

of this kind, there is no doubt that the author has produced a book of considerable merit, the value of which would be considerably enhanced in future editions if the attempt to deal with the wants of the skilled workman were frankly abandoned.

The text covers most of the elementary operations of the fitting and machine shops, and the graduated exercises are well thought out, and in a well-equipped college workshop under the supervision of a skilled instructor a beginner would no doubt make remarkable progress in the use of tools, and be of real value in a works at the end of the course of instruction.

*Steam and other Engines.* By J. Duncan. Pp. ix+471. (London: Macmillan and Co., Ltd., 1907.) Price 5s.

THE development of municipal technical schools during the last few years has given a great impetus to the production of books written especially for elementary students. Mr. Duncan's book, on steam and other engines, is an admirable little work of this class, which students in the early part of a course on mechanical engineering will greatly appreciate, for it is well and clearly written, and covers a wide range of modern practice.

There is nothing more attractive to young engineering students than the purely mechanical details of engines, and the wealth of illustrations accompanying the descriptive matter will no doubt prove of great interest.

While the illustrations are a prominent feature of this book, the more important elementary principles of heat-engine theory and applied mechanics are also presented in a very skilful manner. Students working through the course of instruction prescribed, especially if they are able to carry out the experiments and take part in the engine and boiler trials, as the author recommends, will obtain quite a considerable knowledge of steam and other heat engines.

There appear to be very few errors or mistakes of any importance, but occasionally the author is not an accurate guide, as, for instance, when dealing with the flow of steam in an expanding nozzle he incidentally says that "In the case of a liquid the problem is simple as the property of expansibility is absent," a statement in direct contradiction to the actual facts, as students of hydraulics are well aware.

*The Elements of Mechanics. A Text-Book for Colleges and Technical Schools.* By W. S. Franklin and B. Macnutt. Pp. xi+283. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1907.) Price 6s. 6d. net.

A BOOK on elementary mechanics, which commences by addressing the reader as my young friend, and immediately after, in a lengthy paragraph, draws a comparison between the student and the axolotl, does not seem very promising as a scientific work. This feeling is strengthened when a little further on, in speaking of the laws of motion, one of the authors writes:—

"You, my young friend, must have in some measure my own youthful view, which, to tell the truth, I have never wholly lost, that there is something absurd in the idea of reducing the more complicated phenomena of nature to any orderly system of mechanical law. For to speak of motion is no doubt to call to your mind first of all the phenomena that are associated with the excessively complicated, incessantly changing, turbulent and tumbling motion of wind and water. These phenomena have always had the most insistent appeal to us; they have confronted us everywhere and always, and life is an unending contest with their fortuitous diversity, which rises only too often to irresistible sweeps of destruction

in fire and flood, and in calamitous crash of collision and collapse where all things commingle in one dread fluid confusion."

The book does not, happily, continue in this style after the opening chapter, but commences a systematic treatment of elementary mechanics on familiar lines, which, however, does not present any new features worthy of notice, except that inaccuracies and lack of precision in the statement of scientific principles are numerous. A new text-book on mechanics may be justifiable, if the authors can present the subject in a better way than has been presented before, or in a form more adapted to the wants of its readers, but a comparison of this work with any good elementary treatise on the subject cannot fail to show its inferior character.

E. G. C.

*Die Lösung des Problems der Urzeugung (Archigonia, Generatio spontanea).* By Martin Kuckuck. Pp. vii+83; with 34 figs. and one table. (Leipzig: Barth, 1907.) Price 3 marks.

DR. KUCKUCK made a mixture of gelatine, peptone, asparagin, glycerine, and sea-water, boiled it for an hour, put it in a sterilised vessel, and added a little chloride of barium, which brought about ionisation. The outcome was the formation of minute bodies like protozoa, which show "nutrition, growth, reproduction (segmentation), inheritance, movement (rotation), and form cell-groups (coenobia of Haeckel), which resemble animal morulae." Barium chloride produces similar morulae in fresh white of egg and in yolk of egg. Drops of natrium nucleinecum (Merck), allowed to fall on the surface of the gelatine-peptone-asparagin-glycerine-sea-salt mixture, produce rotating corpuscles, which form loose colonies. The author gives very interesting and striking figures, some drawn, some from photographs, of his artificial cells and cell-colonies. The figures drawn from the artificial morulae would pass muster in a text-book of embryology; the cell-outlines are sharply defined, and each cell has a beautiful nucleus. It seems to us that these and similar experiments would be more interesting, if less were proved.

On this experimental basis, Dr. Kuckuck rears a theoretical superstructure. Mixtures of inorganic and organic substances pass by ionisation into protoplasm. Salts of barium, radium, and nuclein effect this ionisation. The process of organisation is a process of ionisation. It is so now, and it was so in the beginning. The first organisms arose in the sea and were non-nucleated Monera. The nucleated cell arose by the symbiosis of two aniso-electrical non-nucleated cytotodes, as is proved by the fertilisation-process, for is not ontogeny a recapitulation of phylogeny? "Everything living has sex (negative and positive ions), and everything is living because it has sex (negative and positive ions): ohne Geschlecht kein Leben." A sort of genealogical tree is given showing the origin of organisms from inorganic substances, so that the Stammbaum is now quite complete, even as to its roots.

J. A. T.

*The Flora of Columbia, Missouri, and Vicinity.* By F. P. Daniels. The University of Missouri Studies. Science Series, vol. i., No. 2. Pp. x+319. (The University of Missouri, 1907.)

As a study of a local flora, this memoir, furnishing a list of the plants and an ecological survey, forms a suitable volume for the science series of the Missouri University publications.

The flora is characterised by a predominance of genera belonging to the orders Compositae, Gramineae, and Leguminosae. The sedges are numerous, since the species of *Carex* exceed fifty. *Desmodium*, *Mes-*