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PROGRESS REPORT OF THE MINERAL RESOURCES UNIT

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(Prepared by the secretariat)

The following progress has been made with the various ad hoc projects of high priority:

- (a) The documentation concerning the member States is growing daily. Many countries are now adequately covered by the latest publications and maps; especially those which have been visited by the regional adviser. The others depend on correspondence which unfortunately does not always receive the necessary attention. The authorities of some countries are helpful in replying promptly and maintaining close contact; from others there is no response. It is hoped that in due course the service departments of all the ECA member States will realize that close co-operation with ECA's natural resources team is to their benefit.

By now, adequate documentation is available concerning all the African countries north of the equator. As regards the southern half of Africa, the records on mineral resources in the Congo, Republic of South Africa, Angola and Mozambique, are still incomplete.

A comprehensive geological bibliography of the African territories has just been completed. The document covers the period up to June 1963 and contains some 4,000 entries. The secretariat will gladly forward copies to interested parties.

- (b) The last Standing Committee recommended the issue of a newsletter on mineral resource activities in Africa. A similar recommendation had been made concerning water resources. Because of the very limited staff of the Natural Resources Section and the lack of any financial provision for this project, it was decided to combine

efforts in the publication of one newsletter covering minerals, water resources and cartography. The first issue has been published in advance of the Standing Committee's meeting, so that delegates can make comments and suggestions on this subject.

If it is agreed that the Newsletter be published in its present form at regular intervals, e.g., every three months, then the relevant financial provisions will have to be made. The Newsletter will rely to a large extent on contributions from all over Africa. It is hoped that the responsible authorities in every country will hasten to communicate to Africa Hall any new development of general interest. It is not intended that the Newsletter should take the place of existing technical or scientific publications. These contain many original contributions, the reproduction of which would infringe the copyright. On the other hand, the secretariat staff resources are too limited to envisage original technical and scientific papers. Under these circumstances, it is felt that the recommended issue of a journal of scientific and technical papers is not practical for the time being.

(c) The possible establishment of a centre for rock-age determination by radio-active methods has been thoroughly investigated. There are at present, about a dozen of such institutions in Europe equipped to do this work. They range from the atomic energy establishment at Harwell in England to institutes in Moscow and Leningrad. Some of these are contributing extensive work on African rocks and minerals, particularly Oxford University, Clermont-Ferrand and Tervuren in Belgium.

Isotope work is a fashionable concept in this era of atomic energy. Rock-age determination by radio-activity is a new and sophisticated science requiring the highest skills and a substantial knowledge of the background geology of the area from which the sample was taken. At present, roughly 150-200 rock-age determinations are

produced yearly for Africa. The potentialities of the existing arrangements have not yet been fully tested, and there is little reason for adding to the present facilities. The most suitable institutions for meeting additional demands for African work are Oxford, Brussels and Pisa, comparable to the best laboratories in the USA. Their facilities could handle up to double the present number of investigations, should the need arise. It is worth mentioning that the cost of one rock-age determination is of the order of US\$ 500.

- (d) It is proposed to engage mineral economists or industrial engineers as consultants when the need arises. At present most marketing or utilization problems can be solved with the assistance of experts from the Trade and Surveys Division. The use and application of industrial minerals is dealt with in co-operation with the Housing and Industry Sections.
- (e) The creation of a pool of geologists and other specialist staff, with appropriate equipment, has been given careful consideration. The secretariat has reluctantly come to the conclusion that such a step is beyond its present means and functions. It would mean engaging in active field work, e.g., geological surveys, mineral prospecting, etc. Such activities are undertaken as technical assistance by those UN agencies which have funds allocated for that purpose. ECA's role in this field is limited to advising the respective governments on how best to develop and exploit their mineral potential. The actual work has to be carried out by national or other organizations.
- (f) The establishment of a training institute for the petroleum and natural gas industry has been the subject of a careful study and survey. According to the latest figures, the estimated reserves of crude petroleum in Africa amount to 1,760 million tons; North Africa accounts for 1,670 million, the remainder being in

western and southern Africa. As regards natural gas, North Africa produced over 1,600 million cu. m. of the total African production in 1962 of about 1,650 million cu. m. From a purely technical standpoint, a petroleum and gas institute serving all Africa would have to be located in the north near an operating field. This would provide the students and staff with the best facilities for experience and research.

The National Petroleum Institute of Argentina was established in 1962 and can serve as an example: it was modelled on the French Petroleum Institute to provide for an intake of fifty engineering students a year and for about twenty-two members of senior staff. Provision is also made for the training of 200 technical students as drillers, surveyors, refining foremen, etc. The capital investment for this institute was \$6.5 million, and the annual operating cost is estimated at \$1-1.5 million.

UNESCO would, on request, make enquiries into the need for and the practicability of a regional institute for Africa. The Special Fund would probably send out a mission to make more detailed enquiries if the preliminary information was satisfactory and then assist financially in setting up an institute.

As an alternative to establishing a new institute of oil technology, consideration might also be given to the expansion of existing facilities to serve regional needs. The Petroleum Institute of Suez in the UAR was started in 1961 for training of skilled technicians. It provides a four-year course for students of matriculation level. The instruction is mainly in Arabic but English speaking teachers could be added and the facilities enlarged to provide training for other African nationals. The University of Cairo has an English speaking course for petroleum engineers.

Immediate training needs might be solved by using the existing institutions in Europe. The Oil Technology Department of London University's Imperial College offers a degree course of three years. The present staff of one professor and seven lecturers can teach a total of thirty to thirty-six students, although during the current year there were only twenty-five. The students come from all oil-producing countries and in any one class of twelve students, eight would probably come from overseas. Entrants must have at least three A-level passes in pure and applied mathematics, physics and chemistry. The majority of overseas candidates need to spend one to two years at a technical college to bring them up to the required university entrance standard.

The French Petroleum Institute (Institut Français du Pétrole) gives a one-year diploma course in oil technology for engineers who already hold B.Sc. or M.Sc. degrees. There are also training and refresher courses for professional engineers in the industry. Candidates are selected after interview, taking into account their educational level and experience. They may be permitted to study for the diploma or to follow a training course. The senior teaching staff comprises ten professors and twenty assistant professors, and in the 1962-1963 session there were 268 students. About a quarter of these came from developing countries, including thirty from French-speaking countries in Africa; some of these are following the preparatory course.

It would seem that Africa's present requirements for specialized training in oil technology could easily be met by the Paris, London and Egyptian institutes apart from those available in Italy and other countries.

Continuing activities of high priority

- (a) The maintenance of the mineral inventory is a continuing project. Not only are new discoveries reported frequently but known deposits have also to be re-evaluated in the light of new technologies and uses. One of the principal activities of the Mineral Resources Unit

has been to build up an inventory of African mineral resources. The secretariat contributed to the Prague Symposium on Iron and Steel with a detailed report on the raw materials available in Africa for iron and steel manufacture. With the co-operation of the authorities in many member States, it was possible to present an up-to-date account of all the known iron ore, coal and manganese occurrences in the African continent, together with the latest production figures and capacities.

Mineral inventories were prepared for the twenty-seven countries visited or to be visited by the industrialization missions to North, Central East and West Africa. Possible industrialization projects based on known resources were included in the reports.

- (b) The effectiveness of the Mineral Resources Unit is based upon close working relations with local mining and geology departments and major regional organizations. These are best achieved by personal contacts some of which have already been established during the current year. Since the Unit's personnel is at present restricted, field missions and travel have to be planned according to priorities. The movements are dependent on requests from member States for consultations for a specific purpose. Under the present circumstances, it is not possible to visit all the member States for the sole purpose of establishing contacts and gaining personal knowledge of their problems and projects. It is often possible to solve problems by correspondence as was proved recently by the elaboration of a Special Fund mineral survey project in one of the member countries.
- (c) The Mineral Resources Unit is actively engaged in formulating technical assistance and Special Fund projects. Close contact is being maintained with the twelve UNTAB experts at present working in seven different countries in fields ranging from mining legislation to alluvial gold prospecting. In recent months, assistance and advice have been given to various governments on how to obtain the services

of experts for special projects. At the same time the secretariat is always willing to propose Special Fund assistance for the national or sub-regional development of natural resources. Approximately twelve Special Fund projects for Africa are now in the operational or the preparatory stage. They range from the \$3 million iron ore transportation study in Gabon to a \$500,000 aerial survey which has just been completed in Uganda. A pending project is the National Mining School of Bukavu in the Congo for which \$4 million are required. Most of the delays usually experienced with Special Fund projects can be avoided by close collaboration between the relevant national authority, the local UN resident representative and ECA's Mineral Resources Unit. A good example is a mineral survey project in one of the member States: this was initiated by a letter from the secretariat in April this year and concluded by the presentation of an official request to the Special Fund headquarters, New York, in the last days of August. If approved at the next January meeting of the Special Fund authorities, the project might be in operation twelve months after it had first been envisaged.

- (d) Natural resource development is not restricted to UN technical assistance. It is often possible that there is a community of interest between national authorities and foreign private or governmental organizations. In a recent case the Mineral Resources Unit has been instrumental in arranging for a contact between a government authority and a private commercial company. Negotiations are now taking place for a partnership between the two, so as to develop a substantial mineral deposit for the benefit of both participants. It is felt that similar arrangements could often be to the advantage of developing countries which do not have all the means at their disposal to put a promising project into immediate operation.

(e) The development of mineral resources is helped by simple and fair minded legislation. The existing mining codes for Africa show a great diversity in underlying principles as well as important details and applications. This is partly because they were frequently modelled on the established legislation of the colonizing Power, and there are some basic differences in their concepts. Most of the French-speaking countries have in recent years published comprehensive mining codes in booklet form, but they are usually based on the principles prevailing in metropolitan France which are not always in the interest of newly developing countries. In English-speaking countries, on the other hand, the legislation consists frequently of a mass of specific decrees and ordinances, each of which was issued for a particular purpose. Some other African countries have as yet no comprehensive legislation covering the various aspects of mineral exploration and extraction.

The secretariat has taken a particular interest in technical assistance projects concerned with the elaboration of national mining codes. A mission of this kind has just been completed in a French-speaking West African country, and the new legislation has been simplified to incorporate some of the secretariat's recommendations. At present, a UNTA expert is working in collaboration with the Mineral Resources Unit in drawing up a mining code for one of the East African member States.

(f) The training of technical personnel for the development of resources is amongst the most important problems of the developing countries. Whilst mineral production constitutes an important part of the income of every member State, quite a few countries have not yet a single national mining engineer or geologist. This is not just due to the lack of training facilities but mainly to the general disinclination to take up a professional career in the field of mineral resources. Undoubtedly, the training facilities should be

multiplied: a good start has been made in about ten member States in which institutes provide technical training for prospectors, assistant geologists, drillers and mine foremen. These are the same countries whose universities also include geology and occasionally mine engineering departments. A preliminary survey made by the Mineral Resources Unit shows that most of the existing establishments described above could easily be adapted to sub-regional use and cater to the needs of neighbouring countries which have at present no training facilities in this field. However, the present need is less for additional facilities than for candidates for the profession.

The UN fellowship awards for 1962 - providing career training in established foreign institutions - attracted only five candidates for mining or geology from Africa, of whom three came from the same equatorial country. A recent offer of thirty scholarships made by the US Government to another Central African country did not attract a single applicant for training in geology or mining engineering. The provision of new training establishments would be futile unless there is an awakening of interest in the profession as a career. This is an urgent task for national authorities, and the secretariat is only too willing to assist them with advice on attracting citizens to the field of natural resource development.

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