say at 90° , and the perpendicular distance from a point on the P curve to the pP curve will approximate to the distance between the curves at 180° . By a suitable correction this approximation can be made still more exact. Hence, if this given distance corresponds to a time interval of 100 sec., we know that the focus is at least at such a depth that a P wave requires 50 sec. to travel to the epicentre. Multiplying this time by an average value of the velocity at moderate depths, we arrive at a value for the depth of focus. The above-mentioned interval of 100 sec. would thus indicate a focal depth of approximately 400 km.

Records from observatories throughout the world for an earthquake of March 29, 1928, have yielded very satisfactory curves for P and pP , for S and sS , as also for other pulses. The uncorrected distance between the P and pP curves corresponds to an interval of 92 sec., so that great depth of focus seems well established. Several other features of the records point in the same direction. This conclusion is further confirmed by Wadati's assignment,² on the basis of the records from the nearby Japanese stations, of extraordinary depth to this shock.

It is felt that the admission of the occurrence of earthquakes at depths of the order indicated must entail interesting consequences for speculations in regard to the earth's structure and constitution.

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¹ *Proc. Roy. Soc., A*, **132**, 213-236, July 1931. See *NATURE*, **128**, p. 228, Aug. 8, 1931.

² *Geophysical Magazine* (Tokyo), **2**, p. 18, March 1929.

A Counting Device for Use with the Geiger Counter.

THE most trustworthy instrument for recording the impulses delivered by a Geiger counter is no doubt a string electrometer. Since, however, the counting of the deflections on a photographic record requires a good deal of time, a mechanical summation will in general be preferred. The arrangement to be described here has the advantage of being so simple that

FIG. 1.

it does not require any watching, even throughout long series of observation.

The positive (central) electrode of the counter is connected to the grid of an ordinary 3-electrode valve giving an anode current of 20-30 ma. when the grid is free (Fig. 1). To improve the insulation of the grid, the lead-in wire is pulled out through a hole drilled in the side of the bakelite socket and fixed in a plug of ebonite or amber. The anode current of the valve is sent through the coil of an ordinary telephone call meter; the screw which determines the movement of the yoke is insulated and connected to the grid. The yoke is connected to the negative end of the filament. The voltage swing applied to the grid by an

impulse from the counter may easily attain a value of 50 volts and under ordinary working conditions is 20-30 volts, which is sufficient to break the anode current of the valve.

When the whole is at rest, the potential of the grid is nearly the same as the negative end of the filament; the anode current has the corresponding value, and the yoke of the counting machine is attracted by the magnet. Upon the arrival of an impulse from the counter, the anode current is broken, and the yoke is released; as soon as the yoke touches the screw, the anode current is raised again to its normal value.

The connexion of the grid to the insulated screw is necessary; when the grid is brought to a negative potential of 20-30 volts and left to itself, it would remain at this potential for a considerable time, since no grid leak is used.

The number of impulses should generally not exceed 200 per minute; when the number is higher, a considerable number of impulses may be lost. This seems for the main part to arise from the counter itself, a certain restoring time being necessary after each impulse.

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Effect of Light on the Surface Tension of Boys' Soap Solution.

THE letter of Prof. L. D. Mahajan in *NATURE* of Sept. 19, p. 496, which brings forth an interesting point, may be slightly misleading, inasmuch as it tends to indicate that time, or rather adsorption as a function of time, is only a negligible factor in the decrease of the surface tension of colloidal solutions, which I pointed out in 1924.

Even before Dr. Mahajan's memoirs are published, I feel that I must remind the reader who is interested in these questions that the conditions of Dr. Mahajan's experiments are quite different from those on which I based my interpretation of the experimental facts, and that consequently it is premature to issue a general statement.

I have shown, indeed, that the 'time-drop' was small for high concentrations, such as 1 per cent, and that it increased as the dilution increased. For example, one sample would give a drop of 2 dynes at 1 per cent and 20 dynes at 1 per hundred thousand, or 10^{-5} . I explained the difference, and studied thereafter only high dilutions up to 10^{-7} , under subdued artificial light.

Now Dr. Mahajan states—without specifically limiting his statement to sodium oleate solutions—that "the decrease in surface tension is a function of the time for which the solution is exposed to light and not a mere function of the time". As the concentration of the soap solution + glycerin which he uses is not stated, but may be as high as 2.5 per cent—which should give a very small drop—it is indeed quite possible that illumination plays a part in this case. But this does not substantiate the general statement that even in the case of high dilutions, where the drop is considerable, "a possible reason for this is a chemical action, not adsorption in the surface layers alone".

I shall look forward with much interest to Dr. Mahajan's papers, but as some readers may not see them, I think it advisable to direct their attention to the fact that the experiments reported in his letter cannot suffice to weaken my former interpretation.

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Sept. 23.