

*Das Zeisswerk und die Carl-Zeiss-Stiftung in Jena.* Ihre wissenschaftliche, technische und soziale Entwicklung und Bedeutung, für weitere Kreise dargestellt von Felix Auerbach (Prof. a.d. Universität). Pp. vi+124. (Jena: Gustav Fischer, 1903.)

THIS short popular account of the optical works in Jena will be of interest to a wide circle of readers. Of the successful application of science to industry no more striking illustration can be found than in the history of the Zeiss firm, with its aim of "scientific exactness and perfection of workmanship," while to many the description of the present organisation of the undertaking, and the socialistic features of the charter under which it is now controlled, will no less appeal.

The early efforts of Carl Zeiss towards the improvement of the microscope, his adoption of Abbe as scientific partner, and the revolution in the optical theory of the instrument due to Abbe's work, are dealt with in some detail. The need, emphasised by Abbe's investigations, of greater variety in the character of optical glass, to render possible the removal of the chief defects of lens systems, led to the foundation, in 1884, of the glass works of Otto Schott, and from this year we may date an enormous advance in the construction of optical instruments, with a further development of the Jena industry. This brings us to an account of the existing organisation, and a description of the main departments, with details and illustrations of many of the most important and best known instruments, as well as of the workshops and buildings.

The latter part of the work deals with the social and socialistic aspects of the present system of administration. In 1891, some four years after the death of Carl Zeiss, Abbe devised his rights of property in the optical and glass works to the undertaking itself, and originated the statute, under which, after receiving in 1896 the legal sanction of the Duke of Saxony, the "Carl-Zeiss-Stiftung" is now controlled. Particulars are given of the statutory standing of the employés, the system of profit-sharing, the regulation of hours of work, the pension scheme, as well as of institutions founded for the benefit of the workmen, and benefactions to the university and to the town.

In addition to Carl Zeiss and Abbe other personalities connected with the undertaking, Schott, Czapski, Straubel, Pulfrich, &c., are briefly characterised, and with these names may be also mentioned that of the old foreman, August Löber, to whom the firm is indebted for many improvements in technical detail.

*Reasons Against the Theory of Evolution.* By Thomas Woods, M.D., M.R.C.S.L., L.R.C.S.I., &c. Pp. viii+52. (London: W. R. Russell and Co., n.d.)

THE author of this booklet may have perfectly definite convictions as to the truth or falsity of the theory of evolution, but he has hardly succeeded in making his attitude towards the doctrine clear to his readers. His object, the preface informs us, is to notice some occurrences, said to be due to evolution, the contrivances for which must have been pre-arranged, and therefore could not have been the result of accidental circumstances. "If," he proceeds, "Evolution results from 'circumstances and surroundings,' pre-arrangement, of course, cannot have occurred, and if it can be shown that such pre-arrangement has in any instance taken place the whole thing must fall." This can only mean that the author considers himself in a position to disprove the existence of evolution *in toto*. But, on the other hand, we read that "if we regard Evolution as *one* of the means made use of, . . . we may not err." We do not see how these statements are to be reconciled.

Considering, however, the title of the essay, and the whole tone of the author's remarks, we shall probably be doing him no injustice if we put him down as a root and branch opponent of the theory as commonly understood. His leading argument appears to be this:—facts such as the grouping of the planets of the solar system, the freezing and boiling points of water, and, in the organic world, the provision made by nature for the welfare of unborn offspring, with other similar conditions, seem to stand in definite relation with the existence of life on the earth; these conditions must have been pre-arranged, and therefore evolution is impossible. It is scarcely necessary to point out that the argument is a *non sequitur*. In estimating the evidence for and against evolution, it is absolutely immaterial to inquire whether the conditions under which it is supposed to have taken place are or are not the result of "pre-arrangement." Dr. Woods claims in an appendix to have anticipated Favre and Silberman in laying the foundations of thermochemistry. It is unfortunate that in entering the lists of biological controversy he has omitted to acquaint himself with the elementary conditions of the evolutionary problem.

*Lessons in Physics.* By Lothrop D. Higgins, Ph.B. Pp. vii+379; with plates and diagrams. (Boston, U.S.A., and London: Ginn and Co., 1903.) Price 4s. 6d.

IT is rather difficult to "place" this book. At the end there is a glossary in which (amongst more difficult ones) words are defined such as these:—absorb (to take in), alter (to change), constant (always the same), detect (to find out), enlarge (to make larger). Apparently, then, the pupil is not expected to be certain about words of two syllables. We, accordingly, look for great simplicity in the text, especially as the author in his preface trusts that the explanations "have been made with a care which should render them unusually clear and simple." We open the book at random at the first section on magnets, and find the following definition as the first sentence:—"A Magnet is a body so acted upon electrically that it has the power to exert magnetic force."

We open on p. 319, and we find Ohm's law based upon the relative values of E.M.F. and current in the primary and secondary of an induction coil.

We open again at p. 250, and learn, in explanation of the rainbow, that "the sunlight passes through some thin clouds whose particles of water refract the rays, and the spectrum is formed on other clouds or reflected to the eye."

The first 120 pages, on mechanics, appear to be the best part of the book. There are several remarkably pretty plates.

*The Certainty of a Future Life in Mars.* Being the Posthumous Papers of Bradford Torrey Dodd. Edited by L. P. Gratacap. Pp. iv+266. (New York: Brentano's, 1903.)

THE planet Mars has been the subject for many works of fiction, and in the present volume we have another addition to the list.

The main idea of the train of thought in these pages is that upon each planet the possibilities of development just attain to the margin of the next higher step in mental evolution. Thus in Venus the period of *sense* develops to the possibility of the period of *science*, but does not attain it. On the earth the period of *science* develops to that of *spirit*, while the latter is only reached in the planet Mars. On this assumption souls of different degrees move from planet to planet.

The chief characters in this story are Mr. Dodd, his wife and son (the author of these papers). The father and son work out a system of wireless telegraphy, and