

as an elementary text-book of zoology. Undoubtedly a medical student who had mastered it would be far better prepared for his medical studies than is now usually the case. But from what one knows of the history of university teaching, so violent a change is improbable. If it is made at all, it is likely to be made in stages. Meanwhile we can think of no volume of its size more suitable than Prof. Hogben's to supplement the orthodox zoological text-book, in the hands of both intelligent students and teachers. In this capacity, at any rate, it is to be hoped that it may find a wide circulation.

Short Reviews.

The Origin of Life. By Gilbert Rumbold. Second Impression. Pp. 128. (London: The Norfolk Press, 1931.) 5s.

THE true philosophical mind is not connoted exclusively by an ability of learned and scholarly criticism of existing theories, but primarily by the inquisitive attitude which has really given birth to philosophy, and the courage and power of stating one's findings about the problems considered. The author of "The Origin of Life", though not a professional philosopher, displays in his book a true philosophical mind in presenting to us his particular answer to the time-honoured question which he asked himself, "What is it all about?"

Seeking unity of structure and purpose in the world in which we live, the author claims to have found a more adequate explanation of life by means of his "Proton Theory of Living Matter". This theory, which reminds one of a combination of Epicurean physics with Leibnizian monads and Darwinian selectionism, the whole mashed with the language of contemporary physics, is simple and suggestive. In order to bridge the gap between mind and matter, the author imagines the existence of 'egos' or 'earth-minds' of which human minds are but a sub-class. These 'egos' have the property of expressing themselves in the world of matter, the size of their 'modes' of expression being no wider than the proton nucleus of an atom. Then intervenes the principle of natural selection, which directs the 'egos' to meet other 'egos' and thus form the original cells of the living matter. The establishment of a proper hierarchy between these formations leads to an all-embracing explanation of life, while secondary developments of this theory offer tentative explanations of habit, instinct, sex, and suggest possible solutions of some higher problems of philosophy.

These views are indeed very interesting; but before discussing them in detail, one would wish Mr. Rumbold to expand his epitome in such a way as to show exactly the intermediary steps between his dogmatic assertions, and to indicate the connexion of some of his expressions with the standard theories they inevitably conjure up in his readers' minds.

T. G.

Annales de l'Institut Henri Poincaré. Fascicule 2, Vol. 1. Pp. 77-203. (Paris: Les Presses universitaires de France, 1931.) 35 francs.

THE first number of the *Annales* was noticed in NATURE of Oct. 11, 1930 (p. 564). In the second number we have de Donder on Einstein's theory of gravitation, Pólya on some points in the theory of probability, Lévy on the fundamental theorem of the theory of errors, and Kostitzin on some applications of integral equations.

De Donder's paper is a summary of a series of six lectures dealing not only with relativity, but also with wave mechanics and thermodynamics. He tries to show that, contrary to a widely held belief, there is no need to modify the general theory of relativity, for if this is understood in a sufficiently wide sense it is in harmony with the most modern theories of wave mechanics. There are several references to the work of J. M. Whittaker, and it is pointed out that the material tensor, the electric current, and the photonic currents properly so-called are all expressible in terms of Whittaker's photonic potentials.

Pólya's paper is divided into two distinct parts. The first deals with a characteristic property of the Gaussian or normal law, while the second deals with other laws of frequency, obtained by the superposition of small causes which are not independent of one another. Lévy's paper also deals with the normal law.

Kostitzin's paper deals with integral equations which have an infinite number of solutions. He advances the view that by restricting ourselves to linear equations with unique solutions we get an impression of definiteness and causality in Nature which is valid only as an approximation. The multiplicity of solutions corresponds to the more modern view of indeterminacy in detail, with definiteness arising only from a statistical average. In an interesting preface it is suggested that the sceptical and even pessimistic tone of Poincaré's last utterances on the physics of his time was due to his insight into its concealed weakness and his power of anticipating future developments.

H. T. H. P.

Animal Ecology and Evolution. By Charles Elton. Pp. 96. (Oxford: At the Clarendon Press; London: Oxford University Press, 1930.) 4s. 6d. net.

THIS little book consists of three lectures, "The Regulation of Numbers", "The Significance of Migration", and "The Real Life of Animals". An environment is an entity composed of plants and animals, the species of which are constant. But it is pointed out that the numbers of the different species of animals vary not only in accordance with the periodic changes of temperature, rainfall, etc., but also in an irregular manner. There may be an optimum density for a species and, when its population varies too far from this, the species changes its behaviour. The most obvious change is that of migration into a region which may be very different from its old home, a new habitat. It seems to be an inherent impulse, for the individuals which