of those directly facing the gale. I naturally expected to have it strong in my face; but, on the contrary, I found I had almost as perfect a shelter from the wind as if I had been on the other side.

C. M. INGLEBY

Malvern Wells, July 3

AFFINITIES OF THE SPONGES

MR. H. J. CARTER is devoting much attention at the present moment to the study of the Protozoa. In March last he published in the *Annals* and *Magazine* of *Natural History* the results of his investigations on Coccoliths and Coccospheres, stating his opinion that these minute bodies are of vegetable and not animal organisation, as hitherto supposed. Should his supposition prove correct, it will materially modify the theory of the mode of support of animal life at great depths, advocated by many recent deep-sea explorers. In the pages of the same journal for this month (July), Mr. Carter lays before us the results of his more recent researches into the ultimate structure of the marine calcareous sponges, and which entirely harmonise with those already arrived at by Prof. James Clark, of Boston, U.S. The sum total of these are that the Spongiadæ, as a group, are most closely allied to the Flagellate Infusioria; the animal portions of the genera *Leuconia*, *Grantia*, and *Clathrina* among the calcareous sponge-forms, and *Spongilla*, *Isodictya*, *Hymeniacidon*, and *Cliona* among the silicious representatives examined by Mr. Carter, being found by him to consist, for the most part, of aggregations of the same peculiar funnel-bearing ciliated cells characteristic of the new Flagellate Infusorial genera *Codosiga*, *Salpingœca*, *Bicosœca*, &c., introduced by Prof. Clark. The only point at issue between these two explorers in the same field is, whether each separate cell possesses a distinct mouth, or is capable of engulphing food, after the manner of an ordinary Rhizopod, through any portion of its body. Mr. Carter here adopts the latter view.

The most important result of Mr. Carter's investigations is, however, the additional evidence he brings forward in refutation of Ernst Haeckel's no longer tenable hypothesis, that the sponges are most closely allied to, and should even be collated in the same primary group as, the Cœlenterata. Prof. Haeckel's opinions have already been strongly opposed by myself (See *Ann.* and *Mag. Nat. Hist.* for March and September 1870); and Mr. Carter's recent investigations practically deprive Prof. Haeckel and those supporting his views of their last foot-hold. The Calcispongiæ is the group on which Ernst Haeckel and his collaborateur Mickluco-Maclay have more particularly concentrated their attention; it is the especial one, again, they have made choice of, as demonstrating in their opinion, more closely than any, the relationship they would seek to establish. Prof. Clark and Mr. Carter, however, prove beyond doubt their bond of union with the Flagellate Infusoria, the addition of a general investing sarcode layer and a spicular or horny supporting skeleton being, indeed, the only clearly defined characters that separates them from the group.

In seeking to establish other affinities, Mr. Carter is scarcely so happy. In his opinion, the Spongiadæ are more closely allied to the compound Tunicata than to the Cœlenterata, but he allows himself to be led further away here by analogous or general external resemblances than even Prof. Haeckel. To effect his purpose, he proposes that the branchial openings in the gelatinous mass of *Botryllus* "are analogous if not homologous" with the pores of the Spongiadæ, while the common cloacal cavity and fæcal orifice are respectively analogous to the excretory canal system and vent. Fascinating as these external resemblances may appear at first sight, we must penetrate a little beneath them, and before Mr. Carter can hope to substantiate the affinities he would establish, he must demonstrate to what extent the individual zooids of the Ascidian colony can be correlated with the single or aggregated ciliated cells of the sponges. In the former we have highly-organised animals, possessing a well-developed neural, hæmal, digestive, and respiratory system, while in the latter, simple uniciliated cells and undifferentiated sarcode are the only materials to be dealt with. Mr. Carter, again, would institute comparisons between the tough, gelatinous, or albuminous mass in which the Ascidian zooids are embedded, and that sarcode layer more or less generally diffused throughout all sponge structures; but in the first we have formed matter, like bone, horn, or shell, no longer possessing vital properties, while in the sarcode of the sponge we have living substance constantly altering its conditions of relationship, secreting the supporting skeleton, and contributing to the general welfare of the sponge community. Mr. Carter's inference in support of his proposition, drawn from the presence of calcareous bodies resembling spiculæ being met with in certain compound Ascidia, is but of little importance, considering that comparisons on the same grounds might be made between the sponges and the Nudibranchiate Mollusca; these latter likewise frequently secreting calcareous spiculæ in the substance of their integument.

The hiatus between the Spongiadæ and the Tunicata is far too wide to admit of such an institution of homological comparisons; the group of the Cœlenterata is evidently the nearest related to the former, but even here there are at present too many important links wanting to justify our uniting the two in one sub-kingdom, as proposed by Haeckel. *Inter se*, the sponges constitute a very natural division of the Protozoa, intimately related on the one hand through their special ciliated cells to the Flagellate Infusoria, and by the remaining sarcode layer, or skeletal secreting portion, to the simpler Rhizopoda.

In the paper here alluded to, Mr. Carter describes, under the name of *Trychogypsia*, a new calcareous sponge form differing from all others with which he is acquainted in possessing linear fusiform and no triradiate or quadriradiate spicules. The genus *Aphroceras*, described by Dr. Gray in 1858 (see Proc. Zoo. Soc., pp. 113, 114), is recognised by the same characters.

W. SAVILLE KENT

ON RECENT MOA REMAINS IN NEW ZEALAND

IN January 1864 a remarkably perfect specimen of *Dinornis robustus*, Owen, found on the Manuherekia Plains in the interior of the Province of Otago, was transmitted to the museum at York, and formed the subject of a memoir by Prof. Owen in the Transactions of the Zoological Society for 1869. These remains were considered unique on account of the well-preserved condition of some parts of the skeleton, portions of the ligaments, skin, and feathers being still attached to some of the bones, whereas Moa bones in the condition in which they are usually found are partially fossilised, or have at least undergone a sufficient change to deprive them not only of all ligamentous appendages, but to some extent of their proper proportion of organic matter. The discovery in the following year of the unique specimen (now in the museum) of a Moa's egg containing the bones of an embryo chick and attached membranes—within twenty miles of the same locality—was recorded by me in 1867 (Proc. Zool. Soc. p. 991.) I have now to announce the acquisition of another interesting specimen from the same district, being the cervical vertebræ of a Moa, apparently of the largest size, upon the posterior aspect of which the skin, partly covered with feathers, is still attached by the shrivelled muscles and ligaments.

I saw the specimen in question in the possession of Dr. Thomson, of Clyde, who obtained it from a gold miner. It was discovered in a cave formed by an over-