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REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1873-76

UNDER THE COMMAND OF

Captain GEORGE S. NARES, R.N., F.R.S.

AND THE LATE

Captain FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

THE LATE

Sir C. WYVILLE THOMSON, Knt., F.R.S., &c.

REGIUS PROFESSOR OF NATURAL HISTORY IN THE UNIVERSITY OF EDINBURGH

DIRECTOR OF THE CIVILIAN SCIENTIFIC STAFF ON BOARD

AND NOW OF

JOHN MURRAY

ONE OF THE NATURALISTS OF THE EXPEDITION

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SECOND PART.

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Fish are very abundant and easily caught, as are also Rock Lobsters (*Palinurus frontalis*), called "Cray-fish" by the early navigators, which are very large, and very good to eat. More than sixty were taken by means of a baited hoop-net put over the ship's side at the anchorage, and hauled up at short intervals.

Juan Fernandez is so small that from Selkirk's Monument nearly the entire area of the island can be overlooked. Yet this tiny spot of land contains birds, land shells, trees, and ferns which occur nowhere else in the vast expanse of the universe, but here or in the neighbouring Mas-a-fuera. One could almost count the number of trees of the endemic Palm and estimate the number of pairs of the endemic Humming Bird existent at a bird for every bush. Two of the species of land birds, and all the twenty species of land shells of the island are endemic.[1] A small bat, possibly disturbed by the sound of the guns, was seen to fly past.

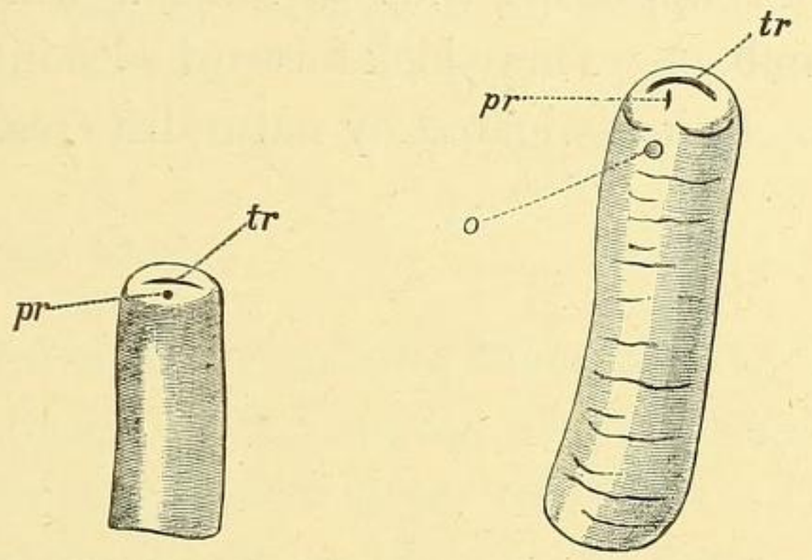
The temperature at the monument at 11 A.M. was 65° F. Close to the farmhouse at the bay still remains a row of old caves dug out in the hillside by the buccaneers. All the rocks collected at Juan Fernandez were typical felspathic basalts.

The Nemertea.—Professor Hubrecht of Utrecht, who is engaged on a Report on the Anatomy and Histology of the Nemertea, has supplied the following notes :—"The Nemertea of the collection, although in several respects highly interesting, are very defective in outward appearance. The immersion in spirit has not only destroyed the natural colours—sometimes so beautiful—of all the specimens, but has at the same time reduced the size and altered the shape of the several individuals to a very uniform cylindrical or flattened pattern. Moreover, the habit of the Nemertea of often breaking themselves into pieces on being placed in any preserving fluid has reduced several other specimens to fragments. Fortunately the state of preservation of all these fragments is most satisfactory, and by applying the modern methods of staining and section cutting they can be successfully transferred into the more useful state of microscopic preparations, the whole animal being in this way both durably preserved and yet fit for delicate histological and anatomical investigations. Not one section need be lost, and the entire reconstruction of all the internal parts thus remains possible at any time.

"This method has already brought to light the presence amongst the Challenger Nemertea of a new genus, represented by two fragments, which fortunately contained all the more important organs. I propose to call it *Carinina*, because it is most nearly allied to the most important and primitively organized genus *Carinella;* it differs from this in certain important points, which will be treated at length in the forthcoming Memoir. Further, it is an unmistakable representative of the interesting group of the Palæonemertea. Both the specimens were dredged between Bermuda and Halifax (Stations 45 and 47), at depths of 1240 and 1340 fathoms. They measure only

[1] For an account of the land birds of Juan Fernandez, see an article by Dr. P. L. Sclater, *Ibis*, p. 178, 1871.

a few millimetres in length. The accompanying woodcuts (figs. 300 and 301) represent these fragments, about four times enlarged; these figures have very few points of interest, giving only the general shape together with the rounded anterior portion of the body, and the openings of the mouth and the proboscis, but there is sufficient reason for their insertion in this place, since they bring vividly before the mind of collectors of marine zoological specimens the desirability of carefully preserving even the smallest and most unpromising fragments that come up in the dredge. As in this case it may often prove possible to distinguish such fragments, specifically and generically, and to obtain most valuable anatomical information by cutting them up into sections.



FIGS. 300, 301.—*Carinina*, n. gen.; four times the natural size. *o*, mouth; *pr*, opening for the proboscis; *tr*, shallow transverse furrow, strongly ciliated.

"Nemertines were obtained at more than twenty different Stations, some of them yielding more than one species. The most striking capture was that of the beautiful pelagic species (*Pelagonemertes rollestoni*), already so carefully described by Mr. Moseley[1] shortly after he had discovered and examined the specimens in the fresh state. They were taken on two occasions; one, an apparently adult specimen, near the southern verge of the South Australian Current, the other off Japan. This animal is most beautifully transparent, the different internal organs standing out very clearly, especially the digestive system, which is of a deep burnt-sienna colour. The lateral cæca of the intestine are branched in the adult. The lateral nerve-cords are united by a commissure which is situated *above* the posterior part of the rectum, the mouth being also situated below the brain. Mr. Moseley suggests that the animal, although essentially pelagic in all its characters, occurs only in deep water, and does not often come to the surface.

"The woodcut (fig. 302) is taken from Mr. Moseley's figure, representing the young specimen, which was better preserved when captured, but which has since perished. The larger specimen, although incomplete, has been preserved in spirit, and will allow of being cut into sections. In this way it may be possible to decide whether I am right in supposing that although Mr. Moseley found the proboscis to be unarmed, it must nevertheless find its place in that group of Nemertea in which the more specialized genera, those having an armature in the proboscis, are arranged. Its position there would not be altogether exceptional, the parasitic *Malacobdella* probably finding its place there also, although in this genus the proboscis is unarmed as in *Pelagonemertes*.

"Mr. Moseley has little doubt that the *Pterosoma plana*, described and figured by

[1] *Ann. and Mag. Nat. Hist.*, ser. 4, vol. xv. pp. 165–168, pl. xv., 1875; *Ibid.*, vol. xvi. pp. 377–383, pl. xi., 1875.

Lesson in his Voyage de la 'Coquille' as a Mollusc,[1] and captured in great abundance between the Moluccas and New Guinea, was another species of *Pelagonemertes*. The genus appearing thus to have a wide distribution, and often to occur in considerable numbers, we may look forward with interest to further specimens being captured and more closely investigated by naturalists residing in that part of the world.

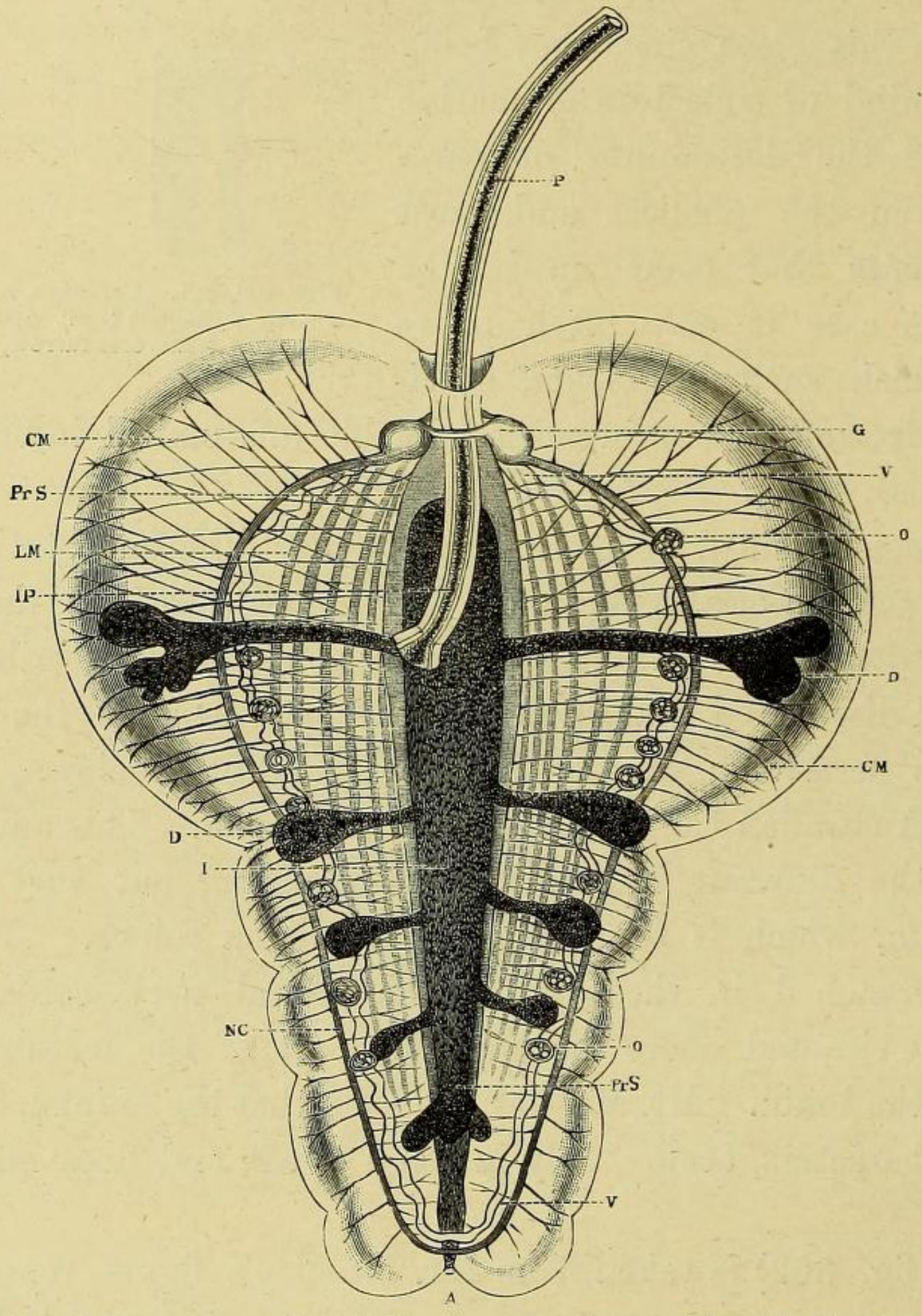


FIG. 302.—*Pelagonemertes rollestoni*, Moseley, enlarged, viewed from the dorsal surface; the proboscis is partly extruded.

P, proboscis; PrS, sac of proboscis; IP, invaginated portion of proboscis within the proboscis-sac; G, superior nerve-ganglion; NC, nerve-cords; V, vascular trunk (the upper V points to an enlargement of the vessel lying just posteriorly to the superior nerve-ganglion); I, intestine; D, diverticula of intestine; O,O. ovaries; CM, circular muscles; LM, longitudinal muscles.

"In looking at the map for the Stations where Nemertea, with the exception of *Pelagonemertes*, were taken by the Challenger, it immediately strikes one that they are all in close proximity to the land. Not one Nemertine was taken at any of the numerous Stations in the open ocean. Even the deep-sea forms above alluded to were found at a compara-

[1] Lesson, M., Voyage de la "Coquille," Zoologie, p. 254, pl. iii. fig. 3, Paris, 1830.

tively short distance from the North American continent. This apparently strict limitation of the Nemertea to the coast dredgings and at the same time their presence in this zone all over the globe is not without importance when attempts are made to estimate the ultimate phylogenetic significance of the group."

Juan Fernandez to Valparaiso.

The Expedition left Juan Fernandez on the 15th November, but the wind persistently hanging to the northward, the American coast was made at Topocalma Point, 70 miles south of Valparaiso, and the ship steamed to the northward along the land. The weather was thick between Juan Fernandez and the coast of Chili, and the swell was from the westward. One sounding, temperatures, and a haul of the trawl were obtained between the two places in lat. 34° 7′ S., long. 73° 56′ W., in 2225 fathoms (see Sheet 38).

The deposit at this Station was a blue mud, with a thin surface layer of a reddish colour, and contained 6 per cent. of carbonate of lime, which consisted chiefly of the shells of Globigerinas, and Orbulinas, and Coccoliths. The mineral particles consisted of quartz, mica, felspars, augite, hornblende, and glauconite. It is worthy of note that this was the first deposit in which glauconite was noticed since leaving the coast of Japan.

In the trawl there were about fifty specimens of deep-sea animals, among which were the following, all of them new species, and five belonging to genera first discovered by the Expedition :—*Ophiacantha sentosa*, Lyman ; *Ophiacantha cosmica*, Lyman ; *Pourtalesia carinata*, A. Ag. ; *Pourtalesia ceratopyga*, A. Ag. ; *Cystechinus vesica*, A. Ag. ; *Aspidodiadema microtuberculatum*, A. Ag. ; *Nymphon longicollum*, Hoek ; *Colossendeis media*, Hoek ; *Parelpidia cylindrica*, Théel ; *Psychropotes longicauda*, Théel ; *Benthodytes mamillifera*, Théel ; *Benthodytes sordida*, Théel ; *Benthodytes sanguinolenta*, Théel ; *Benthodytes abyssicola*, Théel ; *Porcellanaster gracilis*, Sladen.

It was noticed that between Juan Fernandez and Valparaiso the water was of a greenish colour as the continent was approached, contrasting strongly with the deep blue colour which had been constant since leaving the coast of Japan. There was a corresponding change in the general character of the surface animals, Diatoms, Infusoria, and Hydromedusæ becoming very abundant, and the pelagic Foraminifera disappearing from the surface gatherings.

The Foraminifera.—The reader is referred to the Report on the Foraminifera, by Mr. H. B. Brady, F.R.S.,[1] for details concerning these organisms, some species of which are so abundant on the surface, and play so large a part in the formation of deep-sea

[1] Report on the Foraminifera, by H. B. Brady, F.R.S., Zool. Chall. Exp., part. xxii., 1884.