

the limiting stations suggests that it must have been sensible even beyond them, and this would give a greater depth. Taking all these circumstances into consideration, it seems probable that the earthquake originated at a depth of some 25 to 30 miles, say 40 to 50 kilometres, below the surface of the ground.

R. D. OLDHAM.

The Groma: an Ancient Surveying Instrument.

A FEW weeks ago, while looking through some miscellaneous objects at the premises of the Egypt Exploration Society, I discovered a portion of a groma, an ancient surveying instrument, commonly used in Græco-Roman times for setting out straight lines and directions at right angles, in building operations as well as in land instruments.

There are several references to this instrument in the literature, but the only other specimen known was one unearthed at Pompeii in fragments in 1912. This was reconstructed by M. Della Corte and a model is in the South Kensington Museum. There is a representation of a groma on the tombstone of a Roman 'Mensor' found in the neighbourhood of Turin.

The portion now brought to light consists of two roughly shaped pieces each about 12 inches in length, formed of the centre rib of a datepalm leaf, bound together at the centres by a lashing of datepalm fibre, forming a loop for suspension. Near the ends of each piece are in-cuts to locate the plummet strings which were suspended from the ends.

So far as is known, this is the first specimen of the kind known, and special interest attaches to the fact that it came originally from Egypt, having been brought from the Fayum in 1899. Since then it has lain unrecognised among the Museum surplusage in the Society's basement. It probably dates from the Græco-Roman period and may be a tomb model.

The specimen has been acquired by the South Kensington Museum authorities and will shortly be exhibited there.

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The Absolute Density and Coefficient of Expansion of Silicon Tetrachloride.

IN a recent paper on "A Comparison of the Atomic Weights of Silicon from Different Sources" (*Jour. Chem. Soc.*, 1926, 128, 1262) the density of silicon tetrachloride from different sources was determined by means of glass floats. These were calibrated at one temperature and used in the actual measurement at another, but in making the calculation we omitted to take into consideration the alteration in volume of the floats consequent on this change in temperature. After we had instituted inquiries for a trustworthy coefficient of thermal expansion for the 'Durosil' glass used, in order to correct the reported figures, we received a private communication from Mr. A. G. Milligan pointing out this omission, which leads us to take this early opportunity of publishing a provisional correction. Applying the probable value 14.1×10^{-6} for the cubical expansion of 'Durosil' to the data already published (*loc. cit.*), the mean density and coefficient of thermal expansion of silicon tetrachloride become 1.481461 ± 0.000020 and 0.0014048 ± 0.0000022 respectively. We hope to publish elsewhere a complete résumé of the densities, etc., when

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our inquiries have yielded a trustworthy coefficient of expansion for this glass.

It should be noted, however, that the application of this correction to the five densities in question makes no alteration in their relative magnitudes, and thus leaves unaffected the essential conclusion of our paper (*loc. cit.*).

P. L. ROBINSON.
H. C. SMITH.

Armstrong College,
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July 30.

The Movements of Molecules.

IN a very interesting little book on phosphorescence by T. L. Phipson, Ph.D., published in 1866, on p. 184 he says: "We have no proof that the molecules of bodies vibrate in straight lines; their motion is more probably circular. Indeed, my ingenious friend, M. Porro, has endeavoured to show the great resemblance which seems to exist between these molecular movements and those of celestial bodies; and it has been supposed by some philosophers that the molecules of matter are as distant from each other, in proportion to their size, as the planets themselves." "But in the present state of knowledge, all these considerations are premature."

Ignazio Porro (1795-1875) was a French physicist who made improvements in the binocular telescope, the telemeter, and other optical instruments. It would be interesting to know if he had any inkling as to the existence of moving particles or electrons in atoms. I have looked through the list of his published papers given in the Royal Society Catalogue, but did not see any titles which appeared to bear upon the subject; perhaps some readers of NATURE may know of some which do.

A. LIVERSIDGE.

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Pernicious Grafting.

To reply fully to the question asked by Dr. Grabham in NATURE of July 17 would entail a much greater demand upon the space available than the subject would at present appear to justify.

A study of the question as set forth by Dr. Grabham immediately suggests to the practical cultivator that root control would remedy the evil: nobody expects the best results from peach or nectarine trees grafted on any stock unless systematic root pruning is practised, and from the tendency of the wild 'individuals' in Madeira to flower before the fall of the leaf one adduces the fact that there is a lack of sympathy between stock and scion; therefore root pruning might be the means of modifying the flow of 'incompatible' sap to the need of the cultivated variety at that period. Moreover, a cool moist condition of the soil during the winter being essential to successful peach cultivation, it may be necessary to adopt means of providing these conditions in Madeira, as well as a careful selection of root stocks.

W. M. MACDONALD.

14 Canongate,
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July 23.