the experiments to be continued on the same plots for a period of not less than ten years. If this were done at, say, 500 to 1000 centres, we venture to think that a vast step forward would be made; the interpretation of the figures of soil analysis would become more precise than it is at present, and the relationship between soil texture and composition and its productive power or capacity to grow crops would be more clearly understood.

J. P.

OUR BOOK SHELF.

An Account of the Crustacea of Norway. By Prof. G. O. Sars. Vols. i.-v. Vol. v., Copepoda Harpacticoida. Pp. 449+284 plates. (Bergen: Published by the Bergen Museum, 1890-1911.)

By the publication of the concluding parts of vol. v., Prof. Sars has now provided us with the first adequate account of the harpacticoid Copepoda. It was perhaps natural that pelagic Copepoda should first attract the attention of investigators, but many zoologists still appear to think that such forms constitute the principal representatives of the group. This is by no means the case, but perhaps on account of this erroneous impression, the Harpacticoida and other bottom forms have been very much neglected.

An examination of the present volume at once suggests that we still have much to learn of this interesting assemblage. The author gives descriptions of no fewer than 291 species belonging to 99 genera, but at the same time he tells us in his preface that his latest excursion in the summer of 1910 produced about forty additional species, many of them new to science, and most of them obtained in a single locality. This is sufficient evidence that a great deal yet remains to be done, and indeed it is only on the British coast, in addition to that of Scandinavia, that the true bottom forms have been seriously studied, in spite of their considerable economic importance.

It is a matter of some satisfaction that countrymen of our own are among the foremost authorities quoted by Prof. Sars, but this is primarily an indication that these particular forms have been little investigated elsewhere. The abundant large-scale drawings which illustrate each species afford in themselves a most trustworthy means of identification, and it is to be hoped that with such a convenient book of reference now available, a much more extended survey of the types living on the sea bottom will be attempted. We congratulate the veteran author on the successful completion of another volume, and the scientific public on the steady growth of this very valuable work.

W. A. CUNNINGTON.

Traité de Chimie Générale. By Prof. W. Nernst. Ouvrage traduit sur la 6^e édition allemande par Prof. A. Corvisy. Deuxième Partie, "Transformations de la Matière et de l'Énergie." Pp. 422. (Paris: A. Herman et Fils, 1912.) Price 10 francs.

THE issue of the translation in two parts is to be commended, for the original has grown to such an extent in passing through its six editions that a single volume would be of inconvenient dimensions. It is only quite recently that an English version, revised in accordance with the sixth German edition, made its appearance, and was reviewed in these columns. In these circumstances, it need only be said in reference to the general character of the book that the translator's work in the second volume is of the same high standard as that attained in vol. i.

With regard to the treatment of the subject-matter, attention may be directed to the question of catalysis. In explanation of the general catalytic activity of

acids it is assumed, as usual, that the active agents are the free hydrogen ions. It is true that many of the older observations relating to the catalytic activity of acids can be accounted for on this theory if certain subsidiary hypotheses are accepted, but this apparent harmony between theory and experiment vanishes as soon as we leave the domain of aqueous solutions. Recent work has indeed shown that the catalytic activity of acids in non-ionising solvents is much greater than in aqueous or other ionising media, and this important fact cannot be reconciled with the usual ionic explanation of acid catalysis. In view of the importance of the question, the lack of any reference to such observations must be regarded as a serious omission in a treatise which, in so many other respects, may be considered as efficiently revised in accordance with the progress of physico-chemical science.

In regard to the much-discussed question of the nature of crystalline liquids, the author gives an excellent short summary, but considers that none of the theories advanced can be harmonised with experimental observations.

Three short notes are added by the translator dealing respectively with (1) the direct measurement of osmotic pressure by Fouard's method; (2) the radioactive elements; and (3) the methods of measuring the number of molecules in the molecular volume.

Text-book of Mechanics. By Prof. L. A. Martin, jun. Vol. iii., "Mechanics of Materials." Pp. xiii+229. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1911.) Price 1.50 dollars net.

THE present volume forms the third of a series, the first dealing with statics and the second with kinematics and kinetics, having been reviewed in NATURE of May 16, 1907, and February 6, 1908, respectively. The author has not attempted to treat the mechanics of materials exhaustively; the matter includes simple stresses and strains; the strength and elasticity of beams; statically indeterminate beams; struts and columns; torsion; general theorems of stress and strain; compound stresses; the principle of work as used in computing deflections.

The calculus has been used freely, and the impression is given to the reader that there has been a straining after mathematical effect, instead of the mathematics employed being made subordinate to the clear expounding of the mechanical principles involved. Illustrations have been taken, not because of their practical importance, or of their service in elucidating the subject, but because "they furnish interesting applications of the calculus." We note the very scanty use made of the ellipse of stress, although by means of this method much shorter and more readily comprehended solutions may be obtained in many cases. The same straining after mathematical effect may be observed in the treatment of thin cylindrical and spherical shells under internal pressure. Methods of testing and experimental results are almost absent, an omission which helps to contribute to the air of unreality in the treatment.

Some minor blemishes occur; in finding and using a formula for the horse-power transmitted by shafting, the reader is not warned that the torque must be uniform—a state of affairs which scarcely ever occurs. The "dangerous section" of a beam is defined as that at which maximum bending moment occurs; this will be the case in some instances, but a better and more general definition would be that section which has maximum stress. The book has clear diagrams, and numerous, well-considered exercises for working out are included, a point which will recommend the volume to many students.