

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 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

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

account of plants introduced from camp fodder. There are lists of additional plants, of Lepidoptera, and of nesting birds, with locality and date of each observation. A golden oriole and a waxwing are among the birds observed. Among papers read at the meetings (which, by the way, are held on Sundays), those by R. F. Lowndes on trout and by J. Comber on ditch plants bear witness to much first-hand knowledge, and are rightly printed at greater length than the others. Although the war has introduced many competing claims on the energy of the school, the membership of this society has not diminished, and all, from its president down to the smallest junior, are to be congratulated on the excellent report that their united efforts have produced. We hope that in this time of stress other schools will do as well in natural history as does this home of the ancient learning.

The Transactions of the Hertfordshire Natural History Society for 1917 contain much interesting matter. Dr. A. H. Foster, a very sound ornithologist, contributes a list of the birds of North Herts; he gives records of 200 species, and, though stray wanderers are included, the list is a remarkable one. Though the county is becoming dotted with small towns and large villages, the birds, being very conservative, still keep to their old haunts and their old lines of migration. Besides this there are a fair number of good observers, so that few rarities pass unnoticed. Among nesting species may be noted especially the grasshopper warbler (scarce and local), the stone curlew, the woodcock, and the quail. Among occasional birds of passage is the common tern. A regular winter visitor is the golden plover; in the south of the county these birds frequently don the black breast before starting for the north. Surely, then, Dr. Foster must be wrong when he says they never do so in the district of which he writes. He has as yet no record of the breeding of the redshank, which nests regularly in Essex, and shows signs of extending its range over the border into Herts. For the common snipe the record is "a few nesting pairs in summer and many individuals in winter." Do these winter and summer birds belong to different sets which keep apart? A paper on "The Response of Plants to Selective Screening," by Col. Rawson, records some valuable experiments that show that variations may be induced in some plants by screening them from the sun when it is at certain altitudes. There is also an interesting paper on Rotifers by T. E. Lones, and a list of the Macro-Lepidoptera of North Herts by Dr. Foster.

The *Vasculum* is an illustrated quarterly magazine devoted to the natural history of Northumberland and Durham, and from the three parts of the current third volume before us it may be seen that it is fulfilling a useful function. The general editor is the Rev. J. E. Hull, whose speciality is the Arachnida, but who also contributes chatty papers on place-names. The other editors are Mr. George Bolam, the author of "Birds of Northumberland and the Eastern Borders," who writes on the coming and going of the birds of the Upper Tyne Valley; Mr. R. S. Bagnall, who records discoveries of spring-tails and their allies new to science and new to the district; and Dr. J. W. H. Harrison, whose recent work in hybridisation has brought him into prominence, who displays in the magazine a wide knowledge of animals and plants and their associations. Other field naturalists of the counties concerned contribute articles, and we note that they represent the other natural history activities of the district—the Natural History Society of Newcastle and Armstrong College. The magazine brings scattered workers in country districts into intimate association, new discoveries are made known, the older workers are stimulated to fresh endeavours, and those who have received the call of natural history

are encouraged and guided as to literature and methods. The work of the Northumberland and Durham naturalists is providing material for the presentation of the district from an ecological point of view, and the gathering of the material is fostered by the *Vasculum*.

The Proceedings and Transactions of the Croydon Natural History and Scientific Society for 1916 contain a good deal of detailed information in regard to the intermittent bournes of the district. The late Mr. Baldwin Latham showed that the Croydon Bourne flowed early in 1916, for the fifth year in succession, with a maximum flow of 13,345,920 gallons per day, thus equalling the great flow of 1904. Bournes also flowed at Carshalton, Cheam, Nonsuch Park, Smitham Bottom, and Wickham. With regard to the last-mentioned, Mr. W. Whitaker contributes a paper showing that the Wickham Bourne had not flowed since 1883. On May 28, 1916, it was yielding 1,628,550 gallons per day, at a point where it flowed into and filled up a gravel-pit by the side of the railway near Hayes Station. In Mr. N. F. Robarts's presidential address reference is made to a valuable find of bronze implements made in 1914 in Addington Park, when the golf links were laid out and an enormous destruction of woodland took place. So large was the find that the man who took them away staggered under the weight. Apparently he disappeared, but it was found afterwards that a man had called at the British Museum in the same year and had sold about thirty implements and fragments of bronze from Addington. The find contained six socketed celts, and is thought to be of late Bronze age. The Proceedings contain the usual rainfall returns from more than a hundred stations, compiled monthly by Mr. F. Campbell-Bayard, and these are of great value to water engineers and others. The society may be congratulated on the energy displayed in spite of pressing war vocation.

The 1917 issue of the *South-Eastern Naturalist* constitutes the twenty-second volume of Transactions of the South-Eastern Union of Scientific Societies, and includes the proceedings at the annual congress held in London last June. This meeting was reported in our issue for June 28 (vol. xcix., p. 354), when summaries were given of Dr. W. Martin's presidential address and the more important papers read at the meeting. Among the contributions to which limitations of space made any detailed reference impossible on that occasion may be mentioned Dr. B. Daydon Jackson's well-informed directory to the notable trees and old gardens of London, with its references to the gardens of Gray's Inn, planted by Sir Francis Bacon; and those of Syon House, at one time under the superintendence of Dr. W. Turner, physician to the first Duke of Somerset, Lord Protector. Dr. Turner, the "Father of English Botany," published "The Names of Herbes" in 1548, and dedicated it to the Protector. Prof. MacBride's address on "Are Acquired Characters Inherited?"; Dr. J. S. Haldane's on "Abnormal Atmospheres and the Means of Defence against Them"; and Prof. Boulger's on "The Association of the Chelsea Physic Garden with the History of Botany," are all printed *in extenso*.

PARASITIC BIRDS.

THOUGH the singular habits of the parasitic cowbirds (*Molobrus bonariensis* and *M. badius*) are well known to ornithologists, Mr. L. E. Miller has been able to add still further to the records of their eccentricities in a valuable paper published in the Bulletin of the American Museum of Natural History, vol. xxxvii. His observations were made during a recent expedition to Bolivia and north-western Argen-