neglected. The great nature-study movement which is making such rapid strides in this country would be encouraged and assisted by many more such books as this if we had the investigators and writers able to make such careful studies and to put them in print in such admirable shape.

L. O. Howard.

Transactions of the American Society of Mechanical Engineers. Vol. XXI., New York Meeting, 1899, Cincinnati Meeting, 1900. New York; published by the Society, 1900. Pp. 1778; 8vo., 372 ill.; 33 papers, reports of committees, etc. Printed by J. J. Little & Co.

This large and handsome volume represents the work of the American Society of Mechanical Engineers, so far as it can be exhibited in type, for a single official year. The organization was effected in 1880, after many unsuccessful attempts had been made by other less influential or less tactful members of the profession, and started off with a small number of members selected from among the leaders of the profession of engineering. It now has a total membership of 2,064, including 113 foreign members. The officers are a president, six vice-presidents, nine managers, a treasurer and a secretary, while its governing body, the Council, includes the officers, and the past-presidents of the Society are 'honorary councillors' holding their positions for life or during their continued connection with the Society. Two conventions are held each year, one in New York, at headquarters, the other at usually, some large city in the central or western portion of the country. All persons engaged in engineering are eligible to membership, under certain restrictions and in classes, as members, honorary members, juniors, associates; the Council making a first revision of the list and recommending to the Society those whose credentials are considered satisfactory. The headquarters of the Society are at its own house, No 12 West 31st St., New York City, formerly that of the Academy of Medicine.

The published papers and their discussions cover a very wide range of topics and are supplemented by a series of 'topical discussions' in answer to queries suggested by members and sent out by the Council. These volumes are rich in valuable fact and data thus derived.

The papers are often of considerable length and their value is often proportional to their volume. Thus the report of the Committee of a Standard Method of Steam-boiler Trials, 78 pages, is followed by a discussion occupying 27 pages; Admiral Melville gives 17 pages to 'Engineering in the U. S. Navy'; Thurston on 'The Steam-Engine at the Close of the XIXth Century,' occupies 61 pages; Dr. Eddy on 'Entropy,' submits 17 pages; Laird on a 'Remarkable Steam Pumping Engine Trial,' 24 pages; Goss on a similar work, 39 pages; Robertson on the 'Test of a 125-horse-power Gas-Engine,' covers 43 pages; Herschman on 'The Heavy Automobile,' 30 pages; Kerr's admirable paper on the 'South Terminal Station, Boston,' occupies 27 pages; Professors Cooley and Wagner on a 'Nordbury Engine,' admirably full, 96 pages, while the most generally interesting paper of the volume, apparently, that of Professor Higgins on 'The Education of Machinists, Foremen and Engineers,' 19 pages, is discussed in 86 pages and is supplemented at the second meeting of the volume by another paper, occupying 40 pages, in which the author closes a most extraordinarily interesting and instructive discussion, perhaps the most important and instructive respecting technical education ever yet put in type.

A very large proportion of the papers are devoted to accounts of investigations of the performance of heat-engines and of machinery of interesting, and commonly of novel, character and to descriptions of the processes of experimental research and resultant data. The file of the twenty years past is extraordinarily rich in this, to the engineer, most superlatively valuable material. A large part naturally comes from the technical schools and colleges; but it is always practically valuable and often, if not invariably, conveys a form of knowledge that the practitioner most desires. The fact, however, that the 'practical man' cannot be induced to present oftener, and in good form, the outcome of his experience and the results of his endeavors to secure improved design, to invent new devices and processes,

and to secure more perfect constructions and more permanently valuable operation of his machinery, is lamented in some of the discussions and with good reason ; yet it is obvious that this lack is entirely natural ; but it is equally obvious that when the technically educated and professionally trained men of the coming generation, now just issuing from the technical and professional schools, to take the lead in the work of the industries of all departments, shall have reached their period of maturity and of maximum usefulness, this difficulty is likely largely to disappear. In fact, the technical papers of the time are coming to more and more illustrate the literary, as well as professional powers of this class.

The illustrations are all well-made, some half-tone, others engraved, many diagrammatic, and constitute a most important feature of the volume. The book-making is excellent and the whole may be taken as among the best, if not itself the very best, of illustrations of the character of the work of the contemporary man of science in these departments of application. The mechanic and engineer of to-day is the maker of the modern material world and it gives the average citizen of every civilized country a feeling of satisfaction and of safety to find that he is at once 'practical' and scientific, experienced and learned, competent to unite the best of scientific knowledge with the richest of technical experience in the design, the construction and the operation of the machinery of the world and in thus building the foundations of our civilization broad and deep and solid. This volume has large significance from the point of view of the economist, the educator, the philosopher and the statesman, as well as from that of the technicist and the engineer.

Its editor, the secretary, deserves cordial congratulations.

R. H. THURSTON.

BOOKS RECEIVED.

Elementary Anatomy, Physiology and Hygiene. WINFIELD S. HALL. New York, Cincinnati and Chicago, American Book Company. 1900. Pp. 273. 75 cents.

Life and Letters of Thomas Henry Huxley. LEONARD HUXLEY. New York, D. Appleton & Company. 1900. Vol. I. Pp. xi + 539. Vol. II. Pp. vii + 541.

The Limitation of Learning and other Science Papers. ALBERT SCHNEIDER. Chicago, Chicago Medical Book Company. 1900. Pp. 100.

Text-book of the Embryology of Invertebrates. E. KORSCHELT and K. HEIDER. New York, The Macmillan Company. London, Swan Sonnenschein and Company. 1900. Vol. IV. Pp. xi + 594. 18s.

One Thousand Problems in Physics. WILLIAM H. SNYDER and IRVING O. PALMER. Boston, Ginn & Company. 1900. Pp. v + 142.

An Elementary Treatise on Qualitative Chemical Analysis. J. F. SELLERS. BOSTON, Ginn & Company. 1900. Pp. ix + 160.

The Progress of Invention in the Nineteenth Century. EDWARD W. BRYN. New York, Munn & Company. 1900. Pp. viii + 476. $3.00.

Die Erdströme im deutschen Reichstelegraphengebiet und ihr Zusammenhang mit den Erdmagnetischen Erscheinungen. B. WEINSTEIN. Braunschweig, Friedrich Vieweg und Sohn. 1900. Pp. vi + 78 and 19 plates.

Theoretische Betrachungen über die Ergebnisse der wissenschaftlichen Luftfahrten. WILHELM VON BEZOLD. Brunschweig, Friedrich Viewig und Sohn. 1900. Pp. 31.

Über Museen des Ostens der Vereinigten Staaten von Nord Amerika. A. B. MEYER. Berlin, R. Friedländer und Sohn. 1900. Pp. viii + 72.

The Biography of a Baby. MILLICENT WASHBURN SHINN. Boston and New York, Houghton, Mifflin & Co. 1900. Pp. 246. $1.50.

A Reader in Physical Geography. RICHARD ELWOOD DODGE. New York, London and Bombay. Longmans, Green & Company. 1900. Pp. ix + 231.

SOCIETIES AND ACADEMIES.

BIOLOGICAL SOCIETY OF WASHINGTON.

THE 329th meeting was held on Saturday evening, December 1st.

L. Stejneger presented a paper 'On Post-Pliocene Migrations of Siberian Animals into Europe,' saying that three invasions of Siberian higher vertebrates into western Europe are distinguishable since Pleistocene times. The first one took place before the maximum glaciation of the ice age, at a time when Ireland and Norway were both connected with Great Britain,