

methods have tended to support the validity of the values found electrically.

Conductivity of Tetraethylammonium and Ammonium Salts.—The August number of the *Proceedings of the Royal Society* contains some data for the conductivity of various ammonium and tetraethylammonium salts in methyl alcohol, which have been obtained by Sir Harold Hartley and a number of collaborators. The measurements were made at 25° C. and show the rather curious result that the mobility of the complex ethyl ion (NEt_4^+) is seven per cent greater than that of the relatively simple ammonium ion (NH_4^+). With a single exception, the results for the eleven salts studied agree with the prediction of the Debye theory of electrolytes that the molecular conductivity should change in a linear manner with the square root of the concentration; the rate of change of conductivity with concentration also affords evidence for the essential accuracy of some recent developments of Debye's theory, observed and calculated values of the rate of change agreeing on an average to within twenty per cent. The general trend of the results, and particularly the behaviour of the good conductor tetraethylammonium perchlorate, indicates that the magnitude of the deviations from theory increases with the speed of the ions present.

Insulin Therapy.—Although our knowledge of the mechanism of the action of insulin in the body is very incomplete, there is no question of its value in the treatment of diabetes mellitus. The principles of its practical use are well defined, although the actual details may vary; in every case it is necessary to ensure a balance between the diet and dosage of insulin, such that the blood-sugar is kept within

normal limits and none is excreted in the urine. The amount of insulin required will naturally vary according to the severity of the disease and the amount of food taken. The details, which vary according to the physician in charge of the case, are concerned with the methods of determining the amount of insulin required and of calculating the diet. A convenient account of the treatment of diabetes with insulin is given in a small brochure recently issued by the manufacturers of "A.B." Brand Insulin (British Drug Houses, Ltd., and Allen and Hanburys, Ltd.). Simple methods for estimating sugar in blood and urine are described, as well as a simple dietary scheme. The practical use of insulin is given in detail. Sections are devoted to the treatment of the various conditions which may complicate the disease. Although insulin rarely cures, it can undoubtedly prolong life when properly employed; a cure can only be expected when the affection of the pancreas passes off without damaging the organ permanently. In such a case insulin may tide the patient over the infection and permit of recovery of function by the gland. In many cases, however, the timely use of insulin may promote a definite improvement in the condition of the pancreas. In all, its use permits of a better dietary being prescribed, with greater comfort to the patient. Insulin has also found a use in the treatment of various nondiabetic conditions: it is employed to improve the metabolism of carbohydrate, and may be used in states of malnutrition and when it is advisable to stimulate the metabolism of these food-stuffs, as in various forms of vomiting and in liver affections. The booklet may be recommended to those in search of a short and readable account of insulin treatment, based on selected excerpts from current medical literature.

Astronomical Topics.

A Daylight Meteor.—A brilliant meteor was observed by Mr. J. R. Clarke, University, Sheffield, just before sunrise, from Loch Doon, Ayrshire, on Aug. 26 at about 4^h 15^m G.M.T. It travelled from west to east with very low apparent velocity, and was visible for about half a minute. No other reports are to hand at present.

Stellar Photometry.—Some years ago the photographic magnitudes of stars in the zone +90° to +73° declination were obtained by Parkhurst at Yerkes, and this work has now been continued by A. S. Fairley at the same observatory over the zone +75° to +60°. The method used is that of extra-focal images, obtained 6 mm. inside the focus of a Zeiss 14.5 cm. doublet of 81 cm. focal length. A series of fourteen accurately graded artificial images was impressed on each plate before development, thus providing an independent scale for the comparison of densities, which were measured in a Hartmann microphotometer. The zero point was calculated for each plate from stars in the Potsdam Photometric Durchmusterung, the magnitudes of which were first corrected for colour index (assumed from spectral type) and then reduced to the international scale. The methods employed are described in the *Astrophysical Journal*, vol. 73, p. 125, in which Fairley gives the resulting photographic magnitudes of 2354 stars down to magnitude 8.25 within the above-mentioned zone.

The Apparent Recession of the Spiral Nebulae.—*Leaflet 37* of the Astronomical Society of the Pacific gives an account by Mr. Milton L. Humason of the methods now adopted at Mount Wilson of measuring

the radial velocities of the distant spiral nebulae. A new spectrograph lens, designed by Dr. W. B. Rayton, has been brought into use, which greatly shortens the exposures; these, however, still have to be continued on several successive nights in the case of the fainter nebulae. The photographic plates measure $\frac{5}{8}$ inch by $1\frac{1}{2}$ inch, and the length of the spectrum varies from $\frac{1}{16}$ inch to $\frac{1}{8}$ inch, according to the prisms used.

Up to three years ago the measures of distance extended up to 6 million light-years; they now reach 105 million. Reasons are given for assuming that the smaller and fainter nebulae are the more distant, and it is then shown that these small faint nebulae have also the largest velocities of recession. The question whether the recession is real, or arises from the properties of space, does not affect the use of the shift to the red as a measure of distance.

A photograph, taken with the 100-inch reflector, is reproduced, showing a group of faint nebulae in Leo. The brightest of these is of magnitude 15.5, and is stated to be the faintest and most distant object for which a measurable spectrum has been photographed. The deduced distance is 105 million light-years, and the measured recession is 12,000 miles per second, or $\frac{1}{15}$ of the velocity of light.

Measures are given of seven other nebular groups, in which 30 nebulae were examined. The results show that the distances estimated from apparent brightness and diameter are in excellent agreement with those deduced from the velocities of recession. So far as the results extend at present, they indicate a fairly uniform distribution of nebulae in different regions of space.