

animals. I examined the phosphorescent light emitted by three species of deep-sea Alcyonarians with the spectroscope, and found it to consist of red, yellow, and green rays only. Hence, were the light in the deep sea derived from this source alone, in the absence of blue and violet light, only red, yellow, and green colours in animals could be effective; no blue animals were obtained in deep water, but blue animals are not common elsewhere.

It is remarkable that almost all the deep-sea shrimps and Schizopods, which were obtained in very great abundance, are of an intense bright scarlet colour, differing markedly in their intensity of colouring from shallow-water forms, and having, apparently for some purpose, developed an unusually large quantity of the same red pigment matter which colours small surface Crustacea.

Dr. Wallich refers at length in his work, cited above,* to the absence of light in the deep sea, and explains the possibility of persistence of colouring in deep-sea animals, even though they live in absolute darkness. Many deep-sea Holothurians are coloured of a deep purple; no doubt the colouring is useless in their case, and is merely due to the persistence of a colouring developed originally in shallow-water ancestors.

The same purple colouring matter, which is easily distinguished by means of the spectroscope, occurs in a shallow-water (nine fathoms) *Comatula* at Cape York, in the tropics, and in a Holothurian, found in 1,955 fathoms, near the Antarctic Sea. Many deep-sea Corals have their soft structures tinged with a madder colouring matter which occurs also in surface-swimming Medusæ of various kinds.†

No doubt, in the case of many deep-sea possessors of complex colouring matters, these pigments never exercise their peculiar action on light during the whole life of the animals, but remain in darkness, never showing their colour at all. Similarly in the case of many Mammalia, with thick or fur-clad skins, the bright red colouring matter of the blood never sees the light or appears as a red colour. It is only in a few Mammals that this red colouring matter is turned to account, as, for example, in the white races of man, in which case sexual selection has brought about a tinging of the cheeks by its aid.

Most deep-sea fish are of a dull black colour, some are

* "The Atlantic Sea Bed," p. 108.

† For observations on the Colouring of Deep-Sea Animals, see H. N. Moseley, "On the Colouring Matters of Various Animals, especially of Deep-Sea Forms dredged by H.M.S. 'Challenger.'" *Quart. Journ. Micro. Sci.*, Vol. XVII., New Ser., p. 1.