

surface of the ocean. It appears scarcely probable that the shore fauna of two regions so far separated from each other as the Arctic and Antarctic Seas has any direct exchange of forms at the present epoch, so as to allow the same species, in its larval or adult state, to pass from one pole to the opposite without settling at interjacent regions. In brief, I do not believe that at the present epoch the Arctic shallow-water fauna can directly originate from the Antarctic, or *vice versa*. On the other hand, it is a fact that the two faunæ in question resemble each other very closely, and, with regard to the Holothurids, that several forms occur in the Arctic Sea which are most closely allied to those in the Antarctic. I am inclined to suppose that the progenitors of these Holothurids have had a much wider distribution during a past period, that altered physical conditions, a keener struggle for existence, &c., under the tropic and the temperate zones have effected their extinction, or their migration towards the polar seas, or even produced changes in their organisation and general appearance so marked, that their descendants which still remain in the tropical zones present themselves as species distinct from the original, and finally, that the polar seas, with their more uniform physical conditions, allowed them and their descendants to live there and to develop slowly but continuously after almost the same plan. The genus *Psolus* offers an instructive example of forms which are distributed over all seas from the Arctic to the Antarctic, and which are so very little differentiated that we scarcely acknowledge them as distinct species. Thus the northern species, *Psolus squamatus* and *Psolus fabricii*, pass imperceptibly into *Psolus operculatus*, *Psolus complanatus*, and several other tropical or subtropical forms, which in their turn are replaced towards the Antarctic regions by *Psolus antarcticus* and *Psolus ephippifer*, &c. But it must be observed that all these forms of *Psolus*, though they apparently present great similarities, are nevertheless distinguishable, though the differences may or may not be of specific value. It appears pretty evident that they are all descendants from the same ancestors, which may have had their origin in the polar seas or in the tropic or subtropic oceans, and that they, in their wide dispersion, have sustained very well the influence of altered and very various physical conditions in different regions of the world. But, of course, different physical conditions and an altered mode of life have caused some small deviations in internal and external organisation."¹

AGASSIZ writes: "I am unable to distinguish the specimens of this species [*Echinocardium flavescens*] collected at the Cape of Good Hope from the northern ones. There seems to be a number of northern species of Spatangoids which extend to the Cape; among them are to be mentioned also *Brissopsis lyrifera*, *Spatangus raschi*, and *Schizaster fragilis*."²

SLADEN writes: "So far as at present known this genus (*Stichaster*) appears to be confined to the temperate and frigid zones; and most of the species are probably limited bathymetrically to the Littoral zone, only two occurring in the Continental zone and one in the Abyssal zone. . . . *Lophaster* was hitherto known only from the North-Atlantic area. The Challenger obtained examples of a form which I consider referable to the genus from the South Pacific, thus adding another example to the remarkable list of representative forms found in the temperate and sub-frigid zones of the Northern and Southern hemispheres respectively. . . . For a long time the genus *Cribrella* was thought to be represented by a single species only, and to be confined to the northern portion of the Atlantic. Within the last twenty years a number of other species have been discovered, and the genus is found to have a wide area of distribution in the Southern as well as in the Northern temperate and sub-frigid zones. In the higher latitudes north of the Equator *Cribrella* is the only representative of the family, but in its approach towards the southern pole it is accompanied by the allied genus *Perknaster*. Its bathymetrical range is greater than that of any other genus of Echinasteridæ, it being the only representative of the family in the Abyssal zone. . . . Since the discovery of this genus [*Pedicellaster*] in the North Atlantic area a number of forms have been referred to it, which indicate a wide range of distribution. Although I am inclined to think that the whole of the species now ranked as *Pedicellaster* may not ultimately be retained in the genus, the occurrence of representative forms in the higher latitudes of the Northern and Southern hemispheres is fully established."³

CARPENTER writes: "Closely allied to the North Atlantic species [of Comatulæ] are those occurring at Kerguelen and Heard Island, together with a couple of forms inhabiting the Strait of Magellan. This

¹ Zool. Chall. Exp., pt. xxxix. pp. 259, 260.

² Zool. Chall. Exp., pt. ix. p. 175.

³ Zool. Chall. Exp., pt. li. pp. 430, 458, 459, 540, 557.