in declination $-17°$ The form of the catalogue is generally similar to that adopted at Greenwich and Oxford, the measures for each plate being accompanied by an equation for the conversion of measured diameters to magnitudes, and the plate constants required for conversion to standard co-ordinates. The reduction of measured to standard co-ordinates, and thence to right ascension and declination, is fully explained in the introduction, and tables are provided to facilitate the computations. A supplementary catalogue gives the standard co-ordinates of the reference stars. All the plates reach at least to the 12th magnitude, and some include stars fainter than magnitude 13. The whole work reflects great credit on the director and his assistants.

THE CO-ORDINATION OF SCIENTIFIC PUBLICATION.

THE co-ordination of scientific publication formed the subject of a recent conference arranged by the Faraday Society under the chairmanship of Sir Robert Hadfield, when a number of interesting problems bearing on the desirability of a fuller co-operation amongst our scientific and technical societies were discussed. Both in the reading and publication of papers there is, at present, a considerable amount of overlapping and lack of co-ordination, with the result that much valuable work is either lost or overlooked owing to communications being made to societies which are not especially associated with the subject-matter of the investigations concerned, and much benefit would undoubtedly result from a federation of interests in this respect. Whilst there is a general consensus of opinion that it is essential to maintain the individuality of each society in regard to the reading and publication of papers, and that any attempt to pool communications for later distribution by a central organisation is undesirable, much effective co-operation could be secured between kindred societies by the arrangement of joint meetings and conferences with the object of promoting united work on problems of common interest. Borderland subjects merit special consideration from this point of view.

The publication of the proceedings of such meetings in the Transactions of the several societies concerned would be much facilitated by the adoption of a uniform size and type for the publications of societies dealing with allied subjects, so that each could include such papers in its journal or distribute them as self-contained reprints of a standard size. Similar uniformity is perhaps not practicable for all scientific and technical publications, but in so far as it can be adopted it would add much to the accessibility and the utility of the recorded work.

Organised collaboration is also desirable by means of which the members of scientific and technical societies should have opportunity of knowing what papers are being contributed to societies other than their own, apart from their later publication either in the journal of the society concerned or in the form of abstracts. The proposal, which, it is understood, is being considered by the Board of Scientific Societies, to publish a weekly journal of announcements would meet this want, and it is to be hoped that the Board will decide to issue such a publication as soon as possible. Meanwhile, individual societies could aid in this direction by publishing in their journals both the announcements of cognate societies and short summaries of papers read previous to publication, so that the subject-matter is brought to the notice of those interested at as early a date as possible. A method of mutual exchange to facilitate such co-operation could be easily arranged, and would in no way detract from, but rather add to, the interest in the later full publication of papers.

Apart from original contributions, the publications of most societies include abstracts of scientific and technical literature published both in our own and in foreign journals. In so far as such abstracts include subjects of common interest to members of kindred societies, there is at present a great deal of overlapping which could be advantageously eliminated by organised collaboration. We have, in the past, been far too reliant in many subjects on the foreign, and especially on the German, journals for our supply of the world's scientific and technical literature, and it is high time that we became independent and self-supporting in this respect. Effective co-operation should achieve this desirable end for each group of cognate subjects; and whilst the method of collaboration would depend to a considerable extent on the character of the subject, a common journal of abstracts for each group of societies would, in the majority of cases, prove the most advantageous plan. Although a scheme of this character would necessarily decrease the bulk of the publications of each society, the original contributions which mark their individuality would be given greater prominence, time wasted by the re-reading of the same abstract in several journals would be saved, and considerable economies in publication would be effected.

Much attention is being directed at present towards the unification and co-ordination of scientific effort The co-ordination of scientific publication, which has made some progress in the directions indicated during recent years, should certainly continue to occupy a prominent place amongst these problems of reconstruction.

THE DIURNAL VARIATION OF TERRESTRIAL MAGNETISM.

PUBLICATION No. 102 of the Royal Meteorological Institute of the Netherlands consists of a doctor's dissertation in Dutch by Miss Annie van Vleuten "On the Diurnal Variation of Terrestrial Magnetism" and two short papers in English from vol. xxvi. (1917) of the Proceedings of the Science Section of Kon. Ak. v. Wet. of Amsterdam. The dissertation, which extends to 106 pages, contains numerous tables of diurnal variation data for the magnetic elements, and the corresponding Fourier coefficients for a number of stations, more especially for Pavlovsk, Sitka, Irkutsk, De Bilt, Cheltenham, U.S., Zi-ka-wei, Honolulu, Bombay, Buitenzorg, and Samoa, and for the group of years 1906–8. The Fourier coefficients, based on the data from these ten stations from the international quiet days, five a month, are used to furnish answers to the questions advanced in the two short papers in English: (1) Does the internal magnetic field to which the diurnal variation is partly ascribed depend on induced electric currents? (2) Do the forces causing the diurnal variation possess a potential? These are problems chiefly associated in England with the name of Prof. Schuster, to whose work there are many references, while abroad they have occupied, amongst others, Profs. Fritsche and Steiner. Schuster and Fritsche, using totally different observational data, separated the forces causing the diurnal variation into one set having a source external to the earth, and a second set having an internal source. Schuster suggested that the second set arise from currents induced in the earth by the former set. Steiner, employing Fritsche's results, decided against Schuster's hypothesis. Miss van Vleuten's material is at once more homogeneous than Fritsche's, and more representative than Schuster's. She concludes that.

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

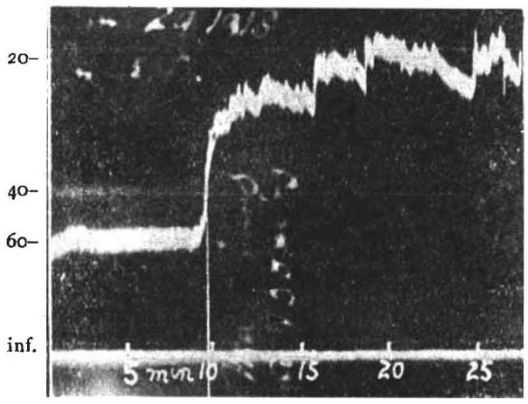

FIG. 1.—Galvanometric record of Miss G. De D. during the air raid of January 29, 1918. At the tenth minute of observation the noise of maroons, immediately followed by that of aeroplanes and guns, broke out, and the resistance, which was approximately 60,000 ohms during the first ten minutes before the 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 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