

obtained from this remarkable formation," and which comprises some rare *Araliæ*, *Sequoia*, and *Menispermities*.

Not the least interesting chapter in the book is one by Mr. W. H. Jackson, on the curious traces of ancient human occupation that are found along the cliff-sides and escarpments in the extreme south-western portion of the Territory. Grouped or singly along these slopes, some near the highest flood-level of the stream, others at considerable elevations above it, are ruins of stone buildings of various sizes and in various stages of decay. They are constructed of stones about 4 inches square by 7 and 12 inches wide, cemented with clay, and divided into rooms 8 or 10 feet square. Some were of two stories, castle-like in form, and provided with squared windows; but, except abundant fragments of coarse pottery, no other relics of these bygone races could be discovered among the ruins. Their chief peculiarity is their situation. Generally high up on the cliff-side, at the base of the more vertical portions, these buildings, often enclosing the entrances to caves and fissures, though at other times quite separated from the rock, are always difficult of access. The inhabitants had evidently much to fear from hostile tribes; and the position of the buildings, coupled with the fact that they can be at times with difficulty distinguished from the natural stone, indicates that the ancient tribes had selected this inhospitable site for the sake of security. But history tells us that even this effort was vain. Mr. Ingersoll, writing about the aboriginal races of Colorado, asserts that originally they inhabited all the country as far west as the head-waters of the San Juan, and lived peacefully, cultivating with rude implements of stone and wood the fertile valleys of the streams, where they pastured their flocks and herds. But about 1000 years ago their neighbours, the Utes, broke up these peaceful encampments. Driven by slaughter and forays, they retired to the more inaccessible fastnesses of South-west Colorado, and there dug reservoirs and built the watch-towers, of which the relics only remain. And here they stood at bay; but "their foes came, and for one long month fought and were beaten back, and returned day after day to the attack as merciless and inevitable as the tide. Meanwhile the families of the defenders were evacuating and moving south; and bravely did their protectors shield them till they were all safely a hundred miles away. The besiegers were beaten back and went away; but the narrative tells us that the hollows of the rocks were filled to the brim with the mingled blood of conquerors and conquered, and red veins of it ran down into the cañon." The Moquis of Arizona are their descendants. Even these desolate wilds tell a tale of human suffering and aggression that can unfortunately find its parallel in every nation's history.

A special Report on the *Mollusca of the region*, and Reports on the Topography and Geography, and a good index are also given. The completeness of the volume, and the painstaking care with which a work presenting no ordinary difficulties has been so successfully performed, reflect the highest credit both on the Government that directed its execution, and the able body of scientists to whom its carrying out was intrusted.

## MISCELLANEOUS.

*Zoology of the 'Challenger' Expedition.*

To the Editors of the *Annals and Magazine of Natural History*.

GENTLEMEN,—A notice of the "Zoology of the Challenger Expedition" appeared in your No. for March 1877, and has excited much surprise. It was in the form of an extract from a letter which Mr. Alexander Agassiz addressed to the Editors of 'Silliman's Journal,' dated Edinburgh, Dec. 18, 1876. In this letter the scientific world is informed that the 'Challenger' collections are to be distributed for description in a very extraordinary manner, and "so that the United States will have their fair share of the work." In fact the *Echini*, *Ophiurans*, *Radiolaria*, and *Spongida* (almost the most important groups to the zoologist and palæontologist, and dredged up in the grand British expedition at great cost) are to be handed over to distinguished naturalists abroad.

I address you on this subject at the instance of a very considerable number of Fellows of learned societies, and, by permission, in the name of those gentlemen whose work in relation to those groups is well known. I state unhesitatingly that not one English writer on the *Echini*, *Spongida*, or *Radiolaria* has been communicated with by Sir Wyville Thomson, in whose hands the Government have placed the direction of the results of the Expedition; they one and all have been passed over with contemptuous neglect. For a great nation to send out expensive expeditions and then to distribute the results for determination and description to foreign naturalists, however distinguished, without considering and employing its own naturalists, is rather characteristic of this age of depreciating criticism; but it is a proceeding which can only be tolerated upon a preposterous application of the idea of catholicity in science and the fact of the incompetence of national investigators.

An assumed deficiency of competent naturalists in Great Britain is, in fact, the only excuse for distributing the collections after the fashion adopted by the "Director;" for the stretching of the idea of brotherhood in science, under the circumstances of the Expedition, is silly. I would direct the attention of the Director (whose apparent ignorance of the work of his fellow countrymen would seem to disqualify him for his position) to the pages of the Palæontographical Society's works, and to those of the Zoological, Geological, and Linnean Societies during the last decade. He will find that a Royal Medallist obtained this honour for researches amongst the Protozoa; he will find that an English palæontologist, who has paid great attention to the *Echini*, has given a classification of their main groups which is accepted everywhere; and he will find younger observers who have given plenty of evidence of their only wanting the opportunity to become very distinguished. There is no deficiency of competent workers amongst us.

As a perfectly independent naturalist, I protest most decidedly

against Sir Wyville Thomson's course of action, and denounce it as unjust and unpatriotic; and in this protest I am joined, as will be proved shortly, by nearly every scientific man with whom I have communicated. I doubt whether Sir Wyville Thomson is justified by the instructions of the Government regarding the disposal of the Collections; but this question will be settled when the correspondence is moved for in the "House." In conclusion, I wish, in my own name and on behalf of those naturalists who act with me, to express our admiration of the labours of the distinguished men who are mentioned by Mr. A. Agassiz, and our thorough appreciation of his own genius and liberality. We can only regret that these gentlemen have been placed, by no fault of their own, in a position so invidious that they can hardly occupy it conscientiously.

Yours, &c.,

P. MARTIN DUNCAN, F.R.S.,  
Pres. Geol. Soc.

April 20, 1877.

*On the Modifications undergone by the Ovum of the Phanerocarpal Medusæ before Fecundation.* By M. A. GIARD.

We shall take as a type the ovum of *Rhizostoma Cuvieri*. This fine Medusa is thrown up in great abundance, during the whole autumn, on the beach at Wimereux, together with *Chrysaora hyoscilla* and some other Acalephs.

The smallest ova taken from the ovary are formed of a transparent vitellus containing a germinal vesicle and a nucleolus. We do not yet recognize in them any enveloping membrane. As the ovum increases in size its transparency diminishes; the vitellus becomes charged with deutoplasm, and the germinal vesicle less easy to appreciate; at the same time a very delicate vitelline membrane, closely applied to the vitellus, may be distinguished at the periphery. In a later stage the ovum presents at its periphery a series of spherules equally distributed over its whole surface, filled with a perfectly hyaline substance, and separated from the external membrane by a thin layer of granular protoplasm, identical with that which occupies the centre and covers the germinal vesicle. An optical section of the ovum may then be roughly compared to that of a young stem of a plant at the moment of the appearance of the first circle of vascular bundles which divide the parenchyma into three parts—one central, another peripheral, and the third radial (uniting the two former). The hyaline spherules increase rapidly, become tangential to one another, at the same time that they reach the vitelline membrane. Under a low power it appears as if the vitellus were surrounded by a layer of cells which project rectangularly at its periphery. Under a higher power it is seen that the central granular protoplasmic mass is united to the vitelline membrane by a multitude of little columns, widened at their two extremities, like the columns formed in a cavern by the union of the stalactites and stalagmites. These little columns are formed by a less granular protoplasm than that of the centre of the ovum.

Lastly, at the moment when the ovum arrives at maturity, the little columns are ruptured, leaving no traces except slight thickenings of the vitelline membrane at the points where they were attached. We have then, therefore, a central granular mass in which the germinal vesicle is no longer directly observable, and round this mass a transparent zone which separates it from the vitelline membrane.

Prof. Harting has seen, in the ova of *Cyanea Lamarckii* and *C. capillata*, the stage in which the little columns exist\*; but not having completely followed the preceding phases, he has given an erroneous interpretation of the appearances observed. He regards the ova of the *Cyaneæ* as furnished with a vitelline membrane of considerable thickness and pierced with a great number of pores leading from the outside to the interior, such, he says, as are met with in the ovum of some Mammalia, perhaps in all, and also in the ovum of many Teleostean fishes, in which, however, these pores acquire much more considerable dimensions. It is evident that these supposed pores are nothing more than the columns of clearer protoplasm above mentioned. In this way the suppositions of Harting with regard to the physiological function of these pores also fall to the ground. He believed them to serve for the respiration of the ovum, and perhaps also for the passage of the spermatozooids.

The preceding observations were made at Wimereux during the month of September 1875. They are a part of a set of researches, still unfinished, on the development of the Medusæ; and I have only decided to publish them now because they appear to me to acquire a much greater generality and importance than I at first supposed, in consequence of the magnificent researches of Weismann† on the ovum of the Daphnoideæ.

Weismann has observed a process precisely similar to that just described, in the formation of what he calls the shell (*Schale*) of the winter egg of the genera *Polyphemus*, *Sida*, and *Daphnella*. It is remarkable that, in this case, as in that of the Medusæ, the ovum undergoes a tolerably long incubation in a special medium furnished by the maternal organism.

The excretion of the hyaline vesicles, which takes place all over the periphery of the vitellus of the ovum of *Rhizostoma*, may in other animals be confined to one point of the surface; the phenomenon would then take on the appearance of the issue of excreted globules. Considering this process, we may inquire whether the phenomenon so often noticed of the rejection of a certain part of the vitellus at the moment of the maturation of the ovum must be regarded as equivalent in all animals in which it has been observed. Bütschli has shown most clearly that the polar corpuscles of the ovum of *Limnæus*, *Succinea*, *Nepheleis vulgaris*, and *Cucullanus elegans* originate by the process of cell-division. I may add

\* Niederländisches Archiv, Bd. ii. Heft iii.

† Zeitsch. für wiss. Zool. Bd. xxviii. Heft 1 & 2.