

fellowship of the Royal Society and four of them have received Nobel prizes. This side of the Commissioners' work—and it is by no means the only side—is perhaps the most notable of their achievements since under the inspiring lead of the Prince Consort they set themselves their first task of developing as a great educational centre the property purchased at South Kensington with the proceeds of the Great Exhibition.

The Institute of Metals

Two important announcements were made by the president of the Institute of Metals, Mr. W. R. Barclay, at the annual general meeting on Wednesday, March 10. The first dealt with co-operation with two sister institutes. As a first step in a scheme of co-operation with the Iron and Steel Institute, members of each Institute can become members of the other without formality other than written application. Combined annual subscriptions and entrance fees have also been arranged. The present scheme of co-operation follows one recently completed by the two Institutes with the American Institute of Mining and Metallurgical Engineers whereby members, associates and student members of the British Institutes may, if under the age of thirty-three years, become junior foreign affiliates of the American Institute of Mining and Metallurgical Engineers on specially favourable terms, the arrangement being reciprocal in the case of members of the American Society. The president also announced that the Council had decided to issue an appeal for the creation of an Endowment Fund, to be invested for the support and extension of the work of the Institute. For the last few years the margin between income and expenditure in the annual accounts had been very narrow, and had afforded little or no opportunity to strengthen the Institute's financial reserves. Economies had been effected wherever possible, but these could not be extended without seriously curtailing the service the Institute renders to its members and to the industry in general. In the judgment of the Council the time had arrived when, on the basis of the record and achievements of the Institute, an appeal could and should be made to the non-ferrous metals industry for a substantial capital sum which it was hoped would appreciably lessen the anxiety constantly felt by the Council and its committees as to the financial future. He was glad to be able to announce that promises or actual contributions amounting to about £14,000 had already been received.

Prehistoric Cultures and Chronology in North Africa

THE most recent contribution of M. R. Vaufrey to discussion of a group of chronological and cultural problems in the archaeology of North Africa, of which an account appears in another column of this issue of NATURE (see p. 432), is of more than local interest in its bearing on questions of wide import in the study of prehistoric civilizations. M. Vaufrey, the distinguished anthropologist who occupies a chair in the Institut de Paléontologie humaine in Paris, has

explored extensively over a number of years among the prehistoric sites of North Africa, and his studies in the classification of the cultures and in the prehistory of that region are accorded the authority due no less to his meticulous precision as an investigator in the field than to his ability in the analysis of archaeological evidence recorded by others. In his latest contributions to a subject upon which no one is thus better qualified than himself to speak, M. Vaufrey has two main objectives.

In the first place, M. Vaufrey's aim is to determine with such precision as the case warrants the cultural association and dating thereby of the 'fossil' man of Mechta el-Arbi, a problem of no little moment in the history of the development of early types of 'modern' man in the Mediterranean area; and secondly, to determine the age which should be assigned to the characteristic art form of prehistoric North Africa, the rock engravings of varied forms of animal life in naturalistic style, a question long a matter of controversy among archaeologists, of which the suggested solutions have ranged from the palæolithic to the Iron age or later. By his conclusions that this type of early man belongs to the Mesolithic age and even later, the early Neolithic, while the cultures with which he is associated, by correlation with the early civilizations of the Nile valley, can be fixed in terms of years at a period extending from the beginning of the fourth millennium, down to the middle or even the end of the second millennium B.C., M. Vaufrey arrives at a result which will be of the first importance when brought into relation with the study of mesolithic and early neolithic cultures throughout the whole range of cultural distributions in the ancient world.

Prehistoric Caves in Kent

A RECENT subsidence of earth at St. Mary Cray, Kent, has revealed the existence of a subterranean cavity, which, it is thought, may prove to be the entrance to a considerable system of caves, similar to that at Chislehurst, two and a half miles away to the south, where thirty miles of galleries have been explored since the caves were rediscovered in 1902. Marks of deer-horn picks, still clearly visible, show where prehistoric man cut away the chalk. Although it will not be possible to attempt to explore the caves at St. Mary Cray until the fallen subsoil has been removed, entrance to two chambers, it is stated in *The Times* of March 4, has been made by Mr. Gibson-Cowan and Mr. Geoffrey Edwards, who found them to be about five feet high by thirty feet long. Probing with a pole ten feet long at the end of the farther chamber failed to encounter obstructing chalk, and it may be concluded, therefore, that they extend in this direction, while the existence of an earlier subsidence a quarter of a mile away, suggests that there may be a system of connected caves of considerable extent. The Chislehurst caves have produced few archaeological relics; but as an Elizabethan villa has been shown to have had direct access to the caves by means of a stair, and the caves were used as refuges,

disturbance must have been considerable. At St. Mary Cray, there is no evidence of occupation, at least since Roman times. It is possible, therefore, that they may serve the needs of the archaeologist to better effect, and it may be, throw further light on the prehistoric excavators of the chalk, to whose activities the dene holes, notably near Croydon, bear witness. Exploration of the newly discovered caves will begin as soon as the subsided clay has been removed and the roof of one of the chambers has been supplied with the necessary shoring.

Modern Developments in Broadcasting

IN a paper read before the Institution of Civil Engineers on February 16, Sir Noel Ashbridge traced briefly the growth of broadcasting transmission and television, and referred to some of the recent developments arising from the researches carried out by the B.B.C. The paper dealt at some length with the design of studios and the effect of size, shape and materials upon their acoustic properties. The advantages of the ribbon microphone over its predecessors were referred to, and the principal methods of sound recording were described. Improvements in the design of transmitting stations are broadly covered by schemes for economizing the power required for producing a given radiation output, and by the use of high vertical aerials, which tend to concentrate the radiation in the horizontal plane so as to give the most efficient service area. Sir Noel remarked on the difficulty of accommodating all the European broadcasting stations within the available wave-length band, and described the expedient of sharing wave-lengths between two or more transmitting stations by synchronizing their carrier waves. Next, a reference was made to the Empire broadcasting service, and the reasons which necessitated the use of short waves for this purpose were outlined. As a result of research carried out on the design of short-wave aerials to give the most efficient radiation, a considerable improvement is to be expected in overseas reception when the new short-wave transmitters of the B.B.C. are brought into operation in the near future. The paper concluded with a brief description of the methods and technique being employed for the transmissions from the London Television Station on ultra-short waves. The results of field strength surveys round London were given, and reference was made to the effect of interference from motor-cars and electrical apparatus.

Ultra-Short Wave Broadcasting

THE broadcasting service from the Alexandra Palace television station has already illustrated the suitability of ultra-short waves as a medium for the transmission not only of high-definition pictures but also of speech and music of very high quality. The latter achievement arises from the fact that in the ultra-short wave-band, the permissible band width available for the modulation frequencies is many times that obtainable amidst the present congested conditions in the medium and long-wave broadcasting bands. It is rather natural to suggest, therefore, that

more use might be made of the ultra-short wave-lengths for high-fidelity sound broadcasting. This matter was referred to in a note in *The Times* of February 18, in which it was pointed out that this aspect has been under consideration by the B.B.C. for some time past. Indeed, experiments were carried out some years ago with a transmitter installed on the roof of Broadcasting House and operated on a wave-length of six metres. Further experiments are being conducted, but it is stated that no plans have yet been made for the development of a public service on these lines. A large-scale extension of the ultra-short wave broadcasting of sound would be complicated by at least two factors. First is the fact that the B.B.C. is not the only user of the band of wave-lengths below ten metres, for some other national services already have vested interests there. Secondly, there is the difficult problem of interference from the ignition systems of motor-cars, which cause very unpleasant noises in neighbouring receivers working on ultra-short waves. It would seem to be unlikely that broadcasting on these wave-lengths will become really popular until the fitting of suppression devices to such ignition systems is made compulsory.

Radio-Elements as Research Tools

IN a lecture to the Society of Chemical Industry on March 1, Prof. F. A. Paneth discussed "Radio-Elements in Chemical and Biological Research". Owing to the extreme sensitivity of electrometric methods it is possible to detect radio-elements in much smaller concentrations than any other chemical substances; and as they are isotopic with ordinary elements we can in many investigations substitute a radio-element for its inactive isotope. Such use of 'radio-elements' as indicators is frequently of great help if the behaviour of an element in very small concentration has to be investigated. Perhaps of even greater importance is a slightly different application. By mixing a fraction of a stable element with its radioactive isotope we can differentiate this fraction from the rest of the element, and then study the exchange of atoms of identical chemical properties. It is especially this use of 'indicated atoms' which opens the door to otherwise insoluble problems. Since the discovery of artificial radio-elements, almost every chemical element can be obtained in the form of its radioactive isotope, and the use of radio-elements as indicators has been greatly extended.

AMONG the problems to the solution of which radio-elements have contributed are the determination of the solubility of very slightly soluble compounds, the preparation of the volatile hydride of bismuth, the study of the permeability to air of almost completely airtight gas-mask fabrics, of the formation of alloys at low temperatures, the rate of solution of exceedingly thin films, and electro-deposition from extremely dilute solutions. With the help of 'indicated atoms' the diffusion of lead into lead, the determination of the surface of adsorbing crystalline powders, the exchange of atoms of one and the same kind in