THURSDAY, OCTOBER 3, 1918.

THE ECONOMY OF NATURE.

La Géologie biologique. Par Prof. S. Meunier. Pp. vii + 328. (Paris: Librairie Félix Alcan, 1918, dated 1914.) Price 5.50 francs.

IN the present-day economy of Nature the various associations of living creatures work into one another's hands, so that a moving equilibrium results. One of the main ideas of Prof. Meunier's "Biological Geology" is that analogous associations have existed in the past in similar correlations, the same biocosmic *rôle* being discharged by successive types. After illustrating the geological activity of organisms in forming and weathering deposits, and in the ceaseless circulation of matter, the author takes an interesting survey of the various haunts of life and their interrelations, and brings forward evidence to show that in past ages there was a somewhat similar biocosmic pattern, with hydroplankton, hydronekton, hydrobenthon, aerial animals, terrestrial animals, even commensals, symbionts, and parasites.

Taking the sedimentary rocks in some detail, the author shows the part that organisms have played in the formation of calcareous, siliceous, phosphatic, sulphurous, carbonaceous, and other deposits, and in the erosion of rocks which their predecessors had helped to form. The author's emphasis is all on continuity—a continuity of "terrain," an ocean with the same chemical character since life began (as Silurian salt deposits testify), an atmosphere without any great change, a continuous biocosm since the pre-Cambrian, with "a continuity of *régime*." Obviously the biocosm loses members, but others take their place, so that there is no change in general equilibrium, or in what Prof. Meunier goes the length of calling the "impeccable harmony" of interrelations. In emphasising a truth the author commits an exaggeration.

It is strange that a naturalist who lays so much stress on continuity should be a champion of the theory that new forms appear suddenly. Thus in speaking of the appearance of *Cardium porulosum* in the beds at Grignon he writes: "What Nature seems to show us is a brusque phenomenon, without hint of a precursor of any kind, as the result of which a living creature comes to add itself to the series already existing." What occurs is not a transformation of species, but a replacement. A species has a life and "personality" like an individual: it is born, it develops, it reaches its climax, it wanes, it exhausts its share of "vital force," and disappears, only to have its place taken by another species, slightly different, but likewise in harmonious relation with the constant properties of the environment. Prof. Meunier recognises the profound changes which the intervention of vital activity made in the economy of the earth, but once organisms had firmly established themselves there has been, he maintains, no environmental change of moment, only change in secondary features, such as the distribution of surface temperature. It seems a strange position to recognise that the appearance of organisms changed the whole venue, and yet to deny that the establishment of grasses and mammals, of flowering plants and their insect visitors, and so on, has made no appreciable difference in the animate environment.

The author seems to us to have missed a cardinal fact—the evolution of the environment—and to have failed to realise how complex a system of relations the present-day environment of an able-bodied, active-minded animal is. Yet he lays emphasis on what animals and men are continually doing in modifying their environment. These modifying agencies seem to Prof. Meunier to show how well adapted the general environment is to the exigencies of organic life. The constancy of environmental influences, which we believe he exaggerates, appears to him to form a "decisive objection against every transformist doctrine that supposes organismal transformations to have been determined by external changes." But transformists are not restricted to any crude Lamarckism. To Prof. Meunier vital energy is a dynamic entity, like crystallogenic energy, capable of passing from one heavenly body to another like light or heat, capable also of remaining for a long time latent, but likewise of manifesting itself in favourable environment, and of expressing itself in a "perfectionnement organique" as time goes on.

It seems to us that the day is past for half-hearted evolutionists, and we have no sympathy with Prof. Meunier's extraordinary view that evolutionists are embarrassed by finding among aquatic animals so many different solutions of the problem of respiration, or by knowing that in the course of ages cetaceans have shown no trace of any transformation of lungs into gills. The best idea in the book is that the earth and sea and sky and all that in them is form a sort of organism that grows as a whole with continuity, keeping up a harmonious correlation, a balance, a *systema naturae*, which changes from age to age, and yet remains in principle the same.

WATER SUPPLIES FOR RURAL DWELLINGS.

Rural Water Supplies and their Purification. By Dr. A. C. Houston. Pp. xv + 136. (London: John Bale, Sons, and Danielsson, Ltd., 1918.) Price 7*s.* 6*d.* net.

THE private isolated water supplies of the scattered rural population are often dangerously polluted; and there are many who would be glad to do what is possible to remedy matters, if they were informed of the dangers they run and the best practical means of escaping from them. But this small work will not prove of great value to the majority of dwellers in rural districts, whose need is for some simple, detailed expedients for easily reducing the risk and inconvenience attendant upon a water supply which is unsuitable from the point of view of either quality or quantity