GEOLOGY AND MINERAL RESOURCES OF AFRICA

At the eighteenth session of the International Geological Congress held in London during August last, the Association of African Geological Surveys held a series of four meetings at which recent advances in the geology of Africa were announced, and discussions of special interest took place. The meetings were of truly international character, and the great interest they aroused is clear from the large attendances and the very considerable number of papers that were presented. Indeed, in many cases only the briefest time could be given to the reading of the papers, but the discussions on the important problems dealt with were of special value. The meetings bore striking testimony to the results already obtained by international co-operation in the whole field of African geology, and in addition indicated the means by which this co-operation could be fruitfully extended.

An important part of the activities of the Association was the presentation of new sheets of the International Geological Map of Africa, together with the co-ordinated description of natural regions; there were also discussions on general and special problems of African geology, and personal contributions on territorial problems.

A full account of the proceedings of the Association has been given by M. F. Blondel, secretary of the Association and director of the Bureau d'Études géologiques et minières coloniales, Paris, in *Chronique des Mines Coloniales* (Numéro Spécial, No. 147, Sept. 15, 1948), a journal well known to African geologists, and it will appear also in due course in the *Comptes rendus* of the International Geological Congress.

Recent advances in the geology and mineral resources of the British African Colonies were summarized in a paper by the directorate of Colonial Geological Surveys, which was based on descriptions by the directors of the British African Geological Surveys, most of which were given in the form of lectures at the Imperial Institute during the preceding year. These lectures and associated papers are shortly to be issued by the Imperial Institute in one volume, which will provide a most useful summary of the present position regarding the geology and mineral resources of these important Colonies.

This was the second session of the Association, the first having been held at the previous session of the International Congress in Moscow in 1937. The formation of the Association arose largely from the need for discussing various problems connected with the preparation of the International Geological Map of Africa; it was found, too, that there were many other problems of an international character that could usefully be discussed at periodical meetings, and the Association was accordingly formed to meet at the same time as the International Geological Congress. The next meeting of the Congress at Algiers in 1952 will be of special interest to all interested in African geology.

At the first meeting of the present session of the Association, Sir Edward Bailey was elected honorary president, Dr. F. Dixey president, and M. Blondel was re-elected secretary; Dr. Dixey then took the chair. All the African Geological Surveys were represented, and during the meetings fifty papers were presented with a view to inclusion in the *Comptes rendus* of the International Geological Congress, and there were also 109 contributions to the discussions.

M. Blondel reported on the work of the Commission of the International Geological Map of Africa. The Commission, which was formed at the International Geological Congress in Brussels in 1922, had as its object the preparation of a geological map of Africa on the scale of 1/5,000,000; M. A. Lacroix was elected president, and M. de Margerie secretary-general. For various reasons progress was at first slow, and in 1934 the task of preparation was taken over by the Bureau d'Études géologiques et minières coloniales, Paris, of which the director, M. Blondel, became the deputy secretary-general of the Commission. Owing to the magnitude of the task it was soon apparent that it would have to be carried out by an international body, and the Association of African Geological Surveys was formed very largely with the object of assisting the work of the Commission. It is none the less important not to overlook the fact that the immense task of compilation, drafting and publication has been performed at the Bureau d'Études géologiques et minières coloniales by M. Blondel and his staff; and the progress made with the map since 1937, in spite of the devastation of the intervening war years, reflects the highest possible credit on these collaborators, to whom all interested in the geology of Africa owe a great debt of gratitude.

In presenting the report of the Commission to the Association, M. Blondel referred to the death of M. A. Lacroix, who had been president of the Commission since its inception. M. de Margerie, who had greatly facilitated the work in its earlier stages, was elected president in his place, Sir Edward Bailey and Prof. Fourmarier were elected vice-presidents, and M. Blondel secretary-general; and it was agreed that the Commission should comprise the heads of the various African Geological Surveys, and certain eminent geologists with special knowledge of Africa.

M. Blondel showed that, of the nine sheets into which the map was divided, the first (No. 1, North-West) was published in May 1936, and presented to the Congress in Moscow; but owing to the loss of the stock of prints during the War, a reprint was made in 1946. Sheet No. 2 (Centre, North) was published in 1948, and No. 3 (North-East) in 1947; No. 4 (West) was presented in proof to the Congress in London; No. 5 (Centre) and No. 9 (South-East) were presented in manuscript form for discussion; and No. 7 (South-West) is reserved for the legend. There remain only No. 8 (South Africa) and No. 6 (East Africa), which are in active preparation, and there is good prospect that the work of the Commission will be wholly completed by the next Congress.

This great work has been financed very largely by France and the French African territories, and by Belgium and the Belgian Congo; Uganda, Southern Rhodesia and Egypt have also assisted. Considerable additional funds are urgently required for the completion of the work. Too large a share has clearly fallen on some countries and too little on others, and it is of the greatest importance that the British Colonies, among others, who stand to benefit so largely by this work, should in the future take a far

greater share in the financial burden than they have in the past.

Following the submission of M. Blondel's report, Dr. N. R. Junner proposed that a tectonic and mineralogical map of Africa should be prepared, and M. Blondel, on being asked, generously undertook this additional task, which should fulfil a want long felt by many African geologists.

Prior to the meeting, the Association had invited the various geological services in Africa to prepare descriptions of the regions for which they were responsible, and in almost all cases this invitation was accepted. During the meeting brief summaries of these contributions were given, covering the following extensive territories: French Morocco, Sahara, Libya, Egypt, French West Africa, Portuguese Guinea, the British Colonies, French Equatorial Africa, Western Belgian Congo, the Katanga, Angola, Northern and Southern Rhodesia, the Union of South Africa and South-West Africa, Madagascar. These papers present an excellent review of African geology in 1948, and it is hoped that they will all appear in due course in the *Comptes rendus* of the Congress.

A geological bibliography of Central Africa, with additions to 1944, recently published by Belgium and the Belgian Congo, was presented to the Association.

The Association had proposed for discussion a number of general subjects, most of which concerned the correlation of the older formations for the purposes of the International Map. A discussion on the Pre-Cambrian formations was opened by Prof. A. Holmes, who, on the basis of recent researches on the age determination of rocks by radioactive methods, and of the disposition of the different orogenic zones, suggested a number of correlations, which in some cases were at variance with those generally accepted. These views stimulated a most interesting discussion, in which many members of the Association took part.

There followed a discussion on the correlation of the Karagwe-Ankolean, Kavirondian, and Nyanzian formations of East and Central Africa, which again elicited much interesting information from many speakers. It was finally agreed that on the International Map these three formations should be shown by the same colour, but with different symbols. The correlation of the Akwapimian, Birrimian and Buem formations was vigorously discussed by West African geologists, and it was finally agreed that the legend should show the upward succession long adopted by the Gold Coast Geological Survey, namely, Birrimian, Tarkwaian, Akwapimian, but with a note that certain French geologists would place the Akwapimian much lower. The Buem was to be shown as Upper Pre-Cambrian, but with the reservation that it might be Cambrian.

Following a discussion on the age and correlation of the Upper Kundulungu and the Waterberg-Matsap, it was agreed that, on the map, these formations should be represented by one colour, and that in the legend the age should be left open, with the observation that the ages suggested by various geologists ranged from pre-Silurian to Devonian and even Carboniferous.

The value of African tillites for correlation purposes was discussed, as was also the importance of *Stromatolites* and comparable organisms in determining the age and relations of the older formations. It was at length agreed that owing to the lack of knowledge of the structure of these algal forms, they should be the subject of study by specialists; and on the motion of M. A. Jamotte, it was resolved that the International Palæontological Union should be invited to undertake a special study of them.

An extra meeting was devoted wholly to the problem of rift valleys, and following papers by Prof. R. M. Shackleton, Dr. R. B. McConnell and Mr. A. M. Quennell, a valuable and interesting discussion took place, in which many members participated.

A long discussion was devoted to the terminology of the African Pleistocene, and it was finally agreed to recommend the adoption of the resolution on this question by the African Pre-History Conference held at Nairobi in January 1947. A resolution was also passed recommending the formation of a sub-commission to study the distribution and correlation of the Kalahari Sands.

The question of the distribution, ages and origin of the African carbonatites also gave rise to a useful discussion.

Finally, during the last meeting of the Association, thirty-three personal contributions on the geology of the various territories of Northern, Central, Eastern and Southern Africa were noted, and certain of them briefly discussed.

It may be of interest to add that at a Specialist Geological Conference arranged in September by the British Commonwealth Scientific Organisation, in consequence of the presence in London of the delegates to the International Geological Congress, a discussion took place on the question of the formation of regional bureaux for the study of long-term fundamental research on African geological problems on a regional as distinct from a territorial basis.

This session of the Association of African Geological Surveys not only enabled many old personal contacts among African geologists to be renewed, but also led to many new ones; and the papers and discussions were of great interest and value not only because of the new observations revealed by them, but also on account of the stimulus they gave to international co-operation in the realms of geology and to a regional approach to many fundamental problems.

The Association recorded its appreciation of the invaluable services of its secretary, M. Blondel, not only in the successful organisation of the session, but also in co-ordinating the activities of the Association during the interval between the sessions of the Congress.

POWER SUPPLY AND THE ELECTRICAL ENGINEER

THE title "Means and Ends" given to the presidential address of Mr. T. J. N. Haldane to the Institution of Electrical Engineers on October 7 expressed at once the twofold character and the unity of his subject. An eloquent reaffirmation of the faith of the engineer in the ultimate value of his calling was made by Mr. Haldane in the second part of an address which in the factual sphere concerned itself with the position of electricity power supply in Great Britain and Western Europe.

Pointing out that as early as the beginning of the seventeenth century Francis Bacon had indicated that man's mental and material progress are inseparably linked with one another, Mr. Haldane said, "At present it is all too painfully obvious that for most of the world we are very far from having