

of the stone lanterns and tombstones made use of in computing the intensity of the Mino-Owari earthquake. The accelerations necessary to overturn were also calculated by West's formula, and it is surprising to see how closely they accord with those obtained from the graphic record of the 'shaking table.'

Because the contents of these volumes are made up of carefully conducted observations of actual and very strong earthquakes, for the first time recorded by means of satisfactory instruments, together with elaborate experimental investigations of important related phenomena, and because all these results are fully discussed with remarkable skill and keen scientific insight, it is, perhaps, not too much to say that they constitute the most valuable contributions yet made to the literature of seismology.

Even those who know the men who are doing this work, through familiar association and often close personal relations, cannot avoid a feeling of astonishment at the extraordinary performances of a people whose contact with the world at large has been only that of the present generation, and with whom the so-called civilized nations have been strangely and unreasonably unwilling to treat on a basis of equality until within three or four years. When I reflect that seismology is only one of the many sciences in which in original research the Japanese are well in the front rank, and this, too, without the inspiring example of an ancestral Galileo, Newton, La Place, Humboldt or Franklin, I wish to do figuratively what I have done many times actually—I take off my hat to an oriental nation that in peace or in war need ask no odds of Europe or America.

T. C. MENDENHALL.

*Rapports présenté au Congrès International de Mécanique appliquée ; Exposition Universelle de 1900.* Tome I. CH. DUNOD, Editeur. Paris. 1900. 8vo. Pp. 546.

The various congresses of the Paris Exposition of 1900 are now bringing out their published papers and discussions, and the royal octavo volumes of the Congress of Applied Mechanics are finely illustrative of the character of the work performed at these conventions and

of the manner in which it is to be published. Of the innumerable books printed relating to the Exposition, these are the most valuable and, to the serious student of that great cyclopedia, most interesting. The 'questions' discussed in Vol. I. are nine in number: 'Organization of Works'; 'Organization of Mechanical Laboratories'; 'Mechanical Applications of Electricity'; 'Hoisting Apparatus'; 'Hydraulic Motors'; 'Sectional Boilers'; 'High-speed Engines'; 'Heat Motors'; 'Automobilisme.'

The first topic is discussed by M. Touissant, who presents a study of the manufacturing establishment generally, and Mr. Dickie, who gives a most interesting account of the organization and administration of the Union Iron Works of San Francisco, the birthplace of the famous battleship *Oregon*, and the source of innumerable steamships, steam-engines and pumping and winding engines, and of mining and manufacturing machinery in enormous amount. M. Boulvin discusses the organization of mechanical laboratories, and his valuable paper is introductory to that of Dwelshauvers, who describes that of the University of Liège, organized by him after years of struggle and strife with the ultra-conservative administration of the University and the Government. The evolution of the mechanical laboratory in America, as an element of technical instruction, is described by Thurston and includes papers by a number of representatives of engineering schools in the United States, giving accounts of an equal number of the most extensive and interesting laboratories of that class in our country. The development of the laboratory of applied mechanics and its accessories as a means of instruction, primarily, and as an item in the equipment of the technical school and as an essential element of the curriculum, was first effected satisfactorily in the United States. The European schools are now coming to the same plan in rapidly increasing numbers, often modeling after our own in both equipment and methods of employment. Another instructive division of this subject is discussed by Commandant Mengen, who tells of the organization and the details of equipment of the laboratory of the ordnance department of the French army, which is very extensive

and complete and is evidently conducted in a modern and fruitful manner.

The third 'question' includes a paper by Dr. Kennelly, describing mechanical applications of electricity, especially as observed in the United States. Messrs. Delmas and Henry discuss the use of the current in hoisting machinery and in the establishments of public works departments. M. Bassères discusses the fourth question and especially the work of the 'Compagnie des Fives-Lillie.' Hydraulic motors, as constructed in Switzerland, the home of that form of prime mover, 1889-1900, are reported upon by M. Prazill. M. Rateau writes of their theory and construction as illustrated by contemporary practice in general.

Dr. W. F. Durand takes up the sixth topic and gives an account, complete and exact, of the water-tube boilers employed in the United States, and M. Brillié also discusses the 'chaudieres a petits éléments,' their classification, efficiency, operation, with characteristic thoroughness. MM. Lefer and Lecornu write of high-speed engines and of regulators, the former including the ancient Greek type, just revived, the steam-turbine. 'Thermic Motors,' apparently only intending to include the gas-engines in the class, are the subject of valuable papers by MM. Diesel, who reports on his own invention and construction; by Mr. Donkin, who discusses those employing the waste gases of the blast furnace; and by M. Witz, the well-known authority on that class of motor, who tells of gas-engines of large power employed in metallurgy. The final discussion in this volume is that of 'automobilisme,' by MM. Rochet, Cuénot and Mesnager.

All the papers here published have special value in their several departments of applied science and some of them are extremely important. The contributors to the volume are usually French writers and practitioners of authority; a few are American, and we recognize the name of but one German in the list. The German government took a leading part in the Exposition and German exhibitors abounded, as did German visitors; but the scientific men of Germany, in this department, at least, seem to have held aloof.

The book is a fine sample of the style and

finish of the French official document. In paper, type and finish, and illustration, while not what a French critic would consider illustrative of a high class of bookmaking, it is, for its place and purpose, most excellent. In many cases of condensation and of abstracting, on the part of the editors, as especially in the case of the descriptions of American mechanical laboratories, where the original contained very extensive and very extensively illustrated details, the necessary work of merciless condensation has been, in the main, very well done. The translations from the English into the French are, so far as a first rapid survey would indicate, excellently performed. The collection will have great and permanent value to the engineer and to the professor of engineering, as well as to all having interest in these divisions of applied mechanics.

R. H. THURSTON,

*The Antarctic Regions.* By DR. KARL FRICKER.

Translated by A. SONNENSCHNEIN. New York, The Macmillan Company. 1900. Pp. xii + 292. With many maps and illustrations. Price, \$3.00.

In view of the widely extended interest in the Antarctic region at the present time, it would seem as though it would almost be unnecessary to say that this was a timely production. It is, however, not the only requisite of a book that it is timely. Its substance should be of a high character and its form of statement should be clear. In this particular case, the historical portion of the work is good, but its character is marred by too great condensation. This fact alone would make it a poor book to put in the hands of the general reader, who is looking for pleasure as well as for information. Even if the original work was intended for the scientific man, the translator should have had tact enough to recognize the fact that it was not at all necessary to follow the German construction of the sentences too closely. A good translation should take some account of the spirit of the language into which the work is to be rendered, and not make its perusal a burden by the introduction of too many parenthetical sentences. Of course in such a work as this much new information is not to be expected, and the major portion of