(3) The great eruption of Krakatoa on August 26 and 27, 1883, was accompanied by subterranean noises which were always described as resembling the rolling of cannon or of thunderstorm. The description from the Sunda Islands does not differ from that from Caïman-Brac.

(4) The subterranean sounds of the Krakatoa eruption have had an enormous intensity, and have been detected at a distance never heard of before. As is well known (*vide* NATURE, vol. xxx. p. 10), the explosions were heard over a circle of 30° radius, *i.e.* 3300 kilometres. It is indeed only the quarter of the length of the earth's diameter; if the hypothesis is true, we would have here a considerable extension of the propagation of the sound through the earth.

(5) Caïman-Brac lies very near the antipodes of Krakatoa. The exact position of Krakatoa is 105° 30′ E. long. and 6° S. lat.; Caïman-Brac, 79° 30′ W. long. and 19° 30′ N. lat. The antipodes of Krakatoa is also 4° 30′ more towards east, and 13° 30′ more towards south; it is in the middle of the United States of Colombia, on the Magdalena River, between the towns Antioquia and Tunja.

(6) The time at which the noises have been heard at Caïman-Brac corresponds sufficiently to what we know about the time of the eruption of Krakatoa. From the report of R. D. M. Verbeek (NATURE, vol. xxx. p. 10) the explosions of the volcano have been noticed in the Sunda Islands on August 26 and 27, and especially on the morning of the 27th. The noise reached its maximum at Buitenzorg on the 27th at 6.45 a.m.; at Batavia at 8.30; and at Telok-Betong at 10 o'clock. From the difference of longitude August 27, 8.30 a.m. at Batavia is the same time as August 26, 8.5 p.m. at Caïman-Brac. If we admit that the propagation of the sound through the 12,000 kilometres of the earth's diameter would take about one hour, the maximum detonations must have reached the Caïmans on August 26 at 9 p.m. Unfortunately the letter of Mr. Roulet does not give us the exact time of day at which the sounds were heard at Caïman-Brac; I have asked my correspondent to complete, if possible, his observation on that point.

I do not wait for the reply before publishing the present communication for the following reasons:—I believe it is very important to call attention without further delay to this fact, and to beg of the inhabitants of the coast and the islands of the Carribean Sea to collect all that can be remembered about these events; perhaps they heard also the noises described at the Caïmans, and they can confirm, or complete, or correct the observation given by Capt. Woodville.

In case the correlation between the noises at Caïman-Brac and the Krakatoa eruption would be ascertained, it would be a fact of uncommon interest which would equal and surpass the other astonishing phenomena to which the cataclysm of the Sunda Strait gave rise: the transmission of the atmospheric waves to the barometers of the whole earth, the propagation of the marine waves to the maregraphs of Europe and America, the crepuscular and auroral glows of the autumn of 1883, the solar corona of 1884 (which is still apparent, and can be observed every day in February and March, 1885), the abnormal polarisation of the sky (A. Cornu), &c., &c. F. A. FOREL

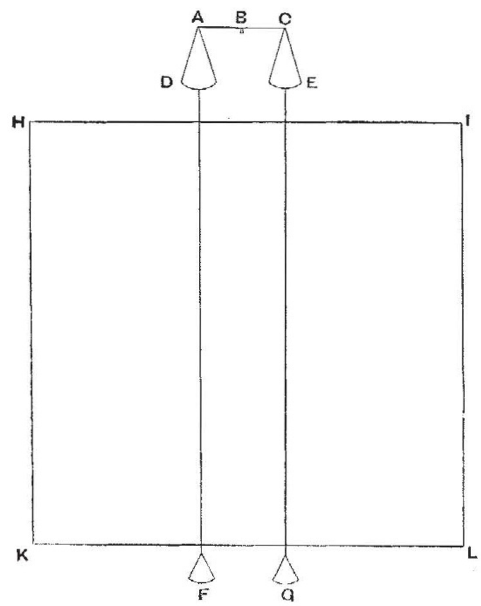
Morges, Switzerland, March 8

REMARKS ON OUR METHOD OF DETERMINING THE MEAN DENSITY OF THE EARTH

IN NATURE for March 5 (p. 408) Prof. Mayer suggests an improvement in our method of determining the mean density of the earth, from which it appears that our plan has not been properly understood. This misunderstanding, no doubt, has arisen from the incomplete description of our method given in the NATURE (Jan. 15, p. 260) report of the *Proceedings* of the Berlin Physical Society, which report was probably the only source of information accessible to Prof. Mayer. We are led therefore to give a short description of our method.

Let H I K L represent a section of a cubical block of lead, about two metres in the edge, and weighing 100,000 kilos. The balance A B C is placed in the middle of the upper horizontal surface. It bears the scale-pans D and E. Under these scale-pans the block is bored vertically through, and two other scale-pans, F and G, are suspended below the block, attached to the balance by means of rods passing through these openings.

A weight in D is brought into equilibrium by weights in G. The weight in D is acted upon by the earth's attraction + that of the block, and that in G by the earth's attraction − that of the block. The weights in G are then greater than that in D by twice the attraction of the block. The weight in D is now removed to F and counter-balanced by weights in E. The weight in E will be less than that in F by twice the attraction of the block. The difference of the two weighings gives therefore four



times the attraction of the block. A correction must be introduced for the variation in the earth's attraction due to the different heights of D, E, and F, G.

In order to obtain as great a deflection of the balance by the method suggested by Prof. Mayer, each of the mercury spheres must exert the same attraction as our lead block. This would require spheres having radii of about one metre. The length of the beam of the balance would be necessarily at least two metres. Besides each mass of mercury would exert some attraction on the weight on the other side, and thus lessen the deviation of the balance.

The method given by Prof. Mayer, except for the suggested employment of mercury, is then no improvement on ours. If we should use mercury, we would construct a cubical vessel to contain it, and use it as we propose to use the lead block. The advantage of using mercury is, however, counterbalanced by the difficulty of obtaining it in such large quantities as would be necessary.

ARTHUR KÖNIG
FRANZ RICHARZ

Berlin, Physical Institute of the University, March 15