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East Africa High Commission:
(13) The East African Industrial
Research Board

Washington, D.C.
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Dear Mr. Rogers:

The East African Industrial Research Board was established in 1942 and was used during the remainder of the War to advise technically local industry while advice from abroad was difficult to obtain and to stimulate the maximum use of natural resources within East Africa. It continued in this role after the war, but with a smaller staff and decreasing responsibilities. On January 1, 1948 it became a Department of the East Africa High Commission.

From 1942 through 1947 - prior to the inception of the High Commission - the Board included a Chairman or Acting Chairman, a Technical Secretary, a Corresponding Member (the Overseas Consultant), and eight other members. In 1945 the Scientific and Technical Staff included, besides the Chairman, Technical Secretary, and Overseas Consultant, a Ceramics Specialist and a Ceramic Assistant, a Chief Chemist and seven Chemists, an Assistant Engineer and a Local Consultant - a total of fifteen. The original staff of 20, assembled under wartime conditions and including refugees and prisoners of war, was reduced to eleven due to departures at the end of the war. There were continuing difficulties in maintaining adequate staff in 1947. By the end of the year two more chemists had been added to the staff making six with the Chief, but the Ceramic Assistant had resigned. Through 1946 there were nine Panels of Honorary Research Advisers, each with three to seven members, to advise respectively on Heavy Chemicals (General); Heavy Chemicals (Phosphatic Fertilisers); Timber Protection; Ceramics; Insecticides (Fyrethrum); Oils and Fats; Leather Technology; Foods, Drugs and Vitamins; Fuel Research.

In addition to the Board, there were in existence a Tanganyika Industrial Committee and a Uganda Industrial Committee. The Uganda Industrial Committee, which included the Commissioner of Mines, the Director of Geological Survey, the Director of Supplies and two other members, and which supervised workshops, a Spinning and Weaving Center in Kampala, and a Pottery at Entebbe, was disbanded at the end of 1945. The properties under its supervision were turned over to government departments. The Tanganyika Industrial Committee through 1947 included the Government Chemist as Chairman and Executive Officer and eight or nine other members. The Committee had a technical staff which worked in the Chemical Laboratory. Much of the Committee's work was done in the laboratory, increasing the amount of industrial work done there, and at times there was some confusion between the work of the Committee and that of the Government Chemist, whose laboratory had operated on a departmental basis before the war. The laboratory carried out considerable general analytical work and gave advice, in response to inquiries from industrialists, on a wide range of manufactures. In addition to laboratory activities, the Committee administered a Totuquina Factory, which produced crude totuquina processed

into powder and tablets from cinchona bark, until mid-1948. The Committee also assisted the Hones Factory which was administered under the Geological Division of the Department of Lands and Mines until it was closed in October, 1945. The wartime work of the two territorial Committees was associated with the work of the Industrial Research Board in its efforts to increase East African production and to cope with wartime shortages of certain essential materials.

The Industrial Research Board was credited with a number of useful findings prior to 1946. Much of its work was done for East African Industries Ltd., under the Industrial Management Board or Corporation, which was set up under the auspices of the Kenya Government to produce pilot plants for the manufacture of items in short supply during the war. A process utilizing Kenya silica and soda ash for making a special fertilizer from raw rock phosphate at Tororo, Uganda; an advanced type of electric tunnel kiln for local ceramic projects; the laboratory work prerequisite for the initiation of the pottery projects of East African Industries, Ltd; and processes for the manufacture of sulphuric acid, copper sulphate, aluminium sulphate, and sodium silicate were among the developments credited to the Board. The latter were being produced by East African Industries, Ltd. by 1945. The control laboratory of the Management Board was partially planned by the Industrial Research Board. Technical advice was given to ceramics manufacturers and experimental work was done on pottery, refractories, bricks and roofing tiles, and other fired low-cost building materials, including murrum, possualanas (for mortar), and mixtures of clay with quarry waste and fibres. Laboratory analysis of salt samples and special advice on native and commercial production of salt from salt lakes was effected to improve the quality of salt and to assess industrial possibilities in Uganda.

studies of

Prior to 1946 locally produced soaps were analysed, and the possibility of using oils other than coconut were carried on in an attempt to improve the local soap-making industry. Similarly, to better the quality and quantity of oil produced in local seed pressing mills, a chemist examined the extractive methods of cottonseed and copra mills and made detailed recommendations for improvements. Improvement of pyrethrins extraction from undried flowers and the proper treatment of streams polluted by the waste products of coffee and sisal processing afforded further objects for study and reports. In addition, the economic aspects of possible new industries were studied, and 15 technical pamphlets were published.

In September 1946, after two years of planning and discussion in East Africa and London, two experts from the UK, Professor J.I. Simonsen, Director of Colonial Products Research Council, and Sir Ian Heibron, Professor of Organic Chemistry at the Imperial College of Science and Technology, London, visited East Africa to study the region's needs for a permanent industrial research organization which would incorporate the Industrial Research Board. In 1947 E.B. Worthington, Scientific Secretary to the Conference of East African Governors, and the Industrial Research Board were concerned with negotiations for the early establishment of a permanent organization, and a memorandum so urging was submitted to the territorial governments and the Colonial Office. However, no permanent organization had been created by the time the Board came under the High Commission, although agreement to the engagement of a Director of East African Industrial Research was obtained in 1949 and the appointment was made in 1951. In 1951 the project was considered further with regard to metallurgical and other industrial research

needs which could arise from developments made possible by the Owen Falls Power Scheme in Uganda and by future exploitation of coalfields in Tanganyika, but no final decision was reached that year, or even by the end of 1952 after a meeting of territorial representatives had agreed to press for a more effective research organization financed by Kenya and Uganda. The Chairman of the High Commission, in early 1952, explained the delay in establishing the permanent organization as follows:

"This delay is attributable to the difficulty of determining, to the satisfaction both of experts in the United Kingdom and the East African Governments, precisely what scope a scientific and industrial research unit in East Africa should have. It is generally agreed in East Africa that an organization capable of undertaking chemical and metallurgical research, and research into building and road materials, should be the aim. It has, unfortunately, not so far been practicable, for financial reasons, to obtain agreement as to when such an organisation should be established and in what stages."¹

The Tanganyika Government has apparently not favored the expansion. In 1947 the Government stated that in view of communications and the fact that the laboratory was operating in Nairobi they did not consider they were getting sufficient use from the organization to warrant their making a further contribution to it.

The entire period 1945-1953 was one of transition and uncertainty for the Board, which continued its relatively limited operations with the expectation that these could be expanded once a decision was reached to establish a permanent organization. The 1952 report of the Board states, "Until a permanent organisation is established it will be impossible to extend activities to include civil engineering or metallurgical investigations on a scale that is desirable."²

The reconstituted Industrial Research Board has included representatives of the High Commission and the three territories - "members of the legislatures and officials concerned with Government policy in regard to industrial development."³ The Administrator of the High Commission is Chairman. The Board now has a Scientific and Advisory Committee including the Director of East African Industrial Research as Chairman, and scientific and technical representatives of the three territories "supported by a panel of persons specially qualified in particular branches of science and technology."⁴ The Advisory Committee was created largely from the membership of the old Board. The Standing Finance Committee of the Central Assembly, during its discussion of the future of industrial research in 1951, recommended that closer liaison with the legislatures and industrial interests might be ensured if the Board were reconstituted. The Industrial Research Board agreed to this at its second meeting in 1951. The old Board met twice in 1948 and 1951 and three times in 1949 and 1950.

The Scientific and Technical Staff of the Industrial Research Board during the period 1948-1952 has consisted of from seven (in 1949) to eleven (1951 and 1952) members. Each year the staff had included the Chairman (who became the Director in 1951), a Ceramic Specialist, the Overseas Consultant (the Corresponding Member of the old Board), a Chief Chemist and usually four (in 1949 there were only two) other Chemists or Scientific Officers, as they were renamed, and one to three Scientific Assistants. In 1951 and 1952 a Visiting Research

Officer, National Institute for Medical Research of Great Britain, was also attached.

The laboratories of the Board remained in temporary buildings as late as early 1952, and were equipped primarily for chemical research and work on ceramics and refractories. A technical library of some 850 volumes had been built up by 1945, on industrial subjects, a number of periodicals and pamphlets were also included, and arrangements had been made for receiving photostats of publications from the UK. By 1950 the library included some 3,000 items in all. The library was intended to become a source of general scientific information as well as of material on industrial questions.

The Tanganyika Industrial Committee was reconstituted January 1, 1948 as an advisory body. With transference of its technical staff to the Government Chemist who reacquired departmental status, the responsibility of the Committee for manufacturing operations ceased early in 1948. The Committee early in 1948 apparently consisted of only three members although its constitution also allowed for one member nominated by the Director of Agricultural Production and three others to be drawn from commerce and coopted from time to time. The Government Chemist acts as Executive Officer of the Committee and laboratory work required by the Committee is considered part of his normal duties.

The expenditures (in £) of the East African Industrial Research Board in 1948-1950 were as follows:

	<u>1948</u>	<u>1949</u>	<u>1950</u>
<u>Administrative and General</u>			
Personal Emoluments	2,292	3,538	2,534
Other	<u>703</u>	881	<u>1,285</u>
Total	2,995	<u>4,419</u>	3,819
<u>Research and Development</u>			
Personal Emoluments	5,811	9,289	9,031
Other	<u>2,700</u>	<u>3,402</u>	<u>3,358</u>
Total	8,511	<u>12,691</u>	12,389
<u>Grants</u>			
Tanganyika Industrial Committee - Special Research Projects	866	1,093	2,115
<u>East African Industrial Research</u>			
<u>Organization</u>			
Recurrent		93	
Extraordinary (house, office, furniture for Director - C.D.&W. Scheme R. 330)		<u>270</u>	<u>3,482</u>
Total		<u>363</u>	3,482
TOTAL	12,372	18,566	21,807

Revenue was £978, £825, £1,373 respectively in the years 1948, 1949 and 1950, and came mainly from laboratory services.

The expenditures on the general activities of the Board, after certain income derived from fees for services are deducted, are met by equal contributions from Kenya and Uganda. Expenditures of the East African Industrial Research Organization - including those for the Director, his secretary and staff - are treated separately. The UK contributes 100 percent of the capital cost and a proportion of recurrent cost. Of the balance of recurrent cost, one-half is contributed by Kenya and one-quarter each by Uganda and Tanganyika. Tanganyika's extremely small contribution to the Industrial Research Board is thus apparent.

Although the facilities for industrial research remained limited, in the absence of agreement on a new enlarged permanent organization, work on a wide range of subjects - ceramics technology, processing of fertilizer, extraction of pyrethrins, water pollution etc. - has been undertaken by the Board since the beginning of 1948.

The ceramics work of the Board has ranged over pottery, refractories and building materials. Each year it has carried out many routine tests of ceramics materials and products, given advice to manufacturers and carried on experimental work designed to improve production. In 1948 the Ceramic Specialist made routine tests of pottery bodies and glazes, advised improvements in the pottery and refractories manufactured by the East African Industrial Management Board, and designed new muffles for use in its tunnel kiln. A process of clay glazing pottery (including decorated ware) which requires little manual skill (earlier pottery had not been of high quality because of the Africans' lack of skill in dipping) was developed on a laboratory scale in 1948 and 1949, and development on a commercial scale was subsequently investigated. In 1950 the commercial manufacture of pottery was discontinued by the only large pottery operating in Kenya, because of Japanese competition, though two small scale potteries, one in Zanzibar and the other in Kenya, were being established utilizing the experience of the Board.

By 1949 the Board had evolved in the laboratory a successful method for converting Kyanite (including fines unsuitable for export) into mullite refractory grog, and that year prepared a design for a furnace to produce grog. In 1950 production was established commercially. Methods of assessing the friability and porosity of the product were instrumental in bringing it up to the standards of the Indian equivalent. The Board also investigated the production of higher grade bricks made of kyanite grog bonded with various materials and various methods of binding fine kyanite for heating in a rotary kiln.

The Board has examined large numbers of clay samples for suitability in the manufacture of bricks and tiles. From 1948 through 1950 the Board experimented on the manufacture of Broseley tiles from Kiambu sub-soils and finely ground quarry debris. Partition bricks were made from fired diatomite-clay mixes, but the Board suggested that these would not be economical compared with pumice cement partition blocks unless manufactured on a large scale in a modern plant. Diatomite insulating slabs bound with sisal, the pussualana type of cement, and the manufacture of cement from Tororo limestone and clays were objects of further testing and design. In 1950 the Ceramic Specialist made a tour of brick making plants in the southern Sudan and reported to the Sudan Government on the possibility of making clay roofing tiles.

Advice was given in 1948 to two manufacturers of drain pipes in the UK who were interested in the possibilities of establishing a factory in East Africa.

One of these firms sent a representative and applied for a license in 1949. The Board carried out tests for this firm in 1949, and in 1950 and 1951 devised for it a lava glaze, made from a shale occurring near Mombasa, which can be fired at a lower temperature than the traditional salt glazes. The projected manufacture of glazed drainpipes from Mombasa shale, however, did not materialize. An alternative clay deposit was found near Nairobi from which a ripe body which would take a lava glaze could be prepared.

The Board continued experimental work on silicophosphate, the phosphatic fertilizer made of Tororo phosphate and soda ash, which had first been produced by the Board, following small-scale laboratory trials, in a pilot rotary kiln in 1945. In 1948 and 1949, as in 1945-1947, the Board produced supplies (20 tons in each year) of this fertilizer for use in field trials to determine yield effects of silicophosphate on annual crops and its effect in accelerating soil restoration under grass covers. Subsequent trials were carried out by the Agricultural Departments of the three East African territories and the Sudan and the results were correlated by the East African Agriculture and Forestry Research Organization. Studies essential to the design of a large scale production plant were continued in 1948. Further experiments and tests, with assistance from the Research Division of the Imperial Chemical Industries, the Building Research Station and Dr. Agrell of Cambridge University, culminated in the establishment of commercial production of the product in 1950. Related processes had been studied, refined and elaborated from 1948. In view of the seasonal need for fertilizer the storage properties were tested.

Following laboratory scale investigations begun in 1945, a three stage counter-current process for the extraction of pyrethrins from undried flowers was developed in 1947. This process seemed to compare favorably with existing methods of dried flower extractions. It has the advantages of cheaper production costs for the planter (since it eliminates the drying process) and a saving of wood fuel, but the disadvantage of a more complicated plant. Laboratory work in 1948 indicated the further advantage that larger amounts of pyrethrins could be obtained from fresh flowers. Moreover, ground fresh flowers could be extracted much more quickly than dried flowers so that a plant using fresh flowers would have a greater output. Work in 1949 and 1950 yielded a method which produced small increases in the pyrethrin extracted but this would be difficult to apply in practice on a large scale. Observations were made on the effect of storage conditions on the pyrethrin content of fresh flowers, and in 1948 the laboratory was associated in a world wide scheme to establish standard methods of analyzing pyrethrum flowers.

A study of methods to avoid pollution of rivers caused by processing of coffee and sisal, financed by the Development and Reconstruction Authority of Kenya and begun in 1946, was completed in 1948. This work, outlined in collaboration with the Water Board of Kenya, was done by a chemist seconded by the Water Pollution Research Station of the Department of Scientific and Industrial Research. The Industrial Research Board provided a laboratory and two junior members of its staff to carry out routine analyses. With sisal waste, screening^{and} biological filtration with re-use of the filtered waters was the most promising treatment. Dry decortication of the leaf also reduced the amount of pollution. For coffee waste waters, the best method was biological filtration and re-use of the partially purified liquid.

A research project has been concerned with the extraction of a valuable product from the waste of dry-decorticated sisal. Hecogenin, from which the expensive drug cortisone for the relief of rheumatoid arthritis can be synthesized, has been extracted in pilot quantities under the direction of an officer from the National Institute for Medical Research. Larger scale extraction on sisal estates in East Africa, which was reported being arranged in 1952, indicated considerable dollar earning possibilities.

Various woods were distilled in 1951 and 1952 and wattle char was found to be a suitable metallurgical charcoal. Assessment of the properties of wood tar for fuel, timber preservation or road treatment was to be undertaken. Another fuel was being sought experimentally in methane gas resulting from fermentation of vegetable matter, sisal and papyrus, for drying, power generation or as a motor fuel. Other investigations included yield of furfural from cotton seed hulls, the preparation of Plaster of Paris from the Mkomazi deposit of gypsum in Tanganyika, the reduction of coffee husk bulk for use as a substitute for bran in feeding cattle, and the determination of oil yields from nuts and seeds.

A large amount of analytical work, not directly in the nature of industrial research, but necessary because no other suitable laboratories were available, has been completed. This analytical work for manufacturers amounted to about one-third of the total effort in 1953. Assays of Kilembe copper, Kenya kyanite, and limestone for cement were included. Silt contents of river waters were determined for the Kenya Public Works Department. In 1949 and 1950 the Board investigated the possible utilization of soda resources of Lake Nakuru where a company was formed to exploit the salt deposits.

The Board's Overseas Consultant in London serves as its main link with industrial research in the UK. He visited East Africa in 1947 and again in 1950 when he advised mainly on industrial development in Uganda. The Board has for years maintained close contact with a number of Research Stations of the Department of Scientific and Industrial Research which seconded a chemist to work on water pollution in Kenya during the period 1946-1948; also with the British Ceramic Research Association, the Imperial Institute, and the Colonial Products Research Council. Close liaison is also maintained with the Councils of Scientific and Industrial Research of South Africa and Australia and with the UK Scientific Mission in Washington. In September and October 1948 the Acting Chairman of the Board, together with the Overseas Consultant, Dr. A.J.V. Underwood, another member of the Board, Dr. K.A. Davies, and Mr. C.R. Westlake, visited the United States to study modern methods of processing phosphatic and nitrogenous fertilizers and the utilization of newer types of fertilizers.

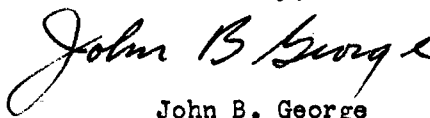
A survey of the work of the Industrial Research Board indicates that it has served primarily two of the East African territories - Kenya and, perhaps to a lesser extent, Uganda - and it has been financed mainly by these two territories. The Kenya Company, East African Industries, Ltd. - now under a three sided partnership of the Industrial Management Board, a Kenya Government Corporation, Unilever, Ltd., and the Colonial Development Corporation* - has in particular received considerable advice from the Industrial Research Board. Unofficial

* East African Industries, Ltd. before October 1953 was financed by the Industrial Management Corporation, a Kenya Government Corporation, and the Colonial Development Corporation. In 1952 when the company suffered a considerable financial loss all its plants except hydrogenation formulations and

European members in the Kenya Legislative Council have, nevertheless, expressed the view that Kenya was contributing too large a proportion of the cost of the Industrial Research Board. Kenya Government officials have replied that the contribution was correct and that the Board was essential to Kenya. Late in 1950 the Kenya Secretary for Commerce and Industry stated in Legislative Council:

"We hear a good deal about the need for increasing industrial development and I have no hesitation in saying that if this organization was not provided on the present basis, the Kenya Government would, without any doubt, have to operate such an organization, possibly on a modified scale, but certainly costing more than the contribution that we are now required to spend."5

Sincerely,



John B. George

refractories were closed down and it was decided that "drastic measures" were necessary. In October, 1953 a new three sided partnership for East African Industries came into effect with the signing of an agreement by representatives of the Industrial Management Corporation, the Colonial Development Corporation, and Unilever Ltd. Under the agreement Unilever Ltd. assumes technical and managerial control, providing specialized management and experienced staff, the Colonial Development Corporation provides substantial working capital. Unilever become substantial shareholders in the company. The new Board consists of a chairman and managing director appointed by Unilever, one representative of the Industrial Development Corporation (initially the Member for Commerce and Industry of the Kenya Government) and the Regional Controller of the Colonial Development Corporation. The Unilever Board agreed to spend more than £75,000 on new machinery and plant. It was planning, in addition to the production of edible oils and fats, the manufacture of margarine from local raw materials as the first step in an expansion program.

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Footnotes

1. East Africa High Commission, Interterritorial Cooperation: Work of the East Africa Central Legislative Assembly, Despatch No. 1/52, 19th May, 1952, from F.E. Mitchell, Chairman, East Africa High Commission to Secretary of State for the Colonies, par. 91.
2. East Africa High Commission, East African Industrial Research Board Tenth Annual Report 1952, p. 2.
3. Despatch No. 1/52, par. 93.
4. East Africa High Commission, East African Industrial Research Board Ninth Annual Report 1951, p. 2.
5. Kenya, Legislative Council Debates, 3rd Session, 1st Sitting, December 1, 1950, 581.

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