected to the same influences." At the same time Mr. Hassall has shown that the coloured variety is *not* "*A. digitatum* in its primary crustaceous condition;" the correctness of which view I have since verified by finding red specimens of considerable size coriaceous, but not crustaceous. On stones and shells from deep water; abundant.

Actinia gemmacea. The variety δ. of Dr. Johnston's work, or that characterized by having the body quite smooth, is brought up from

* Ann. and Mag. Nat. Hist. vii. p. 285. † Brit. Zooph. p. 152.

deep water in great abundance by the fishing-lines, the baits employed being greedily swallowed by the *Actiniæ*. Individuals of a uniform bright scarlet colour are not unfrequently met with, but in general the specimens I have seen are only irregularly blotched with that colour upon a ground of dirty yellow.

Actinia Dianthus. This "Actiniarum pulcherrima" I have met with only twice, adhering to dead valves of *Cyprina Islandica*, a favourite attachment of the preceding species.

Crisia eburnea. On various corallines; apparently not very common.

C. luxata. Although one of the characteristics of this species is the black colour of the internodes, these are no darker than the rest of the polypidom in a specimen before me, in which I have in vain looked for other distinctions. A common parasite upon *Flustra foliacea* and many other corallines.

C. ternata. One of Dr. Skene's discoveries, which does not seem to have occurred since, except to Dr. Fleming, who well characterized it from his Zetland specimens. Cells elongated, gradually increasing in breadth towards the top, for the most part with a lateral projection ending above in a slightly acute angle; aperture terminal, large and oval, level with the surface, and furnished above with from two to four short spines. Vesicles cylindrical, inversely conical, arising from the tops of the cells, very sparingly produced. Numerous very long tubular bodies arising from the cells, give the whole polypidom a very characteristic appearance. The joints are amber-coloured, the remainder being white and pellucid. I have seen no true opercula upon this species, although the persistent polype-sac might be mistaken for such.

Notamia loriculata. Very abundant.

Tubulipora Patina. Usually attached to *Plumularia falcata* and *Sertularia Abietina*; plentiful.

T. serpens. Extremely abundant upon corallines; few specimens of *Plumularia falcata* are without this parasite.

Discopora hispida? About two lines in diameter, calcareous, white, subcircular, revoluted at the margin, which is free, the crust being adherent at the centre only. The surface is closely studded with vertical tubular cells of various lengths, which do not appear to be arranged in any definite order; some are level with the surface, while others project in a slightly inclined manner to a height of twice their diameter. The longer cells are coalescent throughout, the shorter at the base only. Such of the cells as are prominent are obliquely truncated, with the apex bifid, or presenting two sharp spines. Often there is but a single spine, sometimes an additional smaller one arising lower down. The polypidom bears a considerable resemblance to *Tubulipora Patina*, with which it is generically associated by Dr. Fleming: while I say this, I of course *assume* the specific identity of my specimen with *Discopora hispida*, of which I am by no means certain. It may be observed that Dr. Fleming gives as one of the characters of the genus *Discopora*, "crust adhering in the middle;" while the author of the 'History of British Zoophytes' mentions that the crust is "adherent through-

out" in *his* genus of the same name. On *Sertularia abietina*; a single specimen.

Cellepora pumicosa. Extremely abundant.

C. ramulosa. It is not difficult to trace the gradation by which this and the preceding pass mutually into each other. Fragments are plentifully cast upon the beach, and fine specimens are occasionally brought up from deep water by the fishing-lines.

C. Skenei. Deep water; a single specimen.

C. lævis. A specimen now before me agrees well with Dr. Fleming's description of the only one met with by him; it is half an inch in height, and rather more in breadth. But why give as part of the specific character "pores with simple mouths," when a few lines further on we find it stated, that towards the extremities of the branches the orifices are furnished with "a blunt process at the proximal margin"? Although the majority of these processes are more or less obtuse, yet many are acutely pointed; and were it not for the deservedly high scientific character of its discoverer, I would not have the slightest hesitation in referring *Cellepora lævis* to *C. ramulosa*, one of the least ambiguous modifications of which I believe it to be.

Lepralia coccinea. On stones from deep water; plentiful.

L. ciliata. With the preceding; also on shells, and on *Cellepora ramulosa*.

L. quadridentata, Johnst. MS.; Hassall, Ann. and Mag. Nat. Hist. vi. p. 171. pl. vi. f. 5. On a dead valve of *Cyprina Islandica* from deep water.

L. trispinosa. On a root of *Laminaria digitata*.

L. insignis, Hassall, Ann. Nat. Hist. vii. p. 368. pl. ix. f. 5. I have a species of *Lepralia* which agrees well with Mr. Hassall's description (his figure I have not seen) of *L. insignis*, with this slight exception, probably an accidental one, that the spines surrounding the aperture of the cells vary in number from four to six. The strong process rising out of each cell is very characteristic. On a fragment of limestone from deep water.

L. reticulata. Crust reticulated; cells tubulous, narrower towards the base, with a perforation in the upper wall; aperture slightly contracted, and furnished above with a blunt tooth.—J. M^{c}G.

The crust is very thin, spreading irregularly, and of a snow-white colour. The cells are slightly prominent, tubular, increasing slightly in breadth towards the distal extremity; in the upper wall of each cell, close to the mouth, is situated a somewhat triangular opening communicating with the interior, and sometimes crossed by a small transverse spiculum. The round, scarcely contracted aperture of each cell is furnished above with a short blunt tooth which projects downwards, being apparently connected with the triangular opening in the upper wall of each cell. This opening varies much in size, but is always present; it is separated from the mouth by a short interval, which is often broken down and a deep notch formed. Some of the cells are furnished with globular pearly opercula. The interval between the cells is beautifully reticulated, a double row of apertures

existing between each two parallel cells. Only a single specimen of this very distinct species has occurred to me, attached to a fragment of limestone from deep water. Not having been able to find it described, I have ventured to give it a specific name taken from one of its most prominent characters.

Membranipora pilosa. On various fuci and corallines; common.

Flustra foliacea. This varies much in its mode of division. Extremely abundant.

F. truncata. Equally common with the preceding.

F. carbasea. Generally but not always attached to shells; very common here, where it was discovered about a century ago by Dr. Skene, who sent it to Ellis.

F. membranacea. Covering the frond of *Laminaria digitata* and *Fucus nodosus,* especially the former; abundant.

Cellularia scruposa. On corallines, shells, &c.; plentiful.

C. reptans. Not quite so abundant as the preceding, but still common.

Farcimia sinuosa, Hassall, Ann. and Mag. Nat. Hist. vi. p. 172. pl. 6. By a careful examination of a very fine specimen selected from an extensive series, I have found a great variation in the form of the cells. These are generally "rounded above and excavated below for the reception of the head of the succeeding cell," as they are described by Mr. Hassall, but between this form and a perfect rhomboid there exists an obvious gradation. Rhomboidal cells are found chiefly upon the terminal articulations, but occur also throughout the polypidom along with the much more numerous spathulate cells. In Mr. Hassall's specimens the aperture was invariably "situated in the upper third of each cell;" in mine, however, the aperture is occasionally "exactly central;" it often commences at the middle of the cell, although still more frequently at a little above this. Not having seen an undoubted specimen of *F. salicornia,* or one having *all* the cells rhomboidal, and *all* their apertures "exactly central," it would be presumption in me to offer any opinion regarding the specific distinctness of the *F. sinuosa* of Mr. Hassall, to whom we are indebted for the correction of several errors which had crept into zoophytology, as well as for the discovery of many new and interesting species. Brought up by the fishing-lines from a depth of between forty and sixty fathoms, a bank covered by this depth of water being situated about ten miles off the land; not uncommon.

Alcyonidium gelatinosum. Don-Mouth.

A. hirsutum. Shore north of the harbour; like the preceding. I met with it only once.

A. parasiticum. Upon *Sertularia argentea* and many other corallines, once upon *Crassina Damnoniensis,* and frequently upon stones; very common.

Cliona celata. A small *Annelide* inhabits perforations, the orifices of which are very similar to those in which the *Cliona* is found; with respect to the latter, however, I could not have been mistaken, having repeatedly oberved the living zoophyte projecting about a line beyond the orifices in the shell which it inhabited. Found in per-

forations in the dead valves of *Cyprina Islandica* and *Pecten Islandicus*; not uncommon.

The zoophytes enumerated in the preceding catalogue were either collected during a three days' examination of the detritus thrown upon the beach at Don-Mouth after a storm in October 1841, or are the result of a diligent and almost daily search during the first fortnight of February 1842, among the objects brought up from deep water by the lines of the Footdee fishermen. To the sixty-four species enumerated above, in all probability many more remain to be added, but, being about to leave the neighbourhood of the Aberdeeenshire coast, I must leave this pleasing task to future observers.

Old Aberdeen, February 23, 1842.

LI.—*The Physical Agents of Temperature, Humidity, Light, and Soil, considered as developing Climate, and in connexion with Geographic Botany.* By Richard Brinsley Hinds, Esq., Surgeon R.N.

[Continued from p. 333.]

III. Light.

Light and heat are so intimately connected and so generally accompany each other, that the laws of one are very nearly those of the other. Both are of the utmost importance to vegetation, and it is not easy to allow a superior influence to either, each in its turn, when coming under consideration, appearing to claim priority. Light is pre-eminently active in the functions depending on the alternation of day and night, in fixing the more solid constituents, and in bestowing richness of colour and secretion.

Sir Isaac Newton, by means of the prism, separated solar light into seven distinct rays, which from their properties he called colorific. These were red, orange, yellow, green, blue, indigo and violet; and they were found to possess different degrees of refrangibility, it being greatest in the violet and least in the red. A method was now developed for explaining the numerous shades of colour in substances; black was ascribed to the absorption of all the rays, white to their reflection, and every variety of tint or colour was due to the partial reflection of certain rays and the absorption of all the others. More recently it has been proved by Sir David Brewster that these seven colours are resolvable into three primary rays, red, yellow and blue; orange being formed by a mixture of red and yellow, green by yellow and blue, indigo and violet by red and