

European skulls hitherto. The width of the face in front of the ears is 153 mm., at the angles of the lower jaw 127 mm., betokening an extraordinary development of the masseter muscles. Notwithstanding these features, the skull is that of a strong, handsome, and big-headed man.

The opening chapters of this work are devoted to an orthodox and clearly worded description of Europe in the Ice-age. In dealing with human remains, Prof. Werth depends very largely on the methods and conclusions of Schwalbe and of Klaatsch. Prof. Werth accepts Schwalbe's verdict that Neanderthal man was not the precursor of modern man, but was extinguished by the arrival of the Aurignacian race in Europe. He is inclined to think the Cromagnon type represents a later invader of Europe, and accepts this type as the precursor of the long-headed modern Europeans—both of the dark Mediterranean and of the fair Scandinavian type. The work, of which this is Part 1, is well illustrated.

*Studien an Infusorien über Flimmerbewegung, Lokomotion und Reizbeantwortung.* Von Dr. Friedrich Alverdes. (Arbeiten aus dem Gebiet der experimentellen Biologie, Heft 3.) Pp. iv + 130. (Berlin: Gebrüder Borntraeger, 1922.) 12s.

THE little book under notice is a record of careful work, chiefly upon the behaviour of *Paramecium caudatum*, although the three other species of *Paramecium*, *Stentor polymorphus*, and other Infusoria, figure in some of the experiments. The author has made an especially detailed study of the movements of *Paramecium* and of the action of its cilia, and his observations on its morphology are not without interest. He discusses the behaviour of these organisms when operated upon, and also their reactions to narcotics and other chemical stimuli and to the galvanic current.

While the author admits the merit of Jennings's work in this field of study, he is, nevertheless, frequently in conflict with this worker, both in his observations of behaviour and his interpretations of them; but it is not certain that he thoroughly grasps Jennings's views, and it is noteworthy that the latest edition of "The Behaviour of the Lower Organisms" (Columbia Univ. Press, 1915) is not in Dr. Alverdes's Bibliography. Dr. Alverdes ranges himself energetically against all those who see in the Infusoria nothing but "small automata," and vigorously opposes the mechanistic interpretation of their behaviour. Like Jennings, he denies that the local action theory of tropisms can explain completely the behaviour of these organisms. He would substitute for it another view to which his researches have led him, but it is impossible, in the short space at our disposal, adequately to present this view or to criticise it. Undoubtedly Dr. Alverdes's work is careful, and is marked throughout by independence of mind. He insists, with admirable emphasis, that little progress can come from the study of the Protista in unusual media or in media which are artificially prepared upon physico-chemical principles alone. The same argument might be applied with profit to all other work on the Protista.

In spite of a rather difficult and discursive style, the book should not be neglected by those who are interested in the problems with which it deals.

*An Introduction to Electrodynamics: From the Standpoint of the Electron Theory.* By Prof. Leigh Page. Pp. vi + 134. (Boston and London: Ginn and Co., 1922.) 10s. net.

HITHERTO the mathematical equations of electro-dynamics have been based on the experimental conclusions of Coulomb, Ampère, and Faraday. Even books which discuss relativity go no further than showing that these equations are co-variant for the Lorentz-Einstein transformation. In Prof. Page's book, however, the equations are derived directly from the principle of relativity. The mathematician will appreciate this procedure as it is more logical, but we think that the average reader will find the older methods more convincing. The units chosen are those advocated by Heaviside and Lorentz. The value of the charge at any point is equal to the number of tubes of force diverging from the point; all matter is assumed to be made up of positive and negative electrons; electromagnetic force is defined in terms of the electric intensity of lines of force, and gravitational attraction between two electrons is supposed to be negligibly small. The electrons carrying a current are all of the same sign, and their masses are positive. Hence the "mass of the current" is greater than the sum of the masses of the individual electrons composing it.

The author's methods of calculating the radiation from electrons are to be commended, and he also gives a good account of Laue's theory of the diffraction of X-rays. The formulæ deduced for specific inductive capacity, magnetic permeability, and metallic conductivity agree fairly well with experimental results. The theories of Faraday's experiment showing the rotation of the plane of polarisation of light by a magnetic field and of the Zeeman effect are given briefly, but in a convincing way. We can commend this book to the electrician who has an advanced knowledge of mathematics and is interested in the latest theories.

*Handbuch der biologischen Arbeitsmethoden.* Herausgegeben von Prof. Dr. E. Abderhalden. Lieferung 55. Abt. V: *Methoden zum Studium der Funktionen der einzelnen Organe des tierischen Organismus.* Teil 6, Heft 3. *Sinnesorgane: Lichtsinn und Auge.* Pp. 365-462. (Berlin und Wien: Urban und Schwarzenberg, 1922.) 117 marks.

THIS portion of the work, Abderhalden's "Handbuch," is the direct continuation of parts 3 and 41 which dealt with the biophysical methods used in investigating the living eye and its sensitivity to light. The first section, by Dr. Vogt of Basel, is devoted to the method of examining the eye with light from which the red rays have been absorbed by passage through a concentrated solution of copper sulphate and a weak solution of erioviridine. With such light, investigations of the yellow spot are rendered much easier and more accurate. The second section of 76 pages, by Dr. Basler of Tübingen, deals with methods which in the main are intended to investigate the functions of the retina and its various parts. Sharpness of vision, irradiation, and detection of movement are some of the subjects dealt with. The concluding section, by Dr. Struycken of Breda, describes the photographic method he uses for studying the