

while the terms of higher order accord pretty fairly on the whole with Schuster's hypothesis, this is not true of the principal terms of lower order. The natural inference is that the hypothesis is, at best, not a complete explanation of the phenomena. To the second question the answer obtained is that the forces causing the diurnal variation do *not* possess a potential; part, but only part, of the diurnal variation may be derived from a potential. Besides the main data mentioned above, data from a number of other stations are utilised, and there is, besides, a good deal of mathematical theory. While the publication makes most direct appeal to theorists, it contains much valuable information as to facts not otherwise readily accessible.

GALVANOMETRIC RECORDS OF EMOTIVITY.

IN the correspondence columns of the issue of the *Lancet* for February 23, Dr. A. D. Waller described some very interesting results which he had obtained by the study of the "emotive response" or "psycho-galvanic reflex" on various individuals. If, by means of electrodes applied to the dorsum and palm of the hand, a subject be connected in series with two Leclanché cells and a galvanometer, an emotive response is shown by the deflection of the latter, not only to physical stimuli such as burning, unexpected noise, smell (e.g. a poison gas), but also to psychical stimuli such as apprehension, questions, and thoughts, pleasant or unpleasant. The

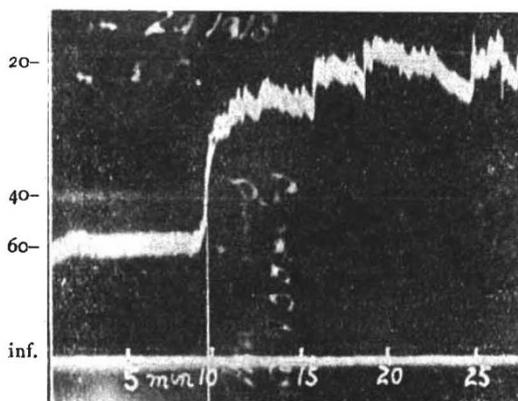


FIG. 1.—Galvanometric record of Miss G. De D. during the air raid of January 29, 1918. At the tenth minute of observation the noise of maroons, immediately followed by that of aeroplanes and guns, broke out, and the resistance, which was approximately 60,000 ohms during the first ten minutes before the disturbance, fell to approximately 20,000 ohms during the next fifteen minutes. (On the left hand is given the resistance in thousands of ohms.)

normal resistance between the back and the palm of the hand is between 10,000 and 40,000 ohms.

From many experiments made on different subjects, besides the big variation in actual resistance there is a marked difference in emotive response; also in the change of resistance which takes place during an experiment, and in the response of the subject to the same stimulus at different stages of the experiment. In some individuals a greater physiological change may be caused by an imaginary than by a real excitation. This is especially the case in imaginative subjects, such as members of the literary, artistic, and scientific professions. A very interesting record (Fig. 1) is given of the response of a subject taken during an air raid.

Comparative records are also given of two officers, one of high and the other of normal emotivity. It

NO. 2533, VOL. 101]

would be of extreme interest to know the nature of response in a series of subjects who have successfully withstood many nerve-trying ordeals—as, for example, the response of the experienced and successful fighting air-pilot. It is possible that this test would be of value in special cases in the selection of air-pilots, and also invaluable to the military authorities as an adjunct to the ordinary medical examination in classifying doubtful "nerve" cases, e.g. shell-shock, neurasthenia, and malingering.

ATMOSPHERIC POLLUTION.

AN examination of the third report of the Advisory Committee on Atmospheric Pollution, published as a supplement to the *Lancet* of March 23, shows that the total deposit for 1916-17 has increased in the (six) summer months over that of the previous year, which was greater than that of 1914-15, so that there has been a steady increase in most of the stations during the past three years. On the other hand, in the (six) winter months a diminution in 1916-17 is recorded. No very definite conclusions can be drawn from these results, as the stations have in some cases been changed; but in London, where the same stations have been in steady operation during this period, there is a distinct improvement in the winter months, and the same is true of Glasgow.

Among the towns exhibiting the highest deposits of atmospheric impurities St. Helens and Glasgow stand out most prominently, whilst Malvern and Exeter, as might be expected, exhibit the lowest figures.

A comparison of deposits during wet and dry weather indicates that, whereas insoluble matter is little affected by rainfall, soluble matter is brought down in much larger amount. The highest and lowest deposits, based on the average of eighteen stations, correspond, nevertheless, in no instance with the highest and lowest rainfall.

Some kind of automatic recorder for the rapid registration of atmospheric pollution, to replace the cumbersome and tedious method at present used, has always been a great desideratum. Dr. J. S. Owens describes in the present report a simple form of such an apparatus, whereby a known volume of air (2 litres) is drawn at a fixed rate through an aperture ($\frac{1}{8}$ in.) into which a piece of filter paper is inserted. The stain produced by the arrested dust particles gives a measure of the amount of suspended impurity, and by calibration with weighed quantities, which have been determined by Mr. J. G. Clark, the depth of deposit can be expressed quantitatively. The method appears to give trustworthy results, and each determination is complete in ten minutes. It does not, of course, touch the gaseous impurities, but as these run to a great extent parallel with the solid impurities, and as the latter are the more injurious, the results should give a fair record of the changes taking place in atmospheric pollution at different centres. As the method involves simple apparatus and but little attention, it is to be hoped that a larger number of observers will be induced to enrol themselves under the present committee.

J. B. C.

LUBRICATING OILS.

IN a paper read by Drs. A. E. Dunstan and F. B. Thole before the Institution of Petroleum Technologists on April 16, the authors, in reviewing the work of previous observers, point out that little knowledge exists as to the chemical composition of lubricating oils and the relation between their chemical character and lubricating properties. These oils probably consist (though nothing very definite is known) of