

perature and heat, properties of steam, and work, &c., all very thorough and very full of matter for careful thought.

In the chapter on the  $\theta\phi$  diagrams, more advanced theory is taken up; and, in fact, there are several chapters here that will be above the average student, and will form good reading for the expert; the facts are marshalled with great skill, and the deductions show that the author is a thorough master of his subject.

The chapters on valve motion problems and inertia of moving parts are good, and the methods adopted to deal with these very difficult problems are as simple as it is possible for them to be.

Though only forty-two pages are devoted to gas and oil engines, the author has managed to get in a great amount of most useful information, and to give all that the general student needs.

The remaining chapters are devoted to certain important thermodynamic problems and to an inquiry into the properties of superheated steam.

Most certainly Prof. Perry has produced a text-book which must be on the shelf of every student of applied thermodynamics, and of every engineer who has to deal with the utilisation of energy.

H. B.

#### OUR BOOK SHELF.

*Practical Plane and Solid Geometry for Advanced Students; including Graphic Statics.* By J. Harrison, M.I.M.E., and G. A. Baxandall. Pp. xii + 558. (Macmillan and Co., 1889.)

THIS book appears to compare very favourably with most English works of its class. The greater part of it deals with practical solid geometry, including the method of indexed plans; this subject is treated in a much more methodical way than is usually the case, and the authors very properly call attention from time to time to constructions which are of a fundamental character. It is a pity they did not go further, and clearly distinguish throughout the book the worked examples which involve new points of theory from those which merely illustrate general constructions previously given. The directions for making cardboard models ought to be very useful to the student; and the constructions are explained in such a way as to make the reasons for them intelligible. The section on plane geometry is distinctly above the average; in particular, there is a very interesting discussion of the description of an ellipse by means of a paper trammel. Of graphical statics only a brief outline is given; but it is useful enough so far as it goes. There is one error to which attention ought to be drawn: on p. 342 it is stated that the tangent plane to a surface at an anticlastic point cuts the surface in a curve with a double point *where there are two inflexions*: this is not generally the case, and, in fact, the anchor-ring gives an example of the contrary. Here the section is a bicircular quartic which has a real ordinary node when the tangent plane cuts the ring, and is not parallel to the polar axis.

*Grundlinien der maritimen Meteorologie.* By W. Köppen. Pp. vi + 83. (Hamburg: G. W. Hiemeyer, 1899.)

THIS little work serves two purposes; it is practically a concise elementary meteorology, and a guide for the use of sailors, showing the best routes in the different oceans, with directions for the management of vessels in storms, especially the dangerous West India hurricanes and the typhoons of the China seas. Dr. Köppen has been known for many years as one of the most prominent meteorologists, and having access to the large amount of materials collected by the Deutsche Seewarte, we might

expect to find the result of his long experience embodied in a useful and an attractive form. The work meets our expectations in every way; all details which are unnecessary for the object in view have been carefully excluded, while all technical and nautical expressions are fully explained, so that the work, which is specially written for seamen, may be read with interest and advantage by all who are desirous of obtaining a knowledge of maritime meteorology. His treatment of the subject includes the general circulation of the atmosphere, as well as the movements of waves, tides and ocean currents, and the value of the treatise is much enhanced by explanatory figures in the text and by separate charts and diagrams.

*Inorganic Chemical Preparations.* By Felix Lengfeld. Pp. xviii + 57. (New York: The Macmillan Company. London: Macmillan and Co., Ltd., 1899.)

THIS is a compact series of instructions for the preparation of typical inorganic compounds, the selection of which seems to have been very judiciously made. References to original literature are given in connection with each preparation. The author takes care to explain "that the manual is merely a laboratory guide, and that unless the work is carefully supervised, it may become purely mechanical, and the course lose half its value." It is, in fact, a series of recipes, and no attempt is made to explain the innumerable difficulties that will confront the inexperienced worker. This is not said by way of complaint; on the contrary, it is the incidental and unexpected difficulties of an operation rather than the plain sailing that give the operator occasion to think, and lead to the close association of the teacher with the mind of the learner.

Mr. Lengfeld purposely refrains from giving a complete list of references to literature, being of opinion that the student should learn to use dictionaries of chemistry. It is doubtful, however, whether the student is able to make a discreet choice from the innumerable references of a dictionary, and we think that the author has rather lost an opportunity in not making his list of references more ample. To those teachers who are introducing more inorganic preparation work into their courses, this book is likely to prove welcome.

A. S.

*The Utility of Sulphate of Ammonia in Agriculture.* By James Muir, M.R.A.C. Pp. 68. (London: Sulphate of Ammonia Committee, 4 Fenchurch Avenue, E.C., 1899.)

THIS is the essay which won the prize lately offered by the Sulphate of Ammonia Committee. Mr. Muir has carefully compiled his little treatise, and made a judicious selection of results of field experiments to illustrate the use of sulphate of ammonia, and to compare its results with those obtained from the use of nitrate of soda. Naturally, the results of the Rothamsted experiments are those most largely drawn upon; Woburn is also quoted from to a considerable extent, and the author considerably always gives references to his authorities. The comparisons between the effects of nitrate of soda and sulphate of ammonia are fully and very fairly drawn, and the farmer should find the essay a great help in deciding which of these nitrogenous manures to apply in any particular case. No doubt the farmer, for whom the essay is chiefly written, will turn to the last three pages, which contain a summary of conclusions and comparisons between the two important nitrogenous manures. This summary is in twenty-seven paragraphs, and but few of these lay themselves open to criticism. We can only suggest that the author might have pointed out more clearly in this summary, paragraph 3, that leguminous plants can, under favourable conditions, make use of free nitrogen; paragraph 7, that nitrogenous manures, and especially ammoniacal manures, do not give their best