Trouvelot and others, are to be utilised for a descriptive account of the Messier objects in the proposed series of articles. Following an interesting biography of Messier, a useful list of the objects is given, with the original positions and numbers, and positions for 1900, together with the N.G.C. designations. M1 and M2 are described in detail in the first article, and each is illustrated by a photograph, and by a drawing showing the appearance in a telescope of 0·24 m. aperture. It is interesting to note that the present publication coincides with the centenary of the death of Messier, who died at Paris in 1817, at the age of eighty-seven.

SCIENCE IN INDIA.[1]

THE report of the Indian Association for the Cultivation of Science for the year 1915 contains, as well as the usual presidential addresses, a miscellany of scientific papers, ranging from ancient Hindu astronomy and the metallurgy of the Rig Veda to modern anthropological methods and problems of isomerism. Physics and chemistry come in for more attention than the biological sciences; in the former category the more important contributions are those of C. V. Raman and Ashutosh Dey on discontinuous wave motion, of S. Banerji on experiments with the ballistic phonometer, and of J. C. Ghosh on a new method of preparing colloids; in the latter a careful and intelligent analysis of the vegetation of the mouth of the Hugli by N. B. Dutt must be mentioned.

The address of the president, Raja Peary Mohun Mukherjee, is a reminder that the association, although it has always held the advancement of science by research and experiment to be its final purpose, started in life with a mission, which it still upholds, for imparting instruction in the general principles of science; though brief, the address abounds in wise reflections and sage advice adjusted particularly to the educated youth of Bengal.

Some of the special addresses allude to the recent establishment of a University College of Science in Calcutta, and to the opinions expressed in some quarters that thereby the association, on its educational and investigative side, may now be considered superfluous. It is to be hoped that such short-sighted views may not meet with any encouragement; for of all the misconceptions that have attended science since it was taken in hand by bland official personages that about "overlapping" makes the most unfortunate departure from inceptive truth. So far from being a stumbling-block, overlapping in the domain of science brings manifold strength and quintessential purification, for the more widely a scientific theory is tested and criticised the less likely is it to be a source of illusion.

ALKALI SOILS AND SOIL SOLUTIONS.

IN any attempt at agriculture in arid or semi-arid regions, considerable trouble is likely to arise from accumulations of soluble salts at the surface of the soil. The trouble is often intensified by irrigation, and it may become so serious as to counteract the advantages of a reclamation scheme that may be satisfactory in other respects. In a recent issue of the *Journal of Agricultural Research*, Dr. Breazeale estimates that the losses from this cause have already amounted to one hundred million dollars in the United States alone, and the evil is by no means checked. The soluble salts arise from two causes. Some come direct from the weathering of soda feldspars, diorite, etc.; much, however, arises from the circumstance that the area was once largely covered by marine lagoons or landlocked seas, the water of which evaporated, leaving the salts behind. When the soils are first brought under irrigation, the water applied to the higher levels is usually excessive in amount, and drains through the lower ground, carrying with it in solution considerable amounts of the chloride, sulphate, carbonate, and bicarbonate of sodium. Calcium carbonate is almost invariably present in the soil, and both sodium chloride and sodium sulphate react with this to produce sodium carbonate, which is much more harmful to vegetation than the other salts. The action is, however, reversible, and the addition of calcium sulphate to the soil has long been a recognised method of reducing the amount of sodium carbonate. The method, however, has not always succeeded, and Dr. Breazeale is able to furnish an explanation from his curves showing the amount of carbonate formed from the various sodium salts. If the carbonate is arising from the interaction of sodium chloride or sodium nitrate with calcium carbonate, then calcium sulphate is effective in bringing about the reversal; if it arises from sodium sulphate, then calcium sulphate is without effect.

The study of the soil solution is of great importance, both in relation to soil formation and because it is the medium for plant growth and the substratum for microbial life. The difficulty is to obtain sufficiently large amounts of the true soil solution. The drainage water does not faithfully represent the soil solution, soil extracts (using water as a solvent) only yield dilute washings of the soils which cannot be concentrated to reproduce the original solution, and the centrifuge only separates moisture from a soil which contains more than the optimum amount. A paraffin-oil displacement method under pressure has been devised by van Suchtelen and Itano, which has been used by Mr. J. F. Morgan. Some of the results obtained are described in the June number of *Soil Science*. The method consists of forcing paraffin oil, by means of a high-pressure pump, through the soil tightly packed in a cylindrical vessel, the pressure being raised so long as moisture is expelled, until it reaches 500 lb. per square inch. In the case of most soils ample solution for the necessary analytical work is obtained—from sandy soils as much as 74 per cent. of the moisture present—and a large amount of solution is yielded without its coming in contact with the oil. From the results of his experiments the author concludes that the method furnishes a fair representative of the solution as it exists in the soil. Successive portions of the same extraction vary only slightly in physical properties, but to a considerable extent in the various forms of nitrogen (ammonia, nitrite, and nitrate). In the different soil solutions phosphoric acid is fairly constant, but calcium, magnesium, and potassium vary, as do the forms of nitrogen. The obtaining of a soil solution by the method is limited to the moisture content of the soil, and depends upon the type of the latter, since all soils are not entirely penetrated by the oil. Work Mr. Morgan has in progress indicates that the method furnishes a valuable index of the microbial changes in the soil.

LOCAL NATURAL HISTORY SOCIETIES.

THE report of the Winchester College Natural History Society for 1915–17, edited by its president, the Rev. S. A. McDowall, shows that a considerable amount of active work is being done by the members. Mr. McDowall himself is interested in natural orchid-hybrids, and he has succeeded in infecting the older members of the society year by year with his enthusiasm; the present report contains valuable notes by H. McKechnie and D. G. Lowndes, with five good half-tone plates. The former also has an interesting

[1] Report of the Indian Association for the Cultivation of Science for the Year 1915. Pp. iii+150. (Calcutta: Anglo-Sanskrit Press, 1917.)