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The articles appearing in  
the Bulletin express the  
views of their authors, and  
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## INTRODUCTION

The number of letters received since the publishing, about three months ago, of the first issue of the Bulletin, seems to indicate that those who received it found it of great use. Requests for supplementary copies have reached us and the number printed for this second issue had to be increased by 20%. The Unesco Regional Centre for Science and Technology, although glad of this situation, has only limited funds at its disposal, and it will therefore be rather difficult for the time being to increase considerably, the number of copies. Thus, the Centre would be very grateful if all those who receive the Bulletin, in particular librarians, Directors of research institutions, Deans of faculties etc. would kindly circulate the Bulletin among the staff members of their respective institutes.

The editorial staff express their thanks in advance.

NEWS FROM THE LAGOS PLAN

SCIENTIFIC RESEARCH IN AFRICA;  
NATIONAL POLICIES; RESEARCH INSTITUTIONS  
Paris, Unesco/ECA, 1966, 221 pages.

This publication, the French and English edition of which are just out of press, is the fourth and final in this series of works issued by Unesco in association with ECA, on the International Conference on the Organisation of Research and Training in Africa in relation to the Study, Conservation and Utilization of Natural Resources, held in Lagos, Nigeria, 28 July to 6 August 1964. It is in two parts: The first one contains the full text of the statements, made by the heads of delegation at the Conference, on national scientific policy in their respective country in the field of research on natural resources. The second part contains the results of a survey on the scientific and technical potential of African countries carried out in connection with the Lagos Conference. The Unesco Secretariat considered it indispensable that the participants of the Conference should have at their disposal an operational inventory of the institutions which contribute to fundamental and applied research in Africa in the field covered by the Conference. The information provided in this inventory supplements "A Review of the Natural Resources of the African Continent" prepared by the Secretariat at the request of ECA. This latter document attempted to describe the situation of scientific research into the environment and the natural resources of Africa and to indicate existing lacunae in this field. The survey on the scientific and technical potential of African countries lists the institutions, facilities and personnel which can be brought to bear on the unsolved problems, and the effective of personnel engaged.

The present survey consists of an "Inventory of the Scientific and technical research institutions in Africa" and of a "Preliminary inventory of African institutions and research workers in the

principal scientific and technical disciplines in Africa ". The directory and the preliminary inventory were submitted in a provisional reproduction to the participants at the Conference in documents UNESCO/CORPSA/4.B and 4.E.

New data have been received since the Conference. This information has, as far as possible, been included in the present edition, at least that which reached the Secretariat before the date the manuscript was sent to the printer.

The publication has been sent, free of charge, to all participants of the Lagos Conference, as well as to all institutions listed in the inventory. The continuation of this survey having been recommended by the Lagos Conference and Unesco's General Conference, a corrigendum questionnaire has been inserted in the outgoing publication. Everyone receiving it is kindly requested to complete it as exactly as possible before returning it duly signed and dated to the Unesco Regional Centre for Science and Technology for Africa.

Further copies of the book may be obtained (1) from the national distributors of Unesco publications, or by writing to the Sales Division, Unesco Headquarters, Paris, or to the Unesco Regional Centre at Nairobi.

#### NATIONAL COMMISSION FOR UNESCO AND THE LAGOS PLAN

The National Commission of Nigeria for Unesco has decided that the theme of its third session, to be held in Lagos, 20-23 September 1966, will be based on the Lagos Plan. We express the hope that other National Commissions will follow the example set by Nigeria. The Nairobi Regional Centre would be glad to give them, within the boundaries of its possibilities, all assistance.

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(1) 7 CFA Francs, US \$ 4 or 20/- (stg.)

SCIENCE POLICY EXPERTS MEET IN CZECHOSLOVAKIA

Goals of national science policies and suggested mechanisms for establishing and implementing them have been recommended at a meeting convened by Unesco at Karlovy Vary in Czechoslovakia.

Co-ordinators of national science policy studies made for Unesco who attended the meeting emphasized the strong link between planning of scientific research and national growth in the broadest sense, particularly in developing countries where modern science is often a new "imported" concept.

They also accented the need for international collaboration and recommended that Unesco offer its services to set up means of exchanging information on science policy studies by the Council for Mutual Economic Assistance, the Organization for Economic Cooperation and Development, the Organization of American States, the Organization of African Unity and other similar bodies.

In a final recommendation, participants noted that this meeting of top-level experts had made a "unique contribution" by bringing together countries of diverse economic, political and social systems.

They came from Belgium, Czechoslovakia, the Federal Republic of Germany, India, Israel, Japan, Norway, Poland, the United Arab Republic, the United States, the U.S.S.R. and Yugoslavia.



L'INSTITUT POUR LA RECHERCHE SCIENTIFIQUE EN AFRIQUE CENTRALE  
( I R S A C )

The " Institut pour la Recherche scientifique en Afrique centrale ", which is connected with the Ministry of National Education of the Democratic Republic of Congo (Kinshassa) was created to promote, develop and carry out scientific research in Central Africa.

The Institute was founded on 1 July 1947 at Kinshassa (Leopoldville), by decree of the Regent of Belgium. At the time, the report which preceded the decree had already justified the creation of the Institute by noting that " to raise the standard of men's life, it is necessary to exploit natural wealth in a rational way. This exploitation is no longer just a matter of common sense, but is based on a sound knowledge of the laws of nature ".

On 30 June 1960, the Congo attained independence. IRSAC became a public Congolese institution and Ordinance No. 154 of 10 May 1965, establishing its new statutes, prepared with the assistance of Unesco, was published in the " Moniteur " on 15 August 1965.

The preamble explains the importance of the role of research into long-term planning in the Government's scientific policy machinery, and continues by indicating that "the perspectives of long-term development of the regions where the different research centres are established and the general interest of the country will determine the orientation of programmes in the disciplines represented at the Institute". The fundamental research carried out by IRSAC, and this was exactly the intention of its creators, will therefore be orientated fundamental research, the objectives of which will be the result of a confrontation between the possibilities and perspectives of science and the needs of development.

The option taken by IRSAC on fundamental sciences allows the Institute to maintain relations with well-known scientific personalities and institutions, and to receive foreign scientists. It also gives its scientists the opportunity to publish their papers in

specialised scientific journals all over the world. The Congo thus participates effectively in international scientific research.

The orientation of research towards the problems of development makes IRSAC a vital instrument in the Congo's socio-economic development. Each subject is approached in the light of its African perspective, whether it be in the field of nutrition, endemic diseases, parasitology, or a problem of cultural and social anthropology, or even one of research in physics related to the particular structure of the country or its privileged geographical situation.

IRSAC acts as consultant to the Government. It is, however, free to decide upon the research to be undertaken, and it can, furthermore, in the framework of its allocated budget, carry out research work of its choice as well as train its personnel.

The statutory body of IRSAC is formed of: the Council of Administration, the Director General, the Scientific and Technical Commission. The Director General is assisted by an Advisory Board.

The Council of Administration is composed of governmental and administrative authorities directly connected with problems currently being dealt with by the IRSAC.

The Scientific Commission brings together various Congolese and foreign personalities, resident in the Congo, recognized for their competence in the field of fundamental and applied research; they come from institutions such as the Institute of National Parks, the National Institute for Agricultural Research in the Congo (INEAC) or the Universities. Corresponding members outside the Congo, of high scientific repute, are also associated with its works.

The Board of Directors maintains contact between the Director General, the Heads of Centres, the Scientific Commission and the local provincial authorities.

However, the Director's offices are the only ones already established, and this has been done with the assistance of Unesco.

The Director General, chosen for his scientific competence and organizing capacities, has his headquarters in the Lwiro Centre; he is assisted by a Deputy Director dealing with the administrative and financial services.

In order to implement its programme, IRSAC has at its disposal multidisciplinary research centres, divided into departments and services working under the responsibility of a scientist who is in charge of a programme of his own or of the whole of the department. These scientists may make their careers at IRSAC or may spend varying periods with IRSAC to carry out specific research work. They are known as "associate scientists". A budget of 80 million Congolese francs has been allocated to IRSAC by the Ministry of National Education. Welcoming international scientific co-operation, IRSAC is able to conclude agreements with foreign institutions or authorities ( Belgium, France, Federal Republic of Germany, USA ). These countries send scientists and finance their research. Technicians are also sent under Belgian technical assistance. Many Congolese technicians, nursing staff and laboratory assistants complete this infrastructure. The administrative and maintenance services employ mainly Congolese personnel - i.e. more than 100 qualified workers and about 300 labourers.

The following table gives an idea of the size of IRSAC:

ADMINISTRATION				RESEARCH				TOTAL		
MAINTENANCE - GENERAL SERVICES										
SENIOR STAFF		JUNIOR STAFF		SENIOR STAFF				JUNIOR STAFF		
Afric.	Europ.	Qualif.	N.qual.	Scient	Ass.S.	Technical Assistants		Qual.	N.qual.	
						Eur.	Afr.			
9	5	83	250	12	4	8	5	94	11	481
-	2	12	-	3	-	1	6	-	-	24
2	-	21	30	-	-	-	-	4	-	57
11	7	116	280	15	4	9	11	98	11	562

IRSAC does not publish its own scientific review and its scientists, therefore, publish the results of their research work in specialised journals. At 31 December 1964, 1273 reports had been published, which makes it difficult to get a general idea of the Institutes' activities. From 1955 to 1960 the "Folia Scientifica Africae Centralis" (24 issues, vol. I to VI, 4 numbers a year) informed the scientific world about the research being undertaken. The new "Chronique de l'IRSAC" at present being printed, will serve a similar purpose giving news of outstanding research, seminars, visits and missions, bibliographies, etc. Furthermore since 1947, IRSAC has published a "Rapport annuel" embodying a statement of work accomplished and a summary of books and articles published. The latest of these reports, covering the period 1960 to 1964, was published on 15 February 1966.

In 1960, IRSAC numbered five centres and three research stations. Unfortunately the Institute suffered from the Congo's post-independence problems (1). In 1960 the scientists evacuated Mabali, situated at the lowest point of the central basin on the eastern shore of Lake Tumba (approximately 80 miles from Coquilhatville). This Centre whose installations are intact and have been kept in order, forms a natural reserve for the study of climatology and microclimatology of low altitude humid forests as well as for the study of physiology and plant ecology. A dynamic team of five scientists would be able to start up activities again.

The fate of the Centre at Uvira was worse. Its situation at the north-east of Lake Tanganyika made it suitable for hydrobiological research. It was in fact, almost totally destroyed during the events of 1964, and it needs to be entirely rebuilt and newly-equipped before any activities could be resumed. The department of hydrobiology has been transferred to Lwiro (Lake Kivu).

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(1) The former IRSAC Centre at Butare (Astrida) has become the "Institut National de recherches scientifiques de la République rwandaise". Studies of cultural and social anthropology are carried out there. The station of Uwinka (high altitude forest at nearly 8,000 ft. above the Congo Nile crest) and of Mimuli (oriental type savanna) now also belong to Rwanda.

In spite of the difficulties encountered since independence, the Centres of Lwiro (Kivu) and Lumumbashi (Katanga) have maintained a high degree of scientific activity. The Centre of Lwiro (25 miles north of Bukavu, at approximately 5,800 ft), headquarters of the Director, covers a total of 5,625 acres with 47,840 square yards of buildings, of which 2,990 square yards are laboratories, including the experimental zoological station of Tshibati situated at the border of the Flora and Fauna Reserve of Biega-Kabuzi (6,700 ft.).

The centre's premises comprise furthermore, private housing three primary schools and a secondary orientation centre, a social home, a football pitch, a tennis court, a swimming-pool, a chapel a carpentry and mechanical precision workshops, a garage, a store, a photographic laboratory, a drawing and cartographic office (800 maps) as well as a series of IBM machines and a radio installation which are at the disposal of the scientists as auxiliary services. A guest-house and bungalows allows the centre to welcome scientific visitors.

At Lwiro there is also a correlation map system installed, based on the use of transparent maps on which are reported, at the rate of a single data per map, different physical, climatological, geological and biological factors.

Finally, the Lwiro Centre also houses the central library, a three-floor building with  $4\frac{1}{2}$  miles of book shelves available. The library is essentially directed towards on-the-spot practical activities since as every Centre has its own library. Yet professors and students of the town of Bukavu make more and more use of the Central library's facilities. Four thousand five hundred and twenty-five books are kept there, one hundred and forty-five new publications have been bought since 1 January 1966 and seven hundred and eighty-eight micro-film strips were purchased in 1965. At the Lwiro Centre alone more than 2,000 periodicals are received. Four craftsmen bind an average of 400 volumes a month.

In agreement with the C.A.D.M.P. of the Ministry of National Education, the library benefits from a quota of Unesco coupons, for its purchases while 13 German reviews are supplied free of charge by the "Deutsche Forschungsgemeinschaft".

From Lwiro, the station of Irangi (high altitude forest, 2,970 ft.) can be reached for short field trips.

The Lwiro Centre carries out research in three main fields: physics, biology and human sciences.

In the field of physics, IRSAC pays particular attention to increasing existing knowledge of the great Central African mountain range: the region of Lake Kivu is, in fact, situated at the geographical centre of Africa south of the Sahara, at an equal distance from the Atlantic and the Indian Ocean, in the middle of the big south-north fracture constituted by the occidental Rift with its interesting seismological and volcanological activities.

The geophysical programme involves the geophysical and geological study of the western part of the African Rift. Carried out in the framework of the Study of the Earth's Upper Mantle, this study will in 1966, be restricted to the borderland of Lake Kivu, geology, gravimetry, magnetism and volcanology being the main means of investigation. Particular attention will be paid to the zone of active volcanoes in a programme of observation. In close parallel to these studies, the ionospheric and terrestrial magnetism services, which are unique in Central Africa, are actively maintained at Lwiro. The determination of the earthquake epicentres in eastern Africa and their correlation with the tectonics of the Rift is the work of the seismological service. This service is also engaged in the establishment of a map showing the seismicity of the region and the frequency of earthquakes. Finally, it maintains permanent observation on volcanic activities in north Kivu. The Lwiro seismological station also maintains the stations at Astrida (Rwanda), Delcommune (Katanga), Binza (Kinshassa), Rumangabo

(Albert National Park), transmits data to interested scientific institutions and publishes preliminary and final bulletins. The station has been granted a subvention by the National Science Foundation (GP No.418).

Biology is divided into four departments, totalling a programme of ten different research programmes. The nutrition department heads these programmes and its activities have been laid down in an agreement between IRSAC and the "Centre scientifique et médical de l'Université libre de Bruxelles en Afrique centrale" (CEMUBAC) and the "Cliniques médicale et pédiatrique" of the same university. Under this agreement IRSAC places its laboratories and personnel at the disposal of CEMUBAC which supplies qualified personnel (scientists, medical doctors, technicians) equipment and some funds.

This department receives financial aid from the International Atomic Agency and gets material assistance from the "Fonds médical tropical".

The programme is a double one and includes :

- (a) the distribution of general and individual medical care, in particular in pediatrics, malnutrition, goitre, leprosy, etc. to children admitted at the hospitalization unit as well as to the whole of the population attending the different dispensaries of IRSAC at Lwiro, or the consultations Lelo 4 times a week at Idjwi island (Lake Kivu). Any analysis involved are carried out in the IRSAC Laboratories;
- (b) the study of the three endemic diseases creating the most serious problems in the Kivu area: protein deficiency; goitre and endemic cretinism on Idjwi island; tuberculosis.

Studies on the metabolism and physico-pathological aspects of protein deficiency are carried out, especially complications of the hydro-electrolytical metabolism and the problems of tissue maturation, while the medical and social aspects of chronic hunger are dealt with by alimentary investigations carried out in the region.



The programme of the working-party on goitre and endemic cretinism is aimed to bring new results on the interdependence of nutrition, ethnology, geology and climatology of these diseases, on the etiologial principle of endemic goitre, on certain biological factors influencing its development and on the causes of its occurrence during growth, the metabolic anomalies caused by endemic goitre and its correlation with cretinism.

Its final aim is to perfect a really effective iodated prophylaxie for endemic goitre. To accomplish this the following steps are being undertaken: a epidemiologic census of the whole population of the island, various tests of radioactive iode captation by the thyroid gland, measurements of urinary excretion and the proportion of hormones in the blood, sample taking and analysis of drinking water and an alimentary investigation of food analysis and research into goitrigenous elements.

As for tubercolisis, a test of intra-dermo reaction to tuberculin is systematically carried out and sputum taken for examination in order to prove the existence of endemic tubercolisis on Idjwi island. In addition to the laboratories of analysis and common research (biological and chemical analysis), a laboratory of isotopic studies has also been operative for over a year.

A small isotopic field laboratory has been established in the northern part of Idjwi island, where the most important concentration of goitre and cretins is found. This laboratory is more than 30 miles (of which 25 miles on the lake) from the IRSAC Centre at Lwiro.

The Department of Zoology is working on six programmes. Having carried out a census of rodent ectoparasites the mammalogy service continues to work on the vector and regions of disease in Central Africa, by the capture and determination of small mammals and their endoparasites, emphasis being laid on the epidemiology of the

diseases thus transmitted. In 1966 the USA allocated this project a further grant. Research work on the biology of the forest Muridae is well under way. This research deals with the study of the population dynamics, (i.e. the periodicity of reproduction in humid forest zones where the seasons are less distinct, and the determination of the population density) and with the study of diet as well as with ethological observations and monographic descriptions of some interesting species. Research work carried out previously on Muridae of the cultivated zone will be completed by a study on the role of the house rat (Rattus).

The ornithology programmes deal with biology and ethology of certain Oscines: Estrildidae (especially mountainous types), Fringillidae, Nectariniidae, and Sylviidae, as well as with the study of reproduction, rest and moulting seasons. The influence of tropical conditions, i.e. increase or changes in the reproduction season on bird behaviour, especially that of the small types, is also being observed.

In addition, a parasitology laboratory has been established which carries out research on Central African ticks, their distribution and biology. For the moment, specimens are collected, morphological observations carried out on the Larvae and the Nymphs as well as ecological and biological studies on their evolutionary cycle. This programme will lead to studies on virology.

Finally in the field of medical entomology, a census and determination of Culicidae of the western shore of Lake Kivu up to the tropical forest (Irangi) passing through the Congo-Nile crest, are carried out. These studies include the capture of Larvae and adult specimens, and individual breeding in order to obtain confirmation of the species and material for the constitution of a collection. The interests of this service in the Culicidae is based on the fact that these latter play an important role in the transmission of virus.

At the Tshibati experimental zoology station the raising of wild animals in captivity (especially mountain gorillas), is continued. In a joint research programme with the Delta Regional Primate Research Centre at Covington (USA) on infectious hepatitis, ten chimpanzee have recently been captured and a series of preliminary examinations are being carried out on them before they are shipped.

The Lake Kivu hydrobiological programme includes water analyses and physico-chemical measurements, the establishment of statistics and graphics for a complete annual cycle and quantitative and qualitative plankton analyses. The result of this research work should permit the introduction of new species of fishes into Lake Kivu.

The Department of Botany is inactive at present since the post of scientist, as Head of the Department, is vacant. A Department of Cultural and Sociological Anthropology deals with human sciences. Notwithstanding the absence of a head of department, research work on the material culture of the Shi is being carried out (collection of data regarding in particular alimentation and the relation of the Shi man to his body, and information on recent politico-social events). Two associated scientists are actually on a mission, assisted by IRSAC, related to prophetism in the Congo and the rural wage-earning class. This department continues to collaborate with the "Musée Royal de l'Afrique centrale" in Tervuren in the field of linguistics, by taking over a Lega investigator.

The Centre of Lumumbashi (formerly Elisabethville), owing to its urban situation, constitutes a research centre as well as a documentation centre for the intellectuals in town. It is also in close collaboration with the "Université Officielle du Congo": its laboratories and premises are at the disposal of students attending lectures or participating in practical work. A certain number of the scientists are also professors at the University. The Centre

of Lumumbashi possesses an electronic microscope that the University is allowed to use.

The Centre is specialised in parasitology and carries out four connected research programmes.

The first is related to the culture of polymorphous trypanosomes. The trypanosomes, human and animal parasites, agents of sleeping sickness, are difficult to cultivate in vitro.

The classical culture mediums are on a blood basis. Previous research by the department has already permitted the preparation of semi-defined mediums, in which the blood is replaced by organic and limpid extracts, free of protein and resistant to sterilization. The culture of Trypanosoma mega, parasite of the toad, Trypanosoma cruzi, parasite of man, Leishmania tropica, parasite of man, etc. is possible in these semi defined media. Nevertheless, these mediums do not admit the culture of trypanosomas responsible for sleeping sickness. Blood has always to be added, but the objective of research of work under way is to replace blood by stable extracts and to determine the elements indispensable for growth. A second series of studies on the culture of a trypanosome in a defined medium completes this first programme. The analysis of the factors of origin is nearly completed and the description of a defined culture medium, every single chemical substance of which is known, is under preparation. A number of isolated factors of growth are new and will probably be valuable for the culture of trypanosomes, agents of sleeping sickness. The third programme deals with the cycle of the Trypanosoma Gambiense in relation to man. The cycle of trypanosomes in the blood of man and animal is not completely known: the classical conception of a continuous multiplication does not fit well with certain facts. The evolution of trypanosomes in the blood of animals is controlled and followed up with the help of radioactive isotopes. This department is also engaged in a

biochemical study on the transformation of trypanosomes. The cycle of trypanosomes is divided into two phases each of which is characterised by its own morphology and physiology. The modifications accompanying the transition from the CRITHIDIS (non infectious) form to the infectious form are astonishing, but very little is known about their nature and determinism. The biochemical study of this transformation is doubly interesting: this kind of research could be of considerable value in explaining the apparition of the pathogenic character of certain trypanosomes; and this transformation seems to be a pattern for biochemical research of cellular differentiation, a crucial point of modern biology.

Finally, Dr. Bafort of the "Institut de médecine tropicale" in Antwerp " came to Lumumbashi on a mission to rediscover and study the Plasmodium vinckei, originally discovered by Rhodain in 1952 in the northern part of Katanga.

In 1966 the tasks of a young African Republic are heavy and complex. There is a lot of work to be done, and rapidly: cure, educate, and procure work, if the gap existing between industrialized nations and developing countries is to be hallowed and finally closed. To do this these young countries must avoid empiric solutions as much as possible and find right from the start, audacious technical and economical short cuts. New countries are facing new problems, the solutions of which cannot be found through the application of old schemes. This is why scientific research plays such a vital role in developing countries.

It is scientific research in fact which innovates, discovers these short cuts, assures rapidity and effectiveness in application, indicates the preliminaries, and ways and means, and may adapt the results. At all times, man has turned to science in order to improve his existence, and at the very origin of every single economic or social advance there is an intellectual conquest.

In our era, where scientific research is taught as team work occupation, we think it is among the most reasonable, and in the long run, most profit-earning investments for a young country.

IRSAC could expand its fields of activities still more. Still more experienced scientists could use its facilities and premises, scientific equipment and personnel; and eventual fields of activities, in physics, biology or human sciences, are countless.

We hope therefore, that new and lasting collaboration will arise out of the comprehension of the absolute necessity of research and of the vast possibilities IRSAC can offer.

Dr. U Rahm,  
Directeur général,  
IRSAC-LWIRO,  
Dépêche Spéciale,  
Bukavu, Kivu,  
(Democratic Republic of Congo).

#### CATALOGUE OF MAPS

F.A.O. and Unesco have just issued in the frame of the Soil Map of the World Project a third edition of the list of maps filed in the World Soil Resources Office and in the F.A.O. library in Rome (1).

The maps have been arranged under the following headings : Soils-Geology and Physiography - Land Use - Vegetation - Climate - Topography - Miscellaneous.

The catalogue covers 145 countries and territories, and lists further the most important World Continental and Regional Maps.

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(1) Rome (F.A.O.), 1965. xiii + 165 pp.

General Meeting of the Association of  
African Geological Surveys (A.A.G.S.)  
Tunis, 4-8 April, 1966

A General Meeting of the Association of African Geological Surveys was held in Tunis in the office of the "Bourse de Travail" from April 4 to 8, 1966, following the invitation presented on behalf of the Tunisia Government, by Mr. A. Azzouz, during the previous meeting (New Delhi, December 1964). Twenty two members of the Association were present. Excuses were sent by members unable to attend due to the delay in obtaining the necessary funds. Others could not get the necessary visas, which often created scientific gaps of great importance in respect of the synthesis of the proceedings.

Others invited who attended the meeting were:-

- Mr. M. Sala, Delegate of the United Nations Special Fund in Tunisia,
- Mr. N.M. Shurki, Representative of the Economic Commission for Africa,
- Mr. M. Solignac, United Nations expert in Tunisia,
- Mr. W.P. van Leckwijck, Representative of the International Union for Geological Sciences,
- Mr. E. Walter, representing Unesco,
- Mr. P. Routhier, Secretary of the Sub-commission for the Metalliferous World Map,
- Mr. A. Obermuller, representing the French Ministry of Industry.

It should be mentioned that Dr. F. Dixey, Honorary President, of the A.A.G.S. also represented the "Overseas Geological Surveys" (London) as an observer.

An Italian delegation under the leadership of Mr. P. Zuffardi requested permission to attend the meeting on account of the proximity of its field of activities in Sardinia to North Africa, the metalliferous lode of which occupied a predominant place in the proceedings of the meeting. Actually, Mr. Zuffardi made important contributions to the discussions.

Finally, numerous Tunisian geologists, among them Mr. A. Attia, Assistant Director of the "Office national des mines", benefitted from the reports and commentaries which they instigated.

The report of the Secretary-General, after recalling the Symposium on the West African Granites (1), made a statement on the progress of the work in hand, i.e.:

- the symposium on the sedimentary basins of the Atlantic coast of Africa will issue its report very shortly; the consecutive symposium on the basins of the eastern coast is about to be started;
- the Map of the Coal Deposits in Africa and its explanatory notice are also being published shortly;
- work on a Map of Iron Ore Deposits has started;
- the Tectonic Map of Africa, the publication of which will be sponsored jointly by Unesco and A.A.G.S., is being completed.

The working sessions of the Tunis meeting have been devoted to the presentation and discussion of the following papers:

- report on the activity of the Geological Services of Algeria (by A. Abderrahim), of Zambia (by Dr. A.M.J. de Swardt), of Swaziland (by Dr. D.R. Hunter), and of the Malagasy Republic (by M.A. Razafiniparany);
- new Metalliferous Maps of Morocco (A. Emberger), of Algeria (A. Popov), of Tunisia (P. Nicolini) and of Egypt (Dr. El Shazly);
- first drawing-up of a Mineral Map of Africa on the scale of 5.000.000 and its reduction to the scale of 10.000.000 (J. Lombard) which have been prepared with the assistance from Unesco;
- symposium on the deposits of lead and zinc in Africa.

Original documents have been produced for the symposium by the following countries: Morocco, Algeria, Tunisia, Egypt, Sudan, Republic of the Congo (Brazzaville), Democratic Republic of the Congo (Leopoldville), Angola, Zambia (Anglo-American Corporation)



and Madagascar. A synthesis of these documents has been presented by the co-ordinator Mr. P. Nicolini. The text of the contributions and the discussions will be published.

Working groups have examined the Mineral Map of Africa and formulated recommendations for corrections before publication.

J. Lombard

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(1) see report in March-issue of the Bulletin

Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale

(A.E.T.F.A.T.)

The "Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale" (A.E.T.F.A.T.) is an international association open to all botanists, of all disciplines, who are studying the flora of Tropical Africa and Madagascar. It was founded in London in 1950 by a number of botanists engaged in the preparation of African Floras, and comprises at present some 450 members.

In some ways A.E.T.F.A.T. is quite an unusual association. It has no statutes, no president, and no council. Its only officers are one librarian and one general secretary. The latter is elected for a period of 3-4 years, and his mandate is terminated with a Plenary Meeting in his home country, at which the next general secretary is elected.

The primary aims of A.E.T.F.A.T. are to facilitate contacts between botanical research workers in the same and related fields, so that they may get to know each other better, have an opportunity to discuss problems of common interest, and exchange ideas, material and reprints. It also attempts to bring all research workers rapidly up to date with works throughout the world concerning all aspects of African and Madagascan botany.

In order to further these aims, the general secretary publishes, and distributes free of charge to all members, an annual Bulletin, which contains general news, names, with address and interests, of new members, changes of address and interests of existing members, titles of recent publications concerning African botany, requests for material and information, etc. A.E.T.F.A.T. also possesses a library, composed of reprints of papers by members, which are regularly supplied to the librarian. These works are currently listed in the Bulletin and on request to the librarian, are sent on loan to members. Each year in

June the latter publishes and distributes (for a moderate fee) the A.E.T.F.A.T.-Index, which contains bibliographical references to everything concerned with systematic botany in Africa south of the Sahara and Madagascar which was published in the world during the past year. In particular it includes all new taxa with their distribution, infraspecific taxa, the basionyms of new combinations with cross-reference to the combinations, and references to illustrations. It also refers to works on anatomy, cytology, embryology, medicinal plants, ornamentals and other cultivated plants, etc. This index enables botanists to follow in detail the progress concerning the flora of Tropical Africa and Madagascar.

In connection with the Plenary Meeting terminating each period of office of the Secretary a scientific symposium is organized, devoted to a special topic (or topics) concerning African and Madagascan flora. The proceedings of each symposium are published in a special volume which is distributed to all members. Up to now five such symposia have been arranged, viz. in Brussels 1951, Oxford 1953, Paris 1957, Lisbon and Coimbra 1960, and in Genoa and Florence 1963. The next symposium of this sort will be held in Uppsala, Sweden, September 12th - 16th this year, and will be largely devoted to "The conservation of vegetation and of its constituent species in Africa south of the Sahara."

Thanks to the collaboration of some 30 specialists and the financial assistance of Unesco A.E.T.F.A.T. published in 1959 a large coloured "Vegetation Map of Africa south of the Tropic of Cancer," with explanatory notes. A new revised edition of this map is being prepared. In a similar way A.E.T.F.A.T. published in 1965 a "Map of the extent of floristic exploration in Africa south of the Sahara."

By the means mentioned above the Association hopes to contribute an efficient exploration of the immensely rich flora of Tropical Africa, a detailed knowledge of which is a necessary prerequisite for many of the improvements in land use which are so urgently needed by the rapidly expanding human population of this continent.

Olov Hedberg  
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Working Party of Specialists in Scientific  
and Technical Documentation in Africa  
Nairobi, Kenya, 25-29 July, 1966.

As a follow-up of resolution 2.2122 adopted by the General Conference of Unesco at its 13th session (Paris November 1964) and of the International Conference on the Organisation of Research and Training in Africa in Relation to the Study, Conservation and Utilisation of Natural Resources, which was held in Lagos, Nigeria, in July-August 1964, the Unesco Regional Centre for Science and Technology for Africa is organising a Working Party of Specialists in the field of scientific and technical documentation in Africa, to be held at Unesco House, Nairobi, Kenya, during the last week of July 1966.

The purpose of the Working Party is primarily to make a survey of the existing facilities in scientific and technical documentation in African countries make recommendations for improvements in these facilities, and advise on the creation of documentation centres and services and on improvements in training facilities.

Considering the nature of the meeting the number of participants will be limited to approximately twelve from both English and French speaking countries in Africa. Since the Working Party is intended to be a source of ideas and guidance in the future programmes of Unesco, the Regional Centre has invited specialists who in the light of their experience and present level of responsibilities in their country, will be able to make substantial contributions.

A summary of the discussions and of the decisions taken will be published in the next issue of the Bulletin.

8th Annual Conference of the Science Association of Nigeria

I wish to congratulate the Director of the UNESCO Regional Centre for Science and Technology for Africa, and his staff for the maiden issue of the Bulletin designed to spread information on UNESCO'S activities in the field of science and technology in Africa and to serve as a link between the various scientists and scientific organisations in Africa. This bulletin will serve a long felt need, and should with time, and with the support of all who are interested in the rapid development of science, and the scientific community in Africa, become an important organ. It is sad to realise that, quite often, a scientist in Nigeria feels himself much closer, in terms of exchange of ideas and materials, to a scientist in the United Kingdom and United States, over 3,000 miles away than to scientists in the Republic of Dahomey only 100 miles from Lagos - the Lagos Plan notwithstanding ! This situation requires urgent improvement, and one of the ways of doing this is by having a publication which could carry information about the activities of scientific organisations in different parts of Africa.

The Science Association of Nigeria was inaugurated in December 1958, at a meeting held in Ibadan. Before this time, there was a West African Science Association, which had been formed in Ghana, and to which a few individuals in Nigeria belonged. With the formation of the Science Association of Nigeria, the Ghana Science Association, and the Sierra Leone Science Association, the West African Science Association became a Federated organisation which holds biennial conferences in various parts of West Africa. A report on the 5th Conference appeared in the first issue of this Bulletin.

The main object of the Science association of Nigeria is clearly stated in its prospectus, namely, to foster the pursuit and understanding of science especially in Nigeria. To this end, annual conferences are held in the main centres of learning in various

parts of the country, the 8th Conference being the latest, held at the University of Ife's campus at Ibadan. What follows is a short account of this conference.

The Theme of a Symposium held during the conference was "Power and the development of Nigeria". For 3 hours each day for 3 days, invited speakers, most of who were members of the association spoke on various aspects of this theme. First the sources of power were discussed - in particular, hydroelectric power, which is soon to play a major role in the development of the country on completion of the £70m Kainji Hydroelectric Scheme now in progress. Other traditional sources of power, such as coal, oil, sun and wind were also considered and their economic value assessed. In this group of papers, nuclear power was also discussed. The conference was informed of the necessity for a nuclear power programme for every country including developing countries.

The second group of papers dealt with the use of power in the communication systems of the country - the use of various types of power in the railways, in road haulage, and in telecommunications; and finally, a group of speakers dealt with Power and Natural Resources. The importance of manpower was well recognised in that two papers, one, a general paper on manpower development in Nigeria, and the other on mental health and man power in a developing country were read. Power problems of the mining industry and in agriculture were also discussed.

It can be seen from the above that the symposia of the association encourage a general approach to science, and each year there is an attempt to x - ray a particular topic in this way. Nevertheless, the specialist papers are very important and in a day devoted to activities of the sections - Agriculture, Botany, Physical Sciences and Engineering, Medical and Zoology, about 50 specialist papers were read.

At this conference, the association was honoured by the presence of two distinguished guest speakers. The first was Dr. William Stroud Chief of Aeronomy and Meteorology at the Goddard Space Flight Centre, in the United States of America, and the second was Dr. Olu Ibukun, the Assistant Director of the Regional Centre for Science and Technology for Africa. Dr. Stroud spoke on the use of satellites in weather forecasting and his talk which was well documented by colour slides was an important highlight of the conference. In his own talk on "New approaches to resources research and exploitation" Dr. Ibukun dealt with a subject of great importance to the developing countries of Africa today in a most scholarly fashion.

A year is a short period during which to plan a conference properly. Within a few weeks of the end of the 8th Annual conference, the Council of the association is already actively planning the next, the 9th Annual Conference which will be held in the University of Lagos in March 1967. It is the hope of the Association that it would be able to welcome scientists from other scientific associations in other parts of Africa to its next conference.

Professor C.I. OLANIYAN

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INTERNATIONAL BIOLOGICAL PROGRAMME

The central theme of IBP - the fundamental basis of biological productivity and human adaptability - was arrived at only after several years of discussion within the parent body, the International Council for Scientific Unions, and in the International Union for Biological Sciences. There was general recognition that there are two questions of enormous magnitude facing the future of the human race: 1) how man can control his own population numbers which in some areas have already outstripped local biological resources and are likely to do so in other areas soon ? and 2) how can biological resources which provide so many human needs be developed through greater understanding of the factors which control productivity ?

There is, of course, a long way to go before what is already known can be fully applied in agriculture, forestry, fisheries, and medicine. Nevertheless, the technological aspects of these subjects have been advanced in the last half century or so more rapidly than fundamental knowledge about what happens in nature. The fantastic progress which has been achieved in atomic physics, space research and molecular biology has by no means been matched in plant and animal ecology, physiology and taxonomy. At the same time the enormous economic development made necessary by the human population explosion is obliterating many plant and animal communities in different regions of the world before there has been time for their serious study, and in this process many organisms of potential value to mankind are being exterminated.

In selecting the theme of biological productivity and human adaptability for IBP there was no intention to belittle the other problem of population control; but it was thought that the latter was so involved with questions of sociology, psychology,

education and religion, that the former gave the better prospects of a co-ordinated world effort by biologists.

Even with this limitation the theme is vast. In order to make it possible to handle, the Programme has been divided into 7 sections, each of which comprises a major world co-operative effort on its own. Many themes of importance relate to more than one section so that there are inter-sectional groups as well. The seven sections are:

- 1) Productivity of Terrestrial Communities (PT)
- 2) Production Processes (PP)
- 3) Conservation of Terrestrial Communities (CT)
- 4) Productivity of Freshwater Communities (PF)
- 5) Productivity of Marine Communities (PM)
- 6) Human Adaptability (HA)
- 7) Use and Management of Biological Resources (UM)

Nearly all of the subjects covered by these sectional headings are of deep interest to the development of inter-tropical Africa, and so are a number of inter-sectional themes such as bio-climatology, systematic botany and zoology, and the comparison of wild and domesticated herbivores from ecological and physiological view-points.

Take an example, that of the tropical savannah which comprises a very large part of Africa and has important components also in tropical Asia and Latin America. Millenia of evolution and speciation have produced in it a great variety of plants and animals beautifully adjusted to the physical and biological factors of the environment. In the natural state, which can be seen today in certain national parks, the savannah has a high rate of primary productivity through grass and bush and a high density and variety of large mammals adapted to feeding at all levels of vegetation from roots to the tree-tops. Nearly all the

annual growth of vegetation is consumed by animals and there is rarely need for fire. But when the hunters and pastoralists have driven away a large proportion of the wild herbivores, then annual growth of vegetation becomes overpowering and fire becomes an annual event in order to get rid of it. The main stream of energy-flow through the biological system is thus cut off and is cast away in flame and smoke. Mankind has then to draw on the side-products, like gum and honey, and the small proportion of the vegetation which can be consumed by cattle and sheep, ill adapted as they are to African savannah.

Here is a case for fundamental study of the productivity systems, both wild and tame, in order to find out and subsequently to apply those factors which could reduce the wastage which is customary today. The large mammals of Africa are wonderfully well adapted to using a maximum of the savannah's primary production, so it might well be that, had the great civilizations of ancient times (when animals were first domesticated) occurred south rather than north of the Sahara, we should today see eland replacing our cows, gazelles our sheep, impala our goats, and the giraffe feeding on the tree-tops thrown in for good measure.

One could repeat examples of this sort by reference to the rain-forests, the deserts, the seas, and the inland lakes and rivers, which are of great importance already as producers of animal protein. In the variety of the human species itself, Africa is also unusually rich. Some groups live at high altitudes or in remote areas, and through isolation have become genetically and physically unusual. Their detailed study before admixture takes place could be of great value to humankind as a whole, and may well reveal genes leading to human attributes of value which have become wholly submerged in the mass of humanity elsewhere.

Clearly, there is great scope for IBP in tropical Africa, but at the same time there is often a paucity of scientific resources in the way of trained personnel, of expensive equipment and funds. As Professor Olaniyan of Lagos University said to the II General Assembly of IBP in April this year: "I have been asked why there are so few Africans participating at this General Assembly. Most African countries are still developing the scientific basis for international co-operation, and this, together with difficulties over finance for travel has prevented many of us from coming. Africa is however much interested in the IBP, particularly in the training of biologists, which is one of the most important aspects in providing the basis for a research programme".

Actually Nigeria, through its national committee of the IBP, has already presented a rather comprehensive national programme. As another example, the East African Academy has held a number of discussions and is working towards an IBP programme for the three East African countries. I believe that IBP offers particularly good opportunities in Africa for the kind of research project which involves two countries, one which is scientifically advanced and has specialized scientists who are interested to work on tropical problems, the other a developing country which has problems of great interest crying out for study, and keen young scientists who would like to work with more experienced men from overseas. Thereby the opportunity can be taken for opening up important new research and the local scientists can gain training and experience in advanced techniques.

The International Biological Programme is now in the second year of its Phase I, which is concerned with design and feasibility studies. The beginning of July 1967 has been fixed as the commencement of Phase II: operations. Thereafter the programme will

continue for a period of 5 years. This division into Phase I and Phase II is not, however, very clear-cut, because a number of projects, including several in Africa, are expected to operate well before the middle of 1967, whereas some participating countries may at that time have reached only the stage of formulating their programmes, parts of which may take another year or more to pass through the stages of financing and the recruitment and training of staff. Likewise the end of IBP in 1972 is not likely to be a sudden event. Even before then it can be expected that some projects will have already given their results and been wound up, whereas others may need a further period. Some IBP projects will doubtless be worked into the permanent pattern of government or university researches.

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## REGIONAL COURSE IN HYDROLOGY FOR THE TRAINING OF TECHNICIANS (1)

At the request of some African countries and in accordance with the decision of the Comité Interafricain d'Etudes Hydrauliques (CIEH), the Government of the Republic of Mali and Unesco organized a regional training course in hydrology for technicians for French-speaking African countries. The course was held in Bamako (Mali), from 1 July to 30 September 1965.

The three directors of this course were Drs.M. Roche, Director of Studies, Hydrological Service, ORSTOM, C.Auvray, Director of Hydrological Research, ORSTOM (France) and G. Chikvaidze, Hydrological Research Institute of Transcaucasia (U.S.S.R.). Twenty-four students from the Central African Republic, Gabon, the Ivory Coast, Mali, Niger and Senegal attended the course. The programme consisted of three main parts: climatology and general hydrology (Dr. Roche), ground-water hydrology and sediment transport (Dr. Chikvaidze) and hydrometry and processing of hydrological data. The lectures were followed by practical work in both the laboratory and the field.

In spite of some language difficulties, the course was carried out successfully. The participants in general showed adequate knowledge of their field and most of them took examinations in all the subjects of the programme. They will undoubtedly be good assistants in the future in the various hydrological services of their countries.

In conclusion, it is necessary to note the excellent organization of the course by the Government of Mali and particularly by Mr. L. Keita, Director of Hydraulics in Bamako.

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(1) See Nature and Resources, Vol.II, No.1

## CONSERVATION OF NATURE AND NATURAL RESOURCES IN ETHIOPIA

In September 1963, after the IUCN (International Union for Conservation of Nature and Natural Resources) Technical meeting in Nairobi (Kenya), a Unesco mission visited Ethiopia, at the request of the Government, to study the conservation problem. Headed by Sir Julian Huxley, its members included Professor Th. Monod, Dr.B. Worthington, Mr. Lloyd Swift and Mr. A. Gille. This group made recommendations including the setting up of a conservation board with very wide powers, and of a conservation department, and recommended the appointment of two short-term consultants to advise the Ethiopian Government on its future policy in this field. The first of them was Major I.R. Grimwood, formerly Chief Game Warden in Kenya, and the second Mr. L. H. Brown, formerly Head of the Agricultural Services of Kenya. As a result of these missions, a conservation board and department were established, a legislative basis for wildlife conservation prepared, a senior game warden nominated and at present measures are being taken to create a certain number of national parks this year. At the beginning of this year, Mr. L.H. Brown carried out another three months mission in Ethiopia, a brief account of which follows hereafter. (1)

Mr Leslie Brown, who was UNESCO wildlife consultant to the Ethiopian Government from January to March 1965, and who prepared a three year wildlife development plan for Ethiopia in that year, has just returned from a three month expedition to the Bale and Arussi mountains of Ethiopia to study the Mountain Nyala Tragelaphus buxtoni. This animal is one of the two major herbivores which occur only in Ethiopia. Discovered in 1908 by Major Ivor Buxton, it was the last of the major African antelopes to be discovered. It is about the size of a Greater Kudu, or rather smaller, and lives mainly in the heath zone of high mountains at 11,000 feet and over. In rainy seasons it descends into the forests, and probably breeds there for preference.

The status of the Mountain Nyala (Tragelaphus buxtoni) has been obscure since World War II, but its range was known to have

contracted through uncontrolled destructive land usage, including felling of forests by Ethiopian peasant cultivators. However, an earlier expedition by Mr. Brown in 1963 demonstrated that in parts of the Mendebo Mountains of Bale Province it was still a common animal and was not in danger of extinction. As part of the three year Wildlife Development plan further research on its status in most of the known range was planned. Grants to carry out the research have in the event been obtained from the National Geographic Society of Washington and the World Wildlife Fund, while Unesco also made a contribution as earnest of its continued interest in the development of natural resources in Ethiopia.

In the course of his expedition Mr. Brown spent nearly two months in the mountains, and walked about 630 miles, most of this distance through very rugged country at over 11,000 feet. The rest of the time was spent in mapping, and in other official business in Addis Ababa and elsewhere. As a sideline, and as a break from the severe exertion at high altitudes, Mr. Brown studied the Great White Pelicans and other birds on the alkaline Lakes of the Rift Valley. This is another area which was considered suitable for a National Park by the Huxley Mission of 1963, and the Great White Pelican P. onocrotalus is the most remarkable of many interesting birds found there. In 1965, a breeding colony was discovered, and most of the 1966 work has been concerned with a study of this colony.

The results of the Mountain Nyala (*Tragelaphus buxtoni*) expedition are still being worked out, but it can be said that the species is not in immediate danger of extinction and that the total population probably numbers several thousands. It has been possible to make interesting comparisons with the status of the habitat of the Mountain Nyala (*tragelaphus buxtoni*) thirty to forty years



ago, from the writings of others, and, last but not least, from the direct experience of the discoverer of the animal, Major Buxton, who is still alive. Although these comparisons indicate a drastic decline in numbers in the Arussi section of the Nyala's (*tragelaphus buxtoni*) range the present day population appears healthy and is breeding well, even in areas where no forest remains.

Recommendations for the conservation of the Mountain Nyala (*tragelaphus buxtoni*) arising out of this work will include proposals for a National Park in the Bale Mountains, and the control of illegal hunting and other destructive practices elsewhere. The forests of Arussi have already been largely destroyed, but large stands of fine timber still remain in Bale, and it will be desirable for conservation work on the forests to go hand in hand with more direct measures to conserve the Mountain Nyala (*tragelaphus buxtoni*). In Ethiopia, where a programme, of conservation of natural resources is just developing, these projects will take time and will be difficult to achieve. The future of the Mountain Nyala cannot be regarded as secure until much more has been done, but the object of the expedition was to undertake research as a basis for sound conservation proposals, and these objectives have been achieved.

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Karen (Kenya).

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- (1) A certain number of copies, in English and French, of the report:

The Conservation of Nature and Natural Resources in Ethiopia

(document Unesco/NS/NR/47, of 31 January 1964) by J. Huxley, A. Gille, Th. Monod, L. Swift, E.B. Worthington,

and, in English only, of the reports:

Ethiopia - Conservation of Natural Resources (Paris, Unesco, August 1965) by I.R. Grimwood,

Ethiopia - Conservation of Natural Resources (Paris, Unesco, August 1965) by L.H. Brown,

are still available and will be sent, free of charge, on request as long as there are in stock, by writing to Unesco Regional Centre of Science and Technology for Africa, P.O. Box 30592, Nairobi, Kenya.

BIOLOGICAL INVESTIGATIONS OF THE NIMBA RANGE, LIBERIA

It is known that the Nimba Range is situated on the boundaries of Guinea, Liberia and Ivory Coast. The isolated situation of Mount Nimba in West Africa, where it is surrounded by dense rain forests and savannas, has produced an astonishingly high number of endemic species. Among the animals, not less than about 200 endemic species are known. As a result of the enormous scientific interest attached to the reserve, and through the efforts of a certain number of biologists, amongst whom Prof. Monod, former Director of I.F.A.N. played an important role, Mount Nimba was declared a strict nature reserve in 1944. The strict nature reserve of Mount Nimba covers 39,500 acres, lying across the boundaries of Guinea and Ivory Coast (of which 32,110 acres are in Guinea and 7,410 acres in Ivory Coast). However, Mount Nimba is also unusually rich in deposits of high grade iron ore and Mineral Companies began to show interest in exploiting them. Disturbed by the danger that persistently threatened not only the integrity but even the existence of the Mount Nimba Strict Nature Reserve through certain plans for mining activities, the International Union for Conservation of Nature and Natural Resources adopted at its sixth General Assembly, held in Athens in 1958, a resolution drawing the attention of responsible authorities to the incomparable scientific interest of the reserve. This resolution was not in vain as the reserve is still intact. However, another threat to Mount Nimba arose more recently from another direction, from Liberia, as a result of the discovery of unusually rich deposits of high grade iron ore on the Liberian side of the Nimba Range. The "Liberian American Swedish Mineral Co." was established and made preparations to exploit the area, and mining operations commenced in 1963. In 1959, however, Dr. Kai Curry-Lindahl from the Nordiska Museet and Skansen of Stockholm held a series of discussions with the management of

LAMCO in order to ensure that biological investigations in the area should precede commercial exploitation. Unfortunately these investigations could not be undertaken owing to the lack of funds.

Because of the unique biological character of Mount Nimba, it was natural that organizations like UNESCO and IUCN should view these developments with very great concern. Following a request of the Guinean Government, a biologist was sent in 1962 to the strict nature reserve of Mount Nimba by UNESCO, to carry on the biological study of the Range. Unfortunately this project could not be continued in the following years; a long term research programme was however established and submitted to the Guinean Government while a reference collection of biological specimens was established. As a result of the Meeting of the IUCN Executive Board in Seattle, USA, in 1962, a Nimba Research Committee was formed with Dr. Kai Curry-Lindahl as chairman and Professor Lamotte and Professor Monod as members. A research programme and budget were drawn up and presented to LAMCO. At the end of 1963 the plan was approved by the Liberian Government and the Board of Directors of LAMCO, who generously made a grant of \$ 50.000 to meet the costs of the first two years of the biological research programme. At a meeting of the IUCN Executive Board in Nairobi, Kenya, in September 1963, the Nimba Research Committee was authorised to organise field investigations at Nimba. Work commenced on August 1st, 1964, the first team of scientists engaged by the Committee being based at the Nimba Research Laboratory at Grassfield with an annex on Mount Nimba.

The first head of mission at Nimba was Dr. Malcolm Coe, of the University College Nairobi. He was succeeded by Dr. J.G. Adam, Institut Français d'Afrique Noire, Dakar, who in turn was succeeded by Dr. Jacques Verschuren, Institut Royal des Sciences Naturelles, Brussels. Other botanists and zoologists were included in the mission, together with Liberian Assistants, and

facilities given to various scientists visiting the area for shorter periods.

Dr. Malcolm Coe returned to Mount Nimba at the beginning of June for about two months in order to continue his research.

Research Committee for the Mount Nimba

Chiefs of Mission

Chairman: Dr. Kai Curry-Lindahl  
Nordiska Museet & Skansen  
STOCKHOLM  
Sweden

Dr. M. Coe  
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THE KENYA POLYTECHNIC, NAIROBI

Acting as the executing agency for the United Nations Special Fund, Unesco is supporting a six-year project at the Kenya Polytechnic to assist in the training of technicians in the fields of Mechanical, Automobile, Electrical Telecommunications and Civil Engineering and Building. These technicians have a vital role to play in the economic and industrial development of Kenya in providing the key personnel who will put into practice the ideas and policies laid down by the professional engineer and management in such fields as design, draughting, development, teaching, erecting and commissioning of plant and equipment, as well as supervising the work of craftsmen and artisans in the workshops and on the building site.

The Kenya Polytechnic was established in 1960 and took over responsibility for the training of technicians and sub-professional grades in commerce and industry from the Royal Technical College, now the University College, Nairobi. With the coming of independence in 1963, the Kenya Ministry of Education sought assistance from the U.N. Special Fund to expand and upgrade the work of the Engineering and Building Departments of the Polytechnic. The agreement was signed in March 1963 and became operational in July of the same year with the arrival in Nairobi of the first two members of the Unesco team.

The plan provides for a team of ten international experts in the various engineering specialities to advise the Principal of the Polytechnic and his staff on the choice of suitable courses of study, the layout of workshops and laboratories and the equipment required, as well as undertaking teaching duties. The Government is providing the necessary counterpart staff to the Unesco team so as to ensure the efficient continuation of the work of the Polytechnic when the assistance from the United Nations

is ended. Ten Unesco fellowships are to be awarded to give the Kenya staff an opportunity of completing their training overseas before returning to work alongside their Unesco counterparts at the Polytechnic.

Equipment costing up to \$340,000 is being provided from U.N. sources for the laboratories and workshops of the Engineering and Building Departments. With financial assistance from the U.S. Agency for International Development, the Kenya Government has authorised a building programme to provide new classrooms, laboratories, workshops and other amenities which will double the existing capacity by 1967. The overall cost of the project is estimated at approximately \$4½ million of which the Kenya Government is contributing 69%.

From a total of 450 at the inception of the scheme in 1963, the Polytechnic student enrolment in the Engineering and Building Departments had risen to 1,070 by January 1966 and is expected to reach 1,300 by 1969. The majority of the students are studying for Technicians Certificates and Diplomas awarded by the City and Guilds of London Institute and their courses follow a sandwich pattern, the students spending alternate three-monthly periods at the Polytechnic and in Industry. They are sponsored for their courses by their employing organisations and their practical and academic training programmes are integrated by regular meetings between the Polytechnic staff and representatives from industry. Entry to the technicians courses normally requires the completion of a secondary school education and the courses are of three to five years duration depending on the field of specialisation. After completing their training, the Polytechnic graduates will fill supervisory posts in Government Departments, with local authorities and in the public services as well as in private industry.

The project is one of the largest of its type authorised by the U.N. Special Fund. Its implementation has required close collaboration between the Government, the Polytechnic staff, the Unesco team and industry. Its success will have an increasingly important effect on the industrial expansion and economic development of Kenya.

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CONFERENCE ON ENGINEERING EDUCATION IN EAST AFRICA  
4TH ANNUAL SESSION AT KAMPALA

Project leaders of the UNESCO Missions at University College, Nairobi, Kenya Polytechnic, and Uganda Technical College were among the representatives of educational institutions, Government Ministries and industry from Kenya, Uganda and Tanzania when the Conference on Engineering Education met at Kampala on 4th & 5th May 1966 for the 4th Annual Session. Previous sessions of the Conference had taken place in Nairobi (1962, 1965) and Dar-es-Salaam (1963) and this first session in Uganda was opened by the Permanent Secretary in the Ministry of Education, Uganda on behalf of his Minister.

In his opening address, the Permanent Secretary suggested the theme of this year's conference - the problems facing educators of engineering subjects in East Africa. Representatives from industry said that the young entrants to Technical training schemes often lacked adequate background, because many of them came from rural and pastoral areas; they had no clear objective in mind and drifted from employment to employment attracted only by immediate prospects of better salaries and unconcerned about future careers. The practical questions relating to improvement of teaching techniques, dissemination of information about engineering careers, apprenticeship schemes etc. were all discussed at the Conference.

To the problem about lack of adequate background, the Conference suggested a practical method of attack. A booklet on Careers in Engineering had been published under its auspices, and was being circulated to schools, careers masters and large organisations. It had sponsored a series of Television programmes, broadcast by the Voice of Kenya and produced by Dr. D. Taylor, Head of UNESCO Mission at the University College, Nairobi.



So popular had been the first series of 13 programmes that Dr. Taylor had been asked to produce a second series of 13 programmes. It is hoped that the T.V. series will be followed by a series of sound broadcasts which will have an even wider audience. The Uganda Technical College had prepared a mobile exhibition which toured schools in Uganda and had proved a great success. Government Ministries were producing careers information for the guidance of school children. So, the problem of improving the knowledge about engineering was being tackled vigourously, and the effects would be apparent as the newer generation of children graduated from High Schools.

Dr. F.A. Varley, Head of UNESCO Mission at the Kenya Polytechnic reported on a Seminar on the teaching of Engineering Drawing which was organised by the Conference and of which he was Chairman. The delegates discussed the difficulties experienced and suggested possible methods to overcome the problems. The Conference accepted Dr. Varley's suggestion that further seminars on the teaching of other technical subjects should be organised.

Dr. Taylor also spoke of his work on the use of Programmed Learning for teaching of specialist technical subjects, and considerable interest was aroused in this method. Dr. Taylor agreed to look into the possibility of a UNESCO-sponsored workshop to give guidance and training for preparation of appropriate texts for use by engineering teachers at different levels.

Prof. Royston Jones, Dean of the Faculty of Engineering at the University College Nairobi gave a preliminary report on the projects which were carried out for the final year of the B.Sc. engineering degree at the University College. Further consideration would have to be given after the scheme has been running a few years to evaluate its effectiveness.

Mr. D.H.W. Hykin, of the UNESCO project at the Kenya Polytechnic read a paper on the organisation of experimental work in engineering courses and he presented examples of the work of the Polytechnic students to illustrate his remarks. Delegates from the various teaching institutions expressed interest in the suggestions made by Mr. Hykin.

A distinguished visitor to the Conference was Mr. B.H.Henson of the City & Guilds of London Institute, and his paper on the ways in which the C. & G. could help developing countries was well received. The paper from Mr. S.S. Roed, Head of the UNESCO project at the Uganda Technical College examining the possibility of establishing an East African Examinations Board for Technicians was considered with Mr. Henson's paper and the Conference recommended the setting up of an Advisory Council on an East African basis to take the first steps towards the formation of such a Board.

The Conference deliberations indicated that there was something wrong with the salary structure that existed in East Africa whereby there was no relation between the amount of training required for a trade or profession and the salary paid for the job. The Conference strongly recommended that Governments would have to examine this question in detail to iron out the anomalies. Only then could the drifting of trainees from job to job cease.

There was general approval of the trends in East Africa towards the introduction of more technical subjects at the secondary school stage, and further progress towards improving the engineering background was expected as a result. Some delegates thought that technical subjects could also be introduced at the primary school level.

The provision of adequate practical training in East Africa for graduates of the University College Nairobi is a very big problem because of lack of proper facilities. A paper was presented to the Conference by Prof. C.A. Judson and his colleagues from University College, Nairobi suggesting a possible answer to this. The scheme suggested a two year post-graduate training programme in the workshops of the University College, combined with lectures and special training periods in industry. There was a lively discussion and some constructive modifications to the original plan were put forward. Prof. Judson agreed to revise his scheme taking account of the discussions and that will probably be discussed at a future session of the Conference Working Party.

The Dar es Salaam Technical College have an A.I.D. (Agency for International Development) team from California Polytechnic and they are trying out a new teaching curriculum to integrate theory with practice. The leader of the Team, Mr. M. Belcher, read a paper on the progress made so far and he was closely questioned on the details of the suggested programme.

The overall impressions of the Conference were that many practical decisions had been taken which would go a long way towards finding the answers to the problems raised. The next session will be held in Dar es Salaam in 1967 and it will then be seen what results have been achieved and what more needs to be done.

Mr. P.G. Bhagwat  
Senior Lecturer  
Department of Electrical Engineering  
Hon. Secretary to the Conference  
University College Nairobi  
P.O. Box 30197  
NAIROBI, (Kenya).

### VACANT TEACHING POSTS IN AFRICA

Nearly 1800 vacant teaching posts in Africa were brought to Unesco's attention before 1 March 1966 by government agencies and universities in the countries concerned - 585 in universities, 867 in secondary schools, 133 in teacher training colleges and 194 in technical educational institutions.

This information is to be found in Teachers for Africa, just published by Unesco as the fifth in a series of documents aimed at helping African countries recruit teachers from abroad for their secondary, post-secondary and higher educational institutes during 1967-68.

The brochure lists qualifications required, language of instruction, dates for the period to be covered, and names and addresses of the organizations where application should be made. No applications or enquiries should be addressed to Unesco itself.

Teachers for Africa also lists nearly 300 national bodies recruiting teachers from abroad and for abroad which can be consulted directly.

This brochure can be obtained without charge by writing to: Unesco, Teaching Abroad, Place de Fontenoy, Paris 7e, France.

### THE REGIONAL SCHOOL BUILDING CENTRE FOR AFRICA

The Regional School Building Centre for Africa, sponsored by Unesco, has his offices in Karthoum, Sudan. The Centre has just started a study of international developments in the expansion of existing and the creation of new universities. The study includes town planning, campus planning and the design and construction of new buildings.

A questionnaire has been sent to universities with a view to get all necessary information about existing development plans. A detailed study of the most significant examples will be undertaken, later this year, by a research scholar from the Zentralarchiv fuer Hochschulbau, Stuttgart. The same kind of studies will be carried out in Asia, Europe and America and the results will be published at the end of 1967.

P.O. Box 1720  
Khartoum, Sudan.

### AVAILABILITY IN EAST AFRICA OF BOOKS ABOUT AFRICAN PLANTS

Three lists have been prepared by the staff of the E.A. Herbarium, P.O. Box 5166, Nairobi giving the titles, prices and places where obtainable of (a) Works of botanical interest published and on sale by the Governments of Kenya, Tanzania and Uganda (b) African floras prepared by the British government (c) Works dealing with African plant taxonomy, plant ecology and kindred subjects which are, or should be, on sale in Nairobi. Copies of the lists are obtainable from the E.A. Herbarium.

UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA

The Commission published in April the fifth issue of its Training Information Notice giving briefs on select training opportunities offered by Governments, International Organizations, National Institutions and others and on the following Fellowship and Scholarship facilities:

International Post-Graduate Training Programme in Science and Technology sponsored by Unesco ( Continuing Yearly Programme);

Post-graduate Course at the Water Resources Development Training Centre of Roorkee, India;

Post-graduate Programme and other courses in Management Development at the India Institute of Management, Calcutta;

United Kingdom's Special Courses designed for Trainees from Developing Countries, 1966/67.

For further information please write to:

Chief, Training Section,  
Economic Commission for Africa,  
P.O. Box 3001,  
ADDIS ABABA,  
Ethiopia.

NATIONAL COMMISSIONS FOR UNESCO IN AFRICA

The following countries in the region covered by the Unesco Regional Centre for Science and Technology for Africa have already established a National Commission for Unesco:

BURUNDI

Monsieur le Secrétaire permanent  
de la Commission nationale du  
Burundi pour l'Unesco  
Ministère de l'Education  
nationale et de la Culture  
B.P. 1990  
Bujumbura

CAMEROON

Monsieur le Secrétaire général  
de la Commission nationale de  
la République Fédérale du  
Cameroun pour l'Unesco  
Yaounde

CHAD

Monsieur le Secrétaire général  
de la Commission nationale  
tchadienne pour l'Unesco  
Ministère de l'Education  
nationale  
Fort-Lamy

CENTRAL AFRICAN REPUBLIC

Monsieur le Secrétaire général  
de la Commission nationale de  
la République Centrafricaine  
pour l'Unesco.  
Ministère de l'Education  
nationale  
B.P. 791  
Bangui

DEMOCRATIC REPUBLIC OF CONGO

Monsieur le Secrétaire général  
de la Commission nationale du  
Congo pour l'Unesco  
B.P. 493  
Brazzaville

DAHOMY

Monsieur le Secrétaire général  
de la Commission nationale du  
Dahomey pour l'Unesco  
Ministère de l'Education  
nationale  
Cotonou

ETHIOPIA

The Director General  
Ethiopian National Commission  
for Unesco,  
Ministry of Education  
Addis Ababa

GABON

Monsieur le Secrétaire général  
de la Commission nationale  
gabonaise pour l'Unesco  
B.P. 813  
Libreville

GHANA

The Secretary  
Ghana National Commission for  
Unesco  
c/o The Principal Secretary  
Ministry of Education  
P.O. Box M.45  
Accra

GUINEA

Monsieur le Secrétaire général  
de la Commission nationale de  
la République de Guinée pour  
l'Unesco  
Ministère de l'Education  
nationale  
Conakry

IVORY COAST

Monsieur le Secrétaire général de  
la Commission nationale de la  
Côte d'Ivoire pour l'Unesco  
Ministère de l'Education nationale  
Abidjan

KENYA

The Chairman  
Kenya National Commission for  
Unesco  
Ministry of National Education  
Nairobi

LIBERIA

The Chairman  
Liberian National Commission for  
Unesco  
Department of Public Instruction  
Monrovia

MALAGASY REPUBLIC

Monsieur le Secrétaire général  
de la Commission nationale de la  
République malagasy  
Ministère de l'Education nationale  
Tananarive

MALI

Monsieur le Secrétaire général de  
la Commission nationale malienne  
pour l'Unesco  
Ministère de l'Education nationale  
B.P. 119  
Bamako

MAURITANIA

Monsieur le Secrétaire général de  
la Commission nationale de la  
République Islamique de Mauritanie  
pour l'Unesco  
B.P. 349  
Nouakchott

NIGER

Monsieur le Secrétaire général de  
la Commission nationale de la  
République du Niger pour l'Unesco  
Ministère de l'Education nationale  
Niamey

NIGERIA

The Secretary General  
National Commission of Nigeria  
for Unesco  
Federal Ministry of Education  
Lagos

RWANDA

Monsieur le Secrétaire général  
de la Commission nationale  
rwandaise pour l'Unesco  
Ministère de l'Education  
Kigali

SENEGAL

Monsieur le Secrétaire général  
de la Commission nationale du  
Sénégal pour l'Unesco  
a.b.s. du Ministère de l'Educa-  
tion nationale  
Dakar

SOMALIA

The Secretary General  
National Commission of Somalia  
for Unesco  
Ministry of Education  
Mogadiscio

TANZANIA

The Secretary General  
National Commission for Unesco  
Ministry of Education  
Dar es Salaam

TOGO

Monsieur le Secrétaire général  
de la Commission nationale de  
la République du Togo pour  
l'Unesco  
Ministère de l'Education nationale  
Lomé

UGANDA

The Secretary General  
Uganda National Commission for  
Unesco  
Ministry of Education  
Parliamentary Buildings  
P.O. Box 263  
Kampala



UPPER VOLTA

Monsieur le Secrétaire général de  
la Commission nationale de la  
République de Haute-Volta pour  
l'Unesco  
Ministère de l'Education nationale  
Ouagadougou

### SCIENTIFIC OUT-OF-SCHOOL ACTIVITIES

BY H. ZUBERI

The 13th Session of the Unesco General Conference gave a mandate to the (Unesco) Secretariat to advise the National Commissions with a view to promoting youth activities related to science clubs and fairs (13C/5, Project 2.122.5: stimulation of interest in science).

As a first step, the Secretariat is preparing a Directory of the Science Clubs and Out-of-School activities in Member States to help possible organisers of such activities, and a questionnaire has been sent to the National Commissions. The last date for the completed questionnaire to reach Unesco headquarters in Paris was 1 June 1966, but they will now be accepted during the months to come.

The reader, of the present note who may have any information about such clubs are requested to kindly communicate it to the Unesco National Commissions in their country. A list of these African National Commissions for Unesco is given in the present Bulletin, pages 53 and 54.

INTERNATIONAL CARTOGRAPHIC BIBLIOGRAPHY 1963

Published under the auspices of the Comité National Français de Géographie and the International Geographical Union with the assistance of the United Nations Educational, Scientific and Cultural Organisation (Unesco) and of the Centre National de la Recherche Scientifique

by  
M. Foncin, A. Froehlich, P. Sommer

Paris  
Armand Colin  
1965

726 pp.

AFRICAN MUSEUMS

Museum, the Unesco quarterly publication which serves as a survey of activities and means of research in the field of museography. In its last issue but one, (Vol. XVIII, No. 3 1965) it dealt exclusively with the "Role of Museums in Contemporary Africa". The contents included: The Role of Museums in Contemporary Africa, by R. Gassain; Training Centre for Museum Technicians in Africa, Jos (Nigeria), by J.C. Muller; An Experimental Mobile Museum for Tropical Africa, by M. Daifuku; The Museums of Senegal, by J. Gérard; The Sierra Leone Museum, Freetown, by J.S. Stone and H.U. Cole; The Museums of Cameroun, by I. Paré The Chad National Museum, Fort-Lamy, by J.P. Lebeuf; The National Museum of Ghana, Accra, by R. Nunod; The New National Museum of Ghana, by F. Minissi; Preservation of the Cultural Heritage in Tropical Africa, by P. Coremans.

PUBLICATIONS AVAILABLE AT THE CENTRE

A certain number of copies of the publications mentioned below are still available at the RCSTA. They will be forwarded on request and without charge to interested persons as long as there are in stock.

1) Proceedings of the First World Conference on National Parks

Seattle, 1962

Edited by Alexander B. Adams

US Government Printing Office, 1964, 471 pages

2) The planned development of scientific research in Africa

by Malcolm S. Adiseshiah, Deputy Director-General of Unesco.

Reprint of an article published in "Impact", vol. XIV (1964), No. 3.

Paris, Unesco, 1964, 10 pages

3) The activities of Unesco in science and technology

Unesco information manuals

Paris, Unesco, 2nd impression, 1965, 24 pages

4) Technical and vocational education and training UNESCO/ILO

Recommendations by Unesco and the International Labour Organisation.

Paris, Unesco, 1962, 36 pages

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