For Book iv. we find the proposal "that all propositions be omitted, as formal propositions, except 2, 3, 4, 5, 10, and that these be taken with earlier books, the rest of the book being treated as exercises in geometrical drawing."

Coming to Book vi., it is recommended "that an ordinary school course should not be required to include incommensurables; in other words, that in such a course all magnitudes of the same kind be treated as commensurable." This at once relieves teachers from an enormous task—that of explaining Euclid's definition of proportion. There is now nothing to be said beyond that the ratio of a to b is the fraction a/b. To meet this change, two alternative proofs are given for vi. 1, though attention is called to the continental practice of making the proof of vi. 2 self-supporting.

With regard to areas, the tendency of the report is to make the treatment algebraic. Euclid vi. 14, 15, 16, 17, 23 contain merely the one fact that the area of a parallelogram is $ab \sin\theta$; nothing is gained by concealing this fact from the student. It is definitely suggested that "numerical" trigonometry shall be taught concurrently with Book vi. "In connection with the formal course, as soon as the proposition that equiangular triangles are similar has been proved, the sine, cosine and tangent can be defined (if this has not been done earlier in the experimental course). In order to make the meanings and importance of these functions sink deeply into the pupil's mind, numerical examples should be given on right-angled triangles (heights and distances); these should be worked with the help of four-figure tables."

"In accordance with the spirit of the above proposals, the committee suggest that the following proposition be adopted:—If two triangles (or parallelograms) have one angle of the one equal to one angle of the other, their areas are proportional to the areas of the rectangles contained by the sides about the equal angles."

"All statements of ratio may be made in fractional form, and the sign = used instead of the :: sign. In the ordinary school course reciprocal proportion should be dropped, and compounding replaced by multiplying."

The report may be described as an attempt, on conservative lines, to simplify the study of geometry and to make it interesting. If the attempt is judged to be successful, now is the time to make examiners unstop their ears.

C. G.

SEISMIC FREQUENCY IN JAPAN.

IN no country has seismology been more carefully nurtured than in Japan. At the University we find a professor and assistant professor of this branch of science; in the Meteorological Department there is a bureau controlling more than 1000 observing stations, and, lastly, there is a committee composed of engineers, architects and men of science who, as an aid to carrying on investigations which will lead to a better understanding of earthquake phenomena, are supported by a Government grant.

This body, since its establishment eleven years ago, has already published thirty-six quarto volumes in Japanese and eight in English, and it is to the last of these, by Dr. F. Ōmori, professor of seismology, to which we now refer. Unlike many of the volumes by which it is preceded, which treat of construction to resist earthquake effects and kindred branches of applied seismology, this particular publication deals with questions which are purely scientific. Its title is "Annual and Diurnal Variations of Seismic Frequency in Japan," the investigation of other periodicities being left for a future occasion.

The materials analysed are 18,279 entries contained in earthquake registers from twenty-six meteorological stations which are distributed in a fairly uniform manner over the Japanese Empire. These registers, which for the most part are dependent on instrumental observation, are discussed separately, and it is in consequence of this method of treatment that conclusions new to seismology have been reached.

The first out of a series of seventy-six curves shows the monthly frequency of earthquakes in Tokio. In plotting this, as in plotting curves for other stations, those months where the ordinary seismic frequency has been affected by "after shocks" have been omitted; that is to say, the curves represent the normal frequencies in various districts. These omissions, all of which refer to the settlements which follow destructive earthquakes, are carefully epitomised. Dotted curves drawn through the mean position of monthly curves show annual and semi-annual periods. A comparison of the curves for seasonal seismic frequency shows that these may practically be divided into two groups. In one group the maximum frequency is in winter, whilst in the other group the maximum frequency is in summer. When we turn to the geographical distribution of the stations the records from which give these curves, it is found that they are distributed over two distinct areas—those which show a winter frequency lie in a district chiefly shaken by earthquakes having an inland origin, whilst those where the greater number of disturbances are noted in summer occupy an area shaken by earthquakes having a suboceanic origin.

In an endeavour to explain this striking result, the annual, monthly and diurnal frequencies are compared with corresponding fluctuations in barometric pressure. The general result arrived at is that the curves showing the winter frequency follow those of changes in barometric pressure, from which it may be inferred that an increase in barometric pressure has a marked effect upon the yielding of a land area. With the curves relating to earthquakes of suboceanic origin, it is seen that the annual variation is the reverse of the barometric pressure on land.

With regard to diurnal variation in seismic frequency, Dr. Ōmori concludes that this is probably due to corresponding variations in atmospheric pressure, but such frequency is not confined to earthquakes originating on the land. Single barometric fluctuations, even if they amount to 20 mm., are not generally related to any marked increase in seismic frequency.

Although the last two observations apparently contradict the more important result indicating a relationship between fluctuations in barometric pressure and the seasonal frequencies of earthquakes originating beneath the sea and on the land, arguments are adduced to show how such contradictions may be harmonised.

The distinction in the rules which governs the frequency of earthquakes with these distinctive origins, now brought forward for the first time, may probably be emphasised when, rather than analysing the registers from different stations—the entries in which may frequently be common to a number of such stations—an analysis is made of registers of earthquakes classified according to their origins. As illustrative of such materials we may refer to a catalogue of about 9000 shocks, published as vol. iv. of the *Seismological Journal of Japan*, in which each entry is referred to a district from which the shock it represents may have originated.

In conclusion, not only do we congratulate Dr. Ōmori on this new departure in seismology, but we also congratulate the Earthquake Investigation Committee on the admirable manner in which it has presented its results to those outside the pale of eastern ideography.

J. MILNE.