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XI.—*Antipathes arctica*, a new Species of Black Coral (Antipathidæ) from the Polar Seas. By Dr. C. LÜTKEN*.

A LITTLE before the commencement of the illness which at the end of last year carried off M. C. S. M. Olrik, Councillor of Justice and Director of Greenland trade, and formerly Inspector in North Greenland, thus inflicting upon science a serious loss by depriving us of a man who had striven with much zeal and great perseverance to elucidate the natural history of Greenland, especially in collecting its zoological and palæontological objects for our museums, that gentleman brought to me at the museum a black coral which, as he knew with certainty, was found in the stomach of a shark (*i. e.* a sea-hound, *Scymnus microcephalus*) in Rodebay†, about two miles north of Jakobs-havn, in North Greenland, by M. K. Fleischer. This discovery is of great interest in many respects. It increases our knowledge of the Greenland fauna with a genus, and, indeed, with a family, which had not previously been included in it; nay, what is more, this family was previously known only from warm or very warm seas: north of the Mediterranean ‡

* Translated by W. S. Dallas, F.L.S., from the 'Oversigt over det Kongl. Danske Vidensk. Selsk. Forhandl.' 1871, pp. 18-26.

† Rink calls it "Rødebay." I do not know which of these denominations is the right one.

‡ The text was already printed when Professor Wyville Thomson had the kindness to inform me that Antipatharia had been found in the British expeditions for the exploration of the great depths by means of the dredge, and consequently in a part of the Atlantic situated between the polar seas and the warm seas which, until recently, formed the northern limit of the known Antipatharia.

From the Mediterranean we know with certainty apparently five species—namely, *Antipathes larix*, Esper, *subpinnata*, Ellis, and *dichotoma*, Pall., *Leiopathes glaberrima* (Esper) and *Gerardia Lamarckii* (J. Haime); whilst I regard it as very doubtful whether *Antipathes scoparia*, Lamk., and *Cirripathes spiralis* (Pall.) also occur in the Mediterranean, as is

and South Carolina no Antipathid has hitherto been known; and that a representative of this group is now suddenly discovered in the extreme north certainly makes a very considerable alteration in the notions which we have hitherto entertained as to its geographical distribution, and leads us to conjecture that it may extend to all the deeper valleys of the ocean*. That the Greenland species belongs to deep water is warranted by the sea-hound's well-known habit of seeking its food at great depths (200–250 fathoms); that it should have gone to fetch this little "sea-shrub" very far from the place where it was itself caught we may regard as not very probable. It is true that the sea-hound, like the sharks in general, is a fish which wanders pretty widely; and we have instances of its straying far beyond its proper range—to Scotland and the north of France, for example. But, nevertheless, in the present case it would be improbable that it should have sought

stated by Milne-Edwards (Hist. Nat. des Corall. tome i. pp. 314–319). The last mentioned is a native of the East Indies; and other species of its genus are known from the West Indies, Madeira, and Australia. *Antipathes scoparia* I believe I have recognized with certainty in a form from the Red Sea represented in our museum. Of the species which are stated only by older writers (*e. g.* Lamouroux) to be from the Mediterranean we may probably take no notice. From Madeira also various species are known (*Cirripathes setacea* and *gracilis*, Gray, *Antipathes furcata*, Gray, and *subpinnata*, Ellis?)—and from South Carolina *Antipathes Boscii*, Lamk., and *A. alopecuroides*, Ellis. In the tract between Florida and Cuba Pourtales found five species (*A. filix*, *humilis*, *tetrasticha*, and two undescribed species). Besides these we know a whole series of species from the West Indies:—*Cirripathes Desbonni*, Duch. & Mich.; *Antipathes pedata* and *atlantica*, Gray; *A. americana* and *dissecta*, Duch. & Mich. (both from St. Thomas); *A. eupteridea*, Lamk. (Martinique); *Arachnopathes paniculata*, Duch. & Mich. (Guadeloupe); and *Leiopathes compressa*, Esp. (Jamaica). Many of these, however, are but imperfectly known. *A. reticulata*, Esp., and *A. larix*, Esp., are also represented as West-Indian; but this can hardly be correct, but due to mistakes either in the determination or in the statement of localities. *A. reticulata* is an East-Indian species (Manilla), and *A. larix* is a native of the Mediterranean. From Cape Palmas we have *A. spinescens*, Gray. From the southern part of the Atlantic we know no Antipatharia.

* Marsigli took *A. dichotoma* at a depth of 140 fathoms. Pourtales captured his species at 116–120, 270, and 195–324 fathoms. Heller took *Gerardia Lamarckii* at 50–60 fathoms, in company with red corals. That the Mediterranean black corals (*palmas neræ*) usually occur in this association, and at considerable depths, is known from Lacaze-Duthiers's admirable investigations upon the Antipatharia. That those in warmer seas also occur at much smaller depths, however, appears from the fact that Dana obtained *A. arborea* in 10 fathoms and *A. anguinea* in 10 feet of water at the Fiji Islands (Explor. Exped. Zoophytes, pp. 577 & 585). At the Pearl Islands, in the Gulf of Panama, Bradley obtained *A. panamensis*, by means of pearl-divers, from 6–8 fathoms (Verrill, "Notes on Radiata, No. 6," p. 500, Transact. Conn. Acad. i.).

its prey beyond the Polar Sea; and were we even to stretch this possibility to its utmost limits, this Antipatharian would still remain a *northern* form, and the diffusion of the family as far as the northern seas would remain indubitable.

The Black Corals, or Antipathidæ, are still among the less-known animal-forms; it is only a few years since their structure was so far elucidated* that they could be arranged in their right place in the system as a type analogous to the Horny Corals (Gorgoniidæ) in the sex- or multitentaculate order of Coralliaria. On account of the great softness and perishableness of the outer layer ("flesh"), which, again, is chiefly caused by the apparently total want of hard parts ("sclerites"), it is seldom that we find in collections specimens which show any traces of this the essential living part of these animals—the horny, most frequently black and spinous "axis" being in general all that remains, and the only thing that we have to depend upon in the description, specific distinction, and grouping of these forms. Most of them, moreover, are known only by imperfect descriptions or defective figures (those of Professor Lacaze-Duthiers's excellent revision† of the whole family, founded on the materials in the Paris Museum, have, unfortunately, never appeared); and of not a few we do not know whence they come. That under these circumstances the determination of species presents nearly insuperable difficulties will be evident; but, on the other hand, I must admit, after the experience that I have been able to obtain by the examination of the comparatively considerable collection in the Museum (seventeen species), that in general it is not difficult to trace the limits between one species and another. The modes of ramification especially present many characteristic and easily grasped differences, although it may be less easy to express these in words.

That the present specimen, after lying, whether for a short or a long time, in the stomach of a shark, is without any trace of the softer and more perishable parts, is a matter of course; but in other respects it is well preserved. That it represents a new species is also very probable, as the locality of its occurrence is so exceedingly distant from that of any previously known Antipathid. But upon this circumstance we must not for the present lay very great stress, as it is certain that

* First elucidated (if we leave out of consideration what Marsigli (1725), Ellis (1786), and Gray (1832) had previously published with regard to it) by Dana (Explor. Exped. Zoophytes, x. tab. 56. figs. 1 & 2), and afterwards more completely by Lacaze-Duthiers (Ann. Sci. Nat. 5^e sér., Zool. & Pal., tomes ii. & iv. 1864-65).

† *Loc. cit.* tome ii. p. 173, and several other places.

deep-sea species may have a distribution which may extend even from the tropical to the glacial zones. If it is actually

Fig. 1.

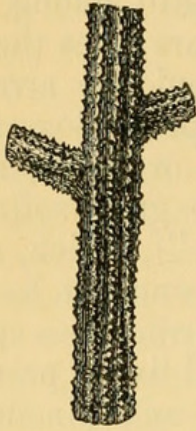


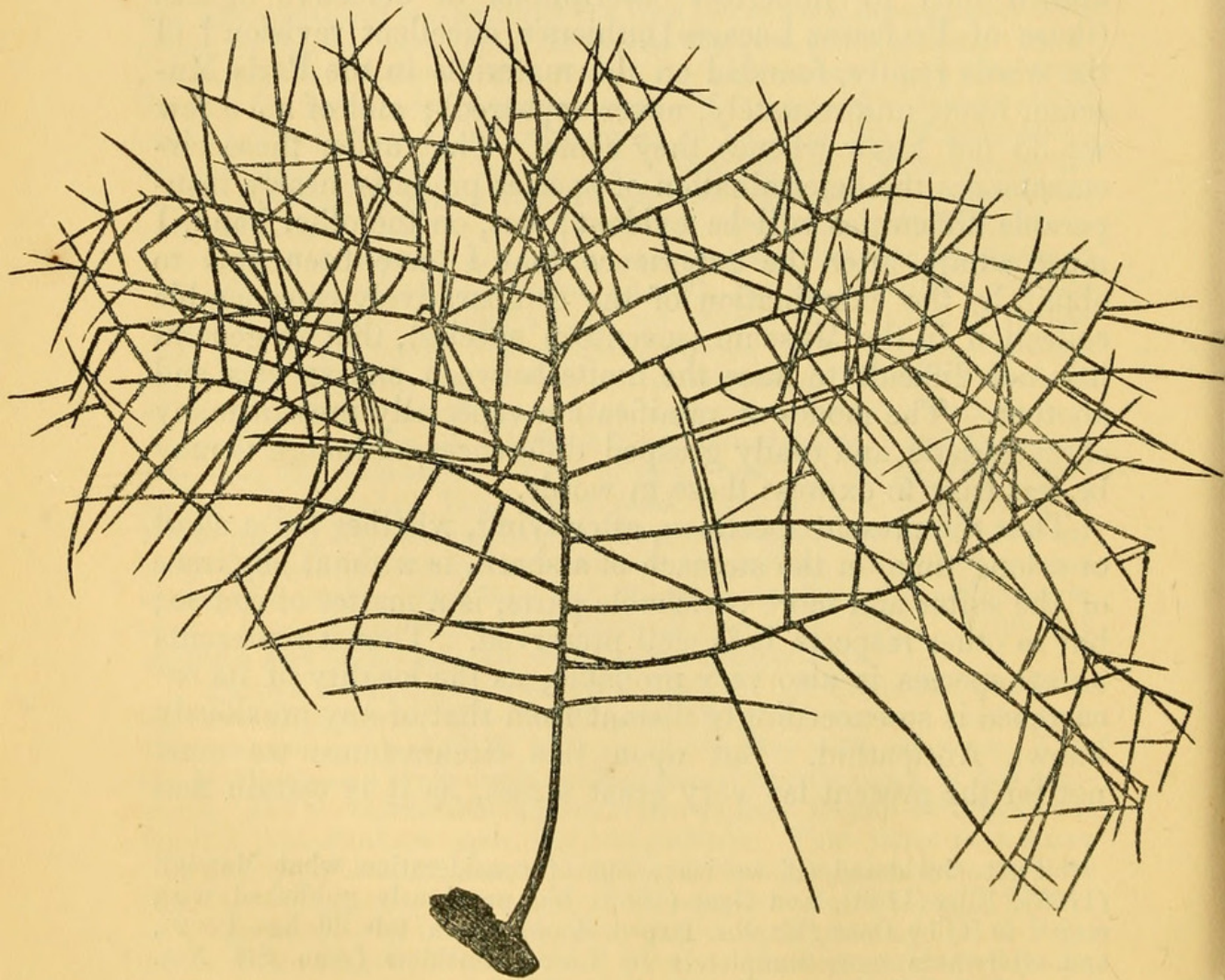
Fig. 2.



A portion of the main stem, enlarged.

The tip of a branch, enlarged.

Fig. 3.



Antipathes arctica, Lütken, somewhat diminished.

the case that a whole series of northern Echinoderms (*Rhizocrinus lofotensis*, *Pteraster militaris*, *Echinus Flemingii*, *Brisopsis lyrifera*, *Echinocardium ovatum*, *Echinocucumis typica*, *Cucumaria frondosa*, and *Molpadia borealis**) live together in the deep water around and among the Antilles, there is, of course, nothing against the possibility that an Antipathid also might be diffused from the icy sea to south of the tropic of Cancer; and our thoughts turn quite naturally at once to the species recently recorded by Pourtales† from the Straits of Florida. Nevertheless I have been unable to refer the present form to any species known to me either in nature or from descriptions or figures; and although this, considering what has been said above as to the defective state of this department of our science, is not much to say, I hope that I shall not fall into any mistake in describing it as new. For its recognition the annexed photoxylographic figure (fig. 3) will, I hope, furnish sufficient means, although I will not omit to add a short description of it; but first I will endeavour to determine its approximate place in the systematic arrangement of the Antipathidæ.

According to Milne-Edwards's proposed classification of this family, our Greenland species is undoubtedly a true *Antipathes*; it is branched and has a rough surface, and its branches show no very great tendency to coalesce (as in *Arachnopathes* and *Rhipidipathes*), although, apparently accidentally, a slight amalgamation occurs at isolated points. I shall leave it for the present undecided how far it may be possible to distinguish the genera of Antipathidæ in the mode attempted by the above-mentioned distinguished zoologist: opinions are divided upon this subject‡; and the analogous genera to them in the parallel group of the Alcyonaria have not stood the test of the more thoroughgoing analysis of recent times; but under

* Bulletin of the Museum of Comparative Anatomy at Harvard College, Nos. 9-13. "Contributions to the Fauna of the Gulf-stream at Great Depths: Echinoderms," by A. Agassiz, T. Lyman, and Pourtales, 1869.

† *Op. cit.* 1867, p. 112; 1868, p. 133.

‡ At the same time with Milne-Edwards, Gray gave (*Proc. Zool. Soc.* 1857) a systematic arrangement of the Antipathidæ. He has only two genera—*Leiopathes*, with smooth, and *Antipathes*, with spinous axis, and distinguishes the species with an unbranched axis only as a subgenus (*Cirripathes*) of the latter. Moreover Milne-Edwards himself regards his attempt at a more minute division of the Antipathidæ into genera as essentially only an artificial arrangement for the ready revision of the species, and pays particular attention to certain striking differences (*l. c.* pp. 312, 313). Verrill also says that "generic characters derived only from the mode of growth and branching are always unsatisfactory in classing compound Zoophytes" (*Notes on Radiata*, No. 6, p. 499).

any circumstances the above-mentioned amalgamation of the branches at particular points will not justify us in giving our species a place outside the genus *Antipathes*. In this genus *A. arctica* will take its place among the species whose branches and stems are not very different in thickness ("polypier se subdivisant en branches de divers ordres, qui ne diffèrent que peu les uns des autres par leur diamètre, lequel décroît graduellement"); but it belongs neither to the species whose branches lie in all possible different planes, and thus form tufted masses ("panicules, touffes") of different forms, nor to those in which they all lie in the same plane, and form as it were a quadrifid or bipinnate leaf (*A. myriophylla*, *pinnatifida*). It stands about in the middle between these two chief types of the genus, and seems at the same time to point from this towards *Arachnopathes*.

The stem is nearly straight, widening below into a flat expansion, by which it has been attached at the bottom of the sea; its height, in a direct line, is 113 millims., and its diameter about $1\frac{1}{2}$ millim.; superiorly it decreases very slowly in thickness; only its lowest portion is smooth, the remainder being covered with somewhat irregular fine furrows; on the raised lines separating these furrows are seated the short acute spines in tolerably close series (fig. 1). The shining black colour of the stem gradually acquires a brownish tint in its upper part; its lower part (about 30 millims.) is destitute of branches; but from the upper part of the stem there issue on each side, right and left, 10–13 *main branches*. Except in the uppermost part of the coral, where some irregularity occurs, the points of origin of these main branches are placed pretty regularly, alternately to the right and left. The distance between two branches situated one above the other on the same side is at the utmost 9 millims. On the whole the middle branches are the longest and strongest; the angle which they form with the stem is not much less than a right angle, and their direction is therefore nearly horizontal. All the branches placed one above the other on the same side lie, at least approximately, in the same vertical plane; and the angle which those from the two sides form with each other at their origin is only a little more than a right angle; and as they curve in an elongated arc at first forward and then backward, their points come to lie in the same (vertical) plane as their points of origin. If we leave the curvature out of consideration, all the coral's horizontal main branches will therefore lie approximately in the same plane. These main branches are not much less in diameter than the upper part of the stem; and they maintain this character nearly throughout their whole length;

their surface is spinous (fig. 2), like that of the stem ; but raised and depressed lines are seen only where they are thickest, which is not always nearest to the base ; the length of the largest main branch is about equal to that of the branch-bearing part of the stem. The *secondary branches*, which are only a little thinner than the main branches, and have an average length of about 35 millims. (of course there are many much shorter, and some much longer), spring from the main branches at right angles and at an average distance of 8-12 millims. apart ; some are directed upwards, and others downwards, whilst others, again, project more or less obliquely forwards, but none backward. The hinder surface of the coral is, in fact, completely without branches ; all the secondary and tertiary branches are turned more or less towards the same side, namely the anterior side. At certain points where secondary branches have met or crossed each other, an amalgamation has taken place ; but in this there is nothing particularly regular, and it therefore appears to me probable that we may find specimens in which no such coalescence has taken place at any point. All the secondary branches are spinous, like the stem and main branches ; and the finer they are, the lighter brown is also their colour.

As only a single specimen is extant, I have in this short description been unable to separate what is only individual and what may be regarded as characterizing the species. I shall now, however, endeavour to bring together in the form of a diagnosis those peculiarities which, until more material may be before us, may serve to distinguish it from the other known Antipathidæ.

Antipathes arctica, Lütken.

Sclerobasis (axis) cornea, nigra vel nigro-fusca, spinosa, arborem humilem, latiore quam altiore constituit ; stipes erectus, teres, gracilis, niger, basi lævis, ceterum spinulis brevissimis, longitudinaliter seriatis, cum sulculis minutis alternantibus, asper ; rami (primarii) patentissimi, horizontales fere, bifariam dispositi, utrinque 10 vel ultra, gracillimi, asperi, colore dilutiore, ramulos (secundarios, tertiarios) similes emittunt, angulos rectos cum ramis (primariis, secundariis) formantes, sursum, deorsum vel antrorsum inclinatos ; rariter coalescunt. Superficies dorsalis vel posterior arboris totius ramulis omnino caret. Altitudo c. 5 pollices, latitudo $6\frac{1}{2}$ poll.

In ventre *Scymni microcephalo* prope oras Grönlandiæ septentrionales inventa.



Lütken, Chr. Fr. 1872. "XI.—*Antipathes arctica*, a new species of black coral (*Antipathidæ*) from the polar seas." *The Annals and magazine of natural history; zoology, botany, and geology* 10, 77–83.

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