

task, have already greatly increased our understanding of the "metabolism of the ocean", as Hensen expressed his ultimate aim.

One must not forget the pioneer work of Wallich, Carpenter, and others, but our knowledge of the abyssal fauna practically begins with the *Challenger* expedition. Abyssal.

The researches of the *Challenger* and analogous expeditions have made it certain that there is no depth-limit to the distribution of animal life, that there are in the great abysses representatives of most of the classes from Protozoa to fishes, and that the distribution of some types tends to be cosmopolitan in correspondence with the uniformity of the physical conditions.

As to these physical conditions, the deep-sea world is in darkness, apart from occasional "phosphorescence", for a sensitive photographic plate is not influenced below 250-500 fathoms; the temperature is about freezing point, the heat of the sun being practically lost at about 150 fathoms; the pressure is enormous, about  $2\frac{1}{2}$  tons per square inch at 200 fathoms; the cold water in sinking brings down a relatively large proportion of oxygen; it is quite calm, for the effects of the greatest storms are only felt near the surface.

There are no plants, apart from the resting stages of a few doubtful algoid forms, for typical vegetable life is dependent upon light, and not even bacteria, otherwise so omnipresent, are known to occur in the great depths. The animals feed on one another and on the organic debris which sinks down from above.

Modern research has yielded no result more stimulating to the imagination than the tidings of this strange, silent, cold, dark, plantless world and its numerous inhabitants.

The *Challenger* and subsequent expeditions yielded results which have been worked up in many of the leading biological laboratories of Europe and America, and there is now an abundance of reliable data; not enough, however, to settle some of the most interesting questions which the facts raise.

What of the metabolism of deep-sea animals, the