

## PROCEEDINGS OF THE PAN- AFRICAN CONGRESS ON PRE- HISTORY

A GENERAL account of the Pan-African Congress on Prehistory was published in *Nature* of February 15, p. 216. The following records the proceedings of the business meetings and supplements the former article.

Sixty-three papers were communicated to the Congress, and, in addition, four symposia were held, dealing respectively with "Pleistocene Marine Terraces", "Fossil Man in Africa", "The Hand Axe Culture in Africa" and "Fossil Apes in Africa".

Three sub-committees were set up to deal with problems relating to: (1) geology and general palaeontology, under the chairmanship of Dr. S. H. Haughton; (2) human palaeontology, under the chairmanship of Dr. A. Galloway; (3) prehistoric archaeology, under the chairmanship of Mr. A. J. H. Goodwin.

A number of important resolutions, arising out of the deliberations of these committees, were placed before the Congress in its final session and duly passed. The most important of these dealt with the question of terminology in the African Continent, and, among other things, it was decided that in future:

(i) The Hand Axe Culture in Africa should be referred to as 'Chelles-Acheul' with suitable regional prefixes, instead of using such terms as 'Chellean', 'Acheulean', 'Stellenbosch', etc.

(ii) That the term 'Tumbian' should be abandoned, as well as 'Kalinian' and 'Djokocian', and that in substitution thereof the term 'Sangoan', with suitable definitive adjectives, be used for the earlier stages of the culture formerly described by the above terms, and the term 'Lupemban' for its later stages.

(iii) That the use of the term 'Aurignacian' for the 'blade and burin' culture in Africa be abandoned in favour of the term 'Capsian' with suitable regional prefixes.

(iv) That the use of the terms 'Clacton' or 'Clactonian' and 'Levallois' or 'Levalloisian' to describe techniques of working stone be abandoned, and that these terms be confined only to describing cultures and that the techniques should, in future, be described as 'block-on-block' technique and 'faceted platform technique' respectively, with suitable definitive terms where necessary.

(v) That the terms 'Kageran', 'Kamasian', 'Gamblian', 'Makalian' and 'Nakuran' should be used throughout Africa to describe defined stratigraphical units, and based upon the established succession of faunas and deposits in East Africa.

Two permanent committees were set up to deal with the question of terminology in the fields of prehistory and quaternary geology respectively. It was decided that, in order to obviate the introduction of unsuitable terms into the literature of African prehistory, all workers should be invited to submit any suggested new names to the members of these committees for prior comment and advice. In this way it is hoped to avoid the creation of different terms for identical cultures in different parts of the Continent.

In its final plenary session, the Congress passed a number of resolutions addressed to Governments of countries in Africa, as well as to Governments of countries interested in research work of Africa, stressing the urgent need for further research work

in the field of prehistory and quaternary geology, as well as human palaeontology.

The Congress decided that, in view of the very important results achieved at this first Pan-African Congress on Prehistory, it was essential that the organisation should be set up on a permanent foundation. Rules and constitution were consequently drawn up and approved, and it was decided that a similar congress should be held at approximately four-yearly intervals.

While the Congress was in session, an official invitation was received from Field-Marshal Smuts for the Congress to hold its next meeting in the Union of South Africa in 1951, and this invitation was accepted.

The *Proceedings* of the Congress are now being prepared for publication, and many of the original papers that were communicated will appear in full. Advance orders for copies should be sent to the General Secretary, Pan-African Congress on Prehistory, P.O. Box 658, Nairobi, Kenya Colony.

## RADIO-COMMUNICATION DURING THE WAR

AS already announced in *Nature*, the Radio Section of the Institution of Electrical Engineers held a Convention during March 25–April 2, at which about a hundred papers were presented describing the progress made in recent years in the subjects of radio-communication, broadcasting and certain types of navigational aids. The proceedings of this Convention, when published in the *Journal* of the Institution, will form a most useful record of wartime progress in radio research and development, complementary to that of the Radiolocation Convention held in 1946.

In his opening lecture on "Telecommunications in War", Sir Stanley Angwin gave some account of the remarkable achievements in this field in recent years, the success of which was undoubtedly due to very effective co-operation between the Government research establishments, the electrical and radio industry, and the Fighting Services.

The first three technical sessions were devoted to papers dealing with radio-communication over long distances and with the special problems encountered in the use of radio technique for military, naval and aeronautical communications. Owing to the limited range of radio frequencies which can be used for long-distance transmission, the band of frequencies allotted to each circuit must be used in the most efficient and economical manner possible. With this objective in view, considerable advances have been made in stabilizing the frequencies of radio-transmitters, in the use of single, in place of double, side-band modulation, and in the combined use of several adjacent narrow frequency channels keyed at a reasonably low speed for the purpose of sending messages between two points at very high speeds. In most forms of modern communication, whether for civil or military purposes, the radio-transmission path is merely a link connecting the land-line telegraph and telephone networks in the countries surrounding the terminal points. Recent developments have therefore taken account of the need for the systems of modulation adopted to be equally suitable for operating both the radio and land-line equipments.

In the application of communication to the modern very mobile army and to ships and aircraft, a number of severe limitations of space, size and weight are encountered; and the manner in which the corresponding electrical and mechanical problems have been solved were described in a series of papers dealing with this field. One of the outstanding achievements of the War was the development and use by the army of the No. 10 set, which, with a carrier wave-length of about 6 cm. and the use of pulse modulation technique, provides multiplex radio telephone facilities in an equipment of a highly mobile form. At the above wave-length the use of a large parabolic reflector gives a concentrated beam of radiation with a consequent high degree of privacy in communication. Although the effective range of each such set is in practice limited virtually to optical distances, the efficiency is such that many sets can be used in series; and it was in this way that Field-Marshal Montgomery was enabled to maintain direct telephonic communication with London during his advance through Germany.

While, as several papers described, the use of very high frequencies, corresponding to wave-lengths of a few metres and less, now plays an important part in communication, particularly for air-to-ground and other relatively short-distance operation, the bulk of long-distance communication is necessarily confined to those frequencies which are efficiently transmitted by reflexion from one or other regions of the ionosphere. In opening the session on "Propagation", Sir Edward Appleton described the British work on the exploration of the ionosphere during the past twenty years or more, and the manner in which such long-term measurements are applied to the prediction of average ionospheric conditions some months ahead. In a following paper, Messrs. K. W. Tremellen and J. W. Cox described the work of the Inter-Services Ionospheric Bureau, which was set up during the War to provide detailed forecasts of communication conditions as required from day to day for various parts of the world. The techniques thus evolved are being improved and applied to peace-time communication problems, the basic scientific work being carried out at the National Physical Laboratory under the auspices of the Radio Research Board of the Department of Scientific and Industrial Research.

At a later session, Mr. H. Bishop presented a paper in which he described the large and important part played by the Engineering Division of the British Broadcasting Corporation during the War. Very elaborate precautionary measures were initiated before the War, to ensure that the broadcasting stations in Great Britain did not provide navigational assistance to enemy aircraft, and these proved to be very successful in practice. In addition, the expansion and maintenance of adequate propaganda and information services to Europe and other parts of the world necessitated the provision of new transmitting stations of various types. As a result, Great Britain now has at Ottringham, near Hull, the highest-power medium-wave broadcasting station in the world, with an output power to the aerial of 800 kW. In addition, the world's largest short-wave broadcasting station has been erected at Skelton, in Cumberland, where twelve 100 kW. transmitters and a system of fifty-one aerials have been installed.

Other papers dealt with recent advances in radio direction-finding and certain types of navigational aids for ships and aircraft; and the Convention was

brought to a close by a lecture by Sir Clifford Paterson, in which he reviewed the work of all the sessions and indicated the direction in which future progress in this subject is likely to be made. Much of the war-time experience will bear fruit in peace-time applications, particularly in connexion with civil aviation, trunk telephony, broadcasting, television and the industrial uses of radio frequency and electronics techniques.

## FLUORIMETRIC ANALYSIS

A DISCUSSION was held in the rooms of the Chemical Society, Burlington House, on February 11, by the Physical Methods Group of the Society of Public Analysts, on "Fluorimetric Analysis".

The first paper was presented by Mr. E. J. Bowen as a basis for discussion of apparatus design. It was argued that although on occasion visual methods might be valuable in revealing unsuspected or unwanted changes in the colour of the fluorescence, photocell instruments have the advantage of simplicity of operation and high accuracy. The best design would seem to be a central lamp sending in opposite directions two horizontal light beams which are made parallel by lenses, monochromatic by filters, and controlled in area by diaphragms. The beams each traverse a rectangular transparent cell of solution, one a standard and the other the one to be measured. The fluorescent light emerging at right-angles to the beams is received (through filters) by two photocells connected in opposition. The measurements may be made either by the direct differential output of the photocells, or by balancing this to zero electrically or by a calibrated variable diaphragm in one of the light beams. The advantages of vacuum type photocells with valve amplification over barrier layer cells for this purpose were stressed, and it was pointed out that the still greater sensitivities obtainable with photo-electron multiplier tubes make them very suitable for fluorimeters to measure feeble fluorescence, and open up some interesting new possibilities.

A second contribution by Mr. Bowen dealt with the theoretical aspects of the 'quenching' of fluorescence in solution. It was suggested that this term should be confined to the phenomenon of the non time-dependent weakening of the fluorescence of a substance below a 'fluorescence efficiency' of unity. This would rule out effects caused by instrumental errors or by residual unwanted fluorescence in the solvent, cells, or filters. The use of the term 'fluorescence fatigue' to describe examples of reversible photochemical action was criticized. A systematic classification of quenching processes into three main types was presented: intramolecular energy rearrangements, intermolecular effects, and inner filter action. Experimental methods of distinguishing these types, and of the two kinds of intermolecular effects, 'collisional' and 'compound' quenching, were described. The paper concluded with a brief account of the types of photochemical change often associated with fluorescent solutions.

Dr. E. Kodicek described precise methods he has worked out for the fluorimetric analysis of such substances as riboflavine, vitamin A, etc., as a means of investigating nutritional problems.

Dr. D. M. Simpson (Cambridge) gave a short account of the applications of fluorimetric analysis to the study of pterins. She emphasized the need for