

THE DEEP-SEA DREDGING EXPEDITION
IN H.M.S. "PORCUPINE"

I.—NATURAL HISTORY

MY part of the expedition in H. M. S. *Porcupine* commenced on the 18th of May, and ended on the 13th of July last. It comprised the Atlantic coast of Ireland, from the Skelligs to Rockall (a distance of about $6\frac{1}{2}$ degrees, or 400 miles), Loughs Swilly and Foyle on the north coast, and the North Channel on the way to Belfast. I took with me as assistant Mr. B. S. Dodd (who had accompanied me in former dredging expeditions); and as dredger Mr. W. Laughrin, of Polperro, an old coast-guardman, and an Associate of the Linnean Society. Both did their share of the work carefully and zealously.

The first dredging was on the 24th of May, about 40 miles off Valentia, in 110 fathoms; bottom sandy with a little mud. The fauna was mostly northern, and the following are the more remarkable species there procured: Mollusca—*Ostrea cochlear*, *Neæra rostrata*, *Verticordia abyssicola*, *Dentalium abyssorum*, *Aporrhais Serresianus*, *Buccinum Humphreysianum*, *Murex imbricatus*, *Pleurotoma carinata*, and *Cavolina trispinosa*; Echinodermata—*Echinus elegans*, *Cidaris papillata*, and *Spatangus Raschi*; Actinozoa—*Caryophyllia Smithii*, var. *borealis*. Of these, *Ostrea cochlear*, *Aporrhais Serresianus*, and *Murex imbricatus* are Mediterranean species; and *Trochus granulatus* also imparted somewhat of a southern character, although that species was afterwards found living in the Shetland district. *Ostrea cochlear* is a small Mediterranean species of oyster; and it is one of the shells which Milne-Edwards noticed as adhering to the telegraph-cable between Sardinia and Algiers from a depth of about 1,100 fathoms. Although considered peculiar to deep water, I found it attached to the columns of the temple of Jupiter Serapis at Pozzuoli, which are reputed not to have been submerged to any depth. The above-mentioned results of this dredging will give a fair idea of the fauna inhabiting the 100-fathom line on the west of Ireland.

After coaling at Galway we steamed south; and (the weather being very coarse and unpromising) we dredged in Dingle Bay, at a depth of from 30 to 40 fathoms; bottom rocky and muddy. As before, in comparatively shallow water, we had two dredges out, one at the bow, and the other at the stern; this was what I always did in my own yacht, when dredging in from 20 to 200 fathoms. In Dingle Bay the dredges several times caught in rocks or large stones, but were saved by the usual yarn-stops, and by the extraordinary strength of the two-inch Chatham rope which was used. On one occasion, when the dredge was fast, the steamer, which was nearly of 400 tons burden, was pulled round, and swung by the rope as firmly as if she were at anchor and moored by a chain cable. Here, again, the Mollusca were mostly northern. *Siphonodentalium Lofotense*, *Chiton Hanleyi*, *Tectura fulva*, *Odostomia clavula*, *Trophon truncatus*, and *Cylichna nitidula* fall within this category; and *Eulima subulata*, *Trophon muricatus*, *Pleurotoma attenuata*, and *Philine catena* may be reckoned southern species. But the most remarkable shell obtained in this dredging was *Montacuta Dawsoni*, which I had described and figured from specimens found by Mr. Robert Dawson in the Moray firth. I subsequently detected in the Royal Museum at Copenhagen specimens of the same species in the collection of Greenland shells, made by the late Dr. H. P. C. Möller. The species was briefly described or noticed by him in the addenda to his 'Index Molluscorum Groenlandiæ,' as "*Testa bivalvis*"; but he did not give it any other name. The size of the Greenland specimens is considerably greater than that of British specimens, thus adding another to the numerous cases of a similar kind which I have from time to time adduced in illustration of the fact, that with regard to those species of Mollusca which are

common to northern and southern latitudes, and which inhabit the same bathymetrical zone, northern are usually larger than southern specimens. It may, perhaps, be a not unfair inference, that the origin of such species is northern, and that they dwindle or become depauperated, in proportion to the distance to which they have migrated, or been transported from their ancestral homes.

The following week was occupied in sounding and dredging off Valentia, and on the way to Galway, at depths varying from 85 to 808 fathoms. The fauna throughout was northern. Several interesting acquisitions were made in all departments of the Invertebrata. Among the Mollusca I may mention—*Nucula pumila* (Norway), *Leda frigida* (Spitzbergen and Finmark), *Verticordia abyssicola* (Finmark), *Siphonodentalium quinquangulare* (Norway and Mediterranean), and an undescribed species of *Fusus* allied to *F. Sabini*; Echinodermata—*Brisinga endecacnemus*; Actinozoa—*Ulocyathus* (or *Phylloidesmia*) *arcticus*. That fine sponge *Phakellia ventilabrum* was also met with so far south, in 90 fathoms. The 808 fathoms' dredging was then a novelty, being the greatest depth ever explored in that way. The length of rope paid out was 1,100 fathoms, and the time occupied in hauling in was 55 minutes. The same proportional time was observed in other dredgings during my part of the expedition, viz. 5 minutes for every 100 fathoms of rope. The dredge contained about 2 cwt. of soft and sticky mud, in appearance resembling "China clay." The animals brought up on this occasion were quite lively; and I examined more than one specimen of a small Gastropod (described and figured by me as *Lacuna tenella*), which had very conspicuous eyes: there was also an active little stalk-eyed crab.

The next cruise was for ten days, and comprised the examination of the sea-bed between Galway and the Porcupine Bank, as well as beyond the Bank, at depths varying from 85 to 1,230 fathoms. All the Mollusca were northern, except *Aporrhais Serresianus*; and even that I am now inclined to consider identical with *A. Macandrea*, which inhabits the coasts of Norway and Shetland; the latter appears to be a dwarf variety or form. The more remarkable species were, *Limopsis aurita* (a well-known tertiary fossil), *Arca glacialis*, *Verticordia abyssicola*, *Dentalium abyssorum*, *Trochus cinereus*, *Fusus despectus*, *F. Islandicus*, *F. fenestratus*, and *Columbella haliæti*, (a tertiary fossil), among the Mollusca; *Cidaris papillata* and *Echinus Norvegicus* among the Echinoderms, and the beautiful branching coral, *Lophohelia prolifera*. In the deepest dredging made in this cruise (1,230 fathoms), occurred several new species and two new genera of the *Arca* family, *Trochus minutissimus* of Mighels (a North American species) having two conspicuous eyes, a species of *Ampelisca* (Crustacea) with the usual number of four eyes, comparatively gigantic Foraminifera, and other animals belonging to undescribed species and genera. An enormous fish (*Mola nasus*), which is not uncommon on the coasts of upper Norway, was slowly swimming or floating on the surface of the sea; but we did not succeed in capturing it for want of a harpoon.

We then put into Killybegs, county Donegal, and coaled there for our Rockall cruise. In anticipation of this cruise taking a clear fortnight, coals were stacked on the deck, in addition to the usual stowage in the bunkers, so as to provide a sufficient supply. Some delay was caused by the non-arrival of a proper galvanometer to work Siemens' electro-thermometrical apparatus, which we were anxious again to try. We left Donegal Bay on the 27th of June, and returned to the mainland on the 9th of July, after experiencing severe weather. The vessel sustained some injury from the heavy cross seas which struck her on her homeward passage. During this cruise we dredged seven days at depths exceeding 1,200 fathoms, and on four other days at less depths; the greatest depth was 1,476 fathoms. In this last-mentioned dredging we



Jeffreys, J G. 1869. "The deep-sea dredging expedition in H.M.S. Procupine."
Nature 1, 135–136.

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