

is a great danger that many important sides of meteorology will be neglected. Safeguards are that the Director of the Meteorological Office should be directly under the Minister of the Department concerned, and on no account under other permanent officials, and that the Meteorological Office should have its separate vote and account in the Estimates. Hitherto the expenses have been controlled by the Meteorological Committee, a body on which several Government Departments as well as the Royal Society are represented; there seems to be no reason why this arrangement should not be continued. The work of the Meteorological Office concerns not only Government Departments, but also such bodies as county councils, municipal bodies, organisers of engineering undertakings, and the general public; and probably none of these know how great a use may be made of meteorological information.

The public is chiefly concerned with forecasts, and probably the mistrust of forecasts which undoubtedly exists in the public mind is due to the delay that occurs before the forecasts are available. Those that appear in the daily papers are based on observations at 6 p.m. of the previous day, but if forecasts based on the 1 a.m. or 7 a.m. observations were sent to every telegraph office in the country and posted up, and could be obtained by telephone subscribers, it would probably prove a great boon, especially to agriculturists, and do much to dispel the present mistrust of weather forecasts.

During the past year the Meteorological Office forecasts have been issued from the Air Ministry, and in the Air Estimate there appears a sum for the Meteorological Office. From this it appears as though the Office is to pass under the Air Ministry. In former times when any change was made in the status of the Office an official inquiry was held, but no such inquiry has apparently taken place as a prelude to the present change, and no public announcement of any kind has been made. There seems no reason for the change. The Meteorological Office had done work on the upper air long before the war, and it was its work which proved that long-distance night flying was a practical possibility. Meteorology must be a national Service, but the policy of handing it over to one Ministry without a separate vote and account would be disastrous, not only to meteorology as a science, but also to the State at large.

The following resolution was adopted at the meeting:—"The Royal Meteorological Society observes that, in the Air Estimates for 1919-20 published last December there appears a sum of 12,000*l.* as a supplement to the grant in aid of the Meteorological Office. It would appear from this that it is intended that the finances of the Meteorological Office shall pass under the control of the Air Ministry.

"The Meteorological Office deals with a variety of problems of high scientific and practical importance, some of which have no bearings on the work of the Air Ministry, but are closely connected with the work of other Government Departments. While recognising to the full the great benefits to the meteorology of the upper air likely to accrue from a close association with the Service to which a knowledge of the upper air is so essential, and which possesses such facilities for its investigation, this society cannot but feel misgiving that there may be a tendency for other branches of meteorology to receive less than their due attention if one Government Department has the sole control of the finances and management. The society, therefore, is of opinion that the Meteorological Committee should continue to have full control of the expenditure.

"It has been the practice in the past, before any

change was made in the body administering the Meteorological Office, for an inquiry to be held by a Departmental Committee. Reports of three such inquiries have been published, the last being that issued in 1904 of a Treasury Committee presided over by Sir Herbert Maxwell, Bart. The Treasury did not adopt the whole of the recommendations of this Committee, but on May 20, 1905, it issued a minute constituting the Meteorological Committee as it has since existed. The society is of the opinion that before the future constitution of the Meteorological Committee and the status of the Meteorological Office are finally settled, it is desirable that an inquiry by a representative committee should be held."

PRE-HISTORY OF MAN IN BRITAIN.

FLINT IMPLEMENTS FROM THE CHALKY BOULDER CLAY OF SUFFOLK.

MR. J. REID MOIR described to the Royal Anthropological Institute on February 17 some interesting flint implements and flakes found in two pits situated to the north of Ipswich, and in a pit at Claydon, to the north-west of that town. In each of these pits Boulder Clay of considerable thickness is exposed, and this deposit, in the opinion of Prof. J. E. Marr, who has visited the sections, is *in situ*, and represents part of the large sheet of Boulder Clay of the Ipswich district. Mr. Reid Moir found many of the specimens described *in situ* in the Boulder Clay, and the others, handed to him by workmen employed in the pits, are of such an order as to make it certain that these implements were also derived from the Boulder Clay. The specimens are in nearly every case made from flakes, and exhibit very little change of surface or signs of abrasion. The two principal types are *racloirs* and *pointes*; primitive flake-implements and large scrapers are also represented in the series. The technique of these artefacts is in many ways comparable with that of Early Mousterian times, and it is probable that these Boulder Clay specimens are referable to this cultural phase. The implements appear to have been lying in or upon a land surface before being incorporated with the morainic material in which they are now found. One well-made and deeply ochreous flake found in the Boulder Clay appears to be of Chellean age. It exhibits reflaking along its edges, and this flaking is patinated in the peculiar manner of some of the Boulder Clay artefacts.

In the discussion which followed the reading of the paper all the speakers united in dwelling upon the importance of the contribution made by Mr. Reid Moir to the study of the pre-history of man in Britain. Prof. Arthur Keith pointed out that the conclusions which followed from the results of Mr. Reid Moir's investigations could only be described as revolutionary, and would involve a reconsideration of the evidence relating to the antiquity of Stone-age implements. Mr. Reginald Smith said that the *pointe* was considered to be the typical implement of the Mousterian stage of culture. Archaeologists would have to consider the possibility of its occurrence in other periods. The peculiar patination which occurred on certain of the specimens found by Mr. Reid Moir in the Ipswich Boulder Clay occurred at Northfleet, and was usually considered to be typical of the Le Moustier period. Mr. Smith also pointed out that some thirty-five years ago Dr. Skerchley had raised the question of the occurrence of palæolithic implements below the Boulder Clay. Dr. Barnes remarked that a considerable number of flakes must be examined before it can be concluded

with certainty that a particular type of implement was present. Mr. Reid Moir's collection appeared to him to present all the characteristics which one would expect to find in a group of implements belonging to the Le Moustier culture.

Mr. Kennard said that palæontologists were firmly convinced that the Boulder Clay was of late occurrence. An examination of a continuous series of examples of the fauna exhibited no traces of the variation between warm and cold types, which would have been expected to occur if the theory of alternating warm and cold periods were correct. Fauna of the cold period were always last in the series. Mr. H. Bury said that the evidence brought forward by Mr. Reid Moir made it necessary to raise the question whether Chalky Boulder Clay was always, and wherever it occurred, of the same age. The evidence from Hoxne was diametrically opposed to Mr. Reid Moir's results, and this, together with the doubts which had been expressed as to the character of the evidence obtained from Hoxne, made it desirable that the borings on that site should be repeated.

RECENT ENGLISH MARINE BIOLOGY.

RECENT English papers on marine biological research include one by Dr. E. C. Jee on the hydrography of the English Channel during the years 1904-17. This forms part i. of the Fisheries Investigation Series III., the publication of which is now resumed by the Board of Agriculture and Fisheries. Periodicities in the physical properties of the Channel water are discussed, and correlations between these and the pilchard fisheries are apparently established. A most interesting "Contribution to the Quantitative Study of Plankton" is published by Dr. E. J. Allen in part i., vol. xii., of the Journal of the Marine Biological Association.

Plankton investigations, in so far as they have been quantitative, have been a series of approximations to a complete determination of the number of organisms of all kinds contained in a unit volume of sea-water. Hensen's original method consisted in the use of a net made of fine-meshed silk cloth which was lowered in the sea and hauled to the surface. Experiment and calculation gave a coefficient for each net, from which the area of cross-section of the column of water filtered could be approximately determined. It has been found latterly that the greater number of microscopic organisms in the water escaped through the meshes of the cloth, and more refined filtering methods were introduced by Lohmann.

Finally, it was thought that by centrifuging small quantities of water a complete enumeration of the organisms present might become possible, and this method did, indeed, largely increase the numbers inhabiting unit volume of sea-water. Why it should not enable the investigator to determine *all* is not easy to see, but it certainly under-estimates them, as Dr. Allen's results show. In his experiments small quantities of water (10 c.c.) were centrifuged and the contained organisms counted. From four such trials a mean of 14.45 per c.c. (or 14,450 organisms per litre) was obtained. The same water sample was then examined by inoculating $\frac{1}{2}$ c.c. in a sterilised sea-water containing the culture solutions used by Allen and Nelson for the study of marine diatoms. The inoculated medium so prepared was then distributed into seventy small flasks, each containing about 20 c.c. of the liquid, and the latter were allowed to stand for several weeks. The colonies (mainly Diatoms and Flagellates) growing in the flasks were then identified and counted, giving an estimated number of at least 464 organisms per c.c. (or 464,000 per litre).

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Even then it is evident that the result is an underestimate of the actual population of the water sample, for the medium is apparently selective, and organisms that appeared in the centrifuged samples did not grow (and were therefore unrecorded) in the cultures. Bacteria did grow, but were not identified and estimated. The result is therefore another, and closer, approximation to a biological value which is of extraordinary interest.

J. J.

THE RED COLOURING MATTER OF PLANT GALLS.

DURING recent years our knowledge concerning plant colouring matters has rapidly increased, and quite a large number of pigments have been subjected to careful and full investigation. A further interesting contribution to our knowledge in this field of research is contained in a recent paper by Dr. M. Nierenstein, in which he deals with the colouring matter of the "red-pea gall" (Trans. Chem. Soc., 1919, cxv., pp. 1328-32). The galls that were examined occur on the leaves of various British oak-trees when galled by *Dryophanta divisa*, Adler.

It has been generally assumed that the red colouring matters of these and similar galls belonged to the anthocyan class, and one of the objects of the investigation was to ascertain whether the anthocyan assumed to be present was related to quercetin. By this means it was hoped to obtain some light upon the relationship between the products present in the normal plant and those pathologically produced as the result of the formation of the galls.

The investigation resulted in the isolation of a red pigment, to which the name "dryophantin" has been given. Dr. Nierenstein concludes that this colouring matter is not an anthocyan, but a diglucoside of purpurogallin (the first derivative of purpurogallin to be found in Nature), and that, like gallotannin, it is of pathologic origin. He is of the opinion that the other so-called anthocyan obtained from plant-galls are in all probability not anthocyan colours at all, but related to "dryophantin." In view of this he proposes to classify these red pigments under the class-name "gallorubrones."

This paper is of considerable interest, particularly if further investigation confirms the presence of purpurogallin derivatives as regular constituents of these and other red galls. In respect of the conclusion implied as to the absence of pigments of the anthocyan group, the present paper is not sufficient evidence of such absence, for the process whereby the colouring matter has been isolated is such that there is a very considerable doubt whether many anthocyan pigments would survive the treatment.

IONS AND IONISATION.

THE Faraday Society, though a small body, is very active. One of the most useful features of its activity is the holding of general discussions on matters of scientific and technical interest, and the publication of these discussions in its Transactions. "The Present Position of the Theory of Ionisation in Solution" was the subject of a discussion held on January 21, 1919, and the report is now issued in the form of a separate reprint (pp. 178, Faraday Society, 10 Essex Street, Strand, W.C.2, price 12s. 6d.), thus making it available to a larger public than the members of the society.

The discussion was opened by Dr. Senter, who briefly reviewed the position with regard to such outstanding problems as the hydration of ions, the deviation of strong electrolytes from the mass-action law,