of the two kinetic energies and the mutual potential energy is unchanged.

7. Hence in any system of bodies, between pairs of which stresses exist whose intensities depend solely upon the distances, the sum of the kinetic energies and the potential energy due to their relative positions is constant.

EIGHT-FIGURE LOGARITHM TABLES.

Tables des Logarithmes a huit décimales des nombres entiers de 1 à 120000, et des sinus et tangentes de dix secondes en dix secondes d'arc dans le système de la division centésimale du quadrant. Publiées par ordre du Ministre de la guerre. Paris, Imprimerie Nationale, 1891. 4to., pp. iv. + 628.

ADVOCATES of the decimal subdivision of the quadrant will be much pleased by the appearance of the above work, which contains the most extensive set of tables of the kind as yet issued. It is not intended in the present notice to enter upon the respective merits of the several systems of dividing the circle, but to consider the volume as a table of logarithms simply. As such it presents marked points of difference from the usual types. These differences are found almost exclusively in the trigonometric portion of the tables, that containing the logarithms of numbers being similar to the customary form. The logarithms of the four trigonometric functions appear on each double page in four separate tables, instead of the usual arrangement in parallel vertical columns. The interval of the argument is the same throughout the entire quadrant, no diminution being found near the beginning of the table. The auxiliary quantities for obtaining sines and tangents of small angles by means of the table of number logarithms are given; but they are placed upon the pages devoted to the trigonometric functions. It would probably be more convenient to find them as usual at the bottom of the pages containing the number logarithms.

The decimal progression of the argument allows the trigonometric tables to be arranged in the form usually adopted for the logarithms of numbers. But instead of ten columns headed with the digits 0 to 9, we find *eleven* columns, of which the first ten are headed 0 to 9. The eleventh, which has no heading, contains a repetition of the column headed 0. This makes it unnecessary to look back along the horizontal line, when we wish the difference between column 9 and the next one. Yet the size of the volume is somewhat increased by this system, and the tables containing the number logarithms

are rather widely spaced in consequence.   In fact the volume is more ponderous than might be expected in comparison with other logarithm books, notwithstanding that the adopted interval of ten decimal seconds is much smaller than that of ten ordinary seconds of arc.   This is made plain if we compare the dimensions and weights of the following well-known logarithmic tables (*bound*):

NAME.	LENGTH.	BREADTH.	THICKNESS.	WEIGHT.
	mm.	mm.	mm.	grams.
Gauss 5-fig.	241	159	14	395
Bruhns 7-fig.	257	175	30	1139
French 8-fig.	370	298	48	3813
Vega 10-fig.	341	238	36	2660

Negative characteristics are given throughout for the logarithms of the trigonometric functions, when the corresponding numbers are less than unity.   This departure from the usual custom of increasing the logarithms by 10 can hardly be regarded as an improvement.   The greatest possible care has been taken to secure the accuracy of the tables ; and in this respect they may be greatly commended.   The actual numbers have been copied from the great manuscript tables of Prony, which are preserved in the archives of the Paris observatory.   The typographical work, which is excellent, was executed at the *Imprimerie Nationale.*

HAROLD JACOBY.

SPHERICAL AND PRACTICAL ASTRONOMY.

An Introduction to Spherical and Practical Astronomy.
By DASCOM GREENE, Professor in the Rensselaer Polytechnic Institute, Troy.   Boston, Ginn & Co., 1891.   8vo, pp. viii. + 158.

PROFESSOR GREENE has written this work to supply the needs of those students who wish to begin the study of spherical and practical astronomy, and have but very little time to give to such study.   The work is a stepping stone to Doolittle's and Chauvenet's books.   The author deals only with " those practical methods which can be carried out by the use of portable instruments," and in describing those methods he is very brief, frequently altogether too brief.
    The order of subjects is as follows : definitions ; spherical problems ; conversion of time ; hour angles ; the transit instru-