

FILE 413

**IMPERIAL INSTITUTE
& IMPERIAL AFFAIRS**

Sept. 26th. 1919.

The Secretary,
The Imperial Education Committee,
War Office,
Cornwall House,
Stamford Street,
LONDON, S.E.1.

Dear Sir,

I desire to acknowledge the receipt of your letter of Sept. 8th. 1919, stating that R.Q.M.S. Francis J. Toole, Royal Army Medical Corps, has been awarded a grant by the Imperial Education Committee to enable him to pursue a three years course in Science at McGill University, Montreal.

I have also received your communication under date Sept. 9th. 1919, stating that Lieut. E. Penney, Royal Engineers, has received a grant to enable him to pursue a course extending over 1½ years in Chemical Engineering at McGill University.

I am writing to report that both of these gentlemen have arrived and have entered upon their respective courses of study.

I shall see that each term a report is forwarded to the Service Students Bureau, Board of Education, Whitehall, London, S.W.1, concerning the progress and conduct of these students.

I have to request that the first instalment of the award to which reference is made in your communication be forwarded to the University in payment of their annual fees and ^{their} maintenance allowance. The fees in the case of each of these students amount to \$207. 00.

I have the honour to be,

Yours very sincerely,

J. A.



Sackville, N. B., Oct. 14, 1919.

Dr. Frank D. Adams,
McGill University,
Montreal, Que.

Dear Sir:

I note what you say in yours of the 9th inst. with regard to the assistance offered by the British Government to Ex-Service Students. Eight of our men were preparing to send in applications and of course are greatly disappointed. However, several of them have expressed a desire to have blank forms in order that they may possibly make application later to continue their studies in England. Kindly send me as many as you can up to eight.

Yours very truly,

H. C. Jordan

BCB/L.

CANADIAN NATIONAL RAILWAYS

OFFICE OF DIRECTOR OF PUBLICITY

W. S. THOMPSON,
DIRECTOR OF PUBLICITY.

MONTREAL, QUE. September 21, 1926.

IN YOUR REPLY REFER TO

Sir Arthur Currie,
McGill University,
MONTREAL.

Dear Sir Arthur:

Following our meeting yesterday
the following cable was sent to our publicity
department in London, England:

"McGill University specially
interested in all Imperial Institute
exhibits except Burmese Archway and
howdah but on account of space anxious
have pictures of pillars Burmese Wood
figures and boat models. Have pictures
taken of these as well as smaller exhibits
in list. Suggest you photograph the last
mentioned in groups. Hurry pictures."

As soon as the photographs referred to
in this cable arrive, I will get in touch with
Colonel Bovey.

Very truly yours,

C. F. Goldthwaite
C. F. Goldthwaite,
Asst. Director of Publicity.

September 22nd, 1926.

C. F. Goldthwaite, Esq.,
Asst. Director of Publicity,
Canadian National Railways,
Montreal, Que.

Dear Mr. Goldthwaite:-

This will acknowledge receipt
of your letter of September 21st with reference to
Imperial Institute exhibits.

Thank you very much for the
trouble you have taken in this matter.

Yours faithfully,

Principal.

IMPERIAL INSTITUTE



ANNUAL REPORT, 1926

By the Director

Lt.-Gen. Sir WILLIAM FURSE, K.C.B., D.S.O.

To the

BOARD OF GOVERNORS.

(Meeting, 9th February, 1927).

CONTENTS

ANNUAL REPORT, 1926.

CONTENTS.

Trustees and Board of Governors	i-ii
INTRODUCTION	2
PLANT AND ANIMAL PRODUCTS DEPARTMENT	
Advisory Council and Technical Committees	5
Intelligence Section	7
Investigations Section	12
Co-operation with Government Departments and other Institutions	16
Liaison with Officers of Technical Departments Overseas	18
List of Institutes and Associations with representation on Technical Committees	19
MINERAL RESOURCES DEPARTMENT	
Advisory Council and Technical Committees	20
Intelligence Section	21
Investigations Section	24
Co-operation with Government Departments and other Institutions	27
PUBLICATIONS	29
EXHIBITION GALLERIES	31
Annual contributions to Exhibition Galleries	40
Cinema	41
STATISTICAL SECTION	42
LIBRARY	43
CENTRAL REGISTRY	43
SECRETARIAT	44
CONTRIBUTIONS from H.M. Government and Governments Overseas	45
STAFF	46

IMPERIAL INSTITUTE.

TRUSTEES:

- THE LORD PRESIDENT OF THE COUNCIL.
 THE FIRST COMMISSIONER OF HIS MAJESTY'S TREASURY.
 THE SECRETARY OF STATE FOR INDIA.
 THE PRESIDENT OF THE BOARD OF TRADE.
 THE SECRETARY OF THE DEPARTMENT OF OVERSEAS TRADE
 (Development and Intelligence).
 THE RT. HON. THE EARL OF SELBORNE, K.G., G.C.M.G.
 SIR ALGERNON FIRTH, Bart.
 SIR EDWARD DAYSON, Bart.

BOARD OF GOVERNORS:

President: ARTHUR MICHAEL SAMUEL, M.P. (Parliamentary Secretary
to the Department of Overseas Trade).

Vice-President: SIR WILLIAM CLARK, K.C.S.I., C.M.G. (Comptroller-
General, Department of Overseas Trade).

Representatives of the Dominions, India, etc.

- Canada - - - The Hon. PETER LARKIN (High Commissioner).
 Australia - - - The Rt. Hon. Sir JOSEPH COOK, G.C.M.G.
 (High Commissioner).
 New Zealand - - *Col. the Hon. Sir JAMES ALLEN, G.C.M.G.,
 K.C.B. (High Commissioner). (*Retired*).
 *The Hon. Sir JAMES PARR, K.C.M.G. (High
 Commissioner).
 South Africa - - J. S. SMIT (High Commissioner).
 Newfoundland - - Captain VICTOR GORDON, C.M.G. (High
 Commissioner).
 India - - - Sir ATUL CHATTERJEE, K.C.I.E. (High Com-
 missioner).

Representatives of Government Departments.

- Treasury - - - *C. L. STOCKS.
 Board of Trade - P. W. L. ASHLEY, C.B.
 Dr. F. H. HATCH, O.B.E., M.I.C.E., M.I.M.M.
 (for Mines Department).
 Colonial Office - - The Rt. Hon. LORD ISLINGTON, G.C.M.G.,
 G.B.E., D.S.O. (*Retired*).
 *Sir GILBERT GRINDLE, K.C.M.G., C.B.
 (*Retired*).
 *J. F. N. GREEN.
 *P. H. EZECHIEL, C.M.G. (for Crown Agents).
 Ministry of Agriculture
 and Fisheries - Sir DANIEL HALL, K.C.B., F.R.S.
 Department of Scientific
 and Industrial Re-
 search - - - Sir FRANK HEATH, K.C.B.

* Members of Managing Committee.

Representatives of Scientific and Commercial Interests.

Royal Society - - Sir JOHN FARMER, M.A., D.Sc.(Oxon.), LL.D.,
F.R.S.

Formerly Governors
of the Mineral WALLACE THORNEYCROFT, J.P., F.R.S.E.,
Resources Bureau M.I.M.E.

W. FORSTER BROWN, M.I.C.E., M.I.M.E.

H. F. MARRIOTT, A.R.S.M., M.I.C.E., M.I.M.M.

President of the
Association of
British Chambers
of Commerce - *Sir STANLEY MACHIN, J.P.

Federation of British
Industries - - A. JOHNSTON.

Royal Botanic
Gardens, Kew
(Director) - - Dr. A. W. HILL, C.M.G., M.A., F.R.S., F.L.S.

Imperial Institute
Advisory Councils *Lt.-Col. Sir DAVID PRAIN, C.M.G., C.I.E., F.R.S.,
(Chairmen) F.R.S.E., F.L.S. (Plant and Animal Products).

*Sir RICHARD REDMAYNE, K.C.B., M.Sc., M.I.C.E.,
M.I.M.E., M.I.M.M., F.G.S. (Mineral
Resources).

Secretary: Major O. J. F. KEATINGE, D.S.O.

* Members of Managing Committee.

The Director (Lt.-Gen. Sir WILLIAM FURSE, K.C.B., D.S.O.),
Mr. R. W. MATTHEW, C.M.G. and Mr. P. C. RICE, O.B.E.,
of the Department of Overseas Trade, attend meetings of the Board
of Governors and Managing Committee.

THE PRESIDENT, BOARD OF GOVERNORS.

INTRODUCTORY.

The Imperial Institute Act, passed in May, 1925, opened a new chapter in the life of the Institute. The Imperial Mineral Resources Bureau became an essential part of the Institute from 1st July, 1925, and, at the request of the new Board of Governors, which was set up on the passing of the Act, under your Presidency, as the Minister for the Department of Overseas Trade, Sir Richard Redmayne consented to act as the administrator of the Institute until the new Director was selected. I was appointed Director by the Board in December, 1925, and took up my duties as such on 1st January, 1926. Major Keatinge became Secretary of the Institute on the same date.

My first duty was to arrange a proper establishment of the staff. This was completed and approved by the Board in March. Details of a pension scheme for the staff have been worked out and it is hoped that this scheme will be inaugurated as from 1st January, 1927. In both these matters, my thanks are due to the staffs of the Treasury and the Department of Overseas Trade for their valuable assistance.

An Advisory Council on Plant and Animal Products, under the Chairmanship of Sir David Prain, was set up in the early spring, while the Advisory Council of the Imperial Mineral Resources Bureau has continued its work for the Mineral Resources Department of the Institute under its original chairman, Sir Richard Redmayne. I cannot too early acknowledge the great help so constantly given me by these two gentlemen as my technical advisers in their respective departments.

Much of my time has been devoted to the re-arrangement of the Exhibition Galleries. During the spring and summer the heating and lighting systems were modernized and the whole of the galleries re-decorated, and we utilised this period, during which they were necessarily closed to the public, to change the system of arranging the exhibits themselves. My hope and belief is that these galleries, if made sufficiently attractive, will be of immense value to the public, and especially to the younger generation, as a permanent "Wembley" from the educational point of view. It is the one and only place in the Empire where the products of each and every part of the Empire, other than those of the Mother Country, are displayed under one roof. Its educational value has been appreciated by the Empire Marketing Board. They have granted the £6,000 needed

to convert a room attached to the galleries into an up-to-date cinema hall where instructional films will be shown to school classes and to the public visiting the galleries. They have also promised for a period of 5 years such funds, up to a maximum of £1,000 per annum, as may be needed for the running of this cinema. They are anxious that the new cinema shall be ready by next midsummer when the Imperial Education Conference assembles in London.

I have explained in the body of this report (pp. 32-36) the system which we are following to make the courts attractive and educationally valuable, and the steps we have taken to get the schools in London interested in the opportunities afforded by these galleries.

I wish to acknowledge the encouragement we have received with regard to the re-arrangement of these galleries. Without the close and personal collaboration of Sir James Allen, the late High Commissioner for New Zealand, it would have been impossible to get the New Zealand court as completely furnished in accordance with my new system as it was by the end of September when the galleries were re-opened to the public, and Captain Victor Gordon similarly gave me every possible assistance with the Newfoundland court. Many changes were made in the Australian court also, under the direction of the High Commissioner.

You, Sir, took the chair at the meeting in the Great Hall on 28th September, at which over 1,200 were present, for the most part head-masters and head-mistresses of London schools, primary and secondary, and Mr. Ormsby-Gore and the Duchess of Atholl most kindly addressed the meeting. Their Majesties the King and Queen made a complete inspection of the galleries on the 15th December, and expressed their satisfaction in all they had seen in a letter addressed to me by Lord Stamfordham. While the Imperial Conference was in session, Mr. Coates, the Prime Minister of New Zealand, and the Maharajah of Burdwan both visited the galleries. None of the other Prime Ministers, I regret to say, were able to find the time to do this, owing to their numerous engagements.

On pp. 33, 34 and 40 will be found a list of Governments, Associations and firms who have generously given grants to enable us to exhibit their products in an interesting and attractive manner.

Much remains to be done before we can feel satisfied. Despite the generosity of Lord Cowdray in providing £20,000, lack of funds is still the principal difficulty. Certain important parts of the Empire have not yet seen their way to subscribe to the upkeep of the galleries

I hope we may soon be able to arrange duplicate samples of all products in sample rooms for the benefit of people who wish, for technical, scientific or business reasons, to examine them closely. It will not be easy to do this adequately without some re-allotment of the courts.

Mention is made on p. 39 of the Imperial Gallery of Art established in the upper east gallery. It was opened with a small exhibition in November and the first exhibition of pictures from the brushes of contemporary artists throughout the Empire is to be held from April to June, 1927. Full information regarding this exhibition was sent early in December to each High Commissioner with a request that he would forward it to his Government. It will doubtless take time before artists overseas will appreciate fully the opportunities offered by the inauguration of this Gallery to make their work known to their fellow craftsmen throughout the Empire and to patrons of art in the Mother Country, but I am confident that, as it becomes better known, this movement will benefit artists in every part of the Empire.

I am glad to be able to report that I have been fortunate in making acquaintance with numerous individuals from many parts of the Empire, whose duties in their respective Dominions and Colonies are akin to ours in endeavouring to advance the plant, animal and mineral development of the Empire. Such personal acquaintance is of immense importance to future collaboration, and I would, in this connection, stress the desirability of the Imperial Institute being represented at Imperial Conferences on such subjects, whether assembled at home or overseas, *e.g.*, the Mineralogical Conference to be held in Montreal in August next, and the Agricultural Conference to be held in Australia and New Zealand in 1928. If the Imperial Institute is to establish itself as an acknowledged and really valuable clearing house of information, it seems to me imperative that it should be officially represented at such meetings, and that provision should be made in our annual budgets for the travelling expenses involved.

The various new developments undertaken during the past year in the activities of the Institute have imposed increased work on all concerned, and I wish to acknowledge the willing and loyal assistance I have received from all my staff. My two principal officers, Mr. Brown and Major Henderson Scott, Major Keatinge the secretary, and the curator of the galleries Mr. Spooner, have each and all worked hard and cheerfully and have been efficiently backed by their respective subordinates.

PLANT AND ANIMAL PRODUCTS DEPARTMENT.

THIS DEPARTMENT IS ADMINISTERED BY A PRINCIPAL OFFICER
WHO IS DIRECTLY RESPONSIBLE TO THE DIRECTOR.

Advisory Council and Technical Committees.

The Advisory Council on plant and animal products was appointed in March, 1926, to advise on all matters relating to the utilisation of these groups of Empire raw materials and to initiate schemes of work which might be undertaken by the Institute. As already stated, the Chairman of the Council is Sir David Prain.

The principal work of the Council during the year has been the formation of a number of Advisory Technical Committees to deal with special subjects, on the lines of the Committees on Silk and Timbers which were established in 1916. The Committees at present constituted are as follows:—

Subject:	Chairman:
Silk - - -	- Sir Frank Warner, K.B.E.
Timbers - - -	- Mr. H. D. Searles-Wood, F.R.I.B.A.
Vegetable Fibres - - -	- Mr. Alfred Wigglesworth.
Animal Fibres - - -	- The Hon. Sir George Fairbairn.
Oils and Oilseeds - - -	- Dr. A. W. Hill, C.M.G., F.R.S.
Essential Oils and Resins	Mr. A. Chaston Chapman, F.R.S.
Tanning Materials - - -	- Sir David Prain, C.M.G., C.I.E., F.R.S.

Committees for other products will be formed as and when required.

Each of these Committees has a member of the Advisory Council as Chairman, and includes scientific and technical authorities, as well as representatives of the trades and industries concerned in its particular group of products. The High Commissioners of the Dominions and India have also nominated representatives on the Committees dealing with products which are of special interest to their respective countries.

It is not possible to deal in detail with the work of these Committees, some of which have only recently been formed, but the following paragraphs will indicate the nature of the problems to which they are devoting attention:—

The **Silk Committee's** investigations of the possibilities of sericulture in the Empire have led to the preparation of a memorandum on the need for developing the silk production of the Empire which has been submitted by the Colonial Office to overseas governments for consideration. An important result of the Committee's work has been the establishment in Cyprus of a filature for reeling the entire output of Cyprus cocoons which hitherto have been exported to the Continent. The development of sericulture in Iraq is under consideration, and arrangements have been made for reeling trials of cocoons from Iraq, Jamaica and Rhodesia, and for subsequent throwing and weaving tests.

The **Timbers Committee** has completed the preparation of a descriptive list of Empire timbers which it has examined and recommends for wider use in this country. Arrangements have been made for printing the list, which it is hoped to distribute widely among timber users and others. The Committee proposes to deal with the enquiries arising out of the distribution of the list of recommended timbers, and to consider other woods not yet examined. Reports have been made on a series of Gold Coast timbers examined at the Institute. Other work has reference to British Honduras woods; the inclusion of selected Empire timbers in official specifications as fire-resisting materials; and timber questions referred to the Institute by Government Departments.

The **Committee on Vegetable Fibres** has considered several important questions connected with fibre production within the Empire. At the request of the Indian Agricultural Commission, a memorandum was furnished giving information as to the quality of Indian hemp in comparison with European hems and making recommendations with a view to its improvement. Other subjects which are receiving attention include the effect of sea-water on the strength of Sisal hemp ropes in comparison with Manila hemp ropes; the improvement of Sierra Leone piassava; and the utilisation of Sisal waste.

The **Committee on Animal Fibres** is devoting primary attention to questions relating to the production of wool in the Empire. They propose to deal in the first instance with the improvement of the wools at present produced in Canada and with the possible extension of the industry in the Dominion. Wools from Iraq and Palestine are being reported on.

The Committee on Oils and Oilseeds is considering the possibility of extending the use of Shea butter with a view to the further utilisation of the large supply of Shea nuts available in British West Africa. Owing to the presence of a certain constituent in the fat there is some prejudice against its use for edible purposes, and it is hoped to arrange for an investigation of this question by the appropriate body in order that an authoritative opinion may be obtained.

The Committees on Essential Oils and Resins, and on Tanning Materials are investigating the possibility of increasing the production within the Empire of a number of important products belonging to these groups which are at present principally obtained from foreign sources.

Acknowledgment must also be made of the important services which the Technical Committees render to the Institute by reporting on the commercial possibilities of materials received for examination.

The investigations of plantation rubber carried out at the Institute by a special staff on behalf of the Ceylon Rubber Research Scheme have been continued throughout the year. This work is under the direction of the London Committee of the Scheme, of which Mr. P. J. Burgess, M.A., is the Chairman. The principal problems under investigation are the variations in the plasticity of plantation rubber and in its ageing properties after vulcanisation. The results of the work are published in the annual report of the Scheme and in the periodical Bulletins.

Intelligence.

The Intelligence Section of the Department deals with enquiries for technical and commercial information respecting the production, utilisation and marketing of Empire raw materials of plant and animal origin. The section is also responsible for the collection and indexing of published and other information on plant and animal products which is likely to be of service in connection with the above-mentioned enquiries and the work of the Department as a whole.

The enquiries dealt with are received from Governments, firms and individuals overseas, and from manufacturers, merchants and others in this country; many enquiries are made personally. A considerable proportion of the enquiries from overseas have reference to the marketing of produce, whilst merchants and others in this country desire information as to supplies of raw materials from Empire sources.

Another important category comprises requests for technical information regarding the details of industrial processes, and particulars of the machinery involved therein; methods of tropical agriculture, and the processes adopted in the preparation of commercial products for the market; current conditions obtaining in the market as regards specific products; and related subjects. Other enquiries are concerned with the prospects for agricultural and other industries in the different countries of the Empire, chiefly in the tropics.

In order to supplement, when necessary, the resources of information available at the Imperial Institute, the Section is in communication with firms and trade and commercial associations who are in a position to supply special information, with official and other bodies concerned with technical questions, and also with agricultural and other Government departments throughout the Empire.

During the year 1926, the Intelligence Section dealt with 929 enquiries varying widely in scope and character, and emanating from, or relating to, many different parts of the Empire. The following selection of enquiries illustrates the character of the work:—

Citrus products. (*Director of Agriculture, Burma*). In connection with a proposal to consider the extended cultivation of limes and the development of an industry in citrus products in Burma, the Director of Agriculture desired to learn the present position of the trade in such products and to have particulars regarding the equipment required for their manufacture, together with information as to the best varieties of limes to plant, and the mode of marketing the products. These particulars were furnished, together with observations on the prospects of the industry in Burma.

Tapioca Flour. (*Director of Industries, Travancore*). Information regarding the manufacture of "pearl" and "flake" tapioca, and the grading of the product for the London market; required in connection with the production of tapioca in Travancore. Enquirer was furnished with the particulars desired, and with commercial samples of tapioca representing typical qualities in demand in London. Valuations were also furnished of Travancore tapioca flour and suggestions made for the marketing of trial shipments.

Papain. (*Director of Agriculture, Burma*). Information regarding the occurrence and cultivation of the papaya tree, the extraction of the juice, and the preparation and marketing of papain; with observations on the question of preparing

papain in Burma for export in competition with the supplies available from Ceylon, etc. References were also given to publications dealing with papain.

Peach and apricot kernels. (*High Commissioner for South Africa, London*). Information regarding the source of supply and mode of utilisation of peach and apricot kernels shipped to the United Kingdom, and the prices realised; together with similar particulars regarding almond oil and its substitutes. Required in connection with the possible shipment of these products from South Africa.

Chicle gum. (*Federation of British Industries, London*). Information as to the botanical source, utilisation, and chief countries of production of "chicle gum"; quantities shipped to the United States in 1924; and names of firms from whom supplies might be obtained.

Fruit preservation and pulping. (*High Commissioner for South Africa, London*). In connection with a proposal for the co-operative preparation and marketing of fruit products in South Africa, information was furnished on the methods and processes employed in the drying of fruit, the preparation of fruit pulp, juices and syrups, and the canning and bottling of fruit and fruit products. In each case particulars were also furnished of the machinery required for the purpose, and the names of firms manufacturing such plant were supplied together with descriptions and quotations specially obtained by the Institute. References were also given to publications dealing with fruit preservation.

Citrus pectin. (*Assistant Government Chemist, Leeward Islands*). The quality of pectin required by jam manufacturers in the United Kingdom and the suitability for this market of citrus pectin from Dominica; with suggestions regarding the preparation of samples of pectin in the Island for submission to possible purchasers.

Locusts. The occurrence of locusts in various countries, and references to publications dealing with these insects and the methods of combating them. Required in connection with a project for collecting locusts in large quantities for use as a commercial source of oil.

Oil palm machinery. Information regarding the machinery required for extracting palm oil and palm kernels for the market, and the area of oil palms likely to be required to keep the machines at full output; the methods of packing employed for the oil and kernels; and a source of supply of seed for planting. Required in connection with a proposal to cultivate oil palms in St. Lucia.

Oil palm cultivation. Information as to the cost of establishing and maintaining an oil palm plantation, and of preparing the products thereof for the market, including the cost of the necessary apparatus and names of reliable manufacturers; the probable yield of products, and financial return per acre, on a plantation in full bearing; and methods of packing and shipping palm oil and kernels. Required in connection with a proposal to cultivate oil palms in British Guiana.

Cohune nuts. Information regarding the occurrence, characters and possible commercial utilisation of the cohune nuts of British Honduras, and the difficulty of shelling the nuts; and references to publications giving further particulars.

Baling of oilseeds, etc. (*Central Economic Board, Khartoum*). Information regarding the MacIlwaine process for baling oilseeds and other products with a view to more economical shipment; and particulars of baling presses suitable for the purpose.

Essential oil plants. The cultivation of "geraniums" (*Pelargonium* spp.), peppermint, and aromatic grasses, which might prove to be suitable crops for an estate in Tanganyika; the mode of distillation employed, with particulars of the apparatus required and names of manufacturers; and suggestions as to obtaining cuttings or roots for planting. Also references to publications dealing with the products in question.

Eucalyptus cultivation. (*Colonial Commissioner for Cyprus, London*). Particulars as to the commercial utilisation of the various species of eucalyptus as sources of oil, with special reference to the species at present growing in Cyprus or suitable for cultivation in the island; also references to publications dealing with eucalyptus trees.

Manila hemp. The cultivation and preparation of Manila hemp (*Musa textilis*) in the Philippines, and the results of trials carried out in Malaya and other countries. Required in connection with a proposal to grow the crop commercially in Malaya, the feasibility of which enterprise has not yet been established.

Tobacco in Rhodesia. Particulars regarding the present position of the tobacco industry in Rhodesia; the varieties of leaf produced; and the principal destination of exports. Also references to publications on tobacco growing, with special reference to Rhodesian conditions.

Timbers for rifle-stocks. (*Royal Small Arms Factory, Enfield*). Information regarding (a) Empire and (b) foreign timbers suggested as possibly suitable for use in place of walnut for the manufacture of service rifle-stocks; with particulars regarding their botanical origin, geographical distribution and general characters.

Canadian timbers for telegraph poles. (*Post Office Stores Dept., London*). In continuation of a previous enquiry regarding Canadian timbers (December 1925), a representative of the Department inspected specimens of timbers at the Imperial Institute and discussed the feasibility of obtaining certain of them in commercial quantities for use as telegraph poles. As a result it was proposed to obtain trial shipments of selected species, for practical tests by the Department.

"Tsinglee" canes. The question of procuring from Empire sources bamboos or other products which could replace Chinese "tsinglee" canes in the manufacture of umbrellas and walking-sticks exported to India. Samples of possibly suitable canes were supplied, and in addition, the Imperial Institute arranged to make official enquiries overseas on behalf of the firm.

Fixation of drifting sand. (*Director of Agriculture, British Somaliland*). Information regarding the methods employed for the fixation of drifting sands in Europe, South Africa, Palestine, New Zealand and other countries; the kinds of plants utilised for the purpose; and for the reclamation and commercial development of sandy areas; and suggestions as to various species which might be employed in this way in Somaliland. Required in connection with a proposal to carry out the fixation of sand on the coast near Berbera.

Among the subjects of other enquiries dealt with by the Intelligence Section during the year the following may be mentioned:—

The utility of Kenya bamboo and South African tambookie grass for paper-making; the suitability of British Guiana mora timber for railway sleepers; the sources of supply and utility of "Port Orford cedar"; the employment of East African "pencil cedar" from Kenya in competition with the American product; the quality and uses of Gold Coast copal; the feasibility of exploiting nipa palms in New Guinea as a source of industrial alcohol; the possible cultivation of vanilla

as an economic crop in Trinidad and British Guiana; the gums and resins of British Somaliland; the Xanthorrhœa resins ("yacca gum") of Australia; the market for "eel grass" from Newfoundland; the manuring of Para rubber; the cultivation of citrus fruits in Rhodesia and East Africa; machines for decorticating ground nuts; and the industrial utilisation of palm nut shells.

Investigations.

The examination of Empire raw materials of plant and animal origin, in order to determine their possible uses in industry and commerce, forms an important part of the work of the Department, and during 1926, reports were furnished on 490 samples. This figure is exclusive of samples not requiring laboratory investigation, such as those sent for identification, the enquiries relating to which are included in the previous section.

The materials received for examination included specimens from most parts of the Empire, viz., Great Britain, Australia, New Guinea, New Zealand, Samoa, Union of South Africa, Newfoundland, India, Ceylon, Straits Settlements and Federated Malay States, North Borneo, Hong Kong, Nigeria, Gold Coast, Sierra Leone, Gambia, Rhodesia, Nyasaland, Tanganyika, Kenya, Seychelles, Mauritius, Somaliland, Cyprus, British Guiana, British Honduras, Jamaica, St. Lucia, Montserrat, Virgin Islands and Falkland Islands; also from Egypt, Palestine and Iraq. Investigations have also been carried out for the Department of Overseas Trade on materials forwarded by their Officers in various foreign countries.

In most cases the materials for investigation are forwarded by Government Departments of Agriculture, Forestry, or Industries overseas, principally in the Colonies and Protectorates, many of which make extensive use of the Institute for obtaining reports on the commercial possibilities of their products. A few typical investigations from those dealt with during the year, are summarised below in order to indicate the scope of this branch of the work:—

Timbers. A comprehensive collection of Gold Coast timbers was displayed at the British Empire Exhibition and, at the request of the Conservator of Forests, a systematic investigation of the more promising species has been undertaken. The selected timbers are being examined in order to determine their mechanical properties and working qualities, and the opinion of the Advisory Committee on

Timbers is then obtained as to the purposes for which they could be utilised and their commercial possibilities in this country. Reports have been furnished during the year on Baku; Kaku or Ironwood; Odum; Penkwa or African cedar and Konkruma. All these timbers would be of value in the Colony for a variety of purposes and, with the exception of Kaku, would probably find a market in this country as furniture woods if they can be offered at prices to compete with the medium grades of West African mahogany.

A report was also furnished on Billy Webb timber from British Honduras. This wood should be serviceable for many purposes locally, but at present cannot be recommended for export to this country.

Waste Kauri Wood from New Zealand. In the Kauri timber industry of New Zealand a large amount of waste wood is obtained and the possibility of utilising it for paper-making is under consideration. At the request of the Forestry Department in New Zealand, the Imperial Institute has examined samples of the waste wood in order to determine the yield and quality of the pulp which it will furnish. The wood contains varying amounts of resin and a further investigation has been carried out to ascertain the nature and value of this resin and whether it would be profitable to remove it from the wood before pulping.

The results of the paper-making trials showed that the kauri wood, either in its original condition or after the removal of the resin, could be converted into paper-pulp of satisfactory quality. If the wood contains over 10 per cent. of resin it might be advantageous to remove the latter before pulping, but when less than this quantity is present the wood might be converted into pulp without previous deresination.

A quantity of the resin was extracted from the wood and, after examination in order to determine its nature and properties, samples were submitted to likely users. It seems probable that the resin would be marketable in this country, but technical trials on a larger scale would have to be made by manufacturers in order to determine definitely its commercial value and possibilities.

Full reports on the entire investigation, together with specimens of paper prepared in the laboratories from each of the samples of wood, have been forwarded to New Zealand in order that the question may be further considered by the Forestry Department.

Tobaccos. Considerable attention is being devoted in a number of the Colonies to the experimental cultivation of tobacco suitable for the English market, and during the year samples from Nigeria, Nyasaland, Tanganyika, Cyprus, Virgin Islands, Palestine and Egypt were investigated. The reports furnished have included the results of laboratory investigations, the opinions of manufacturers and brokers on the characters and value of the leaf, and recommendations for improving the quality of the product.

A consignment of tobacco from Nigeria, consisting of 14 bales, was in general of better quality than the earlier consignments and realised a higher price. The results of the examination of the several consignments have indicated that a good grade of leaf suitable for the British market could be produced in Nigeria by native growers if further improvements in curing could be effected. It has been found, however, that the industry is not very attractive to the natives, and the Department of Agriculture has decided to discontinue, for the present, the efforts to produce tobacco for export.

Six samples of tobacco from Nyasaland, some of which had been grown on manured and others on unmanured land, were of good quality and possessed excellent burning properties. Observations were furnished in the report on the composition of the tobaccos in relation to that of the soils and on the effect of manuring, together with the market values of the tobaccos in London.

The tobaccos from Tanganyika were of Turkish type, and, although not of very good quality, were of promising character. It seems probable that, with better curing and fermentation, Turkish tobacco of satisfactory quality could be produced in the Territory.

The examination of samples of the different Turkish varieties grown in Palestine showed that such leaf could only be marketed in Great Britain at a low price for blending purposes, and that, under present conditions, it would not be able to compete with the Turkish tobacco grown in countries of the Empire which enjoy the preferential rate of duty.

Samples of Turkish tobacco from Egypt were of satisfactory colour and texture, but the burning properties were not good and the flavour and aroma were quite different from those of ordinary Turkish leaf.

Piassava from Sierra Leone. In connection with efforts which are being made by the Department of Lands and Forests in Sierra Leone to improve the methods of preparing and grading piassava, forty-six samples prepared experimentally by the Government Agricultural Chemist, were forwarded for examination and report. The samples had been obtained from two different species of *Raphia* palms; from both young and old trees; from different parts of the leaf-sheath; and had been retted for different periods. A full report on the samples was furnished, including the opinions of merchants and manufacturers as to their comparative merits and commercial value, and large samples of the grades of piassava required in this country are being forwarded for guidance in connection with future work.

Ginger and Ginger Peelings from Sierra Leone. In continuation of previous efforts to improve the preparation of ginger in Sierra Leone, a sample of peeled ginger was forwarded by the Commissioner of Lands and Forests for comparison with the usual unpeeled product. The ginger had been well prepared and was of good quality. Merchants who were consulted stated that shipments of such material would be readily saleable in this country at prices considerably above that of ordinary Sierra Leone ginger. It was suggested that if the ginger were limed and freed from the smaller pieces it would more closely resemble "cut" Cochin ginger and would realise a still higher price. At the suggestion of the Imperial Institute a quantity of the ginger peelings was also forwarded by the Commissioner in order that the yields of essential oil and extract might be determined. The results were very satisfactory and the material would probably find a good opening in this country, but trials on an industrial scale will be necessary before it is possible to report definitely. A small consignment of the peelings has since been received and sold to manufacturers for practical tests.

Cascara Bark from Kenya Colony. The tree yielding this bark is being cultivated experimentally by the Forestry Department in Kenya, and a sample received at the Imperial Institute in 1924 was found to be of satisfactory quality and to comply with the requirements of the British Pharmacopœia. It was pointed out, however, that therapeutical trials would be necessary to ascertain whether the bark is as active medicinally as cascara bark from other sources, and subsequently a larger quantity of the bark was forwarded for this purpose. After the bark had been stored for a year as

required by the Pharmacopœia, a liquid extract of the official strength was prepared from it for trials which were kindly undertaken by the Medical Unit of St. Thomas's Hospital. The report was entirely favourable, the action of the extract being indistinguishable from that of extract from American bark. The bark from Kenya should therefore be readily saleable when available in commercial quantities, and it would appear that the cultivation of the tree might well be encouraged in the Colony.

The many other materials reported on during the year included a number of forest products (benzoin, lac and dammars) from the Federated Malay States; a new kino from Tanganyika; seal oil from the Falkland Islands; sardine oil from India; "mutton bird" oil from Tasmania; oil-seeds from Gambia, Sierra Leone, Gold Coast, Tanganyika, India and North Borneo; essential oils from South Africa, Seychelles and Cyprus; fibres from India, Ceylon, Federated Malay States, Samoa, Tanganyika, Cyprus and Egypt; Sisal waste from East Africa for paper-making; rubber from Jamaica, Papua and India; wheat from Iraq; cocoas from Sierra Leone and New Guinea; and coffees from Tanganyika.

A large number of investigations were in progress at the close of the year. The principal work in hand included the continued investigation of Gold Coast timbers; the suitability of British Guiana timbers for paper-making; the effect of sea-water on Sisal ropes in comparison with Manila ropes; the effect of fresh water and sea-water on the strength of Sunn hems from India; a further series of wheats from Iraq; wool from Iraq and Palestine; tobaccos from Nyasaland, Ceylon, Cyprus and Virgin Islands; and essential oils from Rhodesia, Seychelles and Cyprus.

Co-operation.

Close touch is being maintained with Government Departments and other institutions engaged in research, and materials requiring scientific investigation, or enquiries of specialised character, are passed for action to the appropriate body.

During the year several problems have been referred to the Department of Scientific and Industrial Research as falling within the scope of that Department, whilst on the other hand the Department has passed certain enquiries to the Institute. In particular, co-operation has been established with the Forest Products Research Laboratory in all

matters relating to timber investigations. The Laboratory propose in the first instance to devote attention to home-grown and imported foreign timbers, whilst the Institute will continue to deal exclusively with Dominion and Colonial woods. Arrangements have been made for mutual assistance in this work and for the exchange of reports and specimens; a representative of the Laboratory has also been appointed on the Institute's Committee on Timbers as liaison officer between the two bodies. During the year two investigations of a chemical nature were carried out at the Institute for the Laboratory.

A similar arrangement exists with the Imperial Forestry Institute at Oxford and with the Empire Forestry Association. A collection of Dominion and Colonial timbers received at the Imperial Institute during recent years has been supplied to the Oxford Institute.

Co-operation with the Royal Botanic Gardens, Kew, has been strengthened by the appointment of the Director as a member of the Board of Governors, of the Advisory Council on Plant and Animal Products and of several of the Technical Committees. Valuable assistance has been rendered by Kew in determining the botanical identity of specimens received for examination. Enquiries are also referred as required to the Imperial Bureau of Entomology, the Imperial Bureau of Mycology, the Natural History Museum and other similar institutions.

The Institute is indebted to the Director of the Wellcome Chemical Research Laboratories for having undertaken the chemical investigation of the alkaloids of a West African plant, and to the authorities of St. Thomas's Hospital for conducting therapeutical trials with Cascara bark grown experimentally in Kenya.

Co-operation with many professional institutions, research associations, manufacturers' and trade associations, and other commercial organisations has also been ensured by the appointment of representatives of these bodies on the Technical Committees (see p. 19).

Recognition must also be made of the valuable services rendered to the Department by a large number of manufacturers, merchants and brokers, who have readily furnished information and suggestions relating to the possibility of utilising or marketing Empire raw materials in this country. In a number of cases, manufacturers have carried out trials with promising materials in continuation of the laboratory investigations.

The Institute is represented by officers of the Department on the following organisations: Council of the Empire Cotton Growing Corporation, Dr. E. Goulding; and Council of the British Silk Research Association, Dr. S. E. Chandler.

Liaison with Officers of Technical Departments overseas. During the year a number of officers from Departments of Agriculture and Forestry overseas have visited the Institute in order to discuss investigations and enquiries in progress or to obtain information relating to materials in which they are interested. In several cases officers have worked for a time in the Library, with the assistance of the Intelligence Section, for the purpose of consulting the recent literature on particular products.

Assistance was rendered to the Director of Agriculture in Somaliland in connection with an enquiry as to the possibility of establishing a gum industry in that country, together with information on oil-seeds and other products and on methods of reclaiming sand dunes.

By arrangement, the Inspector-General of Agriculture, Baghdad, interviewed the Silk Committee with reference to the possibilities of silk production in Iraq. Information regarding sericulture was also supplied to the Government Entomologist in Egypt.

Information was furnished to the Conservator of Forests in Cyprus, the Director of Forests in Mauritius, and to agricultural officers from the Gold Coast, Sierra Leone, Nyasaland and Tanganyika, on products in which they are interested; and assistance was given to the Commissioner of Lands and Forests in Sierra Leone in connection with the Colony's exhibit at the Canadian National Exhibition, 1926.

LIST OF INSTITUTES AND ASSOCIATIONS WITH
REPRESENTATION ON THE TECHNICAL COMMITTEES
OF THE ADVISORY COUNCIL ON PLANT AND
ANIMAL PRODUCTS.

- The Silk Association of Great Britain and Ireland (Incorporated).
The British Silk Research Association (Incorporated).
The Royal Institute of British Architects.
The Empire Forestry Association.
The Timber Trade Federation of the United Kingdom.
The Carpenters' Company.
The National Federation of Furniture Trades.
The Institute of Builders.
The Institute of British Carriage and Automobile Manufacturers.
The Forest Products Research Laboratory, Department of Scientific
and Industrial Research.
The Textile Institute.
The London Jute Association.
The Jute Importers' Association, Ltd.
The Flax Spinners' Association, Ltd.
The Rope, Twine and Net Manufacturers' Federation.
The British Hemp Rope Manufacturers' Association.
The Bradford Chamber of Commerce.
The British Wool Federation.
The London Oil and Tallow Trades Association.
The Incorporated Oil Seed Association.
The Seed Oil and Cake Trade Association, Liverpool.
The Liverpool United General Produce Association.
The British Leather Manufacturers' Research Association.
The United Tanners' Federation.
The Federation of Curriers, Light Leather Tanners and Dressers.
The Rubber Growers' Association (on Ceylon Rubber Research
Committee).
The Research Association of British Rubber and Tyre Manufacturers
(on Ceylon Rubber Research Committee).

MINERAL RESOURCES DEPARTMENT.

THIS DEPARTMENT IS ADMINISTERED BY A PRINCIPAL OFFICER WHO IS DIRECTLY RESPONSIBLE TO THE DIRECTOR.

GENERAL.

Six meetings of the Advisory Council on Minerals were held during the year, under the chairmanship of Sir Richard Redmayne.

The Governing Body of the Imperial Institute appointed the sixteen Advisory Technical Committees of the late Imperial Mineral Resources Bureau, as follows:—

SUBJECT.	CHAIRMAN.
Legal Committee - - -	Sir Richard Redmayne, K.C.B.
Abstracts, Publications and Libraries - - -	J. W. Evans, Esq., C.B.E., D.Sc., F.R.S.
Iron and Steel - - -	Wallace Thornycroft, Esq., M.I.M.E., F.R.S.E.
Copper - - -	Dr. F. H. Hatch, O.B.E., Ph.D.
Tin and Tungsten - - -	Professor T. Turner, M.Sc., F.I.C., A.R.S.M.
Lead and Zinc - - -	Sir Richard Redmayne, K.C.B.
Arsenic, Antimony and Bismuth - - -	Sir Richard Redmayne, K.C.B.
Nickel and Cobalt - - -	Sir Robert Hadfield, Bart., K.C.B., F.R.S.
Aluminium and Sodium - - -	J. W. Evans, Esq., C.B.E., D.Sc.
Coal, Coke and By-products - - -	W. Forster Brown, Esq., M.I.C.E., M.I.M.E.
Petroleum, Asphalt, Oil-shales and Natural Gas - - -	Admiral Sir Edmond Slade, K.C.I.E., K.C.V.O.
Gold, Silver, Platinum and Metals of the Platinum Group, and Mercury - - -	H. F. Marriott, Esq., A.R.S.M., M.I.M.M.
Minor Metals (Cæsium, Rubidium, Thorium, Tantalum, Barium, Strontium, Calcium, etc.) - - -	J. W. Evans, Esq., C.B.E., D.Sc., F.R.S.
Chemical Industries - - -	Sir Herbert Jackson, K.B.E.
Refractories, Glass-making and Building Materials - - -	Professor T. Turner, M.Sc., F.I.C.
Miscellaneous Minerals, Precious Stones, Abrasives, Asbestos, Mica, Diatomaceous Earths and Steatite - - -	Dr. F. H. Hatch, C.B.E., Ph.D.

These Committees are only called together when their opinion is definitely sought on some point, and when the Chairman considers that any particular work is to be arranged.

The work of these Committees is of great value, and the Imperial Institute wishes to place on record its appreciation of the great help rendered by the individual members of the various Committees.

The assistance afforded by the Corresponding Members in the various parts of the Empire has helped considerably towards the prompt collection of information as to the mining and metallurgical industries of the Empire. The Imperial Institute wishes to place on record its indebtedness to the Corresponding Members.

Intelligence.

During the year 430 enquiries have been received and dealt with. Many of the enquiries relate to efforts to find markets for minerals and mineral products of Empire origin. Others are directed towards the finding of suitable raw materials of Empire origin required in the manufacturing industries. Still others ask for general or statistical information bearing on the mineral industries in different parts of the Empire. In addition, enquiries are received relating to the laws in force in the various parts of the British Empire.

The answering of enquiries dealing with the above-mentioned subjects requires, in many cases, as complete details relating to foreign countries as to the Empire, and for this purpose the careful indexing of all technical and other publications dealing with the various aspects of the mining and metallurgical industries throughout the world has been vigorously pursued as heretofore and has been found of very great value.

The following is a brief description of the nature of the more important enquires dealt with:—

Sources of Bromine within the British Empire. Owing to the shortage of bromine within the Empire, at the request of the Department of Scientific and Industrial Research, the matter was looked into, and all parts of the British Empire were communicated with, with a view to obtaining information in connection with the possibility of its recovery. Details of the various possible sources were obtained, and owing to the interesting information received, the matter is being laid before the appropriate Advisory Technical Committee (Chemical Industries) for their further consideration, and in order to draft the memorandum to the enquirer on this subject.

Sources of Helium throughout the British Empire.

At the request of the Admiralty, an exhaustive enquiry was made as to the amount of helium occurring in the natural gases throughout the Empire.

All important oil companies were communicated with, and also the Imperial Institute's Corresponding Members throughout the Empire, with a view to obtaining the information. Samples of gas were obtained in certain instances and were examined by the Government Chemist in the United Kingdom. The results of the enquiry were communicated to the Admiralty.

Sources of Quartz, Fluorite and Iceland Spar throughout the British Empire. Arising out of a meeting of one of the Advisory Technical Committees, the question of supplies of these minerals for the manufacture of optical instruments was considered, and enquiries were made throughout the Empire with a view to seeing if sources of material suitable for this industry were available. Details as to the amount consumed were obtained, and in cases where possible material was reported, samples were asked for. It was, however, found that the amounts consumed for this purpose were so small that the Imperial Institute could not, at the present time, take any further action.

Lithium—its sources and uses. Arising out of the discovery of lithium deposits in Manitoba, the Canadian Mines Department requested the Imperial Institute to draw up a document concerning the sources and uses of lithium.

A statement on this subject was prepared and forwarded to the authorities, and a considerable portion of it has been published recently in an official publication of the Manitoba Government.

Discovery of a Hæmatite Deposit in Sierra Leone.

At the request of the Governor of Sierra Leone, information with reference to the discovery of a large hæmatite deposit in Sierra Leone was communicated to the iron and steel firms in the United Kingdom, with a view to seeing if they were interested in the development thereof.

Investigation into a process of low-temperature carbonisation and briquetting of New Zealand lignite.

At the request of the High Commissioner for New Zealand, samples of New Zealand lignite were tested in Germany under the supervision of Sir Richard Redmayne, the Mineral Adviser to the Imperial Institute, and a report by him was submitted to the New Zealand Government.

Accidents in Coal Mining in the United Kingdom, Germany and the United States. Details supplied to the enquirer as to the fatal accidents in these countries during the years 1920-1924.

Chrome ore. The authorities of the Union of South Africa requested a list of names of firms in the United Kingdom dealing in chrome ore. Lists were submitted giving:—

- (a) The selling agents and merchants.
- (b) Brokers.
- (c) Chemical manufacturers.
- (d) Alloy manufacturers.

Petroleum. The Director of the Geological Survey of India requested details as to the methods in force concerning the auctioning of concessions to work Government-owned deposits of minerals, with particular application to petroleum. Details were prepared by the Legal Section in connection with this subject and submitted to the enquirer.

Slate waste. An enquiry was received as to the possibility of the utilisation of the large quantities of slate waste that are made during the operations of mining slate in the slate areas. The matter was laid before the appropriate Advisory Technical Committee (Refractories, Glass-Making, and Building Materials Committee) and enquiries were made from all sources, including Government Departments and others who had experimented upon this material, as to the possibility of its utilisation. It was found after exhaustive enquiries, that owing to its heavy nature it is probable that, other than for local purposes, it cannot be used commercially. Further investigations are being proceeded with, with a view to encouraging research on this matter.

Mineral deposits and geology of Corsica and Sardinia with special reference to manganese, chrome and nickel. A statement was drawn up giving a list of the various works which are published dealing with this subject.

Low-temperature carbonisation of Nigerian lignites. At the request of the Director of the Geological Survey of Nigeria, a statement was drawn up giving a review of the various processes in operation and of possible value in connection with this subject. A suggestion was made as to which of these processes it was thought would be suitable for the treatment of Nigerian lignite.

Manufacture of charcoal in Kenya. Information was requested as to possibility of making charcoal for fuel for use in railway locomotives in Kenya Colony. A statement was drawn up relative to this subject, giving information and details as to the calorific value of charcoal.

Electrical and other physical methods in prospecting. The enquirer wished to obtain information as to the present position as regards prospecting by various geo-physical methods. He was shown the published literature on the subject and was introduced to various authorities in London who had special knowledge of the methods involved.

Felspar of British origin. Enquirer wished to know of British sources of felspar suitable for use in glass manufacture. He was given a list of British producers.

Investigations.

During the year, 170 reports on mineral investigations have been made, incurring analyses and/or technical trials being made on 520 samples.

The laboratory staff have also undertaken the conduct of certain enquiries dealing with mineral technology.

Amongst the more interesting of the investigations, the following may be mentioned:—

Clays from Nigeria. An extensive series of technical trials and chemical analyses carried out for the Geological Survey of Nigeria on clays from Umu Ahia, Nigeria, showed that three of these were very suitable for making white bricks, tiles or pottery, which could be glazed if desired. Certain of the clays could also be used for the production of refractory bricks. These results are of interest as the clays occur in close proximity to lignite fuel and to the railway. Specimens of the ware produced from the material in the ceramic laboratory were sent to Nigeria.

Bituminous oil and lignites from Nigeria. Other work carried out for the Geological Survey of Nigeria included the analysis and report on samples of bituminous oil, lignites and clays from several new localities and an interesting sample of magnetic tinstone. The question of submitting Nigerian lignite to a process of low-temperature carbonisation in order to obtain a smokeless fuel together with a crude oil, received a considerable amount of attention at the Imperial Institute. Small-scale technical trials indicated that the Okpanam lignite would be well adapted for this purpose, the yield of oil comparing favourably with that obtained from lignites from other sources.

Building materials from Kenya. The question of the occurrence in Kenya of minerals which could be used for building purposes has received some attention during the year. In the past, a number of limestones, brick and tile clays, etc., have been examined at the Imperial Institute and a résumé of this work was supplied to contractors in the United Kingdom interested in the matter, for whom also tests were carried out on some Kenya building stones.

Early in 1926, the Government Geologist to Uganda made a brief survey of the building materials available in certain parts of Kenya and a series of 26 limestones, clays, etc., were sent to the Imperial Institute for complete chemical analysis and report. The results obtained showed that at a number of points along the railway there occur limestones and clays which could be used together for the manufacture of good quality Portland cement which would conform to the requirements of the British Standard Specification. Certain of the limestones could also be burnt for building and plasterers' lime.

Soils from Samoa. An extensive examination was made for the Dominion of New Zealand on 49 samples of soil from Samoa in connection with the alleged inferiority of certain coconut areas stated to be worked out. Complete chemical and mechanical analyses showed that in the majority of cases the soils from worked areas were as rich in plant food constituents as were those from virgin ground in the same locality.

Coal from New Zealand. Other work for the Dominion of New Zealand included the examination of products obtained during the experimental carbonisation in Germany of a consignment of New Zealand coal.

Coal, clays and limestones from Nyasaland. A number of mineral samples received from the Government Geologist of Nyasaland were submitted for analysis and technical trials at the Imperial Institute. These included borings from coal deposits, calcareous clays and limestones, the latter being found suitable for making Portland cement.

Detailed statements, accompanied by estimates of cost where necessary, have also been supplied to the Government Geologist regarding the plant necessary for making (1) natural cement; (2) bricks, tiles and drain-pipes.

Soils from Nyasaland. Other work carried out for the Nyasaland Protectorate included the examination of 12 soils

from Nyasaland sent in connection with the question of the improvement of the quality of tobacco grown in the Protectorate, now being investigated by the Plant and Animal Products section of the Imperial Institute.

China clay from Union of South Africa. Amongst the minerals examined from South Africa may be mentioned a crude china clay from Cape Province. This material, after being washed to remove the small amount of gritty matter present, gave a product not quite equal to the best quality English china clay. Analyses and technical trials in the ceramic laboratory showed that the washed china clay could be used for making china and earthenware and possibly in the manufacture of certain grades of paper.

Nickel from Tahiti. Four samples of igneous rock examined from Tahiti were of some interest, as nickel was present in all, but as the richest contained 0.81 per cent. of nickel oxide the minerals were not of immediate commercial importance.

Portland cement. During the year, reports have been furnished on 57 consignments of British-made Portland cement intended for export. Of these, 38 consignments were tested in full, according to the requirements of the Argentine Government Specification (1914) and 7 were rejected on preliminary tests. In addition, 12 consignments were tested in full, according to the requirements of the British Standard Specification (1926), and, in addition, compression tests were carried out on the neat cement and cement-sand mortars at 7 and 28 days after gauging. In addition to the work incurred in regard to the necessary physical and chemical tests, the Staff had to pay about 56 visits to cement works during the year in order to sample the cement and to inspect its loading.

During the latter part of the year, the shortage of fuel due to the coal strike caused a serious diminution in the export of cement, and hence a decrease in the number of samples tested.

It may be noted that the Imperial Institute has a representative on the Portland Cement Committee of the British Engineering Standards Association, and took part in an extensive series of co-operative tests immediately prior to the issue of the latest (1926) Specification for Portland cement. Further work is in progress in the cement laboratory for that Committee.

The fees received on account of investigations carried out for companies and private individuals during the year amounted to £43 11s. 6d. This total does not include the grant payable by the Cement Marketing Company, Ltd., which will amount to about £370 plus travelling expenses.

At the request of the High Commissioner for New Zealand, the Institute has agreed to undertake the sampling and analysis of all shipments of basic slag sent from the United Kingdom to the Dominions. This will involve tests on about 16,000 tons of material per annum, the shipments being distributed over a period of about four months.

Mineral pigments. During the year, samples of crude red and yellow ochre and umbers received from the Union of South Africa were submitted to technical trials. These indicated that, in most cases, the pigments obtainable by suitable grinding and levigation would not be sufficiently high-grade to render them suitable for export, but some could doubtless be used locally. One sample, however, was of good quality, and worth, in its crude condition, about £7 per ton in the United Kingdom.

Promising samples of ilmenite sand (the source from which titanium white is obtained) have been examined from British Guiana and Jamaica, and further enquiries are being made regarding the extent of the deposits in the latter locality.

Iron ores. Extensive deposits of hæmatite ore were recently found in Sierra Leone by Officers of the Gold Coast Geological Survey and a number of samples of the ore have been submitted to chemical analysis at the Imperial Institute. The results so obtained showed that all the samples contained high percentages of iron, together with small amounts of phosphorus and sulphur. It is probable that the average ore obtainable will be suitable for making high-grade pig-iron which could be used for steel-making by the acid-Bessemer or open-hearth processes.

Co-operation.

Since the re-organisation of the Imperial Institute, several new and important schemes for the more complete co-operation between the Institute and the Departments and Institutions doing analogous work have been established.

In addition to the close co-operation of the several parts of the Empire through the medium of the Corresponding Members there has been arranged a closer connection with the research bodies, viz., the Department of Scientific and Industrial Research and the analogous bodies throughout the Empire.

With the view to closer co-operation with the Universities throughout the Empire, and in order to see that suggestions, made by the various Advisory Technical Committees as to the research which they consider desirable, should be undertaken, a letter has been addressed to the Universities throughout the Empire with the approval of the Department of Scientific and Industrial Research, asking for their co-operation in the matter of research, and, up to the present, it would appear that very material advances can be given mutually in this connection.

It is the aim of the Imperial Institute to have on record, as far as possible, a list of the various researches that are being carried out throughout the Empire so that information can be disseminated in connection therewith.

As previously mentioned, the Advisory Technical Committees have been of very great assistance in keeping the Imperial Institute in touch with the industries, while substantial help has also been afforded by the Department of Overseas Trade, the Colonial Office and the Geological and Mining Authorities in the various Crown Colonies and Protectorates.

The Mining and Geological Authorities in the Dominions and India have been in close and direct contact with the Imperial Institute, and their help and co-operation in connection with all matters dealing with mineral and metal industries of the Empire have been greater than heretofore, which has been of very material assistance.

During the year a closer co-operation with the Geological Surveys of the Crown Colonies and Protectorates has been attempted and in some measure was attained. Nigeria and Nyasaland had a considerable amount of work undertaken by the Imperial Institute, and this was carried out expeditiously, and all reports finished before the various members of the surveys returned to their respective countries. It is hoped that it can be arranged in future for all officers of the surveys who visit this country, to avail themselves of the facilities which the re-organised Imperial Institute can offer.

PUBLICATIONS.

The "Bulletin of the Imperial Institute."

In addition to their work in answering enquiries and undertaking investigations, the Plant and Animal Products and Mineral Resources Departments have to devote a considerable proportion of their time to preparing material for the quarterly issue of the "Bulletin." This publication first appeared in 1903; an enlarged and improved edition having been issued since 1912. Consequent upon the amalgamation of the Imperial Mineral Resources Bureau, further changes were made in the first number of this year. After discussions and experiments, upon which the advice of subscribers was sought, it has been decided that the "Bulletin" should take the following form in future:—

Section A. Plant and Animal Products Department.

- (1) Reports on Recent Investigations.
- (2) Special Article.
- (3) Notes of Recent Developments.
- (4) Bibliography.
- (5) Reviews of Books Received for Notice.

Section B. Mineral Resources Department.

- (6) Reports on Investigations.
- (7) An Occasional Special Article.
- (8) Notes of Recent Developments and on Mineral Monographs issued from time to time by the Mineral Resources Department.

Statistics will be eliminated and will in future be published as the Annual Statistical Summary. This will allow of the reduction of the Bulletin to its former size of about 144 pages, and will enable it to be published at its old price of 3s. 6d. per copy.

The Bulletin is issued free to Government Departments throughout the Empire, Technical Officers of Dominion and Colonial Governments and Corresponding Members. It is also exchanged for the official publications of some Foreign Government Departments, and technical and trade periodicals in various parts of the world. The free issue amounts to some 1,100 copies of each number, while the paying subscribers amount to about 170.

The Annual Statistical Summary.

This publication gives detailed figures as to production, imports, and exports for all important minerals and metals throughout the world. The 1922-1925 number was issued early in November, 1926.

Legal Publications.

The compilation of this series relating to the Mining Laws of the countries of the Empire is being continued. The document dealing with the laws of the Orange Free State was published during the year. Those concerning East Africa and Canada will appear early in 1927. Other works in course of preparation are volumes relating to New Zealand, New South Wales, and British Guiana.

Mineral Monographs.

The Imperial Conference having approved the decision to continue the publication of the monographs on specific subjects formerly issued by the late Imperial Mineral Resources Bureau, monographs on Salt, China Clay, Diamonds and Other Precious Stones, Abrasives, Silica and Silica Rocks, and Diatomaceous Earth, will be issued at a future date. It will also be necessary to issue new editions of the documents dealing with Lead, Zinc, and other metals and minerals in order to bring them up to date.

GENERAL DEPARTMENTS.

The General Departments are administered by the Secretary, who is directly responsible to the Director, and comprise:—

THE EXHIBITION GALLERIES.

THE STATISTICAL SECTION.

THE LIBRARY.

THE CENTRAL REGISTRY.

THE SECRETARIAT.

THE FINANCE SECTION.

THE WORKS AND LABOUR SECTION.

THE EXHIBITION GALLERIES.

The Galleries are in charge of a Curator, assisted by an assistant Curator, and three exhibition officers.

Re-organisation. On my appointment as Director, I found the Exhibition Galleries closed for receiving and re-arranging some of the exhibits received from Wembley. The Courts were insufficiently lit and were equipped with an antiquated system of electric wiring. They were generally unpleasing in appearance, chiefly owing to the fact that they had not been redecorated for some years through lack of funds. With your consent, I immediately made arrangements for placing contracts for redecoration, reheating and relighting. Although it was originally promised that these works should be completed by May 15th, it was not until the last week in July that the workmen were finally out of the building. This much delayed the work of re-organisation and re-arrangement of the exhibits.

Hitherto, the Galleries had attempted to serve two objectives—as show rooms for the economic products of the Empire for the technical enquirer, and for educative purposes for school children and the general public. The former purpose necessitated the display of products in bulk, which caused overcrowding, accompanied by lengthy descriptive matter in technical language which tended to confuse the lay mind. As the Galleries are open free to the public it is necessary to enclose the exhibits in showcases which does not allow of close and detailed examination of the products themselves. It was therefore decided to relegate the bulk samples to special rooms where the technical enquirer could examine the specimens at leisure and to devote the Galleries themselves entirely to educative purposes. It is hoped to start work on the equipment of these commercial sample rooms early in the New Year.

While the work of re-decoration and improvement was in progress a start was made with the re-arrangement of the exhibits in the galleries and their utilisation in serving the object of education in Empire development. In this connection I feel that I must express my regret that the Empire Exhibition at Wembley had closed down before my appointment and the greater part of most valuable educative material had been dispersed to all parts of the world.

As a general policy, it was laid down that exhibits should be displayed in such a way as to exemplify the utilisation of the various products from their raw state to the finished article, accompanied profusely by photographic illustrations, area production maps, descriptive labels in clear language, and charts and diagrams illustrating their relative importance. Strict instructions were given to avoid all overcrowding, both of individual showcases and the courts themselves.

Sequence of arrangement. In order to ensure that the general arrangement of the courts should conform as far as possible with the most modern methods of teaching Empire development and economic geography, I invited the Board of Education, the Education Committee of the London County Council, the Middlesex Education Committee, the Surrey Education Committee, the National Union of Teachers, and the Education Committee of the London Chamber of Commerce to nominate members for an Advisory Education Committee to the Imperial Institute. With the enthusiastic help of this Committee, to which I owe a deep debt of gratitude, a definite sequence of arrangement was drawn up exemplifying the manner in which the world position of each country, the climatic conditions, the physical features and the natural resources affect the life and occupations of the people. It is intended to apply this sequence to all the courts throughout the galleries. This arrangement has so far been carried out in the New Zealand, Newfoundland, and Colonial courts. The courts of Australia and Canada have been arranged on a different plan by their respective authorities. The High Commissioners for New Zealand and Newfoundland have been pleased to hand over the re-organisation of their courts to my staff, who are now thoroughly well versed in the new scheme. The Canadian court was almost completed by the time I was appointed, and the Australian authorities found themselves unable to alter the plans previously made. Work had also been started on the South African court but after some delay, the High Commissioner's Office asked me to carry out the re-arrangement. I regret to say that it has not been possible to re-open this court to the public at present. Lack of funds is the difficulty, since the South African Government are not at present subscribing to the upkeep of the galleries. A communication embodying proposals for the new court, together with details of the expense involved, was

forwarded by me to the High Commissioner in September last, and this has been sent to the South African Government. As regards India, the Maharajah of Burdwan, after his visit to the Institute, promised to make urgent representations to the Viceroy and Government of India, and I am hopeful that funds may be forthcoming for the complete renovation of that court.

In order to permit of the courts being arranged on a uniform system, I venture to suggest that, though the fullest assistance is essential on the part of the Dominion or Colony concerned, the final arrangement of each court in the galleries should in future be left to the Director.

Dioramas. As a further means of rendering the exhibits more attractive, a certain number of "dioramas" or modelled panoramas have been put in position in various courts. These models are electrically lit and are so placed that the exhibits relating to the particular industry or activity can be grouped around them, together with photographs, descriptive matter, maps and charts. This method of display has met with success. It has justified the establishment of a studio at the Institute where the very best artists at this type of work are constantly engaged in turning out new models. Those artists work in close conjunction with experts, who have full knowledge of the subject it is desired to depict, and who, from their long residence in the country are thoroughly familiar with local colour. So far, the following dioramas have been installed.

With funds from the New Zealand Government:—

A SHEEP STATION.
A DAIRY FARM.
DEER-STALKING.
TROUT FISHING.
THE SOUTHERN ALPS.
THE THERMAL REGION.

With funds from the Newfoundland Government:—

A TRIPTYCH DIORAMA OF THE PAPER PULP INDUSTRY.

With funds from the Tanganyika Government:—

WILD ANIMAL LIFE.

With funds provided by Messrs. Lever Bros. :—

A WHALING SCENE IN THE FALKLAND ISLANDS COURT.
 PALM OIL INDUSTRY IN THE NIGERIAN COURT.
 COPRA INDUSTRY IN THE SOLOMON ISLANDS COURT.

With funds provided by the Bermuda Trade Development Board :—

A VIEW OF THE ISLAND.

Funds are being placed at my disposal for the following new models :—

The Rubber Growers' Association :—

A RUBBER PLANTATION	} MALAY
A WHARF SCENE (LOADING RUBBER)		COURT.

The Tea Association :

TEA GARDEN IN THE INDIAN COURT.

The Canadian Pacific Railway :—

H.R.H. THE PRINCE OF WALES' RANCH IN ALBERTA.

The Southern Rhodesian Government—

TOBACCO PLANTATION.

THE VICTORIA FALLS.

Messrs. Elder, Dempster & Co., Limited :—

FREETOWN HARBOUR, SIERRA LEONE.

Messrs. Zachonis :—

GINGER PLANTATION IN SIERRA LEONE.

Trinidad :—

COCOA.

The Canadian National Railways are also presenting a diorama which they are having made by their own artist.

I am also in negotiation with other governments and associations with regard to the provision of further dioramas for the West Indian, Fiji and Canadian courts.

Transparencies. Another effective method of brightening the galleries has been found in the transparencies, or carbon photos, which are let into the panes of the lower windows. These represent views of typical scenery and aspects of some industries in the countries concerned. They are placed in close proximity to the relevant exhibits. Of these, 57 have so far been installed in the New Zealand court, six in the East African court and three in the Newfoundland court. It is hoped that at a later date all the windows in the galleries will be treated in the same way.

I am able to report that the innovations so far carried out have met with universal approbation from visitors to the galleries of all classes. Much remains to be done.

Visitors. After two previous visits by Her Majesty, in June and November, Their Majesties the King and Queen paid a private visit to the Institute on the 15th December, when they were received by the President of the Board of Governors, Mr. Arthur Michael Samuel, Parliamentary Secretary to the Department for Overseas Trade, Sir William Clark, Chairman of the Managing Committee, and myself. Their Majesties were much impressed by the improvements which had been carried out, and the measures that are being taken for educational visits by school children. I afterwards received the following letter of appreciation from Lord Stamfordham,

Dear Sir William Furse,

It was a great pleasure to the King and Queen to-day to re-visit the galleries of the Imperial Institute. Their Majesties were much interested in the transformation already made in the galleries and feel confident that, when this change is realised by the public, and more especially by the Education Authorities, the fullest advantage will be taken of the opportunities now afforded by the new Board of Governors. The new and beautiful dioramas, with the accompanying exhibits, offer an attractive and stimulating education in the scenery, activities and development of our Dominions, India and the Colonies. The King and Queen were also gratified to know that, by an arrangement between the Board of Governors and Council of the Royal Commission for the Exhibition of 1851, an Imperial Gallery of Art has been set aside for the exhibition of the Scholarship Work of the British School at Rome, and of the work of contemporary artists from every part of the Empire, at home and overseas.

Yours very truly,

(Signed) STAMFORDHAM.

H.R.H. Princess Mary Viscountess Lascelles, also accompanied the Queen on her second visit.

Among Governors of Colonies who have come to the Institute during the year were Sir John Chancellor, Governor of Southern Rhodesia, Sir Gordon Guggisberg, Governor-General of the Gold Coast, Sir Ronald Storrs, Governor of Cyprus, and Sir R. E. Stubbs, Captain-General of Jamaica. Many Officers of the Colonial Services have from time to time paid visits and have made valuable suggestions.

GENERAL PUBLIC. The average attendance by the general public since the re-opening of the galleries is 10,300 per month.

Re-opening of the galleries. In order to inaugurate the educational scheme, a meeting, which was presided over by the President of the Board of Governors, was held in the Great Hall of the Institute on the 28th September. Invitations to attend the meeting were issued to the Head Teachers in the London area, and some 1,200 of them were present. They were addressed by Mr. Ormsby-Gore, Parliamentary Secretary for Colonial Affairs, and the Duchess of Atholl, Parliamentary Secretary to the Board of Education. The galleries were afterwards thrown open to the teachers, and it was at once discernible that a large number of them had never realised how useful the galleries could be to them in assisting teaching of Empire development and economic geography. The galleries were opened to the public on September 29th.

Educational visits by school-children. By agreement with the London County Council, special tours of the galleries have been arranged for school-teachers at stated times. Parties are met by the two Guide-Lecturers, who conduct them round the galleries indicating the sources of supply of various products and their utilisation. The teachers then bring their children to the Institute and give them practical lessons in the galleries. This new scheme has the advantage over the old in that teachers are thus enabled to impart such information as they think their children can absorb in accordance with the standard of education which they have reached.

Since the inauguration of this scheme on November 1st till the end of the Christmas term (under 2 months) 538 teachers have taken part in these tours.

Commencing on January 17th, the scheme will be extended to include the schools in the Middlesex County Council area, and be further extended to the Surrey area at a later date.

Arrangements are still made, on request, for the Guide-Lecturers to conduct parties of children round the galleries. These are, of course, in addition to those parties brought by their own teachers.

It is specially important to note that I was approached by the Insurance Institute some time ago for a series of conducted lectures to the students, who were then attending a special course, on products in which they would be interested on appointment. I have been assured by the

authorities of the Insurance Institute that these lectures were of great value to them and they have announced their intention of sending further parties during the coming year. This opens up new ground and it is my intention to approach similar institutions, such as the Grocers Institute, with a view to arranging for conducted tours of students attending courses. Members of the Textile Institute paid an organised visit during December, and members of the Conference of Educational Associations are paying a similar visit on January 8th.

The Central Stand. The Central Stand is established in the Main court of the south gallery and here an officer is in constant attendance to answer general enquiries concerning the exhibits. Technical enquiries are referred to the departments concerned. The Stand is stocked with pamphlets giving information concerning industries, life and occupations in various parts of the Empire. Much of this literature is given away gratis, but a charge is made for certain publications. The proceeds from sales since re-opening amount to £13 2s 2d.

Postcards depicting scenes in the Dominions and Colonies, made up in sets of six, are also sold, and 478 packets have been disposed of during the year, in spite of the fact that the galleries were closed for 9½ months of this period.

School specimens. The surplus specimens of economic products are utilised for supplying to school museums. These samples are put up in stout paper bags, properly labelled, and showing country of origin. They can be obtained on application at the rate of 1d. per bag.

The number disposed of in this way during the year was 3,231. Parcels of a number of specimens contain, in addition, a selection of free pamphlets containing information concerning the countries of origin.

Disposal of exhibits to other museums. The following were the recipients of surplus exhibits that became available owing to the reduction in the number needed in our galleries under the new scheme of arrangement:—

The British Museum, Bloomsbury. Indian coins.

The Victoria and Albert Museum. Indian and Malayan Royal presents. Carved Lucknow screen and doorway. Photographs of ancient Indian buildings. Silver-gilt howdahs and palanquins. Malayan pottery.

- The Natural History Museum. Collection of Australian, Newfoundland and Canadian birds. Elephant skull, etc., from Ceylon, and elephant head from South Africa. Collection of British Guiana minerals. Collection of South African minerals (Dr. Hatch). Specimen trunk of logwood.
- The Hove Museum. Carved Baroda pigeon house. Carved Jaipur gateway and drum house. A section of Indian artware and West and East African ethnological exhibits.
- The Batley Museum. A large collection of Indian artware and West African ethnological exhibits. A collection of Newfoundland birds and animals. West Indian exhibits.
- The Royal Ontario Museum of Mineralogy, Toronto. Collection of Empire minerals.
- The Sir John Case Technical Institute. Collection of minerals.
- The Royal School of Mines. Collection of minerals.
- The Royal School of Arts. Marble and building stones.
- Boy Scouts Association. H.R.H. the Prince of Wales' American and South African ethnological exhibits.
- Bristol Museum and Art Gallery. Specimens of drugs and minerals.
- The Vatican Museum. Indian pergolas and statuettes of Indian deities.

Sale of Show-cases. The show-cases of an obsolete type that were withdrawn as a result of the reduction in the number of exhibits in the galleries have been disposed of to the following purchasers:—

- The Batley Museum.
- The Municipal Museum, Hull.
- The Hove Museum and Library.
- The Chelsea Library Museum.
- Lady Wolseley for Hove.
- The Salisbury Museum.
- The Boy Scouts Association.

Participation in other exhibitions. British Industries Fair, 1926. By arrangement with the Department of Overseas Trade, the Imperial Institute occupied over 1,000 square feet at the British Industries Fair. The exhibits consisted of Cyprus silk, Empire tobaccos, hand specimens of Empire timbers, essential oils, glass-making materials, brick, tile and porcelain-making materials, and specimens of rare earths. Arrangements have been made for participation at the forthcoming fair in 1927, when 1,400 square feet will be occupied, of which approximately 600 square feet will be given up to the Rubber Growers' Association for a special exhibit in collaboration with the Imperial Institute.

Loans of exhibits were made for the following temporary exhibitions:—

League of Nations Exhibitions. Empire Day Celebration.

Harrods Stores Empire Shopping Week.

Farningham (Kent) Empire Shopping Week.

Antwerp International Exhibition. Indian products and photos.

Imperial Gallery of Art. As a result of negotiations with the Royal Commissioners for the Exhibition of 1851, the upper east gallery has been set aside for exhibition of the works of selected artists from all parts of the Empire. Artists will be expected to pay cost of freight from their country to London, but no charge will be made for hanging or commission on sales.

The gallery will also be utilised for judging and exhibiting the works of candidates for scholarships at the British School at Rome. A small temporary exhibition was held from November 17th to December 5th of designs submitted for the architectural scholarships at Rome and works of prominent British artists selected for the National Art Gallery at Cape Town. The first main exhibition of Imperial Art will be held in April, May and June next year, and the High Commissioners of the Dominions in London have been asked to put us into touch with the proper authorities overseas.

Finance. Certain, but not all, countries of the Empire contribute towards the upkeep and maintenance of their courts. The total amount does not cover the overhead charges, such as salaries of the exhibition staff, heating, lighting, cleaning and minor repairs.

I give below a list of the present annual contributions.

Annual contributions to exhibition galleries.

	£		£
H.M. Government...	3,000	Kenya	50
Canada	640	Leeward Islands ...	Nil
Australia	640	Malta	Nil
New Zealand	384	Mauritius	100
India	Nil	Nigeria	150
South Africa	Nil	North Borneo	Nil
Newfoundland	64	Nyasaland	Nil
Bahamas	Nil	Palestine	Nil
Barbados	Nil	Northern Rhodesia	Nil
Bermuda	Nil	Southern Rhodesia	Nil
British Guiana	75	St. Lucia	Nil
British Honduras	Nil	St. Vincent... ..	Nil
Ceylon	100	Seychelles	Nil
Falkland Islands	Nil	Sierra Leone	75
Federated Malay States	150	Somaliland	Nil
Fiji	Nil	Straits Settlements	100
Gambia	Nil	Sudan	Nil
Gold Coast	100	Tanganyika	Nil
Grenada	Nil	Travancore... ..	Nil
Hong Kong... ..	75	Trinidad	Nil
Iraq	Nil	Uganda	50
Jamaica	Nil	Zanzibar	50
		Total	<u>£5,808</u>

Special grants for the re-organisation of the courts have been received as follows:

	£
New Zealand	1,600 (balance)
Newfoundland... ..	300
Tanganyika	310
Southern Rhodesia	600
Bermuda	215
Gold Coast	80
Total	<u>£3,105</u>

I have also received information that the Rubber Growers' Association are making a special grant of £500 for the installation of a permanent rubber exhibit, and the Tea Association a similar grant of £200.

The delegates to the West India Conference, when sitting in London and after a visit to the Institute, resolved to recommend to their respective governments that a combined grant of £1,000 should be placed in my hands for the improvement of the British Guiana, British Honduras and West Indian courts.

Publicity. There is no doubt that in the past the galleries of the Imperial Institute were the least known of any of the museums in South Kensington and it is evident that this ignorance continues to some extent. During the year under review, propaganda through the Press has been considerably increased, and on the whole, the start of the campaign may be said to have achieved success in that a number of newspapers and periodicals have published notices, articles, and illustrations concerning the work of the Institute.

During Christmas week, a special distribution of an illustrated pamphlet was made in the Chelsea, Kensington and Notting Hill areas.

By arrangement with Mr. Frank Pick, the Underground Railways have kindly undertaken to produce and display throughout their system an illustrated poster calling attention to the Institute.

I am hopeful that the Institute may benefit from the press campaign to be undertaken during the coming year by the Empire Marketing Board.

There is, however, urgent need of spreading greater knowledge of the activities of the Institute and I am considering the advisability of recommending the Board of Governors to set aside a definite sum for this purpose in the 1927-28 Budget.

Cinema. I am glad to be able to report that the Empire Marketing Board are placing £6,000 at our disposal for the conversion of one of the existing buildings as a cinema and its necessary equipment, provided that the Office of Works are satisfied that all requirements as to fire precautions have been fulfilled. In addition the Board are placing the sum of £1,000 per annum for five years at my disposal for maintenance, staff salaries of the cinema, and for the hire of films.

I have already been promised a number of films, on loan, illustrating the life and industries in the Dominions and Colonies.

I am now awaiting the final decision of the Office of Works with regard to the plans, and immediately after their approval has been given, operations will be started with the constructional work.

The cinema should increase the number of visitors to the galleries very considerably.

The Statistical Section.

At the head of the statistical section is the Chief Statistician with an assistant and four clerks as his staff.

This section is responsible for supplying statistical information of Empire products to the two technical departments and the exhibition galleries. Outside enquiries concerning statistics are dealt with after consultation with the two principal officers concerned. One of its important functions is the preparation of the Annual Statistical Summary each year. During 1926, the section furnished all the information for the quarterly statistics published in each number of the "Bulletin," and details for special articles and notes. The statistical charts in the exhibition galleries have been revised to a considerable extent, and a number of area production maps for display on showcases have been produced.

The following special information has been furnished: A statistical analysis of the position of the tobacco industry in the Empire in connection with a proposal to constitute an advisory committee on tobacco production in the British Empire.

Statistical information regarding the development of an entrepôt trade in Belgium for the distribution of Indian hemp. The enquiry was suggested as a result of the rapid increase in exports of hemp from India to Belgium.

Replies to enquiries relating to the production and trade in manganese in various countries over an extended period (in one case for 60 years past).

Statistics as to the distribution and stocks of gold throughout the world.

Work was started towards the end of the year on the statistics required for the first of the Mineral Monographs which is to be published.

Information for the use of the Royal Commission on the Coal Industry was also furnished with regard to the working conditions of persons employed in the coal industries of the more important coal producing countries.

Assistance was given to the Economic Section of the League of Nations in connection with a report on the world's economic development and the compilation of index numbers relating to the world's productivity in various commodities.

The Library.

In charge of the library is a librarian with an assistant and two clerks.

The library contains some 40,000 publications which are principally works of reference dealing with economic products from all parts of the world. Special attention is given to publications relating to tropical agriculture, forestry, mineral resources, and the production and utilisation of raw materials. In addition, some 590 technical periodicals are regularly received.

The library is principally for the use of the technical departments, but is open to the general public, and a reading room is available for the use of enquirers and other visitors.

During the year, 3,650 new publications and 25,136 periodical publications were received. Selected journals for indexing numbered 6,655; 8,320 technical and other periodicals were issued to the staff for perusal and information.

Lack of accommodation. In order to reduce the storage space it was decided that Government gazettes should be kept for five years instead of ten as heretofore. With the amalgamation of the Imperial Mineral Resources Bureau it has been necessary to retain additional numbers of selected and indexed periodicals.

All available space is now fully occupied and unless further accommodation is provided much valuable reference material may have to be destroyed which would considerably affect the efficiency of the two technical departments.

The Central Registry.

At the head of the Registry is the Registrar with an assistant and three clerks as his staff.

The average number of letters received was 803 per month.

The average number of letters despatched was 769 per month.

As the volume of correspondence has so much increased (average in 1925, received 524, despatched 490) a card index system of dealing with the registration of letters will be commenced in January, 1927. This will considerably reduce the registration work and it is hoped will result in speeding up the work and an economy in the cost of running.

Lack of accommodation. The stock of publications now held exceeds the storage space, although a large number of old "Bulletins" were disposed of this year by a

gratis issue to scientific and technical institutions in various parts of the world. Unless this important service is considerably curtailed further accommodation will have to be found at an early date.

The Secretariat.

The Secretariat staff consists of a secretarial assistant, two shorthand typists, and a junior clerk. The principal functions are the preparation of all papers and matters to be dealt with by the Director and Secretary, the correct registration and filing of all confidential matters, the keeping of staff records, arrangements for visits of teachers and children to the exhibition galleries, arrangements for meetings of various associations which are held at the Institute, matters concerning upkeep of buildings and repairs, the issue of press communiqués and circular letters, the reception and issue of all general stores, and allocation of tasks for the works and labour staff. In addition, it is responsible for the preparation of agenda papers, arrangements for meetings, and preparation of minutes for the Board of Governors, the Managing Committee, the Publications Committee and the Education Committee.

The amount of correspondence dealt with has increased from 262 letters in January to 1,078 letters in November.

Finance Section.

Thanks again to the valuable assistance of the Department of Overseas Trade, the accounting system has been entirely re-organised. Attached is a statement of accounts for the nine months, April to December, 1926.

The Works and Labour Section.

The works staff consists of the printers' shop and the carpenters' shop. The printers' shop produces all the necessary letter heads and forms for general use, circular letters and some pamphlets. In addition, the printing of all labels, descriptive matter, charts and over-printing of maps for the exhibition galleries is also carried out.

The carpenters' shop is kept fully employed in making new show and diorama cases, framing maps, photographs, general repairs and minor alterations, and the preparation of timbers for testing in the laboratories.

The labour staff has been heavily worked during the last year in clearing out the galleries, the replacement of showcases and heavy material, patrolling the building, and cleaning services.

A new system of storekeeping will be inaugurated early in the new year as soon as the new store rooms have been fitted up.

W. T. FURSE,
Lt.-General,

DIRECTOR OF THE IMPERIAL INSTITUTE.

ANNUAL CONTRIBUTIONS.

(1)	United Kingdom Grant	...	...	...	...	...	...	...	£	12,000
	United Kingdom Grant for moiety of salary of Chairman of Mineral Advisory Committee	...	...	...	...	...	...	...	£	500
										<u>£12,500</u>
(2)	The Contributions from India and the Self-Governing Dominions are made up as follows:—									£
	Canada	...	...	...	...	...	...	...	£	2,640
	Australia	...	...	...	...	...	...	...	£	2,640
	New Zealand	...	...	...	...	...	...	...	£	1,584
	*South Africa	...	...	...	...	...	...	...	£	1,200
	Newfoundland	...	...	...	...	...	...	...	£	264
	*India	...	...	...	...	...	...	...	£	1,200
										<u>£9,528</u>
(3)	The Contributions from the Colonies and Protectorates are made up as follows:—									£
	*Bahamas	...	...	...	...	...	...	...	£	50
	*Barbados	...	...	...	...	...	...	...	£	50
	*Bermuda	...	...	...	...	...	...	...	£	25
	British Guiana	...	...	...	...	...	...	...	£	575
	*British Honduras	...	...	...	...	...	...	...	£	100
	Ceylon	...	...	...	...	...	...	...	£	850
	*Cyprus	...	...	...	...	...	...	...	£	100
	*Falkland Islands	...	...	...	...	...	...	...	£	5
	Federated Malay States	...	...	...	...	...	...	...	£	900
	*Fiji	...	...	...	...	...	...	...	£	150
	*Gambia	...	...	...	...	...	...	...	£	500
	Gold Coast	...	...	...	...	...	...	...	£	850
	*Grenada	...	...	...	...	...	...	...	£	7
	Hong Kong	...	...	...	...	...	...	...	£	575
	*Iraq	...	...	...	...	...	...	...	£	100
	*Jamaica	...	...	...	...	...	...	...	£	5
	Kenya	...	...	...	...	...	...	...	£	300
	*Leeward Islands	...	...	...	...	...	...	...	£	200
	*Malta	...	...	...	...	...	...	...	£	50
	Mauritius	...	...	...	...	...	...	...	£	850
	Nigeria	...	...	...	...	...	...	...	£	900
	*North Borneo	...	...	...	...	...	...	...	£	100
	*Nyasaland	...	...	...	...	...	...	...	£	100
	*Palestine	...	...	...	...	...	...	...	£	50
	*Rhodesia, Northern	...	...	...	...	...	...	...	£	100
	*Rhodesia, Southern	...	...	...	...	...	...	...	£	250
	*St. Lucia	...	...	...	...	...	...	...	£	10
	*St. Vincent	...	...	...	...	...	...	...	£	5
	*Seychelles	...	...	...	...	...	...	...	£	25
	Sierra Leone	...	...	...	...	...	...	...	£	575
	*Somaliland	...	...	...	...	...	...	...	£	10
	Straits Settlements	...	...	...	...	...	...	...	£	850
	*Sudan	...	...	...	...	...	...	...	£	500
	*Tanganyika	...	...	...	...	...	...	...	£	100
	*Travancore	...	...	...	...	...	...	...	£	100
	*Trinidad	...	...	...	...	...	...	...	£	150
	Uganda	...	...	...	...	...	...	...	£	300
	Zanzibar	...	...	...	...	...	...	...	£	150
										<u>£10,617</u>

* Does not contribute to upkeep of Exhibition Galleries (see p. 40).

STAFF.

Director	- -	Lt.-Gen. Sir WILLIAM FURSE, K.C.B., D.S.O.
Secretary	- -	Major O. J. F. KEATINGE, D.S.O.
Secretarial Assistant	-	G. S. GODFREY.
Accountant	- -	W. H. GILLHAM. (<i>Seconded from D.O.T.</i>)
Registrar	- -	P. J. REDMOND.
Librarian	- -	F. HENN.

PLANT AND ANIMAL PRODUCTS DEPARTMENT.

Chairman of the Advisory Council:—

Lt.-Col. Sir David Prain, C.M.G., C.I.E., F.R.S.

Principal	- -	H. BROWN.
Vice-Principal	- -	E. GOULDING, D.Sc.(Lond.), F.I.C.
Chief Assistant	- -	S. E. CHANDLER, D.Sc.(Lond.), A.R.C.S., F.L.S.
Intelligence Department:		H. J. JEFFERY, A.R.C.S., F.L.S.,
Senior Assistants		F. FERRABOSCHI, M.A.(Cantab.), A.I.C.
		B. E. LONG, B.A.(Cantab.).
Assistants	- -	G. W. ASTON.
		J. A. NELSON, B.Sc.(Econ.) (Lond.).
Technical Indexer -	-	Miss R. M. JOHNSON.
Laboratories:		
Superintendent	-	J. R. FURLONG, Ph.D., A.I.C.
Senior Assistants	-	O. D. ROBERTS, F.I.C., G. T. BRAY, A.I.C., P. HARRIS, B.Sc.(Eng.).
Assistants	- -	F. MAJOR, B.Sc.(Lond.), A.I.C., H. T. ISLIP, B.Sc.(Lond.), A.I.C.

MINERAL RESOURCES DEPARTMENT.

Chairman of the Advisory Council:—

Sir Richard Redmayne, K.C.B., M.Sc., F.G.S.

Principal	- -	Maj. W. H. HENDERSON-SCOTT, A.R.S.M., F.G.S., M.I.M.M.
Vice-Principal	- -	T. CROOK, A.R.C.S., F.G.S., M.I.M.M.
Intelligence Department:		A. G. PLEWS, B.A.(Cantab.), M.I.M.M.
Senior Assistants	-	R. ALLEN, M.A.(Cantab.), B.Sc.(Lond.), M.I.M.M., G. E. HOWLING, B.Sc(Lond.).
Technical Indexers	-	Miss E. L. ATKINSON, Mrs. F. H BELL.
Laboratories:		
Superintendent	-	S. J. JOHNSTONE, B.Sc.(Lond.), F.I.C.
Senior Assistants	-	W. O. R. WYNN, F.I.C., A. T. FAIRCLOTH.
Assistants	- -	Miss H. BENNETT, B.Sc.(Lond.), A.I.C., Miss R. C. GROVES, M.Sc.(Birm.), A.I.C., H. J. BROUGHTON, W. G. ATKINS.
Legal Consultant	-	G. STONE, B.A.(Cantab.), LL.B.
Chief Statistician	-	J. BRACE, M.M., B.Sc.(Econ.), F.S.S.

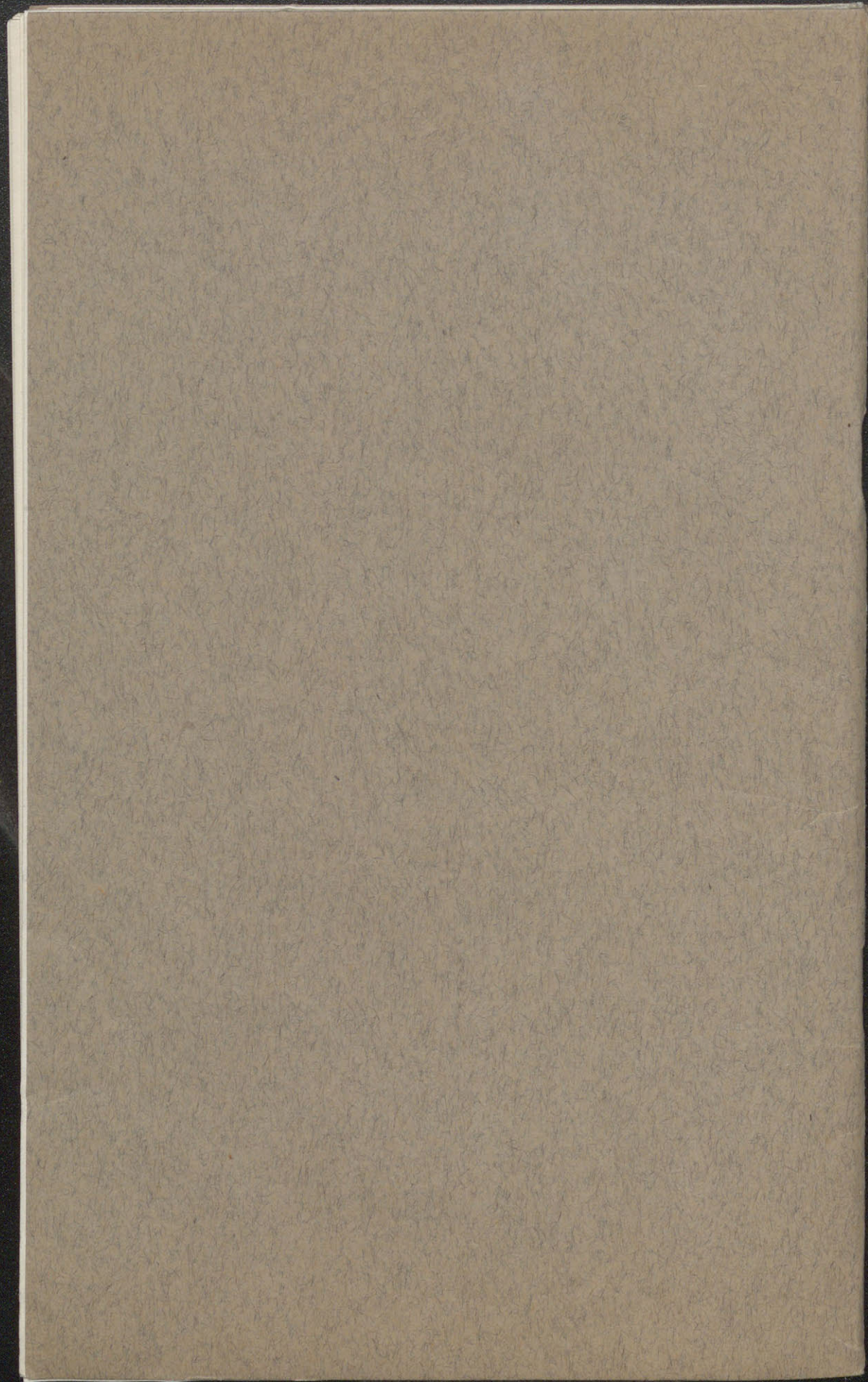
EXHIBITION GALLERIES.

Curator	- -	H. SPOONER.
Deputy Curator	- -	A. B. JACKSON, A.L.S.
Exhibition Officers	-	F. W. ROLFE, F. BOULTON, E. C. MOORE.
Guide Lecturers	-	Colonel M. C. NANGLE, L. A. B. SHARPE, M.A.(Cantab.), B.Sc.

CEYLON RUBBER RESEARCH LABORATORY.

Superintendent	-	G. MARTIN, B.Sc., A.I.C.
Senior Assistant	-	W. S. DAVEY, B.Sc., A.I.C.
Assistant	-	F. L. ELLIOTT, F.I.C.

NOTE.—This list does not include the minor grades of the Imperial Institute staff.



IMPERIAL INSTITUTE

*Comparative Statement of Estimates and
Actual Receipts and Expenditure for the nine
months April 1st to December 31st, 1926.*

	<i>£</i>	<i>s.</i>	<i>d.</i>
Net Surplus at 1st April, 1926	8,020	6	10
Excess of Expenditure over Receipts to 31st Dec., 1926	3,710	5	5
Net Surplus at 31st Dec., 1926	<u>£4,310</u>	<u>1</u>	<u>5</u>



IMPERIAL INSTITUTE,
LONDON, S.W.7.

8th. August, 1927.

Dear Sir,

You will recollect that towards the end of last year I wrote to you in regard to the possibility of co-operation between your University and the Imperial Institute in connection with the investigation of research problems which are suggested from time to time at the meetings of the Advisory Councils and Technical Committees of the Imperial Institute. A further communication is shortly being addressed to you on this subject.

I am enclosing herewith a copy of my Annual Report on the operations of the Institute during 1926 which may be of interest to you.

With regard to the publications issued by the Institute, to which reference is made on pages 29 and 30 of the Report, I would draw your attention to the enclosed copy of a reprint of an article in the "Bulletin of the Imperial Institute" (published quarterly), dealing with recent developments in the Cyprus Silk Industry which are the outcome of work carried out by one of the Technical Committees of the Institute. This will afford an idea of the class of article contained in the "Bulletin" and of the type of work undertaken at the Imperial Institute through the various Technical Committees of which lists are given on pages 5 and 20 of my Report.

In case your University may care to subscribe to the Bulletin of the Imperial Institute an order form is enclosed.

Yours faithfully,

A handwritten signature in dark ink, appearing to read 'W. Furse', with a long horizontal line underneath.

Director
(Lt-Gen. Sir William Furse).

The Vice-Chancellor,
McGill University,
Montreal.



IMPERIAL INSTITUTE,
LONDON, S.W. 7.

11th August, 1927.

Dear Sir,

It will be in the memory of the various Universities and other Institutions within the British Empire at which scientific and industrial research work is carried out, that on the 28th October, 1926, a letter was addressed to them by the Director of the Imperial Institute informing them of the re-organisation and expansion in the constitution and activities of the Institute.

In this letter, an allusion was made to the fact that at a recent meeting of the Advisory Council on Minerals, it had been suggested that post-graduate students working at the various Universities throughout the Empire might be glad to carry out research work on some subject of economic value, and that the professors under whom these students work would probably welcome suggestions. It was stated that the Governors of the Imperial Institute considered that co-operation between the Imperial Institute and the Empire's Universities on these lines might prove of material benefit, instances being quoted to that effect.

It was pointed out also that the Universities could assist the Imperial Institute in carrying out its functions as a clearing house of information in these matters by keeping the Governors of the Institute informed of any researches that may be undertaken independently at the Universities on British Empire raw materials.

It is pleasant to be able to report that the suggestions in regard to possible researches, epitomised above, have been welcomed by almost every University in the Empire.

Since the proposals alluded to were first mooted, meetings of the Advisory Technical Committees on minerals have been held at the Imperial Institute, at which a number of suggested researches, of varying degrees of economic importance and urgency, have been proposed and considered, and the recommendations of the Committees, which have been deliberated upon and approved by the Advisory Council on Minerals, are set out in the report enclosed herewith.

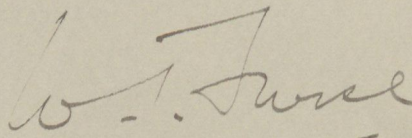
Neither at the Imperial Institute, nor, probably, at any one centre, is there available all the necessary detailed knowledge as to the nature and extent of the laboratory and other equipment established at each and all of the various Universities throughout the Empire, which knowledge would enable the sending on to each University information as to only such researches as the particular University is prepared to undertake or consider. ~~For this reason, and for the reason that it may be of interest to each of them to have the full list of subjects suggested for research before them,~~ the list in its entirety is attached hereto.

The Vice-Chancellor,
McGill University,
Montreal,
Canada.

It is not only conceivable, but probable, that, on occasions, investigators at more than one University may engage contemporaneously upon the same research. Overlapping in research work, however, in moderation, is not an evil—far from it—there are obvious advantages in more than one worker attacking contemporaneously a scientific problem. But it would probably be helpful to the respective researchers, and certainly preventative of an undue amount of overlapping, if Universities engaged on the same line of research were put in touch with each other. This the Imperial Institute is ready to do. For this reason, it is requested that the Universities may see fit to inform the Imperial Institute of any researches on minerals and metals which they may propose to undertake.

In putting forward the possible researches of economic value in regard to minerals and metals, we do not describe the problem in great detail, nor do we presume to indicate how the problem should be approached and attacked, but it is hoped that sufficient information is given to indicate the nature, extent and importance of each specific problem. A wide scope is purposely allowed so as not in any way to restrict the research workers.

Yours faithfully,

A handwritten signature in cursive script, reading "W. T. Furse". The signature is written in dark ink and is positioned above a horizontal line.

Director,
(Lt.-Gen. Sir William Furse).

SUBJECTS FOR RESEARCH.

The list of suggested researches is as follows:—

I.—TIN AND TUNGSTEN.

TIN.

The study of the subject of the dressing of tin ores with a view to devising a cheap and effective method of recovering tin from slimes.

NOTE 1.—It may be pointed out that the Tin Research Committee of the Department of Scientific and Industrial Research is still in being, the Chairman of which, Mr. R. Arthur Thomas, will be glad to help.

NOTE 2.—The loss of tin in slimes, under existing methods, is very considerable.

TUNGSTEN.

1. Alloys of tungsten.

(a) The alloying of tungsten with other metals with special reference to the hardness of the alloys.

(b) The alloying of tungsten with nickel-aluminium, nickel-chromium and nickel-copper alloys, and the study of the effects of the presence of small quantities of other metals thereon.

(c) The investigation of the crystal structure of the hard alloys of tungsten, as, for instance, volomite, an alloy of tungsten (70 per cent.), chromium and cobalt. (See Note 1).

NOTE 1.—It is claimed that this alloy possesses nearly the hardness of the diamond with the toughness of steel. Experiments made with this and similar alloys have not been altogether successful in Great Britain. Research work might with advantage be carried out in regard to the production of such alloys and their heat treatment. Hard alloys of the character under consideration might be used in substitution for diamonds (Bort) in the drilling of boreholes. Such alloys, too, would be valuable for use in the making of end-bearings.

NOTE 2.—It has been ascertained that tungsten will not alloy with lead, silver, gold or mercury, but in respect of nickel-tungsten, cobalt-tungsten, platinum-tungsten alloys and alloys of the stellite series, considerable research work has been carried out. The alloys, too, of molybdenum-tungsten have been investigated, but are not likely to be of any value.

2. Chemical analysis.

A method of quick volumetric analysis for tungsten, which shall be moderately accurate and applicable to a works; also a reasonably quick method for the determination of the impurities in tungsten alloys, such as sulphur, phosphorus, and arsenic.

NOTE.—Mr. J. L. F. Vogel (a member of the Tin and Tungsten Committee and Managing Director of High Speed Steel Alloys Ltd.) has kindly offered to supply samples if necessary, as well as information concerning the subject. Mr. Hutchins of the School of Mines, Camborne, Cornwall, might also be consulted, he having done much investigation work in the direction alluded to.

3. Tungsten wire.

The possibility and practicability of coating tungsten wire with a metal or other substance to prevent oxidization of the tungsten when used in electric appliances.

II.—MISCELLANEOUS MINERALS.

1. ASBESTOS.

(a) The economic utilization of the extremely short fibrous waste produced at mines.

(b) The chemical analysis and comparison of the various forms of asbestos occurring within the Empire, and the specific uses to which these, respectively, can be put.

NOTE.—As to (b), Mr. Godfrey (a member of the Miscellaneous Mineral Committee and Manager of the Cape Asbestos Company) has kindly expressed a desire to be of assistance in this matter.

2. MICA.

(a) In connection with the electrical industry, to devise a quick method for determining the abrasive hardness of mica in its edgewise direction. The method might be either direct or indirect. Also a research to determine any definite relation that exists between face and edge hardness.

(b) To devise a commercial process by which mica can be ground sufficiently fine, and at the same time possess sufficient lustre, to satisfy the requirements of the wall paper trade.

III.—MINOR METALS.

The provision and preparation of the materials necessary for the production of non-ferrous alloys containing zirconium, niobium, tantalum, titanium, and boron; the uses to which such alloys can be put, and their production on a commercial scale.

NOTE.—In this connection, the Imperial Institute is getting into touch with such British firms as are working, or have worked, upon the subject, with a view to collecting information so as to be of aid to such institutions as may see fit to pursue the subject further.

IV.—CHEMICAL INDUSTRIES.

1. The economic extraction of bromine from sea-water (Bitterns).

(a) The constitution and character of Fuller's earth, with a view to elucidating the nature of its distinctive action.

NOTE.—Such an investigation might render possible the application of other substances, or of their preparation to render them suitable for the purposes to which Fuller's earth is put. A matter of some importance, in view of the fact that the supplies of Fuller's earth are limited in extent and distribution. A full knowledge of the distinctive actions of Fuller's earth might result in indicating other useful lines of enquiry.

V.—ALUMINIUM.

1. The devising of an economical method of extracting alumina from bauxites containing 8 per cent. and over of silica; as well as the extraction of alumina from lower-grade ores generally, including clays.

2. As to the relationship between physical properties of the commercial quality aluminium sheet (99 to 99.40 per cent. purity) and its drawing properties.

3. The determination of the commercial uses to which the residues obtained in the process of making alumina and alum from the ores of aluminium may be put.

NOTE.—Mr Murray Morrison (Chairman of the British Aluminium Company and a member of the Aluminium Committee) kindly offers to help by affording facilities to those interested. In connection with this line of research, there arises also for consideration the economic extraction of the potash contained in the clays.

VI.—IRON AND STEEL.

1. The preparation of a complete set of chemical and physical analyses of the iron ores of the world, which analyses shall have regard to the rarer elements contained in the ores.

2. The extent of the embrittling effect on ordinary carbon steel of certain substances, e.g., sodium hydrate, used in commercial processes, and the ascertainment as to how far this effect is a function of temperature and of concentration of the mixture, and whether the effect would be eliminated by the employment of alloy steels.

NOTE.—To enable this work to be carried out, the Imperial Institute would ask the various iron and steel works throughout the world to supply them with representative samples of the principal British and Foreign ores, which they would allocate to the several educational institutions applying to the Imperial Institute; the object being to secure that, as far as possible, true average bulk samples should be forthcoming, and, secondly, that duplication of work in respect of area should be avoided.

VII.—NICKEL AND COBALT.

1. A study of the magnetic properties of nickel-iron alloys.

2. To devise a cheaper method of the extraction of cobalt from its ores, especially those of a refractory nature.

NOTE.—It is necessary, in regard to most of the research work carried out in connection with iron and steel, to use such large-scale plant that it is unsuited to University laboratories. There are some matters which can, of course, be adequately dealt with in chemical and metallurgical laboratories, but some of the work would have to be carried out in the smelting works.

NOTE.—Although a considerable amount of work has been done on this subject, it is only within recent years that the pronounced effect of heat treatment on the magnetic properties of these alloys has been discovered, and it would appear that a reconsideration is necessary in the light of recent knowledge. This is particularly true of those alloys containing more than 30 per cent. nickel. Such matters as (a) the correct heat treatment for each composition in order to obtain the best magnetic properties in any definite direction, and (b) the effect of impurities on the magnetic properties, are of considerable importance, and a large field of work is available in these directions.

The Mond Nickel Company stated that they would be glad to be of any assistance that lay within their power.

It was stated by Mr. Griffiths, of that Company, that alloys of the nature indicated had been used for submarine cables and had improved the speed of transmission from 6 to 8 times.

VIII.—LEAD AND ZINC.

1. The provision of a quick and reliable method of testing lead before it is put into commercial use, and especially a reliable method for determining the amounts of the various impurities which are at times found in commercial and chemical lead.

2. As to the causes of the corrosion of lead, and the determination as to whether it is (possibly) due to the presence of one or other of the isotopes of lead.

3. The reduction of zinc ores, the development of new methods, and their translation into commercial practice.

4. To find a reliable method of determining minute quantities of fluorine (down to one-hundredth per cent.) in zinc concentrates.

NOTE.—At the present time 0.05 per cent. of fluorine is regarded as too high a percentage of this impurity, and the present method of arriving at the fluorine content is entirely unsatisfactory.

5. As to the effect of using higher temperatures in the reduction of zinc ores in retort furnaces, and the presence of cadmium, iron and other impurities in the resulting spelter.

NOTE.—Mr. H. M. Ridge (of the Ridge Roasting Furnace and Engineering Co., Ltd., and a member of the Advisory Technical Committee on Lead and Zinc) stated that he would be glad to be of assistance to researchers in connection with lead and zinc.

IX.—PETROLEUM, ASPHALT, OIL SHALES AND NATURAL GAS.

1. As to the physical properties of various crude oils.

NOTE.—There are many individual physical properties, each of which would make a valuable subject for research. Some aspects have been partially studied, such as specific gravity, viscosity, colour and absorption, but there are others, such as coefficient of expansion, specific heat, electric conductivity, compressibility, latent heat, refractive index and fluorescence, colour-measurement and the adoption of a standard colour scale to all crude oils, viscosity, with special reference to mobile oils, viscosity and melting point hysteresis, surface tension, emulsibility, heat of absorption with precipitated silica as standard, dielectric strength, and heat of combustion, on which comparatively little work has been done. There still remains a wide field for investigation in regard to the physical properties of crude oils.

2. The chemical composition of various crude oils.

NOTE.—A good deal of work has already been done on this subject by individual Companies, and the Imperial Institute will be pleased to put such Companies in touch with any scientific body embarking on an examination of the chemical composition of various crude oils. The Imperial Institute will ask the Companies interested to supply samples of any particular crude petroleum required.

3. The economic utilisation of spent shale.

NOTE.—A certain amount of work has been carried out but not with any degree of success. It is suggested that the possibility of its use for such purposes as—

- (a) Brickmaking
- (b) Cement making
- (c) Manures

is worthy of consideration.

4. The production from shale of a burning oil possessing the properties of a petroleum kerosene.

NOTE.—A certain amount of work has already been carried out, but there is still a great deal to be done, in connection with cracking, as well as odour and colour.

5. A method of determination of unsaturation of petroleum compounds, namely the estimation of olefines and acetylenes.

6. The discovery of suitable chemical compounds to influence detonation of petroleum in internal combustion engines.

NOTE.—In order to be commercially successful, these compounds should be non-toxic, both in themselves and in their resulting mixtures.

7. General catalysis of petroleum, and, in particular, catalytic reduction and oxidation.

8. The production of high-grade lubricating oils, suitable for naval turbines, from crude oils produced and refined within the British Empire.

NOTE.—Such oils should approximate as closely as possible in properties to those obtained from paraffin base crudes of the Pennsylvanian type.

August 29, 1927.

Lieutenant-General Sir William Furse,
Director, Imperial Institute,
London, S.W.7.

Dear Sir William Furse:-

Your letter of the 11th instant addressed to the Vice-Chancellor has been duly received and will be referred to him immediately upon his return. Meantime may I venture to ask that you forward us three additional copies of the printed note of subjects for research.

I trust that your trip through Canada is proving to be a pleasant one.

Yours sincerely,

Wilfrid Bovey.



Tel. KENSINGTON { 1676
3798
3799

ADDRESS CORRESPONDENCE
TO THE DIRECTOR.

REF. No. Cop.7.

IMPERIAL INSTITUTE,
SOUTH KENSINGTON,
LONDON, S.W. 7.

9th September, 1927.

Dear Sir,

In reply to your letter of the 29th August, and in the absence of the Director, who has not yet returned from Canada, I have much pleasure in sending to you the three additional copies of the printed research note which you require.

Yours faithfully,

Thos. Crook.

Vice-Principal,
Mineral Resources Department.

Wilfrid Bovey Esq.,
McGill University,
Montreal,
CANADA.

September 20, 1927.

Professor W.G. McBride,
Chemistry Building,
McGill University.

Dear Professor McBride:-

I am enclosing herewith copy of a circular received from the Imperial Institute, forming part of their scheme of co-ordination in research.

I should be glad if you would let me know whether any member of your Department proposes to carry on research in any of the suggested subjects, in order that I may advise the Imperial Institute to that effect.

Yours faithfully,

Principal.

Copy to Dr. Ruttan
Dr. Stansfield.

PRINCIPAL PUBLICATIONS OF THE IMPERIAL INSTITUTE

BULLETIN OF THE IMPERIAL INSTITUTE. A record of progress relating to agricultural, mineral and other industries, with special reference to the utilisation of the raw materials of the Dominions, Colonies and India.

Vols. I and II are out of print. Vols. III to IX (1905 to 1911), bound in red cloth, 6s. per vol.; single quarterly numbers (Vols. III to IX inclusive), 1s. each. Vols. X (1912) and XII to XVII (1914 to 1919), bound in red cloth, 12s. 6d. per vol.; single numbers, Vols. X to XVII (1912 to 1919), 2s. 6d. each. Vols. XVIII (1920) to XXI (1923), bound in red cloth, 16s. 6d.; single numbers, 3s. 6d. each. Vols. XXII (1924) and XXIII (1925), single numbers, 3s. 6d. each. Vol. XXIV (1926), single numbers, No. 1, 3s. 6d.; Nos. 2-4, 5s. each. Vol. XXV (1927), single numbers, 3s. 6d. each.

PUBLICATIONS ON PLANT & ANIMAL PRODUCTS.

IMPERIAL INSTITUTE SERIES OF HANDBOOKS TO THE COMMERCIAL RESOURCES OF THE TROPICS, WITH SPECIAL REFERENCE TO BRITISH WEST AFRICA.

Issued under the authority of the Secretary of State for the Colonies.

THE AGRICULTURAL AND FOREST PRODUCTS OF BRITISH WEST AFRICA.

By **GERALD C. DUDGEON**, C.B.E., lately Consulting Agriculturist and Director-General of Agriculture in Egypt; previously Inspector of Agriculture for British West Africa. 2nd edition. Pp. xii+176. With maps and illustrations. Price 7s. 6d.

COTTON AND OTHER VEGETABLE FIBRES: THEIR PRODUCTION AND UTILISATION.

By **ERNEST GOULDING**, D.Sc., F.I.C., Scientific and Technical Department, Imperial Institute. 2nd edition. Pp. x+241. With illustrations. Price 7s. 6d.

SELECTED REPORTS FROM THE SCIENTIFIC AND TECHNICAL DEPARTMENT OF THE IMPERIAL INSTITUTE, containing reports on the principal investigations conducted since 1903.

Part I, Fibres (Cd. 4588, 1909), price 7d. Part II, Gums and Resins (Cd. 4971, 1909), price 3½d. Part III, Foodstuffs (Cd. 5137, 1910), price 3½d. Part IV, Rubber and Gutta Percha (Cd. 6022, 1912), price 9d. Part V, Oil Seeds, Oils, Fats and Waxes (Cd. 7260, 1914), price 8½d.

REPORTS OF THE INDIAN TRADE ENQUIRY

These volumes contain the Reports of the Special Committees formed by the Imperial Institute Committee for India, at the request of the Secretary of State for India, to enquire into the possibilities of increasing and developing the trade in Indian raw materials with the United Kingdom and other countries of the Empire.

Hides and Skins, 6s.; Oil Seeds, 6s.; Rice, 6s.; Jute and Silk, 5s.; Lac, Turpentine and Rosin, 5s.; Timber and Paper Materials, 4s.; Cinchona Bark and Myrobalans, 4s.

For list of Mineral Resources Publications, see overleaf.

MINERAL RESOURCES PUBLICATIONS.
(Including those of the late Imperial Mineral Resources Bureau).

MONOGRAPHS ON MINERAL RESOURCES. Tin Ores, 3s. 6d. Tungsten Ores, 3s. 6d. Chromium Ore, 3s. 6d. Platinum Metals, 3s. 6d. Manganese Ores, 3s. 6d. Petroleum, 5s. Oil Shales, 5s. Mercury Ores, 5s. Molybdenum Ores, 5s. Coal, 6s. Silver Ores, 6s. Lead Ores, 6s. Potash, 6s. Copper Ores, 7s. 6d. Nickel Ores, 5s. Cobalt Ores, 3s. 6d. Vanadium Ores, 5s. Bismuth Ores, 3s. 6d. Antimony Ores, 5s. Bauxite and Aluminium, 6s. (All these prices are net).

REPORTS ON THE MINERAL INDUSTRY OF THE BRITISH EMPIRE AND FOREIGN COUNTRIES. (WAR PERIOD, 1913-1919). Aluminium and Bauxite, 9d. Antimony, 1s. Arsenic, 6d. Asbestos, 1s. Barium Minerals, 9d. Bismuth, 6d. Chrome Ore and Chromium, 1s. Coal, Coke and By-Products: Part I, 3s. 6d. Part II, 6s. 6d. Part III, 7s. Cobalt, 9d. Copper, 4s. Felspar, 6d. Fluorspar, 9d. Fuller's Earth, 6d. Gold, 6s. Graphite, 1s. 6d. Gypsum, 9d. Iron Ore Resources of the World: Part I, United Kingdom, 6s. Part II, British Africa, 3s. Part III, British America, 3s. 6d. Part IV, British Asia, 2s. 6d. Part V, Australia and New Zealand, 4s. Part VI, Europe and Africa (Foreign), 6s. Part VII, Foreign America, 4s. Part VIII, Foreign Asia, 2s. 6d. Lead, 3s. Magnesite, 1s. 3d. Manganese, 3s. 6d. Mica, 9d. Molybdenum, 1s. 6d. Monazite, 6d. Nickel, 1s. 6d. Nitrates, 9d. Petroleum, 6s. 6d. Phosphates, 2s. Platinum and Allied Metals, 2s. Quicksilver, 1s. Silver, 4s. Strontium Minerals, 3d. Sulphur and Iron Pyrites, 1s. 6d. Talc, 9d. Tin, 3s. Tungsten, 1s. Vanadium, 6d. Zinc, 3s. 6d.

MINERAL SURVEY REPORTS. Ceylon. Reports for 1903-4, 1904-5, 1905-6, 2½d. each; 1906-8, 3½d.; 1909-10, 1½d.

Northern Nigeria. 1904-5, first report, 1½d.; second report 2d.; 1905-6, 2½d.; 1906-7, 1½d.; 1907-9, 2½d.

Southern Nigeria. Reports for 1903-4 and 1904-5, 2½d. each; 1905-6, 2d.; 1906-7, 2½d.; 1907-8, 1½d.; 1908-9, 2½d.; and reports for 1910, 1911, 1912 and 1913, price 1d. each.

Nyasaland, 1906-7, 2½d.; 1907-8, 3½d.; 1908-9, 2d.

THE MINING LAWS OF THE BRITISH EMPIRE AND OF FOREIGN COUNTRIES. Vol. I, Nigeria, 15s. Vol. II, West Africa (The Gold Coast, Ashanti, The Northern Territories and Sierra Leone), 15s. Vol. III, Part I, The Transvaal, 30s. Vol. III, Part II, Swaziland, 10s. Vol. III, Part III, Orange Free State, 7s. 6d. Vol. IV, Part I, British Columbia, 21s. Vol. IV, Part II, Ontario, Canada (in the Press). Vol. IV, Part III, Dominion of Canada 17s. 6d. Vol. V, Part II, Victoria, Australia, 32s. 6d. Vol. VI, British India, 15s. Vol. VII, Federated Malay States, 12s. 6d. Vol. VIII, East Africa, 12s. 6d. Vol. IX, British Guiana (in the Press).

MINERAL INDUSTRY OF THE BRITISH EMPIRE AND FOREIGN COUNTRIES. STATISTICS, 1919-1921 and 1920-1922, containing detailed statistics as to production and trade of all important minerals and metals. Each mineral or metal dealt with in a separate document, prices varying from 6d. to 3s. per document.

SUMMARY STATISTICS OF THE MINERAL INDUSTRY OF THE BRITISH EMPIRE AND FOREIGN COUNTRIES. 1913-1920, 3s. 1920-1922, 8s. 1921-1923, 8s. 1922-1924, 8s. 1923-1925 8s.

August, 1927.

Tel. KENSINGTON { 1676
3798
3799

ADDRESS CORRESPONDENCE
TO THE DIRECTOR.

REF. No.



IMPERIAL INSTITUTE,
SOUTH KENSINGTON,
LONDON. S.W. 7.

23 March 1928.

Dear Sir,

I have pleasure in calling your attention to the enclosed copy of a recently issued publication of the Imperial Institute dealing with a selection of useful timbers derived from overseas countries of the Empire. Under the title of "A Descriptive List of Some Empire Timbers recommended by the Imperial Institute Advisory Committee on Timbers" the book represents the results of enquiries carried out by the Timbers Committee of the Imperial Institute with the object of bringing to the notice of users of timber in this country selected Empire woods which in the opinion of the Committee merit wider attention than at present obtains, either as substitutes for foreign woods or as "new" timbers. In each case the trade and botanical names of the timber are given, followed by an account of the characters and working qualities of the wood, the purposes for which it is suitable and a statement regarding the sizes in which it is obtainable and the approximate market price. The book contains in addition re-prints of official reports of the Committee which have been published in the Bulletin of the Imperial Institute and a table of mechanical strengths of a number of the woods.

I shall be most grateful if you will be good enough to bring the publication to the notice of your departments likely to be interested in the subject. A further limited number of free copies would be supplied, if desired. The publication is on sale at the Imperial

Institute

The Vice-Chancellor,
McGill University,
Montreal,
Canada.

Institute price 2 shillings. Application for copies should be made to the Director, Imperial Institute, South Kensington, S.W.7.

May I also mention that we have now at the Imperial Institute an Exhibition of Empire Timbers which includes samples of the woods described in the List. The Exhibition will be open until the end of May. I enclose a copy of the Catalogue of the Exhibits.

I am,

Yours faithfully,

W. T. Furse

Director.

Lt.-Gen. Sir William Furse.

April 10th, 1928.

Lieut.-General Sir William Furse,
Director, Imperial Institute,
South Kensington,
London, S.W. 7.

Dear Sir William:-

I am this morning in receipt of your circular letter dated March 23rd, and the Catalogue of Exhibits pertaining to the Empire Timber Exhibition, now being given at the Imperial Institute.

These exhibitions must serve a very useful purpose. I know you go to a great deal of trouble to make them attractive and complete and I congratulate you.

Yours faithfully,

Principal.

The Librarian.

February 4, 1936

The Principal directs me to send you the attached letter
from the Imperial Institute and Bulletin referred to therein.