ART. XVII. — Note on the Dispersal of Marine Crustacea by Means of Ships.

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It has several times been suggested that some of the marine Crustacea may be unconsciously dispersed by man, owing to their becoming attached or temporarily adhering to the hulls of ships. So far as I am aware, however, few definite facts of this means of dispersal have been recorded.

Mr. Stebbing (1888, p. 1135), in recording a specimen of Podocerus falcatus (Montagu) from Kerguelen Island, remarked, "There is the possibility, as I have elsewhere suggested, that these creatures may have travelled out from our own waters along with the vessel to the southern latitude at which they were captured." This species, however, which Stebbing gives in his "Das Tierreich Amphipoda" (1906, p. 654) under the name "Jassa pulchella" Leach, proves to be very widely distributed both in northern and in southern seas, and may have been dispersed, as I have pointed out (1909, p. 647), owing to its habit of attaching itself temporarily to the carapace of Jasus edwardsii and other large Crustacea; and, though it is possible it may also be distributed by attaching itself to ships in the same way, this explanation seems hardly necessary for the particular case Mr. Stebbing was then considering.

In his "History of Crustacea," Mr. Stebbing gives a more certain example of this means of dispersal. He says (1899, p. 98), "In the winter of 1873 an iron vessel entered the port of Marseilles. It had come from Pondichéry by way of the Cape of Good Hope, having had a long and stormy voyage in the most rigorous season of the year. To the iron plates of this ship had become attached a little forest of algae and barnacles, and living among these were a number of higher Crustacea of exotic origin. Two of the specimens were found by Professor Catta to belong to a new species, which in 1878 he named Pachygrapsus advena; one was a Nautilograpsus (or Planes) minutus, a species scarcely ever found in the Mediterranean; the remainder belong to two species, which M. Catta speaks of as Plagusia squamosa and Plagusia tomentosa." Mr. Stebbing points out that the latter species should be called Plagusia chabrus (Linn.), and the former Plagusia depressa (Fabricius). The last-mentioned species was the most abundant, being present in hundreds, though, as Mr. Stebbing points out, being an Atlantic species it might not have had to come far. There seems no doubt that the species mentioned had been brought from other places into the Mediterranean by their becoming attached to the hull of this ship.

Dr. Alcock (1900, p. 437) has since pointed out that the Plagusiae resemble Varuna in being able to make themselves at home on drift timber in the open sea, and that the wide range of some of the species can be thus accounted for. He states, however, that the two species found in the Mediterranean may very probably have been carried there by ships, and adds that on the "Investigator" Plagusiae could always be seen adhering to the ship's sides near the water-line.

We have another example of this method of dispersal in the case of the common European shore-crab Carcinus maenas. Dr. Alcock says (1899,
p. 14) that this crab is found at various places on the Atlantic coast of the northern United States and off the coast of Pernambuco (Brazil); that in Europe it extends in the North Sea almost up to Arctic limits, and is common in all parts of the Mediterranean, being also found in the Black Sea and the Red Sea; and that it is also an Indian species, though evidently very rare. He adds that it "has been reported from the Hawaiian Islands, from the Bay of Panama, and—though there is doubt about this locality—from Australia." He proceeds to point out that the distribution is not altogether without parallel among other marine forms, and is therefore not so singular as has been supposed. In 1901 Messrs. Fulton and Grant (1901, p. 56) pointed out that this crab does undoubtedly occur in Australia in the waters of Port Phillip, where it is now exceedingly abundant, and they state that there seems little doubt that it has been introduced there by the shipping. In their paper they quote Consul Gunnerson as suggesting that it may have found its way from Europe to Australia through the medium of the old lumber-ships attracted thither in the early "fifties" on the discovery of the goldfields, many of these vessels having been far from seaworthy, and been patched up with false bottoms which had become riddled with *Teredo navalis* and fouled with marine growths, affording ample shelter for the fry and young crabs on their long voyage. Messrs. Fulton and Grant suggest that this explanation may also account for the scattered distribution of the species as indicated by Dr. Alcock.

I am now able to add another example of the same method of dispersal. When the British Antarctic ship "Terra Nova" arrived in Lyttelton in October, 1910, it was stated in the newspapers that the sides of her hull were covered with a plentiful growth of seaweed, barnacles, &c., and that after she was tied up to the wharf numerous fish were seen feeding on these. As soon as possible after she had been taken into dock I visited the vessel. but, unfortunately, before I could get down the water had been pumped out of dock, and her sides had been already scraped. From the floor of the dock, however, I secured the following cirripedes: *Lepas hilli* Leach, *Lepas australis* Darwin, *Conchoderma aurita* Linn., *Conchoderma vergata* Spengler and *Balanus tintinnabulum* Linn. These are all species which are known to attach themselves to floating logs, and they are also commonly found on ships, and they therefore present nothing new of interest. However, in one of the planks which had been partially split, and therefore removed by the workmen, there were found four specimens of a large sphaeromid, *Cymodoce tuberculata* Haswell, both male and female specimens, two of these being still alive when I secured them.

This species is quite unknown in New Zealand waters, but is an Australian one, and there seems little doubt that it had attached itself to the ship while she was staying in Port Phillip, and had travelled with the ship all the way to New Zealand—i.e., about twelve hundred miles. The hull of the ship is not covered over with copper, but is all wood. The

* My specimens do not quite agree with Haswell's description and figures in the amount of tuberculation of the body and in the details of the processes on the pleon, and they may prove to be a distinct but allied species. The two specimens which I consider to be the females of the species differ greatly in general appearance from the males, as is generally the case in this genus, and I have not yet been able to identify them with any form already described. These questions must be discussed elsewhere, and they do not affect the present argument, which depends on the fact that the species in question is certainly not known from New Zealand, and is either identical with an Australian species already described or very closely allied thereto.
“Terra Nova” had sailed from England down the Atlantic, calling at South Trinidad, off the coast of South America; then at Cape Colony, where she stayed some short time; and then to Hobart and on to Melbourne. From Melbourne she came direct to New Zealand, coming round the south through Foveaux Strait. It is worth while drawing attention to the fact that in this case both male and female specimens were carried together, so that the establishment of the species in any favourable locality to which they might be taken would be quite possible.

Naturally the Crustacea that are suitable for dispersal by means of ships can also be dispersed by floating logs; in that case, however, they would follow the tracks of the prevailing currents, while the dispersal caused by ships would be erratic, and could not be understood without some knowledge of the prevailing routes taken by the ships.

**ADDENDUM.**

Since this paper was read before the Philosophical Institute of Canterbury Mr. T. F. Cheeseman, of the Auckland Museum, has kindly communicated to me the following occurrence, which appears to be an example of a somewhat similar nature.

About two years ago, happening to hear of a curious crustacean in a fishmonger’s shop in Auckland, he went to see it, and was surprised to find a freshly caught specimen of *Limulus*. He was able to secure the specimen for the Museum, and, as the result of inquiries, found that two fishermen had observed the *Limulus* adhering to the stone facing of the Calliope Dock and had pulled it up with a boat-hook. No vessel had been in the dock, however, for some considerable time.

It is uncertain, therefore, whether this specimen found its way to Auckland by adhering to the hull of a vessel or in some other way; but the occurrence of a live *Limulus* in New Zealand is certainly noteworthy. Mr. Cheeseman has kindly compared his specimen with the characters given by Pocock in his recent revision of the group, and identified it as *Carcinoscorpius rostriacauda* (Latr.), a species known from the Gulf of Siam, the Moluccas, and the Philippines.*

**REFERENCES.**


* A single specimen of *Limulus polyphemus* was found in the harbour of Copenhagen in the eighteenth century, having presumably been carried over from North America by a ship to which it clung (Ray Lankester, Q.J.M.S., vol. 48, p. 229, 1905.)