ARID ZONE RESEARCH

IN 1950, the United Nations Educational, Scientific and Cultural Organization established an Interim International Arid Zone Research Council to survey the scientific problems presented by the arid regions of the world, and to consider what help might be given towards their solution. This Council met in Paris during November 1950 and put forward a programme of activities in this field. It also recommended that Unesco should set up a standing Advisory Committee on Arid Zone Research to guide the more detailed carrying out of the programme, the main outlines of which the Council had laid down. The Committee, originally of seven members and now to be enlarged to nine, was appointed and held its first meeting in Algiers in April and its second in Paris in September 1951. Its meetings are also attended by representatives of the United Nations Organization and its relevant specialized agencies, such as the Food and Agriculture Organization, and by observers from a number of international scientific bodies.

The programme covers: (1) the collection, discussion and dissemination of information already existing; and (2) assistance in specific research projects and the encouragement of co-operation between research centres. It seemed reasonable at the present stage that priority should be given to the first of these activities, since better decisions as to research projects can be made when the field of existing knowledge has been adequately reviewed.

The two principal means by which it is proposed to collect and discuss existing knowledge are reports and symposia. Each year a research field will be chosen and reports from authorities in that field will be obtained and published. In the following year a symposium on the same subject will be organized. It is proposed that each symposium should be held in a country having an arid zone and be accompanied by an excursion.

The first field chosen has been the "Hydrology of the Arid Zone with especial reference to Underground Water". Eight authors have written reports each dealing with the hydrological problems of one of the main arid areas. A symposium on this same subject has been arranged jointly by Unesco and the Turkish Government, and will take place during April 25–29, 1952, at Ankara and be followed by an excursion. The second field chosen is that of the "Plant Ecology of Arid Areas". In 1952 reports will be obtained dealing with the plant ecology of the main arid areas, and these will be followed by a symposium which it is proposed, if possible, to arrange in one of the Latin American countries. The choice of plant ecology as second subject coincides with the decision of the Institute of Biology to hold a conference in London, on the biology of hot and cold deserts, during September 1952. In 1953 the Committee proposes to survey the field of wind, solar and other energy and the possible development of their utilization in arid areas. A symposium on this subject is planned for 1954. The next subject proposed for review is that of human and animal ecology.

Other reports, not falling directly within the above scheme, will be published as occasion arises. Thus a series of 'homoclimatic' maps, setting out the principal meteorological features of the desert regions, have been prepared by Dr. Peveril Meigs. It is intended to publish these after they have been submitted for comment to the World Meteorological Organization and to the International Union of Geodesy and Geophysics. On the biological side a report on the flora of the Djebel Druze has been submitted for publication by the Rev. Paul Monterde, of Beirut, Lebanon.

Another activity on the information side is the preparation of a directory of research centres concerned with arid zone problems. This will include information as to facilities available at each centre, as well as the main fields of research in progress. Data needed for the preparation of this directory are being obtained by means of a questionnaire.

The Committee seeks also to help in the development of research centres and of their activities. It was a recommendation passed to it by the Interim Council "that suitable existing research centres dealing with the differing problems of the Arid Zone should be encouraged, by all appropriate means, to accept visiting scientists and fellowship holders from other countries, to exchange personnel and information among themselves, and to direct their activities towards a coordinated programme of arid zone research". Research centres within the arid zone differ so much in the state of their development and in the facilities available that the Committee has had to examine with great care the suitability of the various centres suggested to it for inclusion in the above scheme. It has at present selected two stations in Algeria as having suitable facilities for visiting scientific investigators and which may form a nucleus from which this scheme may be extended. One of these is the Saharan Research Centre at Beni-Abbes Oasis on the Oued Saoura, in the southern Algerian Territories, and situated about 140 miles south of Colomb Béchar. This station was set up in 1942 by the Centre National de la Recherche Scientifique (CNRS), 1 rue Victor Hugo, Paris 5e. It is staffed by members of the Centre and also accommodates temporary workers. Facilities include laboratories for zoology, botany, geophysics and geology, botanical and other collections, a specialized library and garden plots. There are living quarters and a hotel. The second centre is the Beni Ouif Saharan Biology Station, situated in the Sud Ouranais midway between Colomb Béchar and Ain Sefra. It is at the foot of the Sahara Atlas, where a rich fauna and flora of Saharan, Moroccan and North Algerian species are found together. The station was founded in 1931 by Prof. C. Killian, of the University of Algiers, who is its director. Facilities include laboratory accommodation, collections and a library. There are living quarters and a hotel near by. It was also recommended that Unesco should assist the Fouad I Desert Institute, Heliopolis, Egypt, in preparing a research programme and in augmenting its equipment. The Committee is anxious to receive information of other research laboratories in the arid zone where facilities exist for the reception of visiting scientific workers and at which assistance might be given in co-ordinated research projects.

In the encouragement of actual research projects the Committee's immediate interest has been in problems of hydrology, since this field has been given priority during 1951. It has advised Unesco to give support to two specific investigations. The first is a study by the Research Centre at Beni-Abbes of underwater flow in the Wadi Saoura, in which this centre is situated and which provides exceptional advantages for studying this problem. The second is a study, assisted by models, of the mechanics of underground water flow in calcareous mountains, to

be undertaken by Prof. L. Picard, of the Geological Institute, Jerusalem. The Committee invites suggestions about other research projects which might suitably receive Unesco support. In evaluating suggested projects, the Committee, in addition to a consideration of their general merits, is also guided by the following criteria :

(1) The project should be of importance to several Unesco member States having arid and semi-arid areas ; (2) it should come within the scope of the Unesco Arid Zone Programme at the time the project is proposed ; (3) it should be of a type that can reasonably be expected to achieve definite results within a specified period ; (4) if already under way, it would be completed or its value would be increased through financial aid from Unesco ; (5) the results of the research project will be freely available to the public ; (6) financial assistance will not be granted to defray the salaries of the permanent staff or the purchase of permanent equipment, buildings or land.

In order to help the work of the Committee, Unesco has appointed, or will appoint, in the various member States, honorary consultants who are authorities in the principal fields of arid zone research, at present including hydrology and hydro-geology, climatology, biology and sources of energy supply. These consultants, having specialized and local knowledge, will be able to assist the Committee in collecting technical information and in giving well-informed advice.

METAL ECONOMICS

IN organizing a whole-day discussion on "Metal Economics" in London on October 17, the Institute of Metals turned to a subject outside the range of its regular meetings and papers, which hitherto have almost always dealt with some aspect of the science and technology of non-ferrous metals. The innovation was justified by the obvious importance of the current crisis in metallic supplies to all concerned with technical and commercial developments in metallurgical industry. The large attendance at the morning and afternoon sessions and the close attention with which the addresses and discussion were followed demonstrated the interest of members of the Institute and visitors.

Earlier in the year the presidential address to the Institute* had been largely devoted to a plea that it should devote attention to the resources of metals on which the non-ferrous metallurgical industry is based and to the most efficient utilization of those resources. The three elements tending to produce a long-term shortage of metals are : the rate of increase in the population of the world, adding annually one per cent to its numbers ; the exhaustible, non-renewable characteristic of mineral resources ; and the world-wide demand for higher standards of living. It is necessary to consider what can be done to improve supplies of primary metals, how to make better use of the metals already in service and what substitutes can be used in place of the metals which have become difficult in supply.

The morning session of the meeting was devoted to "Primary Resources of Ferrous and Non-Ferrous Metals". The first paper, on "The World Supply of Non-Ferrous Metals", by R. Lewis Stubbs, secretary of the British Non-Ferrous Smelters' Association, presented the view of the primary producer. According to this, in the long-term prospect supplies of non-ferrous metals as a group will be forthcoming in quantities adequate to meet anticipated demand, although it is possible that aluminium and magnesium will constitute a larger proportion of the total consumption of non-ferrous metals than at present. The paper was strongly documented, and one interesting table is reproduced in this article (Table 1), showing the relation of stockpiling by the United States during the period 1948–50 to other normal consumption and production. The item "Total U.S. special account purchases for 3 years" is considered to represent the additions to the stockpile.

Table 1. World Production and Consumption (thousands of tons) of Copper, Zinc, Lead, Aluminium and Tin during the Three-Year Period, 1948–50

	Total production	Total consumption	Excess or deficit	Total U.S. special account purchases for 3 years	Total excess or deficit
Copper	7065	6940	+ 125	384	− 295
Zinc	5063	4868	+ 97	273	− 78
Lead	4549	4072	+ 564	354	+ 123
Aluminium	3529	3447	+ 82	31	+ 51
Tin	506	406	+ 100	107	− 7

Table 1 shows that, during 1948–50, of the world's total production 5 per cent of the copper and zinc, 8 per cent of the lead and 21 per cent of the tin were stockpiled. It is also seen that, but for stockpiling, production would have exceeded consumption in all the major non-ferrous metals. It is believed that, when the abnormal circumstances of stockpiling and re-armament have ceased, the historic processes of price mechanism will stimulate the discovery and exploitation of new ore resources and the rapid growth of declared reserves. Moreover, it is anticipated that this development will continue at a rate corresponding to the changes in demand. Referring to immediate shortages, Mr. Stubbs considers that the deficit is only a few per cent and that the rate at which new mines are being opened up affords hope that the shortage will not last much longer. An admitted difficulty here is to judge to what level the demand would rise if supplies were not restricted.

The United States and Great Britain and other countries are trying, by the agency of the International Materials Conference, to ensure a fair distribution of raw materials throughout the world. If this scheme were to break down and competitive purchasing were to be resumed, Mr. Stubbs considered that Britain would be rather badly placed because the biggest increases in metal production are in dollar areas. He suggested that, to deal with the threatened change, action should be taken along three lines : by placing long-term contracts ; by encouraging production in non-dollar areas, especially in the British Commonwealth ; and by fostering mining ventures with headquarters in London.

Prof. S. Zuckerman, chairman of the Natural Resources (Technical) Committee, in his paper "Metals as Natural Resources", did not share the optimism of Mr. Stubbs, observing that the disparity between supply and demand is due not to an unexpected rate of increase in demand but rather to a surprisingly slow increase in the production of primary metals. Measures to remedy this situation should include, as well as attention to intensified exploration, including domestic ores and improved efficiency of extraction and recovery, the encouragement of investment in the raw materials industry in order to

* Murphy, A. J., *J. Inst. Metals*, **79**, Pt. 3, 122 (1951).