Petersen on organic matter in the uppermost layer of deposits.

During his plankton work in the Liimfjord, Petersen arrived at the conclusion that the plankton played a very unimportant part in the food of bottom-animals (as, for instance, the oyster). He commenced therefore to study the finely granular mass found in the gut of the bottom animals. He discovered that the uppermost layer of mud on the fjord bottom, 2 or 3 mm. in thickness, consisted of detritus containing minute remains of organisms, mainly of decayed plants from the littoral region, and that only this upper layer of the mud has any nutritive value, the deeper blue-black layer not occurring in the gut of the bottom animals. Starting from these researches, Petersen studied the organic (nutritive) constituents of the mud, especially of the upper layer, and investigated the abundance of bottom-animals over different kinds of deposits. For this purpose he constructed an apparatus (see Chapter X.) for cutting away from the sea-bottom a square foot of its surface. When this large "bottom sample" is sifted the animals contained in the mud can be counted, and by comparing the quantities of mud-eating animals thus found per square foot of bottom, the yielding power of different areas may be estimated, much on the same principle as the productive value of agricultural land is estimated.

The "Michael Sars" had, during the Atlantic cruise, some of Petersen's apparatus on board, but owing to difficulties in using them in deep water, we did not succeed in obtaining material of any value, a fact all the more regrettable, as there is no doubt that Petersen's method gives far more exact results as regards the quantities of certain animals living on the bottom in shallow water than hauls with dredges and trawls. Nevertheless, the material at hand may be used to illustrate the question. The most stringent quantitative science is in the first stages of a new study satisfied to dispense with the demand for absolute exactness, and contents itself with relative values—in other words, with a comparison between different localities.

"Challenger" hauls on different deposits.

Sir John Murray long ago attempted to compare the number of animals taken in the dredge or trawl on different deposits, based on the results of the "Challenger" Expedition, and I reproduce some of his figures from the second volume of the "Challenger" Summary :—