

Gold Coast Colony.

- 1) The Education Ordinance, 1925.
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- 2) Report of Mr. Kingdon's Education Committee, 1919.
T.657.N1E E9
- 3) Report of the Educationists' Committee (Mr. Oman's Committee), 1920. T.657.N2E F0
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- 10) dto. dto. , 1924-1925.
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GOLD COAST COLONY.

No. 21 of 1925.

I assent

F. G. GUGGISBERG,
Governor.

30th December, 1925.

AN ORDINANCE for the development and assistance of Education in the Gold Coast Colony, and for purposes connected therewith.

[1st January, 1927.]

BE IT ENACTED by the Governor of the Gold Coast Colony, with the advice and consent of the Legislative Council thereof, as follows:—

1. This Ordinance may be cited as "The Education Ordinance, 1925", and shall come into force on the first day of January, 1927.

Short title
and com-
mencement
of Ordinance.

Interpreta-
tion.

2. In this Ordinance, unless the context otherwise requires :—

“ Assisted School ” means a school which for the time being is in receipt of a grant-in-aid from Government funds ;

“ Board ” means the Board of Education established under this Ordinance ;

“ Government School ” means a school established by and under the entire control of Government and maintained wholly or in part from Government funds ;

“ Grant-in-aid ” means a grant made annually out of Government funds in aid of any school or training institution ;

“ Manager ” means and includes any and every member of the local governing boards of any society, body, or corporation taking part in educational work in the Colony ;

“ Non-Assisted School ” means a school which is not maintained by, and receives no grant-in-aid from, Government funds ;

“ Prescribed ” means prescribed by Rules under section 17 of this Ordinance ;

“ School ” means any assembly of not less than ten pupils for the purpose of receiving regular instruction, but does not include any Sunday School ;

“ Training Institution ” means an institution approved by the Director of Education for the training of teachers.

Establish-
ment and
Constitution
of Board of
Education.

3. (1) There shall be a Board of Education, which Board shall be constituted by the following officers and persons :—

- (i) The Governor ;
- (ii) The Colonial Secretary ;
- (iii) Three officers of the Government Service to be nominated by the Governor ;
- (iv) The Director of Education ;
- (v) The Principal of the Prince of Wales's College Achimota ;
- (vi) Four persons to be nominated as members of the Board by the Governor to represent the Missionary and Educational Societies working in the Colony ;
and

(vii) Four Africans, one of whom shall be a Head Chief ; such Africans to be nominated as members of the Board by the Governor

(2) The Governor, or in his absence such other member as he shall in writing appoint for the purpose, shall be and preside as President over the proceedings of the Board. Governor to be President of the Board.

(3) The Governor may, if he shall so think fit, appoint for the purposes of any particular session of the Board any officer or person within the Colony to be for such session an Extraordinary Member of the Board. Appointment of Extraordinary members of the Board.

(4) Subject as hereinafter provided, the term of membership of members of the Board nominated by the Governor under Head (vi) or Head (vii) of subsection (1) of this section shall be five years as from the date of their nomination as aforesaid. Provided that any nominated member, on the expiration of his term of membership may be renominated for a further term of five years. And provided further that the Governor may at any time revoke any nomination under this section ; and thereupon the member affected shall forthwith vacate his seat on the Board. And provided further that any member nominated as aforesaid may at any time by notification to the Governor in writing resign his seat on the Board. Term of membership of certain nominated members of the Board.

(5) The Governor may, as occasion requires, fill vacancies on the Board. Power to Governor to fill vacancies.

(6) An officer of the Education Department other than the Director of Education shall be appointed by the Governor to be the Secretary of the Board. Secretary of the Board.

(7) The President and four members of the Board, one at least of whom shall be a member nominated under Head (vi) or Head (vii) of subsection (1) of this section shall form a quorum. Quorum.

(8) The President, in addition to his vote as a member of the Board, shall have also a casting vote in cases where the votes of the members are equally divided. President to have a casting vote.

4. (1) A Register of Teachers shall be kept by an officer appointed for the purpose by the Governor. Register of Teachers.

(2) Such Register of Teachers shall with all convenient despatch be published in the *Gazette* on its completion and shall be kept up to date. Every addition to or deletion from such Register shall likewise with all convenient despatch be published

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in the *Gazette* ; and a complete Register shall be republished with all necessary amendments every succeeding third year.

(3) The conditions under which a teacher may be registered shall be such as shall be prescribed.

Only registered teachers to teach in Government, Assisted, or Non-Assisted Schools.

5. No person shall teach in any Government, Assisted, or Non-Assisted School unless he is registered on the Register of Teachers, or on the Provisional List as may be prescribed.

Salaries of teachers.

6. No registered teacher employed in Government, Assisted and Non-Assisted Schools shall be paid at a lower rate than such as shall be prescribed.

Itinerant teachers.

7. Where there is a greater demand for education than the schools in any particular locality can meet, approved itinerant teachers may be appointed, with the sanction of the Director of Education, by any society, body, or corporation, to teach in such locality ; and grants-in-aid in respect of such approved itinerant teachers may be paid to the society, body, or corporation appointing them as aforesaid.

Grants-in-aid and correspondence to be sent to the representative of body.

8. All correspondence relating to educational work generally, and grants-in-aid when payable, shall be sent to the responsible representative of the society, body, or corporation concerned : or to such other person as may be authorized in writing by such representative.

Pauper children.

9. Any school receiving a grant-in-aid from Government funds shall be under a legal obligation to receive such pauper children who may be assigned to it by the Government, in such numbers and upon such terms as may be decided on by the Board.

Prohibited books or writings not to be used in any school.

10. No book, newspaper, printed matter, or writing whatsoever, the use of which in schools has been prohibited by a written order of the Governor, shall be used or allowed to be in any school.

Proviso as to Government educational activity.

11. Nothing in this Ordinance contained shall be construed to limit the Government in establishing schools under its entire control, in maintaining any such school already so established or in any other educational activity whatsoever,

12. A grant-in-aid from Government funds, the conditions and amount of which shall be fixed from time to time by the Board may be made to any Training Institution, School, or College in which teachers are specially trained, provided that the Director of Education is satisfied with the provision made for the general welfare of the students, and with the discipline and tone of such Training Institution, School, or College ; and provided further that each of such teachers shall have given a bond to complete the course of training, the duration of which shall be determined from time to time by the Board, and to teach either in a Government School or Assisted School for a period of not less than five years.

Grant-in-aid
to Training
Institutions.

13. If in the opinion of the Director of Education the union of two or more schools, under different societies, bodies, or corporations, will conduce to greater efficiency, the Director of Education shall have power to make the continuance of the payment of grants-in-aid to such schools, contingent on such union ; provided that a reasonable time shall be fixed by the Director of Education within which such union shall be effected before the payment of grants-in-aid to the individual schools are stopped : provided also that the Director of Education may recommend the payment of a special grant to cover the whole or part of the cost of such union.

Union of
Schools, etc.

14. In any area where educational development is deemed by Government as being particularly necessary, the Director of Education may, with the approval of the Governor, declare such area a special area for educational development. In each such case the Director of Education may offer to any society, body or corporation for a period of not less than three years, which period may, however, be extended, special privileges with a view to such society, body or corporation undertaking the required educational development ; in each such case a grant-in-aid amounting to the total cost of the salaries of African teachers and African Supervisors, in addition to the grant-in-aid in respect of school buildings payable under Rules made under this Ordinance, may be made ; always provided that the representative of such society, body or corporation is willing and in a position to develop educationally such special area according to a policy agreed upon with Government : and, provided further that such development can be accomplished, in the opinion of the Director of Education, without detriment to the educational work of such society, body or corporation in other parts of the Territories administered by the Governor,

Special areas
of educational
development.

Conditions
applying to
non-assisted
schools.

15. (1) No fees, emoluments or gratuities of any kind may be given or taken in any school which does not satisfy the requirements of this Ordinance.

(2) The Manager and Head Teacher of each Non-Assisted School in which fees, emoluments, or gratuities of any kind are taken shall within two months after the commencement of this Ordinance notify the Director of Education in writing of the existence of such school, and shall furnish all particulars relating to such school and the staff thereof as shall be asked for by him ; and thereafter changes in staff shall be notified to the Director of Education as they occur.

(3) Before any new Non-Assisted School shall be opened particulars thereof together with a list showing the names and qualifications of the staff shall be communicated to the Director of Education ; and thereafter changes in staff shall be notified to him as they occur.

Penalty.

16. Any person contravening the provisions of Sections 5, 6, or 15 shall be guilty of an offence, and on summary conviction thereof shall be liable to a fine not exceeding five pounds or, in the case of a continuing contravention, to a fine not exceeding one pound in respect of each and every day during which such contravention has continued.

Power to the
Board to
make rules.

17. (1) It shall be lawful for the Board to make rules for the further, better, or more convenient, effectuation of any of the provisions or purposes of this Ordinance ; and in particular (but without derogating from the generality of the provision last aforesaid) with respect to any of the following matters :—

- (a) The regulation of the application for, and the allowance of, grants to schools ;
- (b) The examination of Government Schools and Assisted Schools, and of teachers employed or to be employed in such schools ;
- (c) The classification of the certificates to be given to such teachers ;
- (d) The determination of the grants-in-aid to be paid as a contribution towards the remuneration of the teachers ;
- (e) The inspection of schools and educational institutions of whatever character by fit and proper officers ;

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- (f) The registration of all teachers; and
- (g) The prescription of anything which under this Ordinance requires to be or may be prescribed.

(2) Rules made under subsection (1) of this section shall come into operation on being approved by the Legislative Council, either immediately or on and from such other date as may therein or in their regard be provided, and shall thereupon have the same effect as if enacted herein. Provided that the first set of Rules made by the Board under this section shall, on being approved by the Legislative Council, be deemed to operate as from the date of the commencement of this Ordinance.

Rules to be approved by the Legislative Council.

(3) All rules made under subsection (1) and approved under subsection (2) of this section shall be published in the *Gazette*.

Rules to be Gazetted.

18. The Education Ordinance is hereby repealed.

Repeal of Cap. 67.

Passed in the Legislative Council this Tenth day of December, in the year of our Lord, One thousand nine hundred and twenty-five.

D. B. STRATHAIRN,
Clerk of the Legislative Council.

This Printed Impression has been carefully compared by me with the Bill which has passed the Legislative Council, and found to be a true and correct printed copy of the said Bill.

D. B. STRATHAIRN,
Clerk of the Legislative Council.

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Gold Coast Colony.

Education and Agriculture.

1. Education Ordinance, 1925.
2. Report of Mr. Kingdon's Committee on Education, 1919.
3. Report of the Educationists' Committee (Mr. Onan's Committee), 1920.
4. Annual Report of the Education Department, 1923-24.
5. -----Dto-----Dto----- , 1924-25.
6. -----Dto-----Dto----- , 1926-27.
7. -----Dto. for Northern Territories, 1926-27.
8. Report on the Achimota College, 1926-27.
9. Annual Report of the Agricultural Department, 1923-24.
10. -----Dto-----Dto----- , 1924-25.

XVII.—1918—1919.

Report of the Special Committee appointed by
His Excellency Sir Hugh Clifford to report
upon and to make such recommendations
as seem desirable in the Educational system
of the Gold Coast. : : : :

2

Ordered by His Excellency the Governor to be Printed.



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1919.

Price 1—2s.



**GOVERNMENT OF THE
GOLD COAST.**

REPORT

ON THE

AGRICULTURAL DEPARTMENT

FOR THE PERIOD

APRIL, 1923—MARCH, 1924.

*Printed by the Government Printer at the Government Printing Press, Accra.
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STAFF OF THE DEPARTMENT OF AGRICULTURE AS AT 31st. MARCH, 1924.

Administrative Headquarters.

Director of Agriculture	W. S. D. Tudhope.
Deputy Director of Agriculture	A. Ogilvy, N.D.D.
Secretary	J. M. Dunbar.

Research Branch.

Assistant Director of Agriculture for Research	R. H. Bunting, F.L.S.
Assistant Mycologist	H. A. Dade, A.R.C.S.
Government Entomologist	W. H. Patterson.
Assistant Entomologist	G. S. Cotterell, A.R.C.S., D.I.C., F.E.S.
Chemist	R. Coull, B.Sc.
Botanist	Vacant.
Laboratory Apprentices	Three.

PROVINCIAL (ADMINISTRATIVE).**Provincial Superintendents, Superintendents and Assistant Superintendents (20).**

Provincial Superintendents	G. H. Knowles, B.Sc., A. C. Miles, C. Saunders, N.D.A., N.D.D., A. B. Culham.
Superintendents	W. Caldwell, N.D.A., (Hons.) N.D.D. M. D. Reece, G. H. Eady, W. O. Fishlock.
Assistant Superintendents	T. J. S. Smellie, N.D.A., N.D.D. J. Steele, N.D.A., N.D.D. H. J. Horwood, B.A., H.K. Hewison, A. W. Paterson, N.D.A., N.D.D. H. Nicholas, B.A. *J. C. Glover. *E. A. Brew. *J. S. Martinson. *M. Alexis.
Superintendent, Agriculture and Forestry Training Centre	T. Hunter.
Assistant Superintendent, Agriculture and Forestry, Northern Territories	G. C. Coull, B.Sc.
2nd Division Officers, Overseers, Assistant Overseers and Junior Assistant Overseers (38).	
Overseers	R. B. Pobee, A. B. Mensah, J. N. Akwafoe.
Assistant Overseers	S. G. Opata, E. K. Sese, W. F. Adakwa, F. A. Paku, F. T. Hammond, J. E. Onyinah, T. B. Asare, R. W. Damba, Z. J. Osman, I. N. Acquah, A. K. Nkpe, G. K. Seth.
Junior Assistant Overseers	G. Y. Bansah, E. K. Gankui, R. O. Antwi, J. Mensah, E. C. Gyabah, I. N. Frimpong, S. K. Ameko, E. W. Dankwa, S. P. Pobee, J. S. Mahamer, Yakabu Singa, S. R. B. Fletcher, T. V. Danso, G. Asima, D. A. Reynolds, A. Y. Abbah, N. K. Ababio, E. K. Ge, E. M. Addipah, Iddi, G. W. Mahama, 2 vacancies.
Learners (36)	Twenty-eight—8 vacancies.

Special Appointments.

Superintendent, Sisal Plantation	J. E. Symond.
Assistant Superintendent, Sisal Plantation	J. M. Wingate.
2 Temporary Assistant Superintendents	M. Vardy, one vacancy.
2 Coconut Instructors	T. H. Carry, D. J. V. De Vos.
2 Coconut Craftsmen	2 Vacancies.

Clerical Staff.

One 1st Division Clerk	H. G. Wilmot (Chief Clerk).
Eleven 2nd Division Clerks	F. K. Robertson, G. A. Saforo, E. R. Amoah, I. L. Mensah, P. K. A. Badoo, J. M. Adams, G. B. Ofei, J. T. Ahmoah, Robert Newton, W. D. Duncan, one vacancy, (filled meantime by Temporary Clerk).

**REPORT OF THE DEPARTMENT OF AGRICULTURE FOR THE PERIOD
1st APRIL, 1923 to 31st MARCH, 1924.**

DEPARTMENT OF AGRICULTURE,
HEAD OFFICE, ACCRA.
28th June 1924.

Sir,

I have the honour to submit the Annual Report of the Department of Agriculture for 1923-24.

Introductory.

2. It will be observed that the report has been arranged somewhat differently when compared with reports of previous years.

Hitherto it has been the custom that the reports of Provincial Superintendents have formed appendices to the main report. This year the main features of the latter reports have been incorporated in my own report thus avoiding to some extent a certain amount of duplication which unavoidably creeps in, while at the same time eliminating figures of incomplete experiments that can be but of little interest to any one.

It is the intention to publish from time to time separate leaflets dealing with the more important experiments as they come to completion, thus effecting a corresponding reduction in the matter to be reported upon annually.

The reports from the Research Branch are as usual attached in the form of appendices.

3. The strength of the Department has increased somewhat in the African *personnel* while the number of Europeans remains as before, *viz* :—27 Europeans ; 44 Africans (excluding Learners and Clerical Staff) and 2 Cingalese.

SPECIAL DEVELOPMENT WORK.

4. The following paragraphs deal with the progress of those items that are enumerated under this heading in last year's report.

(a) Communal Coconut Plantations.

Attuabo (Western Province).—The planting of this plantation has been practically completed. Some 12,675 palms (planted 30' x 25') are well established out of a total of 14,000 palms. The few hundreds of palms that are still required (to complete) have of course been previously planted but have since failed, owing to a number of reasons, principally non-germination. All vacancies will be filled in due course. The area of the plantation equals 275 acres.

The plantation now presents a most pleasing appearance and much credit is due to those who have been immediately responsible for the work. Many of the palms at 2½ years from planting reach to a height of about 11 feet. A great portion of the plantation is under clean cultivation as a result of intercropping with groundnuts by the local people. Quite a stimulus has been given to this local industry and it is assuming some considerable local importance. It is of interest to note here that groundnuts are now being shipped to Secondee, while quite large quantities find their way inland *via* the Ancobra River to the Prestea district.

The Borassus palms which in the past served as harbourage and provided breeding places for the Rhinoceros beetles are gradually being burnt up or removed.

5. Abra (Central Province).—The planted area on this plantation now extends to 296 acres carrying 17,055 palms, with some planted at 30 x 30 feet and others again 25 x 25 feet apart. This completes the area to be planted ; any planting done now will be in the way of filling vacancies that may occur.

While progress is not as advanced as in the plantation reported on in paragraph 4, it is nevertheless satisfactory. Greater difficulty has been experienced in the matter of labour, while in the earlier stages much more clearing work was required.

Every encouragement is being given to the local farmers to interplant with food crops and they are gradually taking this up; some 80 acres have been so occupied.

The Rhinoceros Beetle has been more troublesome of late, requiring an ever careful watch.

6. Labadi, Teshi, Temma and Kponi Plots (Eastern Province).—Of the four plots that at Labadi is appreciably ahead of the other three. In the latter a large number of vacancies are still to be filled, a matter which is receiving attention during the current rains.

Over the four plots a total of 5,033 palms have become established while approximately a similar number of vacancies have to be filled.

In this connection it should be noted that many seed-nuts in the nurseries unfortunately failed to germinate and in consequence the work of completing the plots has been very much delayed.

7. That in the Coast areas farmers are taking more interest in the valuable coconut palm is shewn by the increased demand for seed nuts; and this I may say also applies to places further removed from the sea.

Thousands of acres of land suitable for Coconuts are lying idle so that an industry of some considerable size could be developed.

The export of Copra although not quite so high as that of last year at 1,305 tons exported is nevertheless much higher than for many years back.

Copra at £26 to £28 per ton on the European market, the level at which it stands meantime, should leave to the producer a satisfactory margin of profit.

(b) Sisal Plantation, Accra.

The plantation continues to make very satisfactory progress, more particularly the younger areas where appreciable growth was made.

The crop is as healthy as could be desired.

A small outbreak of Caterpillar of the moth *Plusia Acuta* was again experienced, but was very quickly controlled by natural enemies and little damage resulted.

9. It is now 3 to 3½ years since the oldest portion of the plantation was planted and in consequence that part is now ready to be reaped.

The preparation of the factory site was commenced in June in anticipation of receiving the buildings in September. Owing, however, to unfortunate delays in England, the factory buildings and machinery did not arrive until early in February last and the erection of same was not completed during the period under review, although this became an accomplished fact very soon after.

The principal machinery that has been installed consists of:—

- (1) One Robey decorticating machine *Sisedecor* size.
- (2) One automatic belt-driven brushing machine.
- (3) One hydraulic baling press to make bales weighing 2 cwts., and
- (4) One double-cylinder 100 B.H.P. two-cycle crude oil engine.

At the time of writing the preparation of the fibre is in full swing.

10. A branch line half a mile long has been laid from the Weshiang railway to the factory site thus providing railway communication with the beach.

Routes for the light railway throughout the plantation for the transport of the leaves to the factory have also been surveyed. The light railway is of the 24 ins. gauge type (14 lbs. per yard) provided with steel sleepers. The trucks will be man-handled to begin with, although later it is proposed to instal a mechanical tractor unit, and enquiries are now on foot with a view to selecting some suitable type.

FOOD CROPS.

11. As regards Rice cultivation in Appolonia the propaganda work has been continue by District Officers and the interest which now exists will no doubt be translated into practice and the cultivation of rice increase as the farmers see the plans of the department developing for their own material benefit.

The erection of a small rice hulling factory is in progress and will now be completed at an early date. The factory is designed to turn out 10 cwts. of white rice per hour. And while it is a simple plant it will in all likelihood meet the requirements of the district for some years to come.

This plant has been erected in order to eliminate the laborious process of hand-hulling on the part of the farmers which until some improved method is substituted must confine the industry to very narrow limits.

12. At Adebrem rice farm—which really forms an adjunct to the factory—satisfactory crops of rice were obtained, although considerably reduced compared with those shown in last year's report.

A somewhat severe attack of "Rice Blast" affected many of the varieties; while extraordinarily continuous and heavy rains, causing much flooding, in no way helped the situation.

The best yields were given by the following varieties—each 1 acre plots:—

Guinalong	..	..	..	1,661 lbs. per acre.
Attabubu	..	..	..	1,040 lbs. per acre.
Tarquah, White.	..	..	..	1,031 lbs. per acre.

All efforts at Adebrem are concentrated on rice and it is therefore the principal crop; new varieties are in process of being tested to ascertain their suitability for the surrounding district, and in time much can be done by the distribution of improved seed.

13. At Ejura where there is an experimental station in the Savannah Country, the area under cultivation has been much reduced.

The cultivation of rice as a pure crop has practically had to be abandoned owing to indifferent results.

14. Efforts are mainly directed to purely local crops with the object of ascertaining the most suitable system of rotation, yields obtainable, seasons for planting and cost of production. No conclusive results have yet been ascertained.

15. In regard to the supply of food crops generally, this has been plentiful and a marked feature is that the cultivation of such is very much on the increase everywhere. In the industrial areas, however prices still remain abnormally high—and the reason undoubtedly is that the suppliers know the market requirements and regulate their supplies accordingly.

On the other hand there are a few centres where distinct scarcity of supplies in the immediate neighbourhood is experienced; and supplies have to be brought from a considerable distance, thus adding much to the price.

16. You are possibly aware that a sub-committee was appointed by the Management Committee of the Gold Coast Agricultural and Commercial Society to report on the supply and transport of foodstuffs to congested areas, but as the full report is to be found in Vol. III., No. 1 of the Society's Journal, further comment seems unnecessary here.

(d) Investigation into the prospects of sugar Cultivation.

17. There is little material progress to report in this connection; the Trans-Volta area has been reported upon as a suitable area in which to encourage the cultivation of the sugar cane under irrigation but closer investigation has yet to be made and there the matter stands meantime.

(e) Oil Palm Products.

18. In the matter of the preservation of the Oil Palm much propaganda work has been conducted on every possible occasion by the provincial staff of the Department.

The felling of oil palms for the production of palm wine continues unabated in most districts. As one would expect this practice is much more noticeable in districts where the oil palm exists within comparatively easy reach of the larger centres of population, and it is extremely unlikely, that any appreciable difference as a result of propaganda will be observed for a very long time to come, or possibly so long as the African has a taste for Palm Wine.

19. A good feature of the propaganda work, however, is the fact that in a few cases Chiefs have become sufficiently enthusiastic in regard to planting. At the moment, perhaps this applies more particularly to the Eastern Province and Ashanti where an attempt has been made to conduct systematic planting of the oil palm. Again on the other hand some chiefs have passed bye-laws in which it is laid down that for every palm tree cut down at least two seedlings shall be planted.

This, of course, is not yet general throughout the Country ; but in any case a start has been made in the right direction.

20. Tapping experiments on the standing palm were continued from last year but with no very marked success up to date.

Two methods were adopted, *viz.* (a) Tapping at the base of growing point and, (b) excising base of peduncle of male inflorescence.

In both cases has the yield been very much less than in the case where the palm is felled and the wine extracted by the method usually practised ; and indeed in some cases the palms ultimately died. The experiments, however, are being continued

21. On the lines suggested by His Excellency the Governor in the Memorandum (No. 542) of 14th August, 1922, a new series of experimental areas have been opened up in the Eastern, Central and Western Provinces of the Colony, with the object of demonstrating the proper care and cultivation of the oil palm and particularly the renovation of neglected areas.

Those areas have been selected in the oil palm belt and as far as possible near a main road where they can be easily seen.

Each of the plots in the Eastern and Central Provinces consists of 25 acres, but that in the Western Province is on a much larger scale and will be referred to later.

22. It is proposed to conduct the work along the following lines. Each block of 25 acres is divided into Plot A (10 acres) on which the existing palms are to be thinned out to 70 or 80 per acre (containing 50-70 bearing palms). The palms left are to be of graduated ages allowing for the over-tall palms being cut out two or so annually and their places taken by younger palms. Seedlings will be planted where necessary to allow for this.

The area is to have all undergrowth dug out and cutlased four times a year, and hoed once just prior to the Harmattan. The palms will be regularly trimmed (if necessary) at each weeding and the fruit collected and measured or weighed.

Plot B (5 acres) Control.—No cultivation or cleaning of the palms will be practised at all, other than is necessary to facilitate gathering.

The fruits will be regularly collected and measured or weighed as in Plot A.

Plot C (5 acres) to be left in its natural state and no fruits to be collected.

Plot D (5 acres) to be held in reserve for planting up in subsequent years with special types of palms.

23. During the period under review work has been commenced at one centre only, *viz.* at Odumase in the Eastern Province ; but any figures that have been obtained so far are necessarily incomplete and therefore they are not published meantime.

It is however, of interest to note that on the plot selected at Odumase three different varieties of oil palms exist namely, Abepah; Abetuntum and Abedam.

24. In the Central Province some difficulty was experienced in obtaining a suitable block of oil-palms, but one has since been acquired at Owan in the Ajumako division and work has no more than commenced.

25. As regards the plot in the Western Province, this is on a much bigger scale, the area of land selected amounting to approximately 100 acres in extent ; it will be worked on the same principle as the plots in the other Provinces.

This area has been leased from Messrs. West African Oils, Limited, at Anaji on Secondee-Axim road ; this firm is manufacturing palm oil on a commercial scale. Work, however, had not commenced as the agreement was only completed towards the end of the financial year. With the close proximity of a factory it should be possible in the course of time to acquire some valuable data in regard to the variation in the yield of oil (if any) under different methods of treating the palms, and results from different varieties.

26. Reverting to last year's report in which reference was made to the appointment of a Botanist to the Staff for work on oil palms amongst other things, it is with regret I have to record that the appointment has not yet been filled ; but possibly this is a matter which may soon materialise.

(f) Shea Butter Investigation.

27. This investigation continues, although there is not much conclusive evidence to report on as yet. A preliminary report has, however, been submitted by the Superintendent of Agriculture and Forestry for the Northern Territories which contains some interesting data.

Of the areas selected (ref: last year's report) two of approximately 10 acres each were treated on the Yendi-Tamale road in the District of Western Dagomba, about four miles west of Yendi.

28. The plots which were selected and marked out in March, 1922, were first of all fire traced to about 10 yards wide and treated as follows :—

Plot A. 2/3 was unweeded and 1/3 weeded while the whole was unburned.

Plot Z. is divided into 4 parts of equal size—B. C. D. and E.—and each of the four divisions was burned on a different date, as shown in the table below, to gain some idea of the effect burning has on the yield of fruit in relation to the time each plot is burned compared with the protected plot above.

It should be explained that during the dry season in the Northern Territories, sooner or later each year, fire sweeps over the area on which the Shea butter trees grow causing considerable loss in the yield of Shea fruits.

C. burned (by mistake) in November and December before flowering commenced.

B. burned 13th January, 1923, the trees being in full flower. In this case the lower flowers were all destroyed and the higher ones untouched. The bark of the trees was very slightly charred but no trees were actually set on fire.

D. burned 27th January, 1923, trees in full flower ; all flowers were destroyed while the bark of the trees was appreciably charred.

E. burned 10th February, 1923, flowers practically over and young fruits forming. All flowers and young fruits were killed and several trees smouldered for a time after the fire had passed.

29. The following table illustrates the effect of the aforementioned treatment, and from the figures it would appear that the annual fires have a drastic effect on the yield of fruit ; an affect which increases as the date of burning is delayed :—

Plot.	Area Acres.	No. of Trees.	Yield of Fruits.	Average per tree (Fruits.)	Remarks.
A.	7.71	1,367	82,156	60	Unweeded
A.	2.52	489	31,235	64	Weeded
B.	3.04	404	4,049	10	—
C.	3.18	473	14,906	32	—
D.	2.72	305	873	3	—
E.	3.09	585	—	—	—

30. An experiment was also conducted in regard to the yield of Shea butter and it was found that 27 lbs. of kernels produced 7 lbs. of butter. By calculation it was reckoned that Plot A (area 10.23 acres) would produce about 232 lbs. of butter equal approximately to 22 lbs. of butter per acre.

(g) Power Alcohol.

31. A separate report on this subject is being submitted to you after the first year's trials, but much further work will be necessary before any definite result can be shown. The main factor in the production of power alcohol is the cost of production of the raw material which so far as our trials have gone are much too high. Further experiment and experience may suggest how this cost can be reduced.

(h) Lime Juice.

32. Since this subject was reviewed in the last annual report the small plant for expressing lime juice referred to therein has been installed at Assuantsi Agricultural Station, and a report on the working of the plant has already been submitted to you.

The plant is by no means of the most modern type—iron boiling pans are in use—and the labour is as yet more or less unaccustomed to the work, but, as each of those details is improved, the cost of production can no doubt be reduced below the figures given in paragraph 34.

33. The production is being shipped as concentrate and a trial shipment of 40 gallons will shortly be made through the African and Eastern Trade Corporation, Limited, who are kindly assisting us in the disposal of this shipment.

34. It has been found that 10 barrels or 1,500 lbs. limes are required to produce 5 gallons of the concentrate, and the cost of producing this quantity with female labour is as follows :—

	s.	d.	
Gathering	3	4	} On Station.
Pressing	3	9	
Concentrating	3	0	
	10. 1		

(including supply of fuel)—

Therefore the cost of production at the station per hogshead of 52 gallons would be £5 4s. 10d.

The total cost f. o. b. Cape Coast per hogs-head is indicated by the figures below :—

Production	£5	4s.	10d.
Container	0	5	0
Transport to Cape Coast	0	10	0
Lighterage	0	1	0
	£6 0 10		

On factory lines there would, of course, be other charges to be taken into account that are not included in the figures above, such as supervision, interest on capital, depreciation of plant and sinking fund for renewals. Some idea, however, of the financial aspect will be obtained when it is known what the value of the product (concentrated juice) is on the European market.

(i) OTHER DEVELOPMENTS.

(a) Tobacco.

35. The cultivation of this crop is being encouraged as far as possible and seeds were distributed here and there to farmers who appeared anxious to take the matter up. Some fairly successful crops were obtained. The curing, however, presents some difficulty to the native farmers, and as regards evenness it leaves much to be desired.

(b) Cotton.

36. This crop continues to receive consideration and its cultivation has been persistently advocated by Political and Agricultural Officers in the mandated area of Togoland and also in the Anum and Peki districts. Seed was distributed free at the commencement of the 1923 growing season and although in many cases little effort was made, some farmers did show some interest. Quite a feature at the Agricultural Show at Ho held early in the current year was an exhibit consisting of 150 samples of cotton which indicates that the subject is by no means dead and that possibly continual propaganda work may increase the industry appreciably. The Department established a hand-gin at the sub-station of Kpedschu; but practically no advantage was taken of it by the farmers in that neighbourhood and arrangements were made to remove the gin to Kelekpe, the centre of a considerable area where cotton is grown.

One disadvantage with the present type of cotton is the length of time taken by the crop to mature, and an effort is being made to select a strain which will mature its crop in a shorter period, but to do so will require some period of time.

Prices prevailing during the past season for cotton have been exceptionally good—from 15/- to 20/- per load—and consequently cotton has come forward in larger quantities than for many years past.

The export for the financial year amounted to 131,295 lbs., valued at £2,703—the largest, it would appear, since 1885—and is distinctly encouraging to further effort to promote an increase in cultivation.

(a) Coffee.

37. To encourage the cultivation of coffee a bonus scheme was introduced (*vide* last year's report) whereby the growers of selected plots who successfully establish and cultivate a plot of coffee receive a bonus of £5 for the first year. For the second and third year the bonus will be somewhat less. The area of each plot is one acre.

Plots were opened up and planted in the Eastern and Western Provinces, while suitable centres have been selected in the Central Province and Ashanti for the same object, in readiness for planting during the forthcoming season.

Some considerable period of time must of course elapse before any results accrue.

ITINERANT INSTRUCTION.

38. Itinerant work continues as heretofore to take an important place in the programme of the department. The objects of itinerant instruction were very fully dealt with in last year's report, so it seems needless to repeat what has already been written so recently.

The value of systematised travelling in the various districts should become more apparent each year.

Officers have generally been well received everywhere—and meetings on the whole well attended by a considerable number of farmers.

The amount of travelling accomplished by the Senior Officers of the Staff is as follows :—

Percentage of times spent on tour.

Headquarters	20%
Research Branch	16%
Eastern Province	40%
Central Province	48%
Western Province	40%
Ashanti	51%
Northern Territories	36%

In addition the junior staff is also employed on itinerant duties when required.

AGRICULTURAL EDUCATION.

39. Kumasi station is devoted to the technical training of pupils in Agriculture and Forestry; This station forms an admirable centre for such work owing to the large variety of crops under cultivation and the many types of experiments in progress.

Pupils are in residence at the Training Centre for a period of two years and during this time engage in practical work each forenoon for six days a week, while the afternoons (excepting Saturday) are devoted to theoretical instruction in elementary science.

40. Thirty-one pupils were in residence throughout the year (29 Agriculture ; 2 Forestry) and of those one appointment was terminated in July on the ground of ill-health.

Towards the end of March one pupil was promoted to the Staff, while 17 pupils were transferred to other stations in the Department to complete their training.

The remainder who are pupils in their first year remain at the Training Centre to undergo their second year's course.

Certificates of proficiency were awarded to those pupils who left the Training Centre at the end of their second year's training and to the pupil promoted to the Staff as follows :—

First Class	2
Second Class	9
Third Class	7
	<hr/>
Total	18
	<hr/>

The standard for a first class certificate is 80% while for second and third 65% and 50% respectively.

Every encouragement is given to recreation ; an excellent sports ground was made some little time ago where the pupils play cricket and football.

41. Structural alterations of the dormitories were carried out during the year and this has improved the ventilation and appreciably added to the general comfort of the pupils.

A bungalow erected in close proximity to the pupils' quarters was completed for the Superintendent in Charge of the Training Centre.

42. Towards the close of the year the contractors commenced work on the building to be known as Cadbury Hall. This is the method by which it was decided after very careful consideration to utilise the generous gift of Messrs. Cadbury Brothers, of Bournville, England, that was granted to promote the interests of education.

The site of Cadbury Hall is situated within the grounds of Kumasi experimental Station and the building when completed will comprise a lecture room, recreation room, laboratory, office and stores. This will permit of ample class room accommodation and opportunities for study hitherto unknown, while it will form a useful nucleus for the College of Agriculture which in the future will probably be required.

Classes in Agriculture for Teachers.

43. These classes which are held annually were conducted as usual at the four under-mentioned stations, and the number of candidates sent forward by the Education Department are also enumerated :—

	<i>January Class</i>	<i>July Class</i>
Aburi	31	29
Assuantsi	19	19
Kumasi	9	17
Kibbi	16	10
Total	75	75

Fifty-five candidates were successful in obtaining the certificate.

44. During the year one Junior Assistant Overseer, Mr. D. A. Reynolds, was awarded a King Edward VII Scholarship after the usual examination.

Publications.

45. The following pamphlets and leaflets were published and distributed by the Department to all interested :—

- (1) How to recognise good Cocoa.
- (2) Notes on growing and curing Tobacco.
- (3) Report on the San Thomé Cocoa pest.

The last is a report by the Government Entomologist on his tour of inspection in San Thomé to study the causes and resultant effects of Cocoa thrips, reference to which was made in last year's report.

RESEARCH BRANCH,

46. The reports by the Government Mycologist, Acting Government Entomologist and Chemist are attached as Appendices A, B and C.

The two former reports indicate that much useful work has been accomplished.

These reports also indicate the widespread nature of fungoid and insect parasites amongst the economic crops of the country, a position which is much aggravated by the absence of proper cultivation and attention required by all crops to assist them to withstand the effects of disease.

47. The posters reproduced in colour dealing with insect pests and fungoid diseases referred to in last year's report were received from England towards the latter end of the period under review, and were in course of being distributed throughout the country to schools and other suitable centres.

48. Appendix D. includes reports from the Imperial Institute on materials submitted for examination at different periods throughout the year.

GENERAL AGRICULTURE.

Cocoa.

49. The shipment of 197,444 tons of cocoa (see Customs Returns of Exports, Appendix K) constitutes a record for any one period of twelve months. This record occurred during the financial year 1st April, 1923, to 31st March, 1924. The amount exported was contributed

from the several provinces as tabulated below :--

	Percentage.		
	1923-24.	1922-23.	1921.
Eastern Province	47.69	51	48.91
Central Province	20.22	19	18.83
Western Province	1.11	3	3.67
Ashanti	30.98	27	28.59

50. The crop was a good average one all over. The continually extending road and railway system is having a most beneficial effect on the industry. The Accra-Coomassie railway was opened in October throughout its entire length and in consequence has correspondingly extended the area in which the buying of cocoa becomes economically possible. Formerly much cocoa was left on the farms and it was only when ruling prices were high that the farmer received adequate compensation for the long carry to market, and then only did he consider it worth while to make up the cocoa for sale.

This of course still remains the case in some districts, but such circumstances are gradually being eliminated with the ever extending system of communication.

51. Buying was by no means brisk until the season had advanced somewhat as is not infrequently the case. Prices responded to the more active demand which became apparent in the early part of 1924 by a rise of several shillings per load. Prices varied between 9/3 to 16/- per load. One explanation of the rise would seem to be the natural desire on the part of buyers to fulfil contracts which they have been unable to do earlier in the season with cheaper beans ; hence with an increased demand prices rise accordingly.

52. There was no organised " hold up " of cocoa on the part of farmers ; it sold freely especially when the rise in price occurred.

Complaints were heard of a " hold up " at different periods, but on investigation these proved to be unfounded.

53. The quality of the prepared beans did not show any very appreciable improvement on that of former years, but generally constituted a fair average. It is difficult to see that any marked improvement is likely to take place until the farmer is offered some consideration for the additional trouble and the expense on his part ; or until some form of legislation is introduced to remedy the present position.

Cola.

54. The export of cola nuts has made a very appreciable recovery. The figures for 1923-24 exceed those for 1922-23 by 2,664,128 lbs. representing a value of £18,942.

The total export figures (15,489,255 lbs.) however, give no idea of the extent of this industry because such large quantities are used locally by Hausa and other Northern tribes and are taken inland by itinerant vendors.

In a number of the more remote localities this is the only saleable commodity of which full advantage appears to be taken when markets permit.

55. Efforts are continually being made to induce the farmers to extend the crop, and these are meeting with a fair degree of success. There has been a steady demand for the so-called " White Cola " seeds for planting out.

Oil Palm Products.

56. I have already in an earlier part of this report, referred to special work in progress in connection with the oil palm industry generally and little more remains to be added.

57. The higher prices prevailing in the European markets have given rise to quite satisfactory increase in the export of oil and kernels as compared with the previous year : but satisfactory as this increase may be it is but a poor indication of the possibilities of the industry. Enormous amounts of fruit go to waste annually.

The export figures are as follows :—

	1923-24.	1922-23.	Increase.
Palm Oil	408,360 galls.	298,979 galls.	109,381 galls.
Kernels	4,563 tons.	3,039 tons.	1,524 tons.

58. In the Western Province, a " Wilt " affection spread through the palm belt during the months of May to September. The condition of the palms was investigated by the Research Branch but no causative organism was found. The " Wilt " was considered to be due to the adverse climatic conditions prevailing during 1923, principally I think due to an insufficient rainfall which records show to be lighter than that of last year.

59. The Manager of Messrs. West African Oils, Limited, has kindly supplied the following information :—

" The quantity of palm fruits has been less for the following reasons :—

- a) Disease (?) of the trees.
- b) Shortage of labour in some districts.

" The quality of the fruit from an oil yielding point of view has not been so good for the latter months which I also attribute to the disease (?) and its effect on the trees.

" The disease (?) reported to you in June, 1923, has weakened the trees and at present our fruit cutters are reporting that there is little fruit owing to it.

" The fruits themselves have been smaller and have contained less oil, particularly those gathered during the last two or three months.

" This is an exactly similar effect to that caused by the disease (?) prevalent in 1918. I consider the previous disease (?) was due to drought and I consider the present is due to the 1923 rains being of too light a character to thoroughly saturate the ground and provide moisture sufficient to serve the trees through the dry season. Labour has been scarce—attracted by high wages and easier work at Takoradi.

" We have not been troubled as much by palm tree felling on our Concessions as we have in previous years : but there is still a tremendous amount of destruction going on outside our Concessions both for palm wine and farming purposes."

Rubber.

60. There has been a somewhat surprising revival in the export of rubber since last year. Prices on the home markets did certainly improve somewhat, but even so they have not been of a particularly attractive nature.

1923-24.	1922-23.	Increase.
364,644 lbs.	15,282 lbs.	349,382 lbs.

This is the highest figure reached for exports since 1919 (calendar year) when 721,588 lbs. was recovered. In any case rubber is not of much importance now as an industry in this country, nor does it show any indication at present of ever attaining its former magnitude.

Fuelwood Plantation, Achimota.

61. Since this matter was dealt with in the Annual Report for 1922-23, No. 1 Block consisting of approximately 100 acres has been planted, while No. 2 block consisting of a similar area received attention in the matter of clearing away and burning bush-growth, lining and planting, the latter operations being completed before the 31st March last.

62. It was at first proposed that *Casuarina equisetifolia* should predominate in the various blocks, but after repeated attempts to establish this species without any success it had to be abandoned in favour of *Cassia Siamea*; while other species are also in course of trial such as the raintree, mahogany, wild almond and Neem.

All varieties are being sown at stake, but I may say that much difficulty has been experienced in satisfactorily establishing the areas referred to above owing principally to two reasons :—

(a) Irregular and scanty rainfall.

(b) Bush fowl and rodents doing away with the seed after planting.

63. No. 1 block has been re-sown now several times, and up to date one can only characterise the results as disappointing.

Agricultural and Commercial Society.

64. This Society continues to make very satisfactory progress : with an increasing membership and its objects becoming better and more widely understood its influence becomes correspondingly greater amongst the Agricultural community.

The past year has been a very full one in every respect : a series of highly successful Agricultural Shows were held in each of the Provinces and Ashanti and in conjunction with them the Cocoa Farm Competitions.

A new departure from the previous year was that all shows were continued over two days instead of one : thus adding considerably to the educational value of each show in a way that was not possible before.

65. In the Eastern Province the Agricultural Show was held at Anyinam in December, some 850 exhibits were sent in and from certain noticeable improvements it is apparent that competitors are beginning to realise that " Show " material must be carefully prepared. A show was also held at Ho organised by a local committee assisted by a donation from the Society.

Some 150 exhibits of cotton were a striking feature of the show.

The Cocoa farm competition was held in the Akim-Abuakwa and Kwahu districts: 711 farmers were entered.

66. The Central Province Show was held at Agona Swedru and the Cocoa farm competition in the Winnebah district, with 138 farmers competing.

67. That in the Western Province was held at Tarquah; there were 657 entries and the cocoa farm competition was held in the same district with 60 farms competing.

68. In Ashanti the show and cocoa farm competition took place at Bekwai, there were 300 entrants for the farm competition. It is estimated that some 8,000 people attended the show, so that it is obvious these shows create a very considerable amount of interest.

69. In addition to the shows above referred to a new feature was a live stock show held in Accra last January. This is the first show to be held devoted entirely to live stock. £50 was allocated from the Society's funds for prizes which sum was further augmented by subscriptions from friends of the Society.

70. These are I think the more important features that have occurred in the Society's year: but fuller details are contained in the report of the Secretary to the Society.

It is no doubt realised that the organisation of the shows, work in connection with the Cocoa farm competitions, entailing as it does three and four separate inspections of cocoa farms scattered over a wide tract of country, and the execution of the Society's work generally, all fall largely on the officers of this Department and have in no small degree added very considerably to the work of all concerned.

Meteorology.

71. The rainfall returns are appended to this report as Appendices E to J, and it will be noted they are for the calendar and not the financial year.

Generally less rain fell than during the previous year, but at the same time the season was not unfavourable for the agriculturist as during the crop-ripening months of the year the rainfall was well up to average.

BRITISH EMPIRE EXHIBITION.

72. A very complete and fully representative exhibit of agricultural products was prepared for the British Empire Exhibition in London by the Agricultural Stations in the Colony, Ashanti and the Northern Territories.

Cocoa, being the important vegetable product of the Colony, naturally takes first place and four varieties prepared in various ways have been sent.

In the general exhibit, samples were also included of Rice, Rubber, Fibres, Spices, Coffee, Cereals, Bamboo, Fruits, Foodstuffs, nuts of various descriptions, Oil seeds, etc.

It appears unnecessary however, to go into further details in this report except to say that the total weight of exhibits prepared by this Department amounted to some 20-25 tons which called for much care on the part of the Officers immediately responsible for the preparation of the products.

A pamphlet entitled "Notes on the Agricultural Industry of the Gold Coast Colony," for distribution at the Exhibition, was compiled from notes contributed by Officers of the Department.

Legislation.

73. The Diseases of Plants Ordinance was passed by the Legislative Council but the question of putting it into operation is still under the consideration of the Secretary of State for the Colonies.

74. A proclamation referring to the British Mandated area of Togoland came into force at the end of 1923 for dealing with Collar Crack disease of Cocoa.

Action was commenced against the disease by cutting out affected trees and destroying them.

It is satisfactory to report that no trouble has been experienced with the farmers who almost invariably express their appreciation of the efforts made on their behalf.

NOTES ON SOME OF THE MORE IMPORTANT WORK ON THE DEPARTMENTAL EXPERIMENT STATIONS.

Stations.

75. Since the reports of Provincial Superintendents of Agriculture are not attached this year as appendices as has been the custom formerly the work in progress at various stations on a particular crop, has been tabulated under one heading for easier reference and so on throughout the following paragraphs.

Although figures are not in all cases in a strictly comparable form they serve to show what is being done and the experiments in progress

76. For easy reference the location of the "stations" is tabulated below :—

Eastern Province.	Mandated Area of Togoland.	Central Province.	Western Province.	Ashanti
Aburi Peki Asamangkese Kibbi	Kpeve Kpedschu	Assuantsi Hemang	Tarquah Adebrem Wioso	Coomassie. Juaso. Ejura.

77. One addition was made to the Stations of the Department during the year, that of Kpeve situated in the mandated area of British Togoland.

This Station comprising some 300 acres was purchased from the Controller of Enemy Property in September, 1923.

The only planted crop is cocoa planted by the late German owner, about 1912, in a number of blocks. The bearing trees number some 6,449.

A programme of future work is under consideration. The roof of the plantation house was blown away during a tornado soon after the plantation was taken over by the Department, necessitating considerable repairs. This station will form the Headquarters of the Assistant Superintendent in charge of the Trans-Volta district.

COCOA.

Assuantsi Station.

78. Sanitation work as usual received considerable attention and all diseased trees were removed

Die Back, *Formes* and *Hymenochaete* were responsible for part of the trouble while again quite a considerable number of trees were killed out by "unsuitable soil conditions".

On Bush Plots 1 and 2 diseased pods were allowed to remain on the trees after 30th June with a view to noting the effect over a series of years. As these plots are apart and distinct from the station, this can safely be done.

Plot 1 produced 13,982 pods of which 2.1% were diseased and Plot 2 795 of which 1.6% were similarly affected.

79. Amelonado and variety plots. (Plot IV planted 15' by 15' and Plot V 10' by 10').

TABLE I.

Particulars	Amelonado.		Variety Ocumare	Plots. Cundeamor.	Criollo.		Total Summa- rised.
	Plot IV.	Plot V.			A.	B.	
When Planted ..	1908-11	1912-15	1910-17	1910-17	1913-21		
Fruiting Trees ..	1,886	576	419	417	256	127	3681
Yield of pods	94,135	12,879	6,359	7,988	6,121	2,382	129,864
Average per tree ..	49	22	15	19	23	18	35
Diseased pods ..	17.75%	15.9%	19.09%	16.27%	20.78%	20.28%	18.34%
Insect Attack ..	66.3%	61.67%	60.10%	60.65%	61.23%	70.31%	65.03%

TABLE II.

Variety.	Nc. of pods fermented.	Quantity of dry cocoa produced.	No. of pods to pro- duce 1 lb. dry cocoa.
Amelonado Plot IV.	77,417	6,400	12.09
Amelonado Plot V.	10,831	850	12.74
Ocumare	5,123	418	12.25
Cundeamor	6,688	624	10.71
Criollo	6,748	500	13.51

80. Of the total pods collected the following were fermented :—

Variety Plots	..	..	..	..	..	..	..	106,807
Bush	..	..	..	..	..	..	..	14,263
Total								121,070

These produced 9,771 lbs. of dry Cocoa.
Number of pods per 1 lb. dry Cocoa—12.

81. Individual tree records in the one acre block in Amelonado Plot IV were recorded. The number of trees is now 178. The pods collected numbered 9,936 of which 8,022 were fermented, producing 582 lbs. dry Cocoa. To produce 1 lb. dry cocoa 13 pods were required. Dry Cocoa produced per tree—3.26 lbs. Average number of pods per tree—55.

82. The mulch experimental plot commenced last year continues. So far the mulched plot shows the advantage of treatment in a somewhat higher yield. Figures will be published when there is something more conclusive to report.

83. The very high proportion of diseased and insect attacked pods over that of previous years is difficult to account for; it may be that inaccuracies have crept in during the process of counting.

Aburi Station.

84. The practice of maintaining Plot 2 under thorough cultivation and Plot 3 under conditions resembling those of the average farm, commenced last year, was continued.

In the table of results below the term "Wet Cocoa" means the fresh beans as removed from the pods ready for fermentation.

Plot.	Variety.	Areas Acres.	Crop.		Wt. of Wet Cocoa, lbs.	Wt. of dry Cocoa lbs.
			No. of pods.	No. fermented.		
1.	Cundeamor	2.408	3,461	3,403	728	287
2.	Amelonado	2.34	24,220	23,218	3,367	1,420
3.	Amelonado	.30	4,872	4,768	972	389
4.	Criollo	.52	2,030	1,934	427	156
5.	Ocumare	.292	912	840	146	55

In comparing the cultivated Amelonado plot 2 with No. 3 it may be mentioned that the latter is a younger plot with practically all trees at their bearing age while in No. 2 are many young plants not yet bearing.

The following table shows the percentage of pods rendered useless by Brown Pod, and insect pests. The total number of pods collected is shown in table above.

Plot.	Variety.	Pods rendered useless by Brown Rot and Insect Pests.	Percentage of useless pods.
I.	Cundeamor	105	3.03
II.	Amelonado	477	1.97
III.	Amelonado	104	2.13
IV.	Criollo	96	4.73
V.	Ocumare	72	7.89

85. The four highest yielders of the selected trees in Amelonado Plot 2 gave the following yields :—

A.27	..	..	..	..	202 pods.
A.24	..	..	..	..	194 "
A.25	..	..	..	..	149 "
A.11	..	..	..	..	145 "

Kibbi Sub-station.

86. The Amelonado variety continued in a healthy and flourishing condition, but the same cannot be said of the Criollo Ocumare or Cundeamor varieties.

The following figures give the results of the past year :—

Variety.	Area acres.	Cocoa wet. lbs.	Cocoa dry lbs.	Dry Cocoa per acre. lbs.	Pods per lb. dry Cocoa.
Amelonado ..	1.25	2,276	847	678	14.8
Cundeamor ..	1.25	1,314	570	456	11.5
Ocumare .. ..	.67	449	175	260	12.0
Criollo .. ..	.57	465	183	321	12.3

The table below shows number of pods rendered useless by disease, etc.:—

Variety.	Total pods.	Pods rendered useless by Brown pod and Insect pests.	Percentage of useless pods.
Amelonado	14,325	1,278	8.9%
Cundeamor	8,123	1,329	16.3%
Ocumare	2,620	266	9.9%
Criollo	2,971	619	20%

Peki Sub-station.

87. The area in cocoa is 10.2 acres which produced 3,127 lbs. dry cocoa, and per acre 306.5 lbs. pods per lb. of dry cocoa—12.3

The percentage of pods rendered useless by brown pod and insect pests was 1.4 per cent—**Asamangkese Cocoa Farm.**

88. The first record of the farm appears in last year's report, since when good progress has been made.

Block I.—A marked difference was to be noticed in the growth of the cocoa plants to the advantage of those which were well shaded as compared with those more lightly shaded. The temporary shade plants consist of plantains, bananas and pawpaw ; cocoa yams were planted throughout the block in May and June ; being now established they provide a useful cover crop.

Insect Pests.—*Helopeltis* and *Sahlbergella* were troublesome during the early part of the year. The Assistant Entomologist visited the station. The destruction of certain weeds found to be host plants of *Helopeltis* and *Sahlbergella* was recommended and carried out, and the whole block kept more or less clean weeded : and with that the pests were checked considerably.

Block II.—The planting of the young cocoa was commenced on the 13th June and the work with the exception of a few bad places was completed by the end of that month.

Young plants of rain tree—*Pithecolobium Saman*—are used for permanent shade and plantains and bananas for temporary shade.

The block is divided into three sections for distance planting experiments. Each section is 370 feet.

The cocoa on these sections is planted at the following distances :—

Section I.—Plants at 15' x 15' total 250 plants.

.. II. .. " 12' x 12' .. 372 ..

.. III. .. " 9' x 9' .. 640 ..

Block III. The clearing of this block was started in September, 1923, and the young cocoa was planted out in March, 1924 ; the same temporary shade as before is used. Distances of planting is as in Block II.

Goomassie Station.

89. The total yields from all plots were rather less than last year and beans were on the average smaller. The percentage of diseased pods for the total crop shows an increase of 1.7 per cent while for the whole it amounts to 10.5 per cent.

90. The yield from one acre of trees 13-14 years old was 669 lbs. of dry beans, showing an average yield of 3.14 lbs. In the aggregate this is 33 lbs. less than for the previous year.

Variety.	Area Acres.	No. of trees fruiting.	No. of pods collected.	No. of pods diseased.	Insect attack.	Pods fermented.	Dry cocoa in lbs.
Amelonado ..	12	2,306	63,807	5,883	40,010	57,924	4,588
Cundeamor ..	4	1,185	28,938	2,380	24,355	26,558	2,255
Ocumare ..	4	1,137	27,448	2,865	17,018	24,583	2,034
Criollo A. ..	3½	657	7,856	1,498	5,702	6,358	500
" B. ..	5	1,160	6,627	1,536	4,832	5,091	408
Totals ..	28½	6,445	134,676	14,162	91,917	120,514	9,785 lbs

Comparative yields of the above with 1922-23 :—

Variety.	Yield in pods.	Dry Cocoa.	No. of pods per lb. dry Cocoa.	
			1922-23.	1923-24.
Amelonado	+ 11,602	+ 634	12.1	12.6
Cundeamor	— 5,355	— 465	11.6	11.7
Ocumare	— 330	— 38	12.	12.
Criollo A.	+ 788	— 8	12.2	12.7
" B.	— 2,480	— 248	11.9	12.4

The lower yield in the Cundeamor plot was particularly noticeable over ¼ of the area. The remaining portions treated with night soil in 1917-18 produced a very fine crop, otherwise the yield would have been much lower in this section.

The two Criollo plots are very poor—the varieties would appear to be unsuited to the Country.

Wioso Sub-station.

91. Cocoa yields :—

	Amelonado.	Cundeamor.	Cundeamor.	Summary.
No. of Fruiting Trees	815	747	685	2,247
Total yield of pods	26,795	21,642	20,211	68,648
Pods per tree	32.87	28.97	29.5	30.44
Dry beans per tree (lbs.)	2.22	2.24	2.34	2.26
Pods per 1 lb. dry beans	14.76	12.92	12.56	13.41
Diseased pods	6.3%	4.5%	5%	5.1%
Insect attacked pods	10%	22.8%	27.2%	20%

The average yield of dry beans per tree shows some considerable increase on that of last year.

In the block of 100 Amelonado trees where individual records are kept, the best yielding trees have produced as follows :—

Tree No. 98	119 pods.
" " 2	118 "
" " 94	100 "
" " 89	99 "
" " 33	98 "

OIL PALMS.

Aburi.

92. The varieties named yielded as follows :—

Variety	No. of Palms.	No. of Bunches.	Weight of Bunches.	Weight of clean fruit	Percentage of clean fruit to bunch.
Abedam	4	13	156 lbs.	134 lbs.	86%
Abobobe	3	13	162 ..	108 ..	66.6%
Abefita	3	15	190 ..	113 ..	59%
Abetuntum	4	31	389 ..	270 ..	70%
Liscombe	2	10	197 ..	112 ..	57%
Gamopeley	2	7	190 ..	126 ..	66%
Dewakawaka	1	2	30 ..	24 ..	80%

Kibbi Sub-station.

93. The following yields were obtained :—

Variety.	No. of Palms.	No. of Bunches.	Weight of Bunches.	Weight of clean fruit.	Percentage of clean fruit to bunch.
Abetuntum	9	68	1,006	513½	51
Abobobe	20	91	1,652	824½	50
Abepa	22	95	1,929	1,091½	57
Mixed Varieties	34	161	3,142	1,593	51

Peki Sub-station.

94. See last year's report as to the division of the plots.

Plot.	Area. Acres.	No. of bearing palms.	No. of Bunches.	Weight of Bunches. lbs.	Clean Fruit. lbs.
I.	2.5	172 (fixed No.)	658	16,894	14,637
II.	2.5	?	495	14,685	8,656
Various	—	—	619	21,363	13,225

The record of fruit from a number of individual palms is being maintained.

Assuantsi Station.

95. This plot consists of 127 palms planted in 1914 and 26 palms which originally existed on the land. Yields are given in table below :—

Young Palms.			Old Palms.		
No. of Bunches.	Weight of Bunches. lbs.	Weight of Fruit. lbs.	No. of Bunches	Weight of Bunches lbs.	Weight of Fruit. lbs.
397	3,483½	2,043	109	3,060½	1,724

COLA.

Aburi Station,

96. The yields of the plots are as below :—

Plot.	Variety.	Area—Acres.	Yield in Nuts.	
			White.	Red.
1	Red	.90	—	16,858
2	White	.67	10,075	3,610
3 (Plantation)	Red	27.5	—	40,758

The crop from plots one and three were much less than last year, while plot two gave a much greater yield.

Kibbi Sub-Station.

97. The plot consists of so called "White Cola." Planting in between the existing trees has been continued with seed from tree No. 99 which for several years gave only white nuts. The total area is now 4.91 acres of which 3.4 acres are in bearing. 125 trees gave 9,002 pods yielding 38,754 white nuts and 3,267 red nuts a slightly higher yield than last year with about the same percentage of white nuts.

Ten trees gave white nuts only during the year, but the one (No. 99) was not one of them

Assuantsi Station.

98. The lines were kept cutlashed and vacancies filled. There are still a few vacancies in the white variety.

Hemang Sub-Station.

99. The growth of this continues irregular though the trees are healthy.

Three trees were bearing immature fruit at the end of the year.

Tarquah Station.

100. The general plot is now showing the benefit of thinning from 15' x 15' to 30' x 30'. The trees are developing whilst the yield is the highest yet recorded.

The experiment with trees at varying planting distances so far would appear to favour the wider spacing. Plot A. 78 trees 22' x 22' produced 11,009 nuts, and Plot B. 45 trees 30' x 30' produced 16,213 nuts.

Wioso Sub-Station.

101. Most of the trees continue to do well.

Coomassie Station.

102. The area has been reduced to 10 acres (trees 25' x 25') and records are being maintained of individual yields from six rows comprising 150 trees.

The total yield was 99,961 nuts.

Yield per six rows was 28,640 nuts.

The highest yielding tree produced 2,167 nuts, while three trees gave over 1,000 nuts each.

Juaso Sub-Station.

103. In the plot devoted to this crop three trees raised from white seed have fruited none of them produced white nuts.

COCONUTS.

Assuantsi Station.

104. Records continue to be taken from individual palms over an area of some 20 acres—the palms are planted 25' apart. The table below gives the results :—

Variety.	Fruiting Palms.	Yield of Nuts.			Percentage immature.
		Mature.	Immature.	Total.	
Ceylon	671	9,510	748	10,258	7.29
Native	431	10,402	656	11,058	5.93

There is a considerable increase in the number of nuts collected from the native palms, but the yield from Ceylon variety is slightly reduced. A satisfactory reduction in immature nuts has taken place.

COFFEE.

Aburi Station.

105. The results of the plots are given below :—

Variety.	Area-acres.	Crop.		Yield per acre.
		Berries.	Beans.	
Liberica .. ..	.915	3680 lbs.	400 lbs.	439 lbs.
Robusta .. ..	.55	523 ..	80 ..	145 ..
Stenophylla .. ..	.35	628 ..	125 ..	357 ..

The yield of beans for the Liberian variety has been estimated.

Kibbi Sub-Station.

106. Results are as follows :—

Variety.	Area acres.	Yield.		Yield per acre.
		Berries.	Beans.	
Robusta .. ..	.365	52 lbs.	12 lbs.	33 lbs.
Liberica .. ..	.365	176 ..	not hulled	—

The trees were cut back in January, 1923, which accounts for the low yield.

Peki Sub-Station.

107. The following returns have been recorded :—

Variety.	Area-acres.	Dry Berries.	Dry Beans.	Yield per acre—Beans.
Stenophylla	330 lbs.	162 lbs.	216 lbs.
Robusta	442 ..	157 ..	209 ..
Liberica	1,064 ..	411 ..	548 ..

New plots have been planted up, the seed being taken from selected trees. Each row in the new plots contain seedlings raised from the seed of one tree.

Assuantsi Station.

108. The Liberian variety continues to be affected with fungoid disease. The yield from the various plots is as follows. All are planted 8' x 8'.

Variety.	Date planted.	No. of fruiting trees.	Weight of good berries.	Weight of diseased berries.	Weight of berries used for seed.	Weight of cured Coffee.
Liberica	1910	415	2,399½ lbs.	27 lbs.	59 lbs.	238 lbs.
Stenophylla	1912	98	54 ..	—	8 ..	20½ ..
Robusta	1912-13	504	389 ..	—	10 ..	106 ..

Hemang Sub-Station.

109. The area of each plot is one sixteenth of an acre and not 1.16 acres stated in last year's report.

Variety.	Fresh fruit. lbs.	Selected for seed.	Dry Coffee lbs.
Liberica	562½ lbs.	4 lbs.	60 lbs.
Stenophylla	137 "	4 "	15½ "
Arabica	57½ "	2 "	13 "
Robusta	55 "	3 "	5½ "

Tarquah Station.

110. The results below have been obtained from the blocks of 20 trees of each variety marked off for record purposes.

Variety.	Yield of fresh fruit.		Cleaned Beans.		Fresh fruit required to produce 1lb. beans.
	Total	per tree.	Total	per tree.	
Liberica ..	56 lbs. ozs.	2.8 lbs.	5 lbs. 12 ozs.	4.7 ozs.	9.74 lb
Robusta ..	125 " 13 "	6.28 "	32 " 14 "	26.3 "	4.8 "
Stenophylla ..	71 " — "	3.55 "	13 " 10 "	10.9 "	5.21 "
Arabica ..	8 " 8 "	.43 "	1 " 14 "	1.5 "	4.53 "

Coomassie Station.

111. The yield of Coffee per acre was as follows :—Liberica 480 lbs., Stenophylla 594 lbs. Robusta 266 lbs, and Uganda 252 lbs.

COTTON.**Kpedschu Sub-Station (Togoland).**

112. The plots were planted in May, June, July and August respectively, and the results obtained are as given below :—

Plot.	Area—acres.	Total weight of seed cotton.	Total weight of lint.
I. (May)	1	36½ lbs.	9 lbs.
II. (June)	1	49 "	13 "
III. (July)	2	283½ "	75½ "
IV. (August)	2	288 "	60½ "
Total	6	657 "	158 (24%)

The average yield of seed Cotton per acre is 109 lbs. which is somewhat better than that of last year although of course it cannot be regarded as good. Many difficulties with drainage were encountered which will necessitate the choosing of more suitable site for further experiment.

RUBBER.**Assuantsi Station.**

113. No tapping carried out. The average girth of the 37 trees under observation three feet from the ground was 37.7 inches, an increase of 1.1 inch in last year.

Hemang Sub-Station.

114. Of the trees under observation one has died from root disease. Planted in 1916 the average girth is now 24 inches three feet from the ground. This is an increase of 4.4 inches since the measurement was recorded last year.

Tarquah Station.

115. No tapping has been done. The annual increase in girth is given in the table below of five groups of trees :—

No. of Trees.	4	9	8	9	9
Distance planted	12' x 24'	15' x 15'	20' x 20'	30' x 30'	40' x 40'
Average girth	50.75"	48"	—	62"	60.77"
Increase	2.00"	1.67"	—	1.89"	2.66"

Thinning operations and storms have caused the removal of five trees from the 12' x 24' group and one tree from the 20' x 20' group.

Diseases have not been very prevalent. Reference should be made to last year's report.

Wioso Sub-Station.

116. The 48 trees under observation to record the yearly increase in girth averaged 28.68 inches at three feet from the ground.

Average increase for the year being 3.25". The largest tree in the block measured 48.5 inches and shows an increase of 4½ inches during the year.

Coomassie Station.

117. Tapping was carried out from August to December to produce rubber for the British Empire Exhibition and the following records were obtained.

Section 1.—103 trees planted 1909—15' x 15' average girth 44.57"—previously untapped

Tappings	69
Sheet	117 lbs.
Scrap	17 "
Total	194 "

Average yield per tree—30.1 ozs.

Yield per tree per tapping—.43 ozs.

Section 2.—109 trees (planted 1909) 45' x 45' in cocoa plots average girth 58.35" previously untapped.

Tappings	84
Sheet	343 lbs.
Scrap	23 "
Total	366 "

Average yield per tree—53.7 ozs.

Yield per tree per tapping—.63 ozs.

Section 3.—1,850 trees (planted 1909) 15' x 15', average girth 34.92" previously tapped 1918-1920.

Virgin back panel tapped on this occasion :—

Tappings	84
Sheet	1,415 lbs.
Scrap	226 "
Total	1,641 "

Average yield per tree—14.1 ozs.

Yield per tree per tapping—.169 ozs.

The previous yield of No. 3 section during 1919-20 was 40.5 ozs. per tree.

All tapping was on the two left hand cuts system on one-third circumference of the tree at 22½" and 45" from the ground.

TOBACCO.**Kpedschu Sub-Station.**

118. Area .75 acres planted 3' x 3'. Two varieties used. Boyd and Yellow Pryor. The leaves were attacked by leaf spot which reduced the quality of the crop. The yield however, was a slight improvement on that of the previous year. This amounted to 132½ lbs. Boyd, and 98½ lbs. Yellow Pryor of cured tobacco.

Total weight 231 lbs.

Adebrem Sub-Station.

119. Tobacco was planted but was not successful

Juaso Sub-Station.

120. The crop gives some promise of success and is being given further trials. A small temporary curing house has been erected in readiness for the next crop.

ROTATION EXPERIMENTS.**Kibbi Sub-Station.**

121. The following table shows the yields during the year, which was the third year of the rotation:—

Plot.	Crop.	Planted.	Area—acres.	Yield.
A	Corn	March, 1923	1/6	509 lbs. in cob.
B	Water Yams ..	"	"	469 "
C	Cotton	April, 1923	"	1 lb.
D	Water Yams ..	March, 1923	"	414 lbs.
E	Fallow	—	—	—
F	Groundnuts ..	March, 1923	74' x 36'	36 lbs. Hong Kong. 72 .. local variety.

Peki Sub-Station.

122. This plot has not been particularly successful.

Plot.	Crop.	Area.	Yield.
4	Corn	½ acre.	2,381 lbs. cobs 1,171 lbs. Corn.
	2nd crop		2,181 735 lbs.
1	Groundnuts ..	" "	466 .. cobs —
Check ..	Yams	" "	343 .. Good yams, 2,589 lbs. Water Yams.
2	Yams	" "	301 .. 2,448 lbs.
3	Cotton	" "	18 .. Seed Cotton.

Assuantsi Station.

123. There are four plots ¼ of an acre each:

Plot A.—Planted with Cassava 3' x 3' in March, 1923. A yield of 16.49 tons was recorded.

Plot B.—Planted with Jerusalem peas and Canavalia beans, and while in growth were dug in as a mulch in September, 1923. The plot was then planted (11th September) with tobacco 3' x 1¼'.

Half of the plot was cut for leaf in January, 1924, producing a yield of 14½ lbs. The remaining half was allowed to seed—2 lbs. of seed being obtained. Yellow Pryor gave the best result with approximately 80 lbs. cured tobacco per acre.

Plot C. Planted with Sea Island Cotton 10 lbs. seeds were sown but germination was very poor. The crop was picked in December, January, February and March and yielded 25 lbs.

Plot D. Planted with Corn 29th March, 1923—8 lbs. of seed used 4' x 2'. Reaped in August, 1923, producing a yield of 2,018 cobs or 266 lbs. grain or at the rate of 426 lbs. per acre.

Hemang Sub-Station.

124. Each lot is $\frac{1}{2}$ acre from which the following results were recorded :—

Plot.	Crop.	Yield.	Remarks.
A.	Cassava ..	9,375 lbs.	8 $\frac{1}{2}$ tons per acre.
B.	Tobacco	—	Failed owing to disease.
C.	Jerusalem Peas	160 lbs	320 lbs. per acre.
D.	Maize	1,484 cobs or 285 lbs.	570 lbs. per acre.

Wioso, Juaso, and Ejura sub-stations.

125. Details of these experiments will be published when more information is available.

GROUNDNUTS.**Kpedschu Sub-Station.**

126. Area of plot 2 acres—eight varieties were sown 3' apart.

Variety.	Area square feet.	Weight of nuts fresh.	Weight of nuts dry.	Yield per acre unshelled.
American	540	23 lbs.	10 $\frac{1}{2}$ lbs.	847 lbs.
Gambia	135	4 $\frac{1}{2}$ "	2 "	645 "
Illorin	504	9 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	475 "
Chinese	2,358	97 "	49 $\frac{1}{2}$ "	914 "
Tamale	1,179	50 $\frac{1}{2}$ "	26 "	960 "
Hong Kong	20,043	754 "	446 $\frac{1}{2}$ "	970 "
Kwahu	33,012	1,138 $\frac{1}{2}$ "	663 "	1,440 "
Native	29,475	802 "	498 "	736 "

From the Kwahu variety oil was extracted for the British Empire Exhibition and it gave 15% against 13% in the other varieties.

SOYA BEANS.

127. This crop was planted out at Kpedschu, Assuantsi, Wioso and Adebrem, but in most cases the results were anything but satisfactory.

FRUITS.**Assuantsi Station.**

128. The yield of fruit has on the whole been satisfactory. That from the five selected lime trees amounted to 15,893 limes, which is somewhat less than last year. Sour Orange, Shaddock, Grape Fruit, Sweet Orange, Avocado pears, Sweet sop, Guava, Bread fruit, were all recorded.

A few fruits were picked in May and December of the Ceylon Mangoes of which two varieties exist, *viz.*, Jaffa and Rupee. There was a heavy crop of Tangerine in May and June, but most of the fruit was destroyed by attack of insects.

Hemang Sub-Station.

129. This section makes good progress. Grape fruits, Tangerines and Oranges suffer much from the fruit moth. The five selected lime trees planted 15' x 15' in 1917 are recorded as having produced 40,299 limes which is a particularly heavy crop.

Tarquah Station.

130. Under systematic cultivation the trees have improved considerably; good crops of Limes, Oranges and Grape fruits have been collected.

The yield of fruit from 6 trees of the spineless lime has been recorded as follows :—

Total yield	735 fruits.
Weight of Fruit	70 lbs.
Average per tree	122 fruits.

The yield is lower than that of last year.

BAMBOO.

131. As a report was recently submitted dealing with this, further comment here is unnecessary.

Nurseries.

132. The following is a record of plants and seeds distributed from all stations.

ABURI STATION.

Descriptions.	Plants.	Seeds.
Cocoa	1,295	425
Coffee	581	6,200 and 2 lbs.
Fruits and decorative ..	5,786	5,038, 12 pkts. and 14 lbs.
Other Economics	—	3,166, 1 pkt. and 1 lb.
Vegetable Seeds	—	74 pkts.
Shade trees	—	1,000, 13 pkts. and 26½ lbs.
Total	7,662	15,829 ; 100 pkts., 43½ lbs.

133. Kibbi Sub-Station.

Description.	Plants.	Seeds.
Cocoa	246	9 pods
Coconuts	—	198
Coffee	2,689	23 berries.
Cola	1,240	8,293
Fruit trees	1,490	6
Other Economics	—	301 lbs.
Ornamental	517	5 pkts.
Vegetable Seeds	—	22 pkts.
Total	6,182	8,498 seeds ; 9 pods ; 23 berries ; 301 lbs ; 27 packets.

134. Peki Sub-Station.

Description.	Plants.	Seeds.
Coffee	5,060	—
Ornamental	473	—
Fruit trees	136	—
Other Economics	276	—
Vegetable Seeds	—	10 packets.
Total ..	5,945	10 packets.

135. Assuantsi Station.

Description.	Plants.	Seeds.
Cocoa	—	396 pods.
Coconut	2,457	3,786
Fruit trees	1,318	152 seeds, 2 pkts., 5 lbs.
Coffee	110	21 lbs.
Shade trees	618	1 lb.
Ornamental	9,712	40 lbs.
Other Economics	6,407	60 seeds, 39 lbs.
Sugar Cane	20	—
Total ..	20,642	3,998 seeds ; 396 pods ; 2 packets ; 106 lbs

136. Tarquah Station.

Description.	Plants.	Seeds.
Food Crops	1,362	—
Coffee	346	36 lbs.
Fruit trees	564	9 ozs. and 3 packets.
Shade trees	313	14½ lbs.
Other Economics	32	—
Ornamental	7,348	—
Total ..	9,965	51 lbs. and 3 pkts.

137. Adebrem Sub-Station.

Description.	Plants.	Seeds.
Paddy	—	1,174 lbs.
Coffee	308	—
Tobacco	—	4 packets.
Food Crop	—	250 lbs.
Banana	39 suckers	—
Total ..	347	1,424 lbs ; 4 packets.

138. Coomassie Station.

Description.	Plants.	Seeds.
Shade and Decorative	5,500	—

139. The following is a summary of the total distribution of plants and seeds from all stations :—

	Plants.	Seeds.	Packets of Seeds.	Lbs. of Seeds.
Aburi	7,662	15,829	100	43
Kibbi	6,182	8,498	27	301
Peki	5,945	—	10	—
Assuantsi	20,642	3,998	2	106
Tarquah	9,965	—	3	51
Adebrem	347	—	4	1,424
Coomassie	5,500	—	—	—
Accra Horticultural Nursery	9,729	—	—	—
Total	65,972	28,325	146	1,925

As the figures indicate, a very considerable amount of planting work has been executed.

REVENUE.

140. The revenue denoted below was derived from the sale of produce of the various stations :—

						£	s.	d.
Aburi	..	..	..	..	..	62	4	10
Kibbi	..	..	..	..	..	59	4	1
Peki	..	..	..	..	..	42	9	2
Kpedschu	..	..	..	..	..	7	0	0
Ho and Kpandu	..	..	..	..	..	28	1	2
Assuantsi	..	..	..	..	..	207	14	6
Hemang	..	..	..	..	..	33	6	7
Coconut Plantation, Cape Coast	..	..	..	..	..	19	5	4
Tarquah	..	..	..	..	..	111	18	5
Wioso	..	..	..	..	..	16	2	8
Adebrem	..	..	..	..	..	19	11	0
Coomassie	..	..	..	..	..	128	9	11
Juaso	..	..	..	..	..	35	18	3
Total	..	..	..	..	..	£771	5	11

141. The number of visitors recorded at the various stations are given below :—

Kibbi	..	..	..	..	..	..	116
Peki	..	..	..	..	..	..	91
Kpedschu	..	..	..	..	..	..	1
Assuantsi	..	..	..	..	..	..	40
Hemang	..	..	..	..	..	..	46
Coconut Plantation, Cape Coast	..	..	..	..	..	..	30
Tarquah	..	..	..	..	..	..	110
Coomassie	..	..	..	..	..	..	232
Juaso	..	..	..	..	..	..	130
Total	..	..	..	..	..	..	796

STAFF.

Appointments and Promotions.

142. Captain John McNie Wingate was appointed Assistant Superintendent, Sisal Plantation, on 27th December, 1923, and assumed duty on 9th January, 1924.

Six Learners were promoted to Junior Assistant Overseer, and eleven Learners were appointed to the Agriculture and Forestry Training Centre by competitive examination.

Two Temporary Clerks were appointed to the Second Division on passing the Civil Service Examination.

Retirement on Pension.

Mr. J. C. Glover, African Assistant Superintendent of Agriculture, retired on pension on 15th March, 1924, after completing about twenty-six years of valuable service in the Department.

Termination of Appointment.

The appointment of Mr. A. A. L. Smith, Temporary Assistant Superintendent, was terminated from the 17th October, 1923, on completion of agreement.

The appointments of two Ceylon Craftsmen were also terminated: one on the 11th January 1924, being invalided, and the other on the 17th January, 1924, on completion of agreement.

The death of Mr. E. D. Segbefia, Junior Assistant Overseer, occurred on the 15th June, 1923, at Labadi.

HEALTH.

143. The health of the Staff has been fair. Ten Europeans were on the sick list for 117 days, one Sinhalese for 114 days, and 19 members of the African Staff for 169 days.

144. In concluding, it is my privilege to add my appreciation of the energy and co-operation displayed by the Staff at all times during the period under review which has been a very full one, on account of the increasing activities of the Department in all directions.

I have the honour to be.

Sir,

Your obedient Servant,

A. OGILVY, *Lieut. Col.*
Acting Director of Agriculture.

APPENDIX A.

REPORT ON THE MYCOLOGICAL SECTION FOR THE
YEAR ENDING 31st MARCH, 1924.

The Government Mycologist was absent from the Colony on leave from the 29th September, 1923, to the 7th February, 1924, and the Assistant Mycologist was absent on leave from the 1st April until the 24th July.

2. During the year the following tours were undertaken:—

Government Mycologist, 11th-21st April—Collar-crack areas of Eastern Akim.

Government Mycologist, 16th-21st June—Collar-crack areas of Eastern Akim.

Government Mycologist, 13th August—4th September—West African Oils Estates, Western Province, Assuantsi, Tarquah, and Coomassie.

Assistant Mycologist, 17th October;—6th November—Collar-crack areas of Togoland.

Assistant Mycologist, 8th-12th December—Koforidua district to take photographs for British Empire Exhibition.

Assistant Mycologist, 27th-31st December—Coomassie for Departmental Conference on Diseases Bill.

Collar-crack of Cocoa.

3. Since the last annual report, this disease has been reported from several localities in Eastern Akim and from Akrokerrri, Ashanti.

Field investigations and cultural work on the causative fungus has established its identity with *Armillaria mellea* (Vahl.) Fr.

In other parts of tropical Africa the same fungus is reported to have fatal effect on Coffee, Tea, Para and Ceara Rubbers, Mango, Guava, *Ficus*, *Eucalyptus*, *Spathodea*, *Bauhinia*, *Erythrina*, *Hibiscus* and Roses; in Europe, America and Australia it is destructive to deciduous and Coniferous trees.

The symptoms of the disease which *A. mellea* causes in cocoa appear to be peculiar to that host. Longitudinal cracks appear in the collar of the host and extend upward. From these cracks are protruded narrow frilly outgrowths of fungus tissue which are at first cream coloured but later become yellow and eventually black. The frills are continuations of white leathery plates of mycelium contained by the cracks which may extend to the centre of the tree.

The fruiting bodies of the fungus are mushrooms and occur in groups near ground level. They vary in colour according to age; when young the cap is uniformly brown but as it develops in size the outer skin ruptures and remains as small brown dots on the cream-coloured surface of the pileus. The stalk is usually dark in colour at its base, and the whole fruitification rots away as a slimy, rusty-brown mass infested by nematodes and fly-larvae.

In order to control the disease it is necessary to reduce the excessive moisture conditions in which the fungus flourishes, to destroy all traces of the fungus on cultivated crops and forest hosts, and to isolate affected areas by trenching.

Bud-Rot of Coconut Seedlings.

4. Only negative results have been gained by inoculating healthy seedlings with cultures of organisms taken from diseased plants. Whilst it is impossible to say that the diseased condition is not produced by an organism, it is considered probable that they have been caused physiologically as a result either of inducing germination in unripe seed or in seed which has been badly stored. Investigation along these lines is proceeding.

Rice Blast.

5. (*Piricularia Grisea* Sacc.) was reported as not so serious as last year at Adebrem.

Oil Palm Wilt.

6. A visit of investigation was paid to the Western Province in connection with the wilting of oil-palms. No pathogenic organisms was found that was likely to cause the trouble and the conclusion was reached that the wilt was due to physiological causes following adverse climatic conditions.

Liberian Coffee Disease.

7. The fungus causing mealy pod disease of cocoa and the annual loss of a very large percentage of Liberian Coffee berries, was found to be infecting the green shoots of Liberian coffee at Aburi. It was also found on wounded fruit of *Persea gratissima*.

Moulds on Dried Cocoa Beans.

8. Work on mouldy cocoa beans was continued and provided indications for future lines of investigation.

Damping-off Disease of Tobacco.

9. This disease which occurs in Togoland was investigated, and the causative organism *Pythium aphanidermatum* (Edson) Fitz p. isolated.

Other Diseases.

10. A number of leafspot diseases on economic crops have been collected for determination.

The incidence and possible parasitology of species of *Colletotrichum* on immature, withered cocoa pods is under investigation.

Soy Beans.

11. In co-operation with the Assistant Superintendent of Agriculture, by whom a report was submitted, further examinations of Soy bean nodules were undertaken.

Publications.

12. Articles of mycological interest have been written for the Journal of the Gold Coast Agricultural and Commercial Society, and the preparation of bulletin on local fungous disease is under way.

General.

13. The collection of photographic records of fungous diseases was augmented and a series of lantern slides prepared for the use of travelling officers. Specimens of characteristic diseases were prepared for the British Empire Exhibition ; during leave in England, coloured photographs of diseases were made for that exhibition, and a list of local fungi compiled for publication.

R. H. BUNTING,

Government Mycologist.

APPENDIX B.

REPORT OF THE ENTOMOLOGIST FOR THE YEAR
ENDING 31st MARCH, 1924.

The Government Entomologist, Mr. W. H. Patterson, was absent on leave from the Colony from April 18th until July 24th, 1923, and from February 2nd, 1924, when he took up duties in connection with the British Empire Exhibition in the United Kingdom. During his tour in the Colony most of his time was taken up in collecting specimens for the British Empire Exhibition, editing the Journal of the Gold Coast Agricultural and Commercial Society, and doing duty at the Agricultural Shows. The Assistant Entomologist was in the Colony during the whole year under report.

2. Pests of Cocoa :—

- (a) *Sahlbergella*, *Helopeltis* and *Homocoerus*, have caused no more injury than in former years indicating that a natural equilibrium has been obtained. Natural enemies of the former pest appear to be negligible, only one certain parasite having been found which has been determined as being a new species, *Encyrtus cotterelli* sp. n. fam. Chalcidae.
- (b) *Thrips*—(*Heliothrips rubrocincta*) appears to be increasing in the Central Province and immediately follows sudden exposure of trees to sun and drying winds. This can be observed where clearings for roads have been newly made. The Government Entomologist visited San Thome early last year in connection with this pest, his observations being the subject of a separate report.
- (c) Cocoa Bark Caterpillar.—The larva of a Noctuid reported in the last Annual Report as feeding on the bark of Cocoa was again observed at Peki and also at Kpeve in British Togoland. These appear to be of two different but closely related species. The larvae spend the earlier part of their life-history feeding externally on the bark under a gallery made of frass and silk eventually boring into the branch finding entrance at reaping and pruning wounds. This pest is exceedingly common in Peki district, but appears only to attack the weaker trees. The adult moths are being determined.
- (d) Bark Borer (*Glenea* spp.).—A few trees on the Aburi Station have been attacked by this Pest. The borers have been cut out and the wounds tarred.
- (e) Cocoa Storage.—Work is in hand at the time of writing on the relation between moisture content in beans and attack of moth (*Ephestia* sp.) and weevil (*Araecerus fasciculatus*).

3. Pests of Cola :—

Cola Weevil (*Balanogastriis colae*). Work on the life-history of this pest has been completed. Cola pods are as a rule collected and broken under the actual Cola tree, the fresh nuts being infected from previously fallen and broken pods infested with weevil. Pods should be collected, and broken away from the trees entirely, thus reducing liability of infection. The fungus *Beauveria* previously reported is not effective in keeping the number of weevils down. Infection takes place in the adult stage and as oviposition commences immediately on emergence from the pupa oviposition is completed before death.

4. Pest of Palms.

- (a) Oil Palm Leaf-miner (*Coelonomenoder elaeidis*). This beetle has been very much in evidence on the Akwapim ridge this year. The attack ceased at the commencement of the dry season. The larvae are heavily parasitised but apparently their efficiency is reduced during certain seasons owing to the adult developing a migratory habit. This beetle was reported from the West African Oil Estates, Secondee, as being a possible cause of "Wilt" of Oil-palms. This was found not to be so, the beetle being comparatively common but no serious damage. This work will be the subject of a special paper.
- (b) Rhinoceros Beetles.—It has been found that there are two distinct Rhinoceros Beetles attacking Coconut in the Colony. *Archon centaurus* is found up-country and *Oryctes monoceros* only on the coast.

A considerable number of Borassus Palms in British Togoland have been killed by *Oryctes* sp. the larvae breeding in the dead trunks.

Coconuts in the vicinity are unattacked.

5. *Pests of cotton.* This applies only to cotton growing districts of British Togoland. Owing to the possibility of this becoming an important industry a special study is to be made of pests. So far only a preliminary survey has been made :—

- (a) Stainers (*Dysdercus* spp.)—These are common and causing considerable damage, 30% to 40% of the cotton picked on Kpedschu station being stained, not counting aborted bolls. Investigation of the prevalence of stainers at different periods of the season and the relation to other food plants is required.
- (b) Boll-worms.—These are comparatively common but not serious. This will call for special work.

6. Fruit Moth (*Archres* sp.) was again in abundance during March this year. The food plants of the larva have not yet been ascertained.

Apiculture.

7. Two colonies were in existence at Aburi at the beginning of the year. One of these is still flourishing, but has giving no indication of storing honey in sufficient quantity to be profitably removed. The other colony never made headway and eventually died.

On the plains of Southern British Togoland a comparatively flourishing industry is in existence, the honey being sold to local Hausas. Specimens of honey and wax obtained appear to be of good quality. These have been sent to specialists for opinion on value.

G. S. COTTERELL,
Acting Government Entomologist.

APPENDIX C.

REPORT ON THE CHEMICAL SECTION FOR THE YEAR ENDING 31st MARCH, 1924.

The Agricultural Chemist has been in the Colony during the year.

During the year under report the question of the provision of adequate laboratory accommodation has been discussed at some length and it has finally been decided to remodel the laboratory at Aburi and by removing a number of trees overhanging the building to improve conditions and avoid excessive humidity. At the close of the year these alterations were in hand and completion may be expected at an early date.

The scope of the Chemist's work has been much more accurately defined and the improving conditions will shortly enable this to be carried out efficiently.

2. Approval has been given for the appointment of an African Chemist's Assistant who has been employed by Messrs. West African Oils, Limited. The staff will then consist of a Chemist, Chemist's Assistant and an Apprentice.

3. The Chemist visited Provincial Headquarters in the Colony and Ashanti to confer with Superintendents in order to be able to correlate laboratory investigations with the work in hand in the Provinces. A tour of this nature ought to be undertaken annually. One's opinions of the investigations necessary can only be formulated after consulting the officers in charge of the field work who can appreciate the economic aspect of the situation as viewed by the native. My experience has been that without such exchange of views work proposed by me may be only of very secondary importance, the tendency in laboratory work being to neglect the economic in favour of the academic.

4. As matters now stand it appears, for example, that work on cocoa is not of prime importance, the industry being well established and the product being of a grade for which there is a steady demand, which is shown by the steady yearly increase in our exports. Instead of attempting the impossible task of improving the quality, work ought to be directed towards producing a uniform grade.

In this connection it may be mentioned that the fermentation of cocoa appears to be complete when a maximum temperature varying between 40° and 50° C. is reached. This maximum is usually reached on the 6th or 7th day, but may be earlier or later. The unfortunate breakage of two vat thermometers at the time of harvest prevented verification of whether this could be accepted as a criterion of the completion of fermentation.

5. It is of much greater importance to collect information regarding one of our older industries and collect data which will be of use in the exploitation for the benefit of the native of the vast potential wealth of our oil-palms.

6. In the absence of a Botanist the greater part of my time has been employed in the study of the varieties of the oil-palm in the vicinity of Aburi, to find first of all whether these are really varieties and whether they have been grown true from seed. Full details of these investigations will be found in a separate report. It may be said here, however, that as these so-called varieties do not appear in pure stands and therefore cannot be correlated with soil conditions, and that the possibility of cross-fertilisation is great, the task of isolating pure strains will cover a very long period of time. It is my opinion, which I put forward with some trepidation, in view of literature on the subject (cf. Kew Bulletin Misc. Inf. 1914, pp. 285-288) that a great deal too much from economic standpoint may be made of these varieties and formulae. The only factors to be considered are the production of fruit and the oil content of that fruit. Sufficient data have now been assuaged to enable the necessary chemical investigation to be started.

Power Alcohol.

7. Samples of maize and cassava grown under standardised conditions were examined and showed little variation in starch content. It should be noted, however, that the cassava samples consisted of peeled roots.

Soil.

8. A number of soils typical of cocoa growing areas in the Eastern Province have been examined. It is impossible so far to generalise upon the results of these. The volume of work necessary to enable this to be done would not appear to justify an extension of this work with the present staff.

At the suggestion of the Superintendent of the Agriculture and Forestry Training Centre a manurial experiment has been laid out at Coomassie to test the value of locally obtainable manures and the response to chemical fertilisers. This is at present confined to the Amelonado-cocoa plots there, but will be extended if the results obtained justify that course.

R. COULL,

Agricultural Chemist.

APPENDIX D.

REPORTS BY DIRECTOR OF IMPERIAL INSTITUTE ON PRODUCTS SENT FOR INVESTIGATION.

NEELE.

The Neele seeds which are the subject of this report were forwarded to the Imperial Institute by the Director of Agriculture, and are referred to in his letters No. 77/7/1923 of the 13th January, and No. 481/7/1923 of the 2nd March, 1923.

The two samples which differed considerably in appearance, were stated to be derived from varieties of the Neele plant, growing respectively in the Northern Territories and the Western Province. The botanical specimens of the plants were identified at Kew as the same species, viz., "*Citrullus Vulgaris. Schrad.*," the seeds of which are known to be very variable. The two types of seed from the Gold Coast are being grown at Kew in order to determine whether there are corresponding differences in the plants.

DESCRIPTION.

Northern Territories.

Weight 18 lbs. Small, narrow, flat, straw-coloured seeds; similar to neele seeds which were the subject of Imperial Institute report dated the 24th December, 1921. No information was furnished as to the district from which the earlier seeds were derived.

Western Province.

Weight $\frac{1}{2}$ lb. Thin, flat, oval, yellowish-brown seeds, from $\frac{1}{8}$ to $\frac{1}{4}$ inch in length and $\frac{1}{8}$ inch wide. The seeds were composed of a thin, brittle, papery husk and cream-coloured oily kernel. They were larger and flatter than the seeds from the Northern Territories described above and differed from these in general appearance.

RESULTS OF EXAMINATION.

Seed.

The seeds were examined with the following results :—

	Seeds from the Northern Territories.	Seeds from the Western Province.	Seeds examined in 1921.
Moisture in seeds as received. .	6.4	8.1	7.0
Yield of Oil (on extraction with light petroleum) from seeds as received	45.3	33.8	44.4
Yield of Oil (on extraction with light petroleum) expressed on moisture—free seeds . .	48.4	36.8	47.7

In respect of yield of oil, the seeds from the Northern Territories correspond with those examined at the Imperial Institute in 1921, whereas the seeds from the Western Province contain a much lower percentage of oil.

Oil.

The oil extracted from the seeds was chemically examined with the following results, which are shewn in comparison with the corresponding figures for the oil obtained from the earlier sample :—

	Oil from Northern Territories seed.	Oil from Western Province seed.	Oil from seed examined in 1921.
Specific gravity at 15°/15°C ..	0.9236	0.9230	0.9232
Refractive index at 40°C ..	1.467	1.467	1.467
Acid value	3.2	1.8	1.3
Saponification value	191.3	195.1	192.8
Iodine value (Hubl. 17 hr.) per cent	124.3	119.2	121.7
Unsaponifiable matter per cent	0.8	0.7	0.8
Solidifying point of fatty acids	29.2°C.	32.7°C.	32.5°C.

These results show that the oils from the three samples of seed are very similar in composition.

Residual Meal.—The residual meal left after the removal of the oil from the Western Province seed was cream-coloured and possessed no distinct taste. The results of a chemical examination are given in the following table, which includes the figures for the meal from the seeds examined in 1921 :—

	Meal from seed from Western Province. (Calculated as containing 7 per cent of fat.)	Meal from seed examined in 1921 (calculated as containing 7 per cent of fat.)
Moisture	9.7 per cent	10.1 per cent.
Crude Proteins	28.2	35.3
Fat	7.0	7.0
Carbohydrates, etc. (by difference)	11.3	14.3
Crude fibre	39.2	29.0
Ash	4.6	4.3
Nutrient ratio	1 : 0.97	1 : 0.86
Food Units	99	120

Neither of these meals contained cyanogenetic glucosides, and that from the Western Province seed, unlike the meal examined in 1921, gave no indication of the presence of alkaloids.

Commercial Value.

The opinions of oil-seed crushers were obtained on the seed from the Northern Territories and the oil extracted from it at the Imperial Institute. They were of opinion that oil could be refined without difficulty and should be suitable for technical use, and probably, if suitably treated, for edible purposes. The residual meal was regarded as a fairly useful feeding stuff which should be saleable at a somewhat higher price than cotton seed cake.

The firm valued the seed at £17 to £18 per ton nett weight, delivered in the United Kingdom, and offered to purchase a trial shipment of 200 to 300 tons.

Remarks.

As already indicated, the Neele seeds from the Western Province differ in appearance from the seeds from the Northern Territories which resembled the sample examined in 1921. The seeds from the Western Province gave a much lower yield of oil, and the residual meal contained less protein and considerably more fibre than that obtained from the earlier sample.

The oils from the three samples were, however, practically identical in composition.

In this connection it may be mentioned that the seeds of *Citrullus vulgaris*, are known to vary widely in appearance and yield of oil, whilst the constants of the oils may also differ within certain limits.

In general, the oil of these Neele seeds from the Gold Coast is similar in composition to that of some of the other varieties of *C. vulgaris*, but the residual meal is richer in protein than the meals yielded by the seeds of this species from certain other localities.

If available in commercial quantities and at a suitable price the seed from the Northern Territories would find ready market in the United Kingdom. The seed from the Western Province would be of lower value on account of the smaller percentage of oil: a further sample of this variety should, however, be forwarded in order to determine whether the lower yield of oil is a constant feature.

SHEA FRUITS.

The Shea fruits which are the subject of this report were forwarded to the Imperial Institute by the Director of Agriculture, and are referred to in his letter No. 1594/7/1923 dated the 13th August, 1923.

The fruits were furnished in accordance with a suggestion made by the Imperial Institute that a consignment of Shea Fruits, which had been sun-dried without being allowed to ferment should be forwarded in order that the possibility of utilising the pericarp as a source of alcohol might be determined.

Description.

The consignment weighed 134 lbs. and consisted of dried fruits about 1½ inches in length and one inch in diameter. The fruits, which were in good condition, were composed of 30.3 per cent of reddish-brown pericarp, 22.0 per cent of shell and 47.7 per cent of kernel.

Results of Examination.

The pericarp of the fruits was analysed with the following results:—

	Per cent.
Moisture	17.4
Crude protein	4.1
Fat	3.5
Reducing sugars, calculated as dextrose	5.5
Non reducing sugars, calculated as sucrose	0.1
Starch (by acid hydrolysis)	10.4
Other Carbohydrates (by difference)	39.6
Crude fibre	13.1
Ash	6.3

From these results it will be seen that the constituents which could be directly converted into alcohol (*viz.*, sugars and starch) amounted to only 16 per cent of the weight of the pericarp. Experiments were therefore carried out with a view to determining the total quantity of reducing sugars which could be obtained by hydrolysis, but on treatment with sulphuric acid (of 1.5 per cent strength) under pressure the pericarp did not furnish more than 16.9 per cent of such sugars (expressed as dextrose) so that even if the whole of these sugars were fermentable the yield of alcohol would be comparatively small.

Remarks.

The pericarp of these Shea fruits contained only 5.6 per cent of sugars and 10.4 per cent of starch and it was not found possible to increase the total yield of reducing sugars by acid hydrolysis beyond 16.9 per cent of the weight of the original pericarp. It is thus clear that the material is not likely to be suitable for utilisation as a commercial source of alcohol.

SHEA BUTTER AND KERNELS.

The samples which are the subject of this report were forwarded to the Imperial Institute by the Agricultural Chemist, and are referred to in letter No. 428/7/1923 of the 21st February, 1923, from the Director of Agriculture.

It was stated that the samples of shea butter represented the products obtained by two different native methods of preparation.

DESCRIPTION.

Grunchi method No. 1.—Weight 8 lbs. A cream-coloured, fairly hard solid fat, in clean condition, with a slight "burnt" odour.

Grunchi method No. 2.—Weight 6 lbs. A greyish-white, fairly hard solid fat, free from "burnt" odour, but of rather dirty appearance owing to the presence of a small amount of extraneous matter, consisting chiefly of powdered kernels. After being filtered the fat was white.

Kratchi method No. 3.—Weight 12 lbs. A greyish-cream, fairly hard solid fat, with a more pronounced "burnt" odour than that of No. 1. As in the case of sample No. 2, a small amount of powdered kernels was present giving the fat a dirty appearance. When filtered the fat was of a dark cream colour.

Germinated seeds from Kete Kratchi.—Weight 1 lb. This sample consisted of fairly large shea kernels which had commenced to germinate. The kernels were in a moist condition and covered with mould, but appeared to be sound internally.

RESULTS OF EXAMINATION.**Fat.**

The clean filtered fats were chemically examined with the following results:—

	Grunchi No. 1.	Grunchi No. 2.	Kratchi No. 3.
Acid Value	3.1	4.1	3.2
Unsaponifiable matter per cent	6.5	6.1	7.3
Melting point	31.5°C	31.5°C	33.0°C

From the point of view of colour the sample "Grunchi No. 1" was the best of the samples as received, but after being filtered "Grunchi No. 2" was the best in this respect, being white whilst the other two fats were cream-coloured. As indicated above, samples Nos. 1 and 3 had been slightly "burnt" in preparation. The results of the chemical examination show however, that the three fats were very similar, although No. 3 contained slightly more unsaponifiable matter than the two other samples.

Kernels.

The germinated kernels as received contained 26.3 per cent of moisture, and yielded on extraction with light petroleum, 31.5 per cent of fat, corresponding to a yield of 42.7 per cent from the moisture-free kernels. The fat, which was pale-greenish-yellow and fairly soft with the usual appearance of shea butter, was found to have an acid value of 19.2 and to melt at 29.5°C.

Remarks.

The results of examination of the three samples of shea butter indicate that the "Grunchi" and "Kratchi" methods yield similar products.

The percentage of fat in the sample of germinated kernels was lower than the usual figure for shea kernels which have not germinated; previous samples of which examined at the Imperial Institute have contained from 45.5 to 58.5 per cent of oil, expressed the moisture-free kernels. The acid value of the fat in the present case is, moreover, rather higher than is usual for the fat of sound shea kernels. These features are evidently due to the hydrolysis and assimilation of some of the fat during examination.

SHEA BUTTER AND KERNELS.

The samples of Shea Butter and Kernels from the Gold Coast which are the subject of this report were forwarded to the Imperial Institute in September, 1922, by the Agricultural Chemist, whilst on leave in the United Kingdom.

The Agricultural Chemist furnished a description of the native processes used for preparing the samples of butter, with a view to ascertaining the effect, if any, of these methods on the amount of unsaponifiable matter in the resulting product.

Description of Samples.

The materials consisted of eight samples of Shea kernels (1-A to 8-A) and eight corresponding samples of Shea Butter (1-B to 8-B), together with a sample (No. 9), which was described by the Agricultural Chemist as an "emulsion of fat and latex." The eight sets of samples of kernels and butter were marked respectively "Wa," "Nadawle," "Issa," "Kujoperi," "Nabolo," "Wulugu," "Karaga" and "Konkomba," whilst sample No. 9 was marked "Tamale."

Results of Examination.

On inspection of the products at the Imperial Institute it did not seem necessary to examine the entire series in detail, but two of the samples of fat, *viz.*, those labelled "Wa" and "Konkomba," which had been prepared by different methods, were investigated with the results given below:—

1-B. Wa.—This was a solid fat of a pale greyish-cream tint. It had a slight "burnt" odour, characteristic of native prepared shea butter, and contained a small amount of dirt. After filtration through paper the fat was of pale cream colour.

8-B. Konkomba.—This was a solid of a darker shade than that of sample 1-B, and with a much more pronounced odour. A small amount of dirt was present and the fat appeared to have been slightly burnt in the course of preparation. When filtered through paper it was light brown.

The two fats after filtration were found to have the following constants, which are shewn in comparison with the corresponding figures for the fat prepared in the Colony which was dealt with in Imperial Institute report dated 31st May, 1922:—

	1-B. "Wa."	8-B. "Konkomba."	Previous sample examined in 1922.
Specific gravity at 100°/15°C ..	0.8636	0.8635	0.8634
Refractive Index at 40°C	1.465	1.464	1.461
Acid value	7.2	5.9	6.7
Saponification value	182.2	184.5	182.4
Iodine value (Hubl. 17 hrs.) per cent	57.7	56.3	54.5
Unsaponifiable matter per cent ..	6.4	5.3	4.7
Solidifying point of fatty acids (Titer test)	53.5°C	54.2°C	54.8°C
Melting point of fat	31.0°C	31.4°C	33.0°C

The results of chemical examination thus show that the two present samples and the previous sample from the Gold Coast were all of similar composition. It will be seen that sample 1-B. (Wa) contained slightly more unsaponifiable matter than No. 8-B. (Konkomba), but in neither case had the method of preparation yielded fat containing an unusually low percentage of the latter substance.

No. 9 (Tamale).—This sample representing an intermediate stage in the native process of preparing shea butter, was a soft, purplish-white fatty material consisting of an emulsion of fat with water and a powdered solid substance (composed of finely ground kernels). It did not contain any appreciable amount of latex.

On preparing Shea Butter from the "Tamale" at the Imperial Institute, by a process similar to that stated to be used by the natives, a product was obtained containing five per cent of unsaponifiable matter, whilst another specimen, obtained by merely melting and filtering the "Tamale," contained only 4.4 per cent.

It therefore appears that the native method of preparing Shea Butter from "Tamale" does not cause any reduction in the amount of unsaponifiable matter in the fat.

Remarks.

The results of this investigation indicate that the Shea Butter prepared by the native method of the Gold Coast as in the case of sample No. 1-B. (Wa), does not differ greatly in respect of the percentage of unsaponifiable matter present from that obtained by the Nigerian method used in preparing sample No. 8-B. (Konkomba), and that, in general, Shea Butter prepared by the native processes does not contain a lower proportion of unsaponifiable matter than is usually present in the fat extracted by other means.

COFFEE.

The samples of Coffee which are the subject of this report were forwarded to the Imperial Institute by the Director of Agriculture, and are referred to in his letter No. 988/7/1923, dated 4th May, 1923.

It was stated that Coffees had been grown at the Agricultural Station, Aburi, and it was desired to ascertain their quality with a view to the possible extension of the plantations.

Description.

The characters of the samples are given in the following table :—

No.	Variety and Weight.	Description.	Average weight of beans.
1.	Coffee Liberica (4½ lbs.)	Medium-sized to large beans, cream-coloured and opaque, seed coats yellowish-brown to greenish-brown, tightly adhering	0.24 gram.
2.	Coffee Stenophylla (4½ lbs.)	Small to medium-sized beans, mostly cream-coloured and opaque, some greyish-cream, seed coats light-brown to greenish-brown, tightly adhering	0.12 gram.
3.	Coffee Robusta (5 lbs.)	Small to medium-sized beans, greyish-cream to cream-opaque, seed coats light-brown to greenish-brown, tightly adhering	0.13 gram.

The samples were of good appearance, but contained some husk and broken and unripe beans.

Commercial Value.

No. 1 was considered in the trade to represent a good Liberian Coffee, worth at present about 57s. to 58s. per cwt. in London for export to Scandinavian countries, where this variety is consumed. No. 2 was regarded as suitable for the United Kingdom market and worth about 60s. to 63s. per cwt. in London; it should also be saleable at a slightly lower price for export to the Continent.

No. 3 was described as an exceptionally good West African Robusta coffee which would be readily saleable in lots from 50 to 200 tons at 53s. to 54s. per cwt. c.i.f. for direct shipment to the Continent, and also saleable to some extent in the United Kingdom at about 57s. per cwt. for the home trade.

At the date of the above valuations the following prices per cwt. in London, were ruling for the principal commercial grades :—

Mocha	.. .. .	.. .. .	.. .. .	85s. to 120s.
East Indian, bold to good	.. .. .	.. .. .	.. .. .	85s. ,, 105s.
Java (Plantation)	.. .. .	.. .. .	.. .. .	80s. ,, 150s.
,, (Liberian)	.. .. .	.. .. .	.. .. .	65s. ,, 75s.
Robust (Plantation)	.. .. .	.. .. .	.. .. .	56s. ,, 62s.

Remarks.

The foregoing results show that commercial shipments of these coffees should find a ready market. In preparing consignments care should be taken to avoid, as far as possible, the inclusion of pieces of husk and of broken and unripe beans.

APPENDIX E.

METEOROLOGICAL OBSERVATION RECORDED AT ABURI, 1,500 FEET ABOVE SEA LEVEL DURING THE YEAR, 1923.

	Temperature (Degrees F.)						Relative Humidity.	Rainfall in Inches.	Clouds Amount.	Wind Force.
	Shade Max.	Shade Min.	Dry Bulb.	Wet Bulb.	Solar Max	Terr. Min.				
January	88.03	70.03	75.12	72.77	151.51	67.41	87.29	.56	8.00	2.83
February	90.71	70.28	76.67	73.39	156.71	65.21	83.21	1.97	7.57	3.17
March	88.88	70.90	77.80	73.38	163.93	67.09	83.58	1.99	8.06	3.64
April	88.16	69.76	77.20	73.46	157.63	64.50	80.86	4.89	7.90	2.90
May	85.54	69.51	77.54	74.61	154.51	66.87	84.67	7.93	8.12	2.09
June	83.73	69.46	74.70	73.33	145.80	67.73	92.30	8.04	8.86	2.60
July	76.77	66.38	70.25	68.87	120.77	66.29	69.45	2.75	8.74	2.22
August	78.80	64.90	69.29	68.35	137.77	64.67	94.48	.59	8.77	2.41
September ..	81.96	66.30	70.56	69.26	144.26	66.06	92.50	2.96	8.33	2.23
October	85.09	68.03	74.09	71.87	154.83	64.58	88.00	4.05	7.67	1.83
November ..	86.56	69.93	76.26	73.33	151.11	65.56	84.50	6.11	7.16	2.43
December ..	87.45	71.09	76.12	73.90	139.80	69.25	87.93	1.30	6.61	2.09

Monthly Averages.

Average for 1923	85.14	68.88	74.63	72.21	148.21	66.26	85.73	3.59	7.98	2.53
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APPENDIX F.

RAINFALL RECORDS, 1923.

EASTERN PROVINCE.

	Aburi Agricultural Station.		Kibbi Agricultural Sub-Station.		Peki Plengo Agricultural Sub-Station.		Accra.		Akuse.		Anyinam.		Ho.	
	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy Days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.
January .. ..	.56	3	.66	2	.92	4	—	—	.29	1	2.34	3	.51	2
February	1.97	7	5.49	12	2.55	5	—	—	.65	5	4.05	5	2.30	6
March	1.99	4	4.16	10	4.40	6	.74	3	3.05	7	7.05	7	4.54	5
April	4.89	8	9.84	17	10.45	15	1.19	3	6.87	9	12.69	18	5.10	11
May	7.93	19	9.46	17	5.59	12	5.73	11	8.85	11	8.22	16	8.14	12
June	8.04	17	10.90	19	10.29	11	5.41	10	3.23	12	10.35	17	8.00	13
July	2.75	19	2.89	18	2.17	7	2.13	9	1.94	4	3.17	16	1.77	10
August .. ..	.59	5	.28	6	.03	1	.01	1	.07	1	.56	4	.49	3
September	2.96	10	4.19	12	10.84	12	1.03	5	2.20	9	7.88	17	11.18	16
October	4.05	11	7.06	14	6.15	14	4.46	7	5.40	9	9.74	17	8.99	19
November	6.11	12	5.69	11	3.02	6	.28	2	2.84	7	4.16	11	2.33	6
December	1.30	4	.96	5	—	—	—	—	—	—	.79	2	.83	3
Totals	43.14	119	61.58	143	56.41	93	20.98	51	35.39	75	71.00	133	54.18	106
Average of previous five years	43.22	101	60.88	139	50.33	91	26.10	51	39.35	69	59.84	59	(a) 46.11	100

(a) Average for two years only.

APPENDIX F.—continued.

RAINFALL RECORDS, 1923.

EASTERN PROVINCE.

	Mpraeso.		Begoro.		Quittah.		Odumase.		Asamangkese.		Labadi Coconut Plantation.		Kpedschu.	
	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.
January	—	—	2.93	—	—	—	1.10	2	—	—	—	—	—	—
February	—	—	3.46	7	1.75	1	3.00	3	—	—	—	—	—	—
March	4.89	10	10.02	11	.44	2	3.88	6	—	—	—	—	—	—
April	7.48	—	14.06	16	2.68	7	3.93	9	—	—	2.73	4	4.90	12
May	8.21	—	9.00	13	3.03	9	8.33	14	9.73	15	5.17	9	10.10	15
June	7.62	21	12.07	15	3.27	7	7.39	16	13.40	12	4.29	6	4.80	10
July	8.01	14	1.92	12	2.87	8	2.84	12	6.57	15	2.17	8	3.98	7
August	—	—	.82	3	.63	2	1.55	2	.48	3	.02	1	.99	2
September	12.85	21	7.84	18	1.36	4	4.50	12	4.31	6	.85	1	5.60	10
October	5.81	14	9.14	19	2.22	6	6.28	17	7.33	9	2.68	2	11.01	17
November	2.28	2	2.19	7	1.30	1	.99	7	7.13	12	.17	1	4.50	6
December .. ..	.40	2	.85	5	—	—	—	—	.38	6	—	—	1.00	2
Totals	57.55	84	74.30	120	20.65	47	43.79	100	(b) 49.33	78	(c) 18.08	32	(c) 46.88	81
Average of previous five years ..	—	—	—	—	21.31	44	—	—	—	—	—	—	—	—

(b) Rainfall for eight months only.

(c) Rainfall for nine months only.

APPENDIX G.

RAINFALL RECORDS, 1923.

CENTRAL PROVINCE.

Month.	Assuantsi Agricultural Station.		Hemang Agricultural Sub-Station.		Abra Coconut Plantation.		Ayinasu.		Oda.		Saltpond.	
	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.
January	1.14	6	.39	2	—	—	—	—	.54	2	—	—
February.. .. .	6.29	7	3.30	6	1.02	2	2.83	9	4.21	8	1.13	2
March	4.52	6	4.59	7	3.81	5	5.34	6	4.18	9	5.97	3
April	4.63	9	5.88	11	2.17	7	2.82	8	8.64	16	2.21	4
May	11.34	18	6.49	17	8.87	11	13.34	16	10.54	16	7.82	8
June	8.71	20	8.59	19	8.75	10	5.99	12	8.88	20	5.91	8
July	2.60	17	3.98	17	2.84	8	2.53	11	5.61	11	.99	2
August .. .. .	.32	5	.71	5	—	—	.10	1	1.20	3	—	—
September	4.24	12	3.24	13	.92	3	4.81	10	5.99	15	2.29	3
October	4.44	10	8.50	14	2.10	7	2.58	12	10.55	21	.55	2
November	5.32	13	9.84	18	2.01	4	4.65	12	7.22	19	.95	2
December	2.17	6	3.13	7	—	—	1.68	7	.97	3	—	—
Totals	55.72	129	58.64	136	31.79	57	46.67	104	68.53	143	27.82	34
Average of previous five years	48.44	127	63.55	105	—	—	54.93	104	57.78	134	31.48	51

(45)

APPENDIX H.
 RAINFALL RECORDS, 1923.
 WESTERN PROVINCE.

	Tarquah Agricultural Station.		Wioso Agricultural Sub-Station.		Axim.		Adjuah.		Dunkwa.		Mansu.	
	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.
January	3.92	6	3.83	3	.97	1	.60	1	1.19	2	3.64	4
February	5.76	12	2.48	8	.98	3	.15	1	4.10	9	4.48	7
March	4.16	12	4.32	10	11.29	10	4.07	6	4.22	10	3.69	7
April	9.35	15	6.13	13	1.64	7	1.10	4	6.72	13	4.40	9
May	12.25	23	6.73	12	30.76	26	10.89	16	9.93	19	11.86	16
June	9.48	18	7.89	16	19.24	16	11.63	15	5.79	13	12.88	17
July	3.61	15	3.68	17	7.59	12	8.58	18	5.44	18	4.23	9
August	1.09	7	1.12	5	.46	1	.62	8	1.14	5	.74	3
September	4.21	18	2.49	13	2.64	7	2.03	14	4.73	13	3.73	10
October	7.15	21	5.92	15	16.86	9	1.54	5	9.11	14	4.65	9
November	7.83	19	1.64	7	6.89	10	.41	3	4.60	10	4.40	9
December	2.81	9	.80	1	.90	3	—	—	—	—	3.13	55
Totals ..	71.62	175	47.03	120	100.22	105	45.65	103	56.97	126	61.83	105
Average of previous five years	62.45	157	55.02	98	63.79	95	44.21(a)	69	52.34	87	60.11	

(a) Average for three years only.

APPENDIX H. (contd).

RAINFALL RECORDS, 1923

WESTERN PROVINCE.

	Seccondee.		Seysie. (Butre).		Adebrem.		Half-Assinee		Siwum.	
	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches	No. of Rainy days.	Inches.	No. of Rainy days.	Inches	No. of Rainy days
January .. .. .	.17	2	1.57	3	2.28	6	2.65	2	1.34	4
February	—	—	1.92	4	4.03	7	4.40	5	.70	3
March	6.02	6	3.37	8	3.11	11	14.45	11	4.45	8
April	1.39	6	2.79	6	7.23	10	3.99	6	6.48	13
May	12.30	20	9.50	17	12.28	20	16.64	17	10.71	11
June	6.90	15	10.00	21	23.34	21	23.21	19	9.87	12
July	5.76	15	5.67	14	6.72	17	6.02	13	9.19	15
August .. .. .	.22	7	.10	3	2.06	7	1.21	5	1.45	5
September .. .. .	.74	11	1.38	7	4.14	9	.59	8	2.95	8
October	4.93	10	3.14	9	5.29	10	6.89	9	8.93	17
November .. .. .	.78	2	1.30	6	3.80	9	4.91	12	4.82	12
December .. .. .	.08	2	.29	3	1.19	4	2.95	5	.46	4
Totals	39.29	96	41.03	101	75.47	131	87.91	112	61.35	112
Average of previous five years ..	38.85	75	46.13(b)	96	—	—	—	—	—	—

(b) Average for two years only.

APPENDIX I.

RAINFALL RECORDS, 1923.

ASHANTI.

Month.	Coomassie Agricultural Station.		Juaso Agricultural Sub-Station.		Ejura Agricultural Sub-Station.		Bekwai.		Goaso.		Kintampo.		Abomposu.		Sunyani.		Wenchi.	
	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.
January ..	2.18	3	.38	4	.12	1	1.30	1	—	—	.50	1	1.85	4	.24	2	.19	1
February ..	5.91	5	1.26	3	.58	2	2.70	2	1.08	1	3.50	2	.55	4	.28	2	2.75	4
March ..	6.97	7	7.71	12	6.65	6	3.50	6	.95	6	4.15	7	3.07	11	6.64	7	3.70	5
April ..	8.80	12	12.03	16	7.44	10	10.60	11	11.44	5	7.94	13	9.37	14	7.31	13	8.99	13
May ..	3.91	9	9.85	11	7.64	9	11.21	10	6.60	11	7.68	11	6.59	17	7.16	14	3.74	9
June ..	7.73	17	5.90	9	8.69	14	8.70	10	5.79	12	12.96	13	7.14	19	6.35	10	6.11	10
July ..	8.10	18	5.99	15	3.63	7	9.20	14	6.96	18	4.06	9	8.72	20	7.15	12	3.83	7
August ..	.40	5	.17	2	1.33	2	.31	3	.34	3	1.98	7	.56	6	.55	4	.46	1
September ..	5.50	9	7.70	13	13.42	18	2.15	6	6.75	11	17.16	26	4.19	17	9.23	13	10.97	18
October ..	5.46	14	8.26	22	6.75	19	11.70	12	6.09	16	9.36	21	10.17	23	9.16	17	6.69	16
November..	3.73	7	3.78	12	2.12	6	7.00	11	2.54	7	3.34	7	5.42	16	3.27	5	2.03	6
December ..	0.50	1	.41	5	.53	1	.50	2	.25	1	1.25	2	.58	2	.42	1	1.30	2
Totals ..	60.20	107	63.44	124	48.90	95	68.87	88	50.79	91	73.88	119	58.21	153	57.76	100	50.76	92
Average of previous five years ..	56.69	111	65.37	119	53.83	110	74.12	(a) 97	—	—	70.30	96	—	—	51.20	104	—	—

(a) Average of Rainy days for two years only.

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APPENDIX J.
RAINFALL RECORDS, 1923.
NORTHERN TERRITORIES.

Month.	Tamale Agricultural Station.		British Kratchi.		Salaga.		Wa.		Yendi.		Zuaragu.	
	Inches	No. of Rainy days.	Inches	No of Rainy pays	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.	Inches.	No. of Rainy days.
January .. .. .	.45	2	1.10	4	2.63	5	3.09	3	4.31	3	.56	2
February	—	—	.26	1	.33	1	—	—	—	—	—	—
March	1.78	3	4.43	12	1.39	5	2.13	6	4.99	3	.56	2
April	3.71	7	5.78	10	4.47	7	4.89	8	5.39	7	1.28	5
May	2.72	8	3.85	9	6.82	10	4.16	9	3.94	6	2.02	6
June	5.25	7	6.49	12	4.73	7	5.72	8	4.31	8	4.38	6
July	3.58	10	7.10	16	5.18	7	4.59	9	9.36	7	6.46	13
August	4.72	7	1.88	10	3.54	4	7.51	11	4.82	5	12.40	10
September	10.18	17	12.22	24	9.05	18	13.68	17	16.54	15	11.01	13
October	2.91	9	3.43	19	8.10	17	2.65	9	3.46	7	2.99	7
November .. .. .	.73	2	1.13	5	1.81	3	1.54	3	1.37	2	—	—
December	—	—	.09	1	.02	1	.75	1	—	—	—	—
Totals	36.03	72	47.76	123	51.07	85	50.71	84	58.49	63	41.66	64
Average of previous five years ..	43.16	75	(a) 45.18	77	43.99	75	42.57	75	—	—	45.71	61

(a) Average for four years only.

APPENDIX "K."

VALUE AND QUANTITY OF THE PRINCIPAL VEGETABLE PRODUCTS EXPORTED FROM THE COLONY DURING THE LAST TEN YEARS.

Year.	Cocoa.		Cola-Nuts.		Guinea Grains.		Palm Kernels.	
	lbs.	Value. £	lbs.	Value. £	lbs.	Value. £	Tons.	Value. £
1913	113,239,980	2,489,218	7,024,868	144,705	41,036	706	9,744	159,128
1914	52,888 tons	2,193,749	7,862,414	142,190	18,894	319	5,633	88,671
1915	77,278 "	3,651,341	8,267,100	139,163	15,849	277	4,064	50,512
1916	72,123 "	3,846,090	6,742,898	130,571	2,280	38	5,857	85,899
1917	90,964 "	3,146,851	11,984,645	239,134	5,253	173	4,768	74,911
1918	66,343 "	1,796,985	13,254,538	262,144	32,799	1,407	8,933	152,922
1919	176,155 "	8,278,166	16,319,972	350,249	12,868	513	9,892	253,243
1920	124,773 "	10,056,298	16,203,851	452,745	18,534	530	7,664	224,684
1921	133,195 "	4,764,067	13,693,412	463,597	13,846	285	1,650	30,820
1922 (January-March quarter) ..	71,777 "	2,562,274	3,497,116	90,328	1,664	25	515	9,257
1922-1923	176,245 "	6,445,384	12,825,127	332,923	2,820	25	3,039	43,003
	197,444 "	6,058,223	15,489,255	351,865	1,029	16	4,563	69,863

Year.	Palm Oil.		Rubber.		Cotton.		Copra	
	Gallons.	Value. £	lbs.	Value. £	lbs.	Value. £	Tons.	Value. £
1914	495,763	37,646	654,133	21,631	23,514	588	656	11,829
1915	330,990	25,769	647,982	25,167	12,016	300	770	12,821
1916	450,360	38,302	2,215,973	78,865	18,896	447	633	14,386
1917	198,900	24,770	2,961,204	110,272	43,870	227	736	19,916
1918	670,867	83,689	1,391,097	57,006	20,640	211	99	2,772
1919	938,595	140,163	721,588	33,637	Nil	—	983	30,091
1920	629,612	114,084	299,180	27,331	24,394	234	427	17,561
1921	67,447	7,718	102,780	6,744	19,068	755	443	10,488
1922 (January-March quarter) ..	702	91	7,618	215	—	—	15	302
1922-1923	298,979	28,999	15,282	430	7,704	251	1,694	33,987
	408,360	43,301	364,664	11,442	131,295	2,703	1,305	29,333

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**GOVERNMENT OF THE
GOLD COAST.**

REPORT

ON THE

AGRICULTURAL DEPARTMENT

FOR THE PERIOD

APRIL, 1924—MARCH, 1925.

*Printed by the Government Printer at the Government Printing Department, Accra.
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Report on the Agricultural Department for the Financial Year 1924-25.

Department of Agriculture,
Gold Coast,
Head Office, Accra,
23rd May, 1925.

Sir,

I have the honour to submit the following report on the work of this Department and upon agriculture generally for the year 1st April, 1924-31st March, 1925.

I.—INTRODUCTION.

It has been found convenient to re-arrange the items slightly whereby some economy in space—particularly in the number of tables of results—has been effected. It will be understood that routine work on the stations goes on steadily and no special reference is made to that or to plots or crops on the stations in cases where the crop has not been worked or where there is nothing special to report. The collection of the results of one crop into one table has been made to meet the convenience of those interested in one crop rather than the results of any particular station as a whole.

Reports of the divisions of the Research Branch are attached in the usual form as appendices.

II.—STAFF.

The following changes have taken place during the year :—

A. Appointments.

(a) **European.**—Mr. F. N. Howes, B.A., was appointed Botanist but did not take up his duties during the year. Mr. W. H. Beckett, B.A. (Cantab.), Assistant Superintendent of Agriculture, Oda, 24th December, 1924.

Messrs. B. T. Steemson, J. C. Muir, F. A. Robb, and W. T. O. Maidment have been selected for appointment as Assistant Superintendents and are undergoing a course of Tropical Agriculture at the Imperial College of Tropical Agriculture, Trinidad.

(b) **African.**—Mr. R. D. J. M'Cauley, Chemist's Assistant, Aburi, appointed on 1st April, 1924.

The following were appointed Junior Assistant Overseers :—

C. A. Boateng, 1st April, 1924, E. V. Sakey, 1st June, T. E. Asiedu, 1st September, and Mr. J. E. Onyinah was re-appointed Assistant Overseer in October, having previously resigned on the grounds of urgent private affairs.

Mr. R. Newton and Mr. W. D. Duncan, Temporary Clerks were appointed second division clerks in March on passing the Civil Service Examination.

Mr. E. D. Addo, Temporary Clerk, 1st May, 1924. 14 Learners were appointed in April, 1924.

B. Promotions.

C. H. Knowles, B.Sc. (London), Provincial Superintendent of Agriculture in charge of Eastern Province was promoted to Deputy Director of Agriculture on August 2nd, and to Director of Agriculture on December 6th.

C. Resignations.

Lieutenant-Colonel A. Ogilvy, N.D.D., Deputy Director, 2nd August, 1924. Mr. W. Caldwell, N.D.A., N.D.D., Superintendent of Agriculture, 6th June, 1924. Mr. T. J. S. Smellie, N.D.A., N.D.D., Assistant Superintendent of Agriculture, 27th September, 1924. Mr. H. J. Horwood, B.A. (Oxon.), Assistant Superintendent of Agriculture, March, 1925. Mr. L. P. Coussey, Learner, 1st August, 1924.

D. Retirements.

Mr. W. S. D. Tudhope, Director of Agriculture, 6th December, 1924.

• Appreciative remarks upon Mr. Tudhope's long service and a reference to the loss to the Colony and the Department were made by His Excellency the Governor in his address to Legislative Council in February.

Mr. M. D. Reece, Superintendent of Agriculture, 12th December, 1924.

E. Dismissals and Terminations of Appointment.

The appointments of one Junior Assistant Overseer and one Temporary Clerk were terminated on the grounds of general inefficiency in May, 1924 and March, 1925 respectively. One Junior Assistant Overseer and one Learner were dismissed for misconduct and 10 Learners failed to pass the examination for promotion to the staff.

F. Death.

The Department lost the services of Mr. D. J. V. Devos, Coconut Instructor, on 29th September, 1924, when he died in England on returning from leave in Ceylon.

G. Leave and Absences due to illness.

21 European officers were absent from the Colony on leave a total of 2,428 days, one Sinhalese was absent for 167 days.

27 African officers were on leave for 944 days.

7 European officers were on the sick list for a total of 70 days and 17 African officers for a total of 264 days.

H. General.

The year will, therefore, be seen to be one in which the staff suffered more than usual by resignations, etc., officers now appointed to the provincial staff, unless they have tropical experience elsewhere, take a course at the Imperial Tropical Agricultural College, Trinidad. The course commencing in October and finishing in June, generally means that the services of such officers are lost for at least a year, but it is anticipated that the Colony will ultimately gain by the training and experience so acquired.

III.—GENERAL AGRICULTURE.

(a) Cocoa.

As will be seen by the table of exports at the end of this report, for the third year in succession, a record has been established in the amount of cocoa exported. The main season developed into a favourable one, although it opened with rather late rains, giving rise to much germinated cocoa about the middle of the season. Another factor in helping towards an increase in the crop is undoubtedly the extension of the lorry roads enabling cocoa to be brought to railway centres at a remunerative rate, thus encouraging farmers to work up cocoa that previously was permitted to go to waste. Owing to the use of heavier lorries the local freight on cocoa was reduced in some areas. Prices on the whole were much better than last year.

The season was characterised by an exceedingly severe exhibition of Harmattan. Towards the end of the season considerable alarm rose owing to cocoa from many different parts of the country showing white spots under the skin and between the divisions of the "cotyledons." Examination by the Mycologist and Chemist showed these spots to consist of a deposit of fat and crystals of matter which in the ordinary course would have been carried away during fermentation. Reports were received to the effect that the pods actually dried on the trees, hence when the beans of such dry or partly dry pods were put to ferment, the amount of liquor present or produced during fermentation was insufficient and resulted in solid matter being left on the beans when ready for drying.

Farmers' Union.

An Association of farmers having its Headquarters at Nsawam was active during the year and its operation resulted in some thousands of tons of cocoa being shipped principally to United States of America. It remains to be seen whether the operations are more beneficial to the farmers in the Union than the regular methods of selling the cocoa through the large cocoa buying firms.

(b) Cola.

The crop appears to have been a heavy one and the exports by sea being rather greater than last year. Prices on the whole appear to have been rather lower than the year before.

C. Oil Palm Products. A satisfactory increase (nearly 50%) is to be noticed in the export of palm kernels but the quantity of oil was very much less than for the year previously. The price however, of both these articles was much greater and seemed at the end of the year to be well maintained. Considerable activity has been displayed in many parts of the Colony in the planting of oil palms organised by the Political Officers with the co-operation of Agricultural Officers.

D. Rubber. The export of this fell off considerably, compared with last year due to the unremunerative prices offered.

E. Cotton. A very large increase in the area of cotton planted for export purposes was noticeable in Togoland and particularly around Ve where it is estimated that several hundreds of acres of cotton were planted, the amount exported constituting by a long way a record. The season was a good one but rather long drawn out and the crop was not entirely reaped at the end of March; hence the figures shown do not represent all the crop. The prices have been good on the whole.

The Director of Agriculture, Nigeria, visited the Colony in January to examine the possibility of growing cotton, etc., under irrigation in the lower Volta area, and while satisfied that the soil is suitable for cotton he found the conditions were not suitable for a large irrigation scheme.

F. Copra. There is again a reduction in the amount of copra exported. From the general appearance in the palms around Keta, the bearing of the palms has been normal, while several young palms commenced to bear—hence the reduction in the crop must be due to an increase in the number of nuts used locally.

The crop continues to attract increasing attention in the coast areas and numbers of nuts have been obtained for planting by individual owners.

G. Food Crops. These have been plentiful throughout the year and prices to the farmer consequently were somewhat reduced. But as usual, this does not seem to affect the prices in the large markets, where supplies are carefully regulated to the demand. Round large towns an increasing use is made of lorry transport, the cost of which is considerably reduced owing to competition and the use of larger lorries. In some parts, the first maize crop was poor on account of lack of rain, the shortage continued until the second crop, which was on the whole good. A disease known as Corn Smut was found for the first time during the year and now appears to be fairly well spread over the country. Efforts have been made by the issue of posters, pamphlets and by lectures by travelling officers and with the assistance of Political Officers, to teach corn growers the need for doing everything possible to eradicate this disease.

IV.—SPECIAL AGRICULTURAL DEVELOPMENT.

A. Coconut Plantations.

(a) **Eastern Province.** The Labadi, Teshi beach plot, Tenma beach plot and Kpone plots have made good growth. The Tenma inland and Teshi inland plots have not done well and show that conditions there are not suitable for coconuts.

White ants have been troublesome in places. Some 17 plants at Labadi are fruiting and the older part of this plot may be considered to have done exceedingly well.

Failure of seed put in the nurseries prevented the vacancies being filled, some 125 seedlings only being available. At the end of the year some 3,366 seedlings, however, were waiting suitable weather for planting out. Increasing interest is being taken along the coast, some thousands of coconuts having been obtained for private planting.

(b) Central Province.

The plantation at Abra was completely planted but there have been many deaths due to attacks of Rhinoceros beetle (of which 5,020 were captured) and the dry weather in what should have been the main rainy season.

Farmers have planted as catch crops 100 acres cassava, 10 acres ground-nuts, 34 acres peppers, okros, tomatoes, etc., 2 acres corn, 1 acre sugar cane.

The young coconuts have made fair growth and the nursery contains sufficient seedlings to provide for present vacancies.

(c) Western Province.

Area 290 acres at Atwabo, containing some 14,128 palms planted 25 x 30 feet apart completed in 1924. Some 561 vacancies were filled during the year. The palms continue to make good growth. Ground-nuts are grown extensively by the neighbouring farmers, in the space between the palms, an arrangement which reduces the cost of weeding.

The Rhinoceros beetle has been troublesome, some 1,352 being caught during the year—straying cattle have been troublesome at times.

B: Accra Sisal Plantation.

Mr. J. E. Symond, Superintendent and Captain J. McN. Wingate, Assistant Superintendent were present during the whole of the year. During this financial year the plantation came into bearing and a commencement has been made with harvesting. Enough labour was available for the first nine months of the year, the average number employed being about 100, 75 of whom were Northern Territories men. During the last quarter a serious shortage of labour hampered operations very considerably, and reduced the out-put. At the close of the year 48 Northern Territories men were employed and 20 local labour.

Weeding was confined to the younger areas until harvesting commenced, as it was impossible to work inside mature sisal. After harvesting the areas reaped received attention. Buildings and labourers quarters were kept in good repair, and the roads kept up as well as possible with the small labour staff. During the last quarter of 1924, many plants were affected by what might be called "Sun-Scorch". The tips of leaves show light green blotches, which become white and spread rapidly downwards; and affected portion finally drying up and becoming brown. The Mycologist is of the opinion that this is a physiological disturbance probably due to excessive heat after rains. The trouble ceased with the advent of dry weather but the affected leaves are practically useless for decorticating.

The machines and factory buildings arrived at the end of the financial year, and were erected by June 1924. Owing to various delays, and the re-laying of the engine crankshaft being necessary, a proper start was not made until August; since when the factory has been regularly at work.

During February the engine was not running for three weeks, as a new gudgeon pin in one cylinder had to be substituted. The machines all appear satisfactory and are now running well.

Harvesting naturally commenced in the areas first planted, which were not, however, the best. This was probably due to the planting of cassava as a catch crop in the early days. There have been wide differences in yield from different areas, varying from 9-20 cwts to the acre. The largest yield has been obtained from Sisal on high ground which has never been planted with catch crops. Replanting will be begun during next year, with the first 300 acres.

A hand experiment gave a percentage of fibre in the leaf of 3.15%. This experiment was small, and a proper one under normal working conditions gave 3.26%. Many plants are poling amongst the first planted areas. The number poling, planted as suckers in 1920, can be roughly estimated at 8%.

The small, $\frac{1}{4}$ acre plot of coffee has been maintained. The plants look healthy, but are very small and suffer considerably during the dry season.

Production. 136 tons of fibre have been produced during the financial year. This is divided into :—

119	tons	grade I.
9	"	II.
8	"	Tow.
136		

Our fibre was reported on by brokers in London as worth £44 a ton. The average yield per acer is 13.8 cwts.

Rainfall during the year has been slight. Much interest has been displayed in the plantation by both Europeans and Africans. Several enquiries have been made by the latter as to prospects, and a few would without doubt make a commencement with small farms if definitely assured that their crop will be purchased from them by Government when mature.

G. Rice.

(a) **The Rice Mill Essiama.** The factory was completed and the machinery installed during the year. Trial runs were made, but it was found that the engine (an Austin tractor) was not sufficiently powerful to turn all the machines. Several minor adjustments were found to be necessary, while continual breakages in fan blades of one of the blowers took place. It was decided not to work up the 1924 crop.

Arrangements have been made for an officer to visit the Makers' works, explain the trouble and ascertain what should be done to overcome the difficulty, and meanwhile a new engine has been ordered.

The chief and people in the neighbourhood are greatly interested in the Mill and when it is working, a large increase in cultivation of rice is expected.

(b) **The Rice Farm Adebrem.**—Area cultivated 18 acres. Number of varieties tested—14. Birds were very troublesome at ripening time and the protection against them considerably adds to the cost.

Results.

Variety.	Area acres.	Paddy lbs.	Paddy per acre lbs.	Units of labour per ton.
Attabubu	4.43	5,640	1,274	300
Tarkwa white	4	3,971	993	303
Guinalong	3	5,400	1,800	138
Tarkwa red	1	1,436	1,436	154
Average.. .. .			1,323	234.6

The results with the varieties Pendi, Bondobi, Essiama, Borneo (Hill) Nos. 5, 6, 7, 8 and 9, American and Black Hill were very poor.

D. Achimota Fuel Area.—Until September the procedure, adopted previously, of weeding only the lines in which the trees have been planted was continued, when a change was made on two plots, clean weeding being tried. Part of one of the clean-weeded plots was planted up afresh with *Cassia* seed. Suitable rainfall, the seeds germinated well, and the plants have thrived excellently.

The agencies responsible for the loss of the seed or the destruction of the seedlings when very small could not be properly determined, but since clean weeding has been practised, the loss of seeds or seedlings has been markedly less, while there has been practically no loss among the young plants.

In March 1925 an Austin Tractor from the Ejura Agricultural Station with a double furrow plough and a harrow was put on the land. It was found that the type of plough was unsuitable on account of the presence of roots of bushes, and its use has been discontinued until a suitable type of plough is available.

It appears that the destruction of weeds etc., while the plants are young, is essential and the plan now adopted is to clean the ground, and plant the seed, replanting as often as necessary until a good stand of plants is obtained, then to keep the ground free from weeds until the land is sufficiently shaded, when the trees may be expected to look after themselves.

The plot planted in September, 1924 is the most regular of all the area, and this late planting shows that given suitable weather immediately after planting, trees can be established, while the growth of weeds is not as troublesome as during the rainy season proper.

E. Oil Palm Plantations.—The experimental palm plantations referred to last year have been continued. The following are the results:—

(a) **Eastern Province Plot Odumase.**—Plot A. (10 acres) was weeded each quarter, the palms are kept pruned and vacancies filled. The palms average 70 per acre and range from four feet stem to 40 feet. A number of the tall ones will be felled each year when seedlings put in to take their places have grown sufficiently.

For comparison of yields, cost of collecting, etc., the trees are classified, up to six feet stem, from 7–12 feet, 13–18 feet and above 18 feet.

On Plot B. (five acres) no cultivation is done.

Cost of collecting fruits.

To 6 feet 17.1 bunches per unit of labour

7-12 feet 10.8 " " " " "

13-18 " 11.0 " " " " "

above 18 " 9.1 " " " " "

Yields from varieties.

Variety.	Cultivated Block.				Uncultivated Block.		
	1	2	3	4	5	6	7	8
	Height.	No. of palms.	Aver. No. bunches per palm.	Aver. wt. clean fruit per bunch.	No. of palms.	Aver. wt. lbs. clean fruit.	Average wt. lbs. clean fruit per bunch.
Abepa	6 feet	8	5.0	9.3	4	7.0	6.1
	7-12 "	11	7.3	6.9	6	8.8	5.3
	13-18 "	1	8.0	3.1	—	—	—
Abetuntum ..	6 "	1	7.3	6.1	3	8.7	6.5
	7-12 "	10	7.3	8.0	6	11.8	5.7
	13-18 "	3	7.3	5.6	1	10.0	6.9
Abedam	6 "	8	6.75	6.95	4	6.75	5.9
	7-12 "	8	7.0	6.7	6	8.8	6.1
	13-18 "	4	8.0	6.7	—	—	—

The experiment has not yet been going long enough for the effects of cultivation to be felt, but the bunches on the uncultivated block in general would seem to be smaller.

The total amount of fruit from each block is as below : —

Block.	Area acres.	No. bunches per acre.	Aver. wt. clean fruit bunch.	Total wt. fruit per acre. lbs.	Units of labour per acre.	Wt. of fruit. Unit of labour lbs.
A. Cultivated	10 acres	386.9	3.2	1,238	32.0	38.7
B. Uncultivated	5	602.0	3.6	2,167	62.2	34.8

Owing to the want of uniformity between these blocks they are not comparable, hence the effects of cultivation will best be judged as time goes on by the results of the Plot A. compared with its previous results, allowances being made for the effects of the season, etc., as judged by the corresponding results of Plot B.

(b) **Central Province, Owan.**—Plot A. 10 acres and B. five acres are worked in the same plan as the above. On A. there are 53 palms per acre. No records were kept as to the cost of collecting from palms of various height, nor of varieties. The yields are as below :—

Block.	Area acres.	No. of bunches per acre.	wt. of clean fruit per acre lbs.	Units of labour per acre.	Fruit per Unit of labour lbs.
Cultivated A.	10.	85.3	1,063	150	7.0
Uncultivated B.	5.	81.	855	5.1	171.0

(c) **Western Province, ANAJI.** This plot on the Axim motor road, was taken up in March, 1924. Its area is 100 acres.

The following are the results:—

Cost of collecting fruit.

To 6 feet—36 per unit of labour
 7-12 „ 18 „ „ „ „
 over— 6.4

Yield of varieties.

Variety.	No. of Palms.	Average Number bunches per palm.	Average weight per bunch. lbs.
Abepa	5	1.0	20.8
Abetuntum	5	4.0	18.9
Abedam	5	3.4	12.7
Abefita	5	1.8	13.1
Abehene	1	2.0	23.0

The total amount of fruit for eight months from each block is as below:—

Block.	Area.	No. per acre.	Total weight fruit per acre. lbs.	Units of labour per acre.	Fruit per unit of labour. lbs.
Cultivated A. .. (8 months.)	50 acres	65.8	961.8	59.0	16.3
Uncultivated B. ..	20 acres	45.3	595.7	13.1	45.5

Percentage of clean fruit per bunch—

large bunches gave 52.1% average of clean fruit,
 small „ „ 73.3% „

(f) **Shea Butter.**

A report upon the investigation of shea in the Northern Territories by Captain G. C. Coull who was seconded from this Department and attached to the staff of the Chief Commissioner of Northern Territories was published during the year.

(g) **Power Alcohol.**

The investigations as to the possibility of producing commercial alcohol from local crops has continued. The general conclusion is that maize is too costly, but that there does appear to be a possibility in the case of cassava as a raw material.

(h) **Lime Juice.**

An offer has been made by a large firm of lime juice manufacturers to erect a factory when 300 acres of limes in a compact block in a locality having suitable transport facilities is available. In accordance with this offer the farmers in a district in the Central Province have been recommended to plant up limes and arrangements were made at the end of the year for some 2 cwt. of lime seed to be ready for distribution early in May.

(i) **Tobacco.**

Small areas are still being cultivated in parts of the Eastern Province and particularly Togoland. The planters complain of difficulty in obtaining a ready market. They say their friends and neighbours are prepared to use the tobacco, but when it comes to buying it, they prefer what they consider the more potent material from the United States of America. The difficulties are principally connected with regulating the temperature and moisture in the curing houses, which it is thought will gradually be overcome as the growers gain more experience.

(j) **Coffee.**

The plots of coffee planted in various parts of the country under a bonus system, have had varying results. The interest taken in the plots generally varies in accordance with the frequency of visits of District Agricultural Officers, and with shortage of staff the plots have suffered. It is feared that several of the plots which showed some promise a year ago will be abandoned. Some of the plots have been carefully looked after and have thrived satisfactorily.

V.—AGRICULTURAL STATIONS.

A. (a) The following is a list of Agricultural Stations in the Colony and Ashanti, showing area, crops grown, etc.

Province.	Station.	Area (acre).	Area in use (acre).	Chief Crops.	Supervision.	Average Number of labourers employed.	Vote. £
Eastern ..	Aburi	160	160	Cocoa, Rubber, and general crops	Superintendent of Agriculture and Assistant Overseer	32	650
	Kibi	25.7	25.7	Cocoa, Oil Palms, Cola, etc.	Assistant Overseer	8	150
	Peki	43.6	32	Cocoa, Oil Palms, etc.	Assistant Overseer	9	180
	Asamangkese	54	15	Cocoa	Overseer	10	300
	Kpeve	300	30	Cocoa	Assistant Supt. of Agriculture and Assistant Overseer	10	750
	Kpedshu	50	20	Cotton	Assistant Overseer	12	
	Horticultural Nursery, Accra	1½	1½	Plants, Shrubs, etc.	Junior Assistant Overseer	12	300
Central ..	Assuantsi	640	150	Cocoa, Rubber, Coconuts, Oil Palms, etc.	Assistant Supt of Agriculture and Assistant Overseer	25	650
	Hemang	43½	38	Cocoa and general crops	Assistant Overseer	9	180

V.—AGRICULTURAL STATIONS—(contd.).

A. (a) The following is a list of Agricultural Stations in the Colony and Ashanti, showing area, crops grown, etc.

Province.	Station.	Area (acre).	Area in use (acre).	Chief Crops.	Supervision.	Average Number of labourers employed	Vote. £
Western ..	Tarkwa	278	190	Rubber and general crops	Supt. of Agriculture; Overseer	24	500
	Wioso	38	—	Cocoa and general crops	Overseer	10	160
	Adebrem	25	—	Rice	Assistant Supt. of Agriculture	12	400
	Essiama	—	—	Rice Factory	Junior Assistant Overseer	2	
Ashanti ..	Kumasi	205	—	Cocoa, Rubber, and general crops	Superintendent of Agriculture Assistant Overseer and Junior Assistant Overseer	38	750
	Juaso	37	—	Cocoa and general crops	African Asst. Superintendent, Junior Assistant Overseer	9	200
	Ejura	20½	—	Groundnuts and Cassava	Travelling Instructor	6	150
Special Stations (see section IV.)							
Eastern ..	Achimota	1,400	200	Forest trees for firewood	Temporary Overseer	50	1,100
	Sisal Plantation ..	1,000	930	Sisal Hemp	Supt. and Assistant Overseer	120	—
	Labadi and Teshi, Temma, Kpone ..	154	154	Coconuts	Junior Assistant Overseer	7	200
	Odumase	22	15	Oil Palms	Temporary Overseer	4	170
Central ..	Abra	296	296	Coconuts	Ceylon Coconut Instructor and Junior Asst. Overseer	37	500
	Owan	20	15	Oil Palms	Do. do.	9	150
Western ..	Atwabo	275	275	Coconuts	Ceylon Coconut Instructor	16	300
	Anaji	100	70	Oil Palms	Junior Assistant Overseer	23	620

(15)

(b) Buildings, Machinery, Tools, etc.

- The various offices and station buildings have been maintained in good order. Quarters for the Overseer were built at the oil palm plot, Anaji.

An additional store-room was built at the Provincial Office, Koforidua.

The quarters at Kpeve were practically rebuilt, and an office constructed.

The stations were provided with the necessary tools. A corn sheller was used for demonstration purposes in the market place at Koforidua and attracted much attention.

A number of standard prunners found a ready sale among farmers in the Eastern Province and a suggestion was adopted by one of the large trading firms to stock these implements regularly.

B. The following tables show the results of the various chief crops.

(a) Cocoa.

(i) Amelonado.

Station.	Area acres.	Date planted.	Distance apart feet.	Crops.			Rate per acre loads (of 60lbs.)	Pods per lb. cocoa.	Pods.					
				No. of pods fermented.	Weight wet cocoa lbs.	Weight dry cocoa lbs.			No. attacked by			No. rendered useless.		
									Akate.	Borer.	Brown rot.	Akate.	Borer.	Brown rot.
Aburi..	II. 2.34	1891-93	15 x 15	27,619	4,711	1,809	12.9	15.2	2,171	2,041	1,103	14	63	416
	III. .30	1891-93	15 x 15	5,983	1,011	441	24.5	13.2	370	156	275	15	11	187
Kibi..	1.25	1912	12 x 12	1,684	2,139	911	12.2	12.0	5,648	1,901	795	—	—	59
Peki..	II. 2.3	—	10 x 15	27,766	4,417	1,260	9.1	22.0	1,534	1,366	743	469	1,038	340
	II. 2.4	1910	10 x 15	3,174	917	262	1.8	12.1	488	305	374	179	189	234
Kpeve	23.0	1903	12½ x 12½	132,916	20,382	6,794	4.92	19.6	—	—	3,034	—	—	—
Assuantsi	IV. 10.0	1908-11	15 x 15	94,417	15,075	7,126	11.9	12	30,627	—	7,627	not recorded.		
	V. 2.0	1912-15	10 x 10	13,829	2,274	1,101	9.2	12	4,612	—	842	not recorded.		
Tarkwa	.73	1912	12 x 12	737	—	56	1.25	13.2	94	—	67	—	—	—
Wioso	3.0	1916	12 x 12	7,688	1,104	566	3.08	13.8	1,722	589	479	—	—	479
Kumasi	II.	1908-10	15 x 15	67,826	14,513	5,851	8.9	11.5	50,732	17,094	—	—	—	—

(ii) Criollo.

Station.	Area acres.	Date planted.	Distance apart feet.	Crops.			Rate per acre loads	Pods per lb. cocoa.	Pods.					
				No. of pods.	Weight wet cocoa lbs.	Weight dry cocoa lbs.			No. attacked by			No. rendered useless.		
									Akate.	Borer.	Brown rot.	Akate.	Borer.	Brown rot.
Aburi.. ..	0.52	1909	12 x 12	3,322	262	17	8.4	12.6	729	197	216	72	13	141
Kibi	0.57	1912	12 x 12	1,783	349	138	4.0	11.3	1,186	254	120	—	—	9
Assuantsi ..	A. 2.5	1913-21	15 x 9	7,411	1,194	535	3.6	13	2,429	—	437	not recorded.		
	B. 2.0	1913-21	15 x 9	2,836	427	222	1.9	11	900	—	235	not recorded.		
Wioso	3½	1910-13	12 x 12	11,170	2,819	973	4.6	11.4	7,829	3,341	900	—	—	900
Kumasi	5	1910-16	12 x 12	5,981	1,359	529	1.8	11.3	4,258	1,723	1,213	—	—	1,213

(iii) Cundeamor.

Station.	Area acres.	Date planted.	Distance apart feet.	Crops.			Rate per acre loads.	Pods per lb. cocoa.	Pods.					
				No. of pods.	Weight wet cocoa lbs.	Weight dry cocoa lbs.			No. attacked by			No. rendered useless.		
									Akate.	Borer.	Brown rot.	Akate.	Borer.	Brown rot.
Aburi.. ..	2.40	1901	15 x 15	4,866	1,109	455	3.1	10.7	530	230	218	27	26	201
Kibi	1.25	1912	12 x 12	5,985	1,020	391	5.2	13.0	4,376	550	168	—	—	62
Peki	2.00	1913	12 x 10	4,490	1,047	40	3.5	10.7	638	344	404	253	170	243
Assuantsi ..	2.0	1910-17	15 x 9	8,495	1,338	735	6.1	10.0	2,720	—	570	not recorded.		
Wioso	2.5	1916	12 x 12	11,187	1,596	785	2.2	14.2	3,098	212	879	—	—	468
Kumasi	4	1908-11	15 x 15	25,895	5,607	2,252	9.4	11.0	18,328	6,985	4,076	—	—	4,076

(iv) Ocumare.

Station.	Area acres.	Date planted.	Distance apart feet.	Crops.			Rate per acre loads.	Pods per lb. cocoa.	Pods.					
				No. of pods.	Weight wet cocoa lbs.	Weight dry cocoa lbs.			No. attacked by			No. rendered useless.		
									Akate.	Borer.	Brown rot.	Akate.	Borer.	Brown rot.
Aburi.. ..	0.25	1891-93	12 x 12	1,615	272	145	9.9	10.8	342	289	137	39	24	97
Kibi	0.67	1912	12 x 12	2,752	512	210	5.2	11.8	2,174	267	48	—	—	6
Peki	2.0	1913	12 x 10	6,420	1,764	577½	4.8	11.1	997	873	509	255	209	301
Assuantsi ..	1.25	1910-17	15 x 9	7,183	1,135	574	7.6	11	2,261	—	523	not recorded.		
Wioso	2.5	1916	12 x 12	9,466	1,592	691	4.9	13.7	2,545	2,121	730	—	—	398
Kumasi	4.0	1910-16	12 x 12	27,980	5,081	2,484	10.4	11.2	18,126	5,039	2,737	—	—	2,737

(v) Notes.

- The crop on the whole was slightly better than last year, and while the attacks of insect pest varied for different parts, on the whole the damage seems to have been much the same. Ten of the trees of Amelonado cocoa at Aburi, the individual records of which have been kept since 1913, gave the following averages and the table also shows their positions for four years:—

No.	Average over 11 years. No. of pods.	Position.			
		1921-22	1922-23	1923-24	1924-25
A 2 ..	181 (1)	2	5	2	7
3 ..	170 (4)	}	8	6	10
4 ..	170 (4)				
5 ..	173 (3)	1	2	10	1
6 ..	179 (2)	3	1	8	3
7 ..	167 (6)	9	3	7	4
8 ..	157 (9)	}	6	5	9
9 ..	157 (9)				
10 ..	162 (8)	10	4	3	8
11 ..	163 (7)	4	10	1	2

(vi) Asamangese Station.

This station is entirely devoted to cocoa. Three blocks of five acres each have been planted one block each year. During this year all the blocks were kept clean weeded. The growth of the oldest plot has been seriously interfered with by the attacks of Akate, and handpicking was resorted to.

Spraying with lime sulphur solution was practised to deal with ants, mealy bugs and a superficial brown fungus, and apparently met with some success. The youngest plot did very well. The shade trees are fairly well established.

(vii) Kpeve.

The eradication of elephant grass which had obtained a strong hold among the cocoa, and is responsible for the deaths of many cocoa trees, is the most important work on the station.

Two methods are at present being tried, (a) frequent cutlassing of the grass, (b) digging up roots at intervals of some months. The results at present are inconclusive.

(b) Cola.

Station.	Variety.	Area.	Distance apart	Date planted.	Crops.	
					Nuts.	
					Red.	White.
Aburi	White ..	.67	20' x 20'	1910	3,263	9,389
	Red ..	.90	20' x 20'	—	30,639	—
Kibi	White ..	6.78	30' x 30'	1914 & 18	2,526	78,989
Peki	—	2.0	25' x 30'	1914 & 18	just coming	into bearing.
Assuantsi ..	White ..	2.0	30' x 25'	1919	not bearing.	
	Rcd ..	2.5	30' x 25'	1915	just coming	into bearing.
Tarkwa	Plot A. ..	1	22' x 22'	1907	10,871	—
	„ B. ..	1	30' x 30'	1907	11,083	—
	General ..	27	15' x 30'	1907	116,406	—
Wioso	White ..	4½	—	1918	just coming	into bearing.
Kumasi	Red ..	10	25' x 25'	1911-15	129,008	—
Juaso	White ..	—	—	—	—	—
	Red ..	—	—	—	—	—

The plot at Kibi consists of the so-called "white" cola. 53 trees bore pods containing white nuts only, the crop being more than double last year, the percentage of red nuts falling to less than half that of last year.

(c) Oil Palm Products.

Station.	Variety.	Date planted or age.	No. of Palm.	Crop.		
				No. of bunches.	Weight of bunches lbs.	Weight of clean fruit lbs
Aburi	Abedam ..	1909	5	26	405½	281½
	Abobobe ..	1909	3	8	156	105
	Abefita ..	1909	2	10	156	111
	Abetuntum	1909	3	10	54	32
	Liscombe ..	1909	2	11	177	125
	Gamopeley	1909	4	15	331	199
	Diwakawaka	1909	1	4	52	34
Kibi	Abobobe ..	1912	85	20	354	177
	Abepa ..	1912	—	94	2,131½	1,001½
	Abetuntum	1912	85	30	523	243½
	Abedam ..	1912	—	44	1,019	169½
Peki	Plot I. ..	old trees	172 (1)	287	7,458	5,532
	" II. ..	" "	? (2)	325	10,038	7,524½
	Various ..		239	441	12,471	8,348½
Assuantsi ..	"	1914	(1½ ac.)	304	3,418	1,985
Kumasi ..	"	1916	16	65	359	145

(1) Palms thinned to 68 per acre, (2) any number of palms allowed to grow.

(d) Rubber.

No tapping was carried out during the year.

(e) Cotton.

The cultivation of cotton is confined to the station at Kpedsu on the Ho-Adidome Road in Togoland. Cotton has been cultivated here for three years. The first two gave very inferior results but the year under report gave much improved crops. The season appeared to be a satisfactory one, but picking was long drawn out and was not completed, in some cases, at the end of March.

Eight acres were planted in June, July, August and September.

Results as below :—

Month.	Variety.	Distance teet.	Area acre.	Total Seed-Cotton lbs.
June	Various	3 x 2	½	118
July	"	4 x 2	1	76
"	Sonko	"	1	158
"	Kadeanyingba ..	"	1	205
August	Various	"	1	41
"	"	"	1	54
September ..	Sonko	"	1	104
"	Kadeanyingba ..	"	1	170

A plot of ½ acre was devoted to special rows of varieties ; all distances were 4' x 2'.

Variety.	Square feet.	Yield seed cotton.	Corresponding yield acre.
1. Allen	2,800	25 lbs.	389 lbs.
2. Zeidabi	"	22	343
3. Meade	"	10 $\frac{1}{2}$	163
4. Sonko	"	19 $\frac{1}{2}$	303
5. Sagai	2,400	15 $\frac{3}{4}$	286
6. Gumante	"	7 $\frac{3}{4}$	141
7. Kadeanyingba	"	13	236
8. Kpalagunda	1,200	5 $\frac{1}{2}$	191

1-3 were obtained from Nigeria, 5, 6, 7 from Tamale, and 4 and 8 from Kpalime.

A selection was made of the individual best plants and seed was collected separately from each, so that next season a selection of plants will be obtained the progeny of one plant.

The Assistant Government Entomologist spent considerable time studying cotton pests on the station, principally stainers.

(f) Coconuts,

Station.	Variety.	Area (acres).	Distance apart.	Date planted.	Crop.
					Nuts.
Assuantsi	Ceylon ..	12	25' x 25'	1912-13	3,479
	Native ..	10	25' x 25'	1910-12	10,062
Kibi	Ceylon ..	.55	30' x 30'	1912	102
	Native ..		"	"	"
Peki	Local ..	3.5	25' x 25'	1918	65

The yield from the Ceylon variety was greatly reduced.

(g) Coffee.

(i) Liberica.

Station.	Area.	Distance apart.	Date planted.	Crop.	
				Fresh fruit.	Dry coffee.
Aburi .. .. .	.85	10' x 10'	1912	lbs. 3,298	lbs. 307
Kibi .. .. .	.365	8' x 8'	1912	121	16
Peki .. .. .	.75	8' x 8'	1913	1,107	461
Assuantsi .. .. .	.75	8' x 8'	1910	2,451	241 $\frac{1}{2}$
Hemang .. .. .	.06	—	—	425	37
Tarkwa .. .. .	.48	10' x 10'	1904-07	731	81
Kumasi .. .. .	.1	8' x 8'	1909	2,086	224
		8' x 8'	1920	492	51
Wioso	1.0	12' x 6'	1916-17	210	26

(ii) Robusta.

Station.	Area acre.	Distance apart.	Date planted.	Crop.	
				Fresh fruit. lbs.	Dry coffee. lbs.
Aburi .. .. .	.55	10' x 10'	1913	1,042	156
Kibi .. .. .	.365	8' x 8'	1912	199	36
Peki .. .. .	.75	8' x 8'	1913	1,428	703
Assuantsi	1.00	8' x 8'	1912-13	1,209	329
Hemang .. .. .	.06	—	—	142	28½
Tarkwa .. .. .	.80	10' x 10'	1912	741	188
	.27	8' x 8'	1912		
Kumasi	½	8' x 8'	1914-15	581	114
	½	8' x 8'	1920	212	46
Wioso	1.0	12' x 6'	1916-17	370	81

(iii) Stenophylla.

Station.	Area acre.	Distance apart.	Date planted.	Crop.	
				Fresh fruit. lbs.	Dry coffee. lbs.
Aburi .. .. .	.35	10' x 10'	1909	364	51
Peki .. .. .	.75	8' x 8'	1913	85	38
Assuantsi .. .. .	.25	8' x 8'	1912	79	29
Hemang .. .. .	.06	—	—	100	18½
Tarkwa .. .. .	.34	10' x 12'	1912	413	82
	.73	8' x 8'	1913		
Kumasi	½	8' x 8'	1912	326	92

(iv) Arabica.

Tarkwa06	6' x 6'	1912	12½	3½
Hemang06	—	—	79	12½

(v) Uganda.

Kumasi	½	8' x 8'	1915	769	189
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(h) Food crops.

Station.	Area (acre.)	Crop.	Distance feet.	Crop lbs.	Rate per acre.
Kibi169	yams	4 x 4	2,692	7.1 tons.
	.158	corn	4 x 4	1,006 (cobs)	
Wioso	1.0	corn	3 x 1 3 x 2	507 (dry corn)	8.5* (1st crop)
	1.0	"	"	116 "	1.9 (2nd crop)
Adebrem	1.0	"	3 x 2	1,276 "	21.3 (1st crop)
	1.0	"	"	551 "	9.2 (2nd crop)
Assuantsi	1.0	Hausa patch	6 x 6	1,375 "	12 cwt. 9 cwt.
	0.75	Ginger	3 x 6	800 "	

*bushels of 60 lbs.

(i) Rotation.

The rotation plots were continued at Kibi, Peki, Assuantsi, Hemang, Wioso, Kumasi and Juaso. The results from a rotation area do not give much information until the rotation is complete, when it is proposed to publish the returns separately.

(j) Visitors.

Station.	No. of visitors.
Aburi	16
Kibi	40
Peki	37
Kpeve	not stated.
Assuantsi	39
Hemang	85
Tarkwa	38.
Wioso	147
Kumasi	341
Juaso	113
Asamangkese	103
Atwabo	18
Abra	27
Owan	21

K.—DISTRIBUTION OF PLANTS.

Station.	Cocoa.		Coffee.		Kola.		Coconuts	Other Economic.		Fruit trees.		Ornamental and shade plants.		Vegetables.	Oil Palm seed.
	Plants.	Pods.	Plants.	Seed. lbs.	Plant	Seeds.		Plants.	Seeds.	Plants.	Pkts. seed.	Plants.	Seed. lbs.		
Aburi	206	281	4,967	24	—	—	6	388	1,432	9,122	50	260	32	22 pkts	—
Kibi	200	23	1,040	40	646	400	—	—	—	—	—	412	—	96 cuttings	18 lbs.
Peki	—	—	2,495	—	—	—	—	153	—	—	—	—	—	47 lbs.	—
Assuantsi	—	6	1,734	253	—	—	10,450	12	—	440	6	1,608	2	8 pkts.	—
Hemang	12	8	—	108	—	—	84	12	—	60	—	78	—	335 cuttings	—
Tarkwa	—	—	658	21	—	—	—	1,532	3 lbs	504	—	9,684	12 lbs.	—	—
Kumasi	—	12	2,796	155	—	—	—	—	23 "	1,887	26	1,972	3½ lbs.	—	—
														10 pkts	—

(1) Revenue.

Station.	Amount.		
	£	s.	d.
Aburi	102	16	4
Kibi	63	16	5
Peki	39	4	1
Kpeve	88	6	0
Kpedschu	6	2	1
Assuantsi	169	1	3
Hemang	49	6	7
Abra	6	5	6
Tarkwa	8	12	9
Adebrem	4	2	6
Anaji	24	7	3
Wioso	20	17	10
Kumasi	209	2	7
Juaso	45	11	5
Ejura	37	10	0
Total	£875	2	7

VI.—AGRICULTURAL INSTRUCTION.

The instructional work carried out by the Department during the year is as under the following headings :—

A. The Agricultural and Forestry Training Centre, Kumasi.—Thirty-two learners were in residence during the year, 12 Seniors and 20 Juniors of which 24 were Agricultural and eight Forestry Learners; 10 Learners (nine Agricultural and one Forestry) having completed their two years' course were sent to outstations for their final year of training. Two Learners were dismissed during the year for misconduct, leaving 20 to continue the second years' course.

The 10 Learners who left the Training Centre were granted awards on the result of school work as follows :—

First Class (80% marks)	1
Second Class (65% ,,)	2
Third Class (50% ,,)	7

Four Learners completed three years training and sat for the staff examination in March, 1925. Their papers were considerably better than previous ones, indicating that good use had been made of the facilities for study at the Training Centre. Three of them passed the examination and have been appointed Junior Assistant Overseers on probation.

Progress generally has been good. Discipline and general appearance of the Learners has been the subject of favourable comment by His Excellency the Governor, Chief Commissioner of Ashanti, and other visitors.

The Learners have shown keenness in cricket and football especially the latter. The team occupied 6th place in the Kumasi Educational Institution's Football League. Good sportsmanship has been exhibited in all games and this has helped considerably in the development of character, initiative, and spirit of co-operation, which is so essential to progress. The weekly meetings of The Mutual Improvement Society have been a success, Learners showing keenness and thoughtful intelligence in the various discussions. The value of these meetings cannot be over-estimated and now a projector lantern has been provided should be of still greater value.

Gadbury Hall was completed and on December 6th, 1924, the building was presented to the Government by Mr. Organ on behalf of Messrs. Cadbury Brothers of Bournville, England. It was then formerly opened by His Excellency the Governor in the presence of a large number of the European and African communities.

This imposing building consists of a main hall 84' x 24' divided into two parts for a Lecture Hall and Recreation Room, a Laboratory 42' x 24', an office and storeroom and provides ample accommodation for present needs.

The feeding of the Learners which is carried out by a Mess Committee has been in every way satisfactory, few complaints being heard.

The health of the Learners has been very good ; no serious cases of illness being recorded.

The number of visitors during the year was 341 including His Excellency the Governor, the Chief Commissioner of Ashanti, two African members of the Legislative Council, and Director of Agriculture.

The Chief Commissioner of Ashanti visited the Training Centre on March 31st and after addressing the Learners presented the prizes to those who were successful.

B. Class in Agriculture.—The Annual classes were held as previously, at the following stations, for Teachers and Students sent by the Education Department to the numbers shown :—

	July, 1924.	January, 1925.
Aburi	28	25
Assuantsi	8	12
Kibi	7	22
Kumasi	22	26
Totals	65	85

Examinations are held at the close of each course which lasts three weeks, and those who are successful in passing the examination for the two courses in one year receive a prize. 44 candidates succeeded in passing the two examinations at the end of the July course.

G. King Edward VII. Scholarships.—Scholarships are awarded, tenable for three years, to learners who have completed two years' training at Kumasi on the results of a competitive examination held each year.

The present holders of the scholarship are Mr. S. R. B. Fletcher (1st July, 1922) Mr. D. A. Reynolds (1st July, 1923) and Mr. H. B. Daniel (1st July, 1924). The amount of the scholarship is £30 per annum and the scholar must satisfy the authorities as to his progress. The scholars go for special study for one year at Aburi and the balance of the time is spent on the stations.

D. Sir Alfred Jones Bequest.—During the year the arrangements were completed whereby the Trustees of the late Sir Alfred Jones deposited with the Crown Agents a sum, to which Government adds an equal amount, the interest of which is to provide scholarships tenable at the Imperial College of Agriculture Trinidad or an Agricultural College in the Gold Coast, open to West Africans between ages of 17–25 who are able to satisfy certain conditions and selected by competitive examination.

No selection has yet been made.

E. Itinerant Instruction.—The work has continued to occupy an important place among the activities of the Department, and on the same lines as previously.

An innovation was introduced by the use of a lantern and slides illustrating diseases, etc., of cocoa. So far the lantern has been used only in the Eastern Province, and everywhere it has aroused keen interest. It is proposed to extend the system.

The amount of time occupied in travelling by the senior officers is as follows :—

	Days spent on tour.
Headquarters	25.8%
Research Branch	25.6%
Eastern Province	48.0%
Central Province	49.4%
Western Province	43.3%
Ashanti	59.7%

Certain of the junior staff are employed on itinerant duties when required.

VII.—PUBLICATIONS.

Publications as below have been issued during the year.

A. Books.

Gold Coast Plant diseases, by R. H. Bunting and H. A. Dade.

This contains a brief description of the known diseases of plants on the Gold Coast and suggestions as to remedies. To enable the book to be of use to others than Scientific observers, technical terms have been avoided where possible and fully explained otherwise. This book forms a useful commencement for future use in compiling the list of plant diseases in the Colony.

B. Pamphlets.

A series of pamphlets containing advice, instructions or information has been commenced, the following having been issued :—

	No. issued.
(1) " Cotton " by C. H. Knowles .. ..	.. 300
(2) " Corn Smut " by H. A. Dade .. ..	.. 500
(3) " Notes on cocoa poster " by C. H. Knowles and R. H. Bunting .. ..	.. 500
(4) " Diseases of corn " by R. H. Bunting ..	.. 750

No. 2 was accompanied by a large coloured poster drawn by Mr. H. A. Dade and reproduced in colour by the courtesy of the Surveyor-General.

No. 3 was drawn up chiefly for the use of the schools, etc., to whom cocoa posters referred to in last year's report, were distributed. The Agricultural portions of the Gold Coast Hand-book and of the Hand-book to the British Empire Exhibition were revised during the year.

C. The Annual Report for 1923-1924.

D. Quarterly reports of departmental activities in the various provinces have been published regularly in the Journal of the Agricultural and Commercial Society, and several articles have been written by members of the staff and published in the same journal.

E. Provision has been made for the results of investigation to be published from time to time in a uniform manner as Bulletins, but none were issued during the year.

VIII.—RESEARCH BRANCH.

The reports of the various divisions of Research Branch are to be found in Part X.

It will be seen that considerable progress has been made. A disease apparently recorded for the first time here, **Corn Smut**, appeared during the year.

The Assistant Entomologist spent a considerable part of his time in the Colony studying cotton pests in Togoland.

A commencement has been made in the study of the soils of the Colony.

IX.—MISCELLANEOUS.**A. Agricultural and Commercial Society.**

The Society has continued its activities, principally in connection with organisation of Agricultural Shows and Farm Competitions. Shows were held at :—

Western Province .. ..	.. Sekondi.
Central Province .. ..	.. Oda.
Eastern Province .. ..	.. Peki and Keta.
Ashanti .. ..	.. None.
Northern Territories .. ..	.. Han.

Farm competitions were held in the Central Province—round Oda, Eastern Province in the Trans-Volta district and in Ashanti. Special reports on these shows appears in the Journal of the Society.

The Accra Exhibition, on account of lack of financial support, was postponed.

B. The British Empire Exhibition.

Further consignments of Agricultural produce were sent to England in accordance with the requests of the Exhibition Committee. Mr. A. W. Paterson Assistant Superintendent, Western Province was appointed to represent the Agricultural Department at the Exhibition taking over from Mr. W. H. Patterson Government Entomologist in March, 1925.

C. New Plants Introduced.

The following new plants were introduced during the year :—

- | | | | |
|---|---|--|-----------------------------------|
| Talipot palm from Ceylon. | } | from M. F. Irvine, Agricultural
Instructor, Achimota. | |
| Velvet beans vars. of <i>Sorghum</i> sweet corn | | | |
| Sugar Cane | } | from Director of Agriculture Tanganyika. | |
| <i>Albizzia Moluccana</i> | | | |
| <i>A. Stipulata</i> | | | |
| <i>Eucalyptus Angulosa</i> | | | |
| <i>Acacia cunninghamii</i> | | | |
| <i>Cyphomandra betacea.</i> | } | from Director of Agriculture India. | |
| <i>Gynocardia odorata</i> | | | |
| <i>Rhus semi-alata</i> & <i>R. insignia</i> | | | |
| <i>Alangium Begoniaefolium</i> | | | |
| <i>Spondias Axillaris</i> | | | |
| <i>Antidesma Diandrum</i> | | | |
| <i>Ficus Cunea</i> | | | |
| <i>F. Hookeri.</i> | | | |
| Oil Palm variety | | | Sumatra. |
| Bengal Beans | | | Director of Agriculture, Nigeria. |

D. Meteorology.

The rainfall for the Calendar year 1924, was greater than the average at 28 stations from which rainfall records are received, as compared with 16 stations at which the year's rainfall was below the average.

Places of greater annual rainfall were generally in the forest area of the Eastern Province the Northern part of Ashanti and Eastern part of the Northern Territories, on the Western part of the Central Province and the eastern part of the Western Province.

The departures from the averages of the different months throughout the year show January, February, April, October and December to have been generally wet months.

February was a wet month for the Eastern Province and adjacent parts of the Central Province and Ashanti.

March was on the whole a dry month. April was wet for the forest areas except central Ashanti.

May, June, July and August were generally dry.

The main cocoa crop was delayed by dry weather in what should have been the wet season, while the October and December rains delayed the preparation of cocoa and were responsible for much germinated cocoa as reported elsewhere.

Harmattan.

The early months of 1925 were characterised by an abnormal display of Harmattan. Very low temperatures were recorded and the very dry conditions gave rise to an unusual feature in cocoa—the pods in many cases becoming dry on the trees, while over large areas normal fermentation was interfered with, on account of lack of the normal amount of moisture in the pods. The matter is referred to elsewhere in this report.

E Additions to Library.

A number of standard up-to-date works on Agriculture was added to the Library at Head Office and the libraries of the Provincial Officers, while the Research Sections were provided with selections dealing with their special work.

Monthly and weekly journals dealing with general agriculture and with African affairs are regularly received. To prevent an unnecessary accumulation, only a limited number of publications dealing with tropical agriculture is sent to each provincial headquarters—but the publications from Headquarters are circulated when desirable.

F. Legislation.

The Plants (Injurious Pests) Ordinance was not put into operation during the year, it having been decided to postpone it one year, during which time the further lectures to farmers were given.

The importation of maize straw was prohibited by order in Council on account of the outbreak of smut on Corn.

G. Ornamental Planting.

(a) **Accra Nursery.**—An area of $1\frac{1}{2}$ acres near the Secretariat has been maintained as a nursery with a stock of ornamental plants for use in and around Accra.

In addition to collecting seeds, cuttings, etc., and propagating them in the nursery, planting has been carried out by the nursery staff as below:—

	Trees.	Shrubs.	Palm.	Hedge Plants.
(a) Planting streets, additions	157	34	146	bundles of cuttings.
Supplies	775	—	—	—
School street planting, additions	1,307	—	—	—
Korlebu Hospital, additions	1,943	1,732	—	36
Supplies	395	78	—	—
(a) „ sewage, additions	555	—	—	—
Supplies	211	—	—	—
(a) European Hospital, additions	10	214	3	130
Supplies	—	44	—	12
Achimota, additions	940	—	—	—
Supplies	145	—	—	—
Railway, Accra Station	30	46	—	—
(a) Cantonments (Survey)	288	130	—	—
„ (Regiment)	350	110	—	—
(a) The Castle, Christiansborg	32	—	—	—
Bungalow, additions	2,675	3,143	25	284
Supplies	350	110	—	—
Totals	10,163	5,641	174	462

The items marked (a) were entirely done by the nursery labour.

The stock of plants in the nursery at end of the financial year was:—

Ornamental trees	6,420
„ Palms	280
Shrubs	1,723
Climbers or Creepers	24
Flowering trees	8,382
Flowering shrubs	1,596
Fruit trees	1,800
Border plants	620

The expenditure including amount received from Accra Town Council on labour was £371.

(b) Achimota.

(i) **Avenues.** Avenues of shade trees have been planted along the roads within the main fence of the College grounds at Achimota. The trees are planted at road level, 25 feet apart and 23 feet from centre of road.

They consist of Rain trees on main road from the Railway, Mangoes around the oval road, Almond and Neem on the two shorter roads. Copious watering was found to be necessary and vacancies have been regularly filled. Mole crickets have been troublesome. Some 1,100 plants have been set out exclusive of supplies for vacancies.

(ii) **Playing fields.**—Three playing fields two of approximately $2\frac{1}{2}$ acres each and one of $9\frac{1}{2}$ acres were planted with couch grass. The areas were levelled by the Public Works Department and roughly weeded, when they were handed over for planting. Imported seed was tried on one but failed completely hence all were planted up with tufts of grass. The area planted in September appears to have done best and seems to indicate that provided the season is satisfactory so far as rain fall goes, there is no particular advantage in early planting, while the continuous weeding necessary entails considerable additional expense. The cost of the avenues was approximately £105 and of the grass plots about £370.

(c) **Gold Coast Hospital, Korlebu.**—During the year the planting up of the avenues and lawns at the Gold Coast Hospital as previously agreed upon was completed. The large area in front of the hospital was roughly levelled and planted with couch grass except the western corner—the site of some cottages and containing a burial ground. An area on Guggisberg avenue was laid out with garden beds, ornamental plants, etc.

The trees and grass are well established, maintenance being now a simple matter.

H. Plant Sanitation.

Collar Crack eradication, Togoland.—The areas dealt with were—

Amedjope
Akome
Kpedse.

The operations on the farms consist of digging up and burning trees showing the disease, tracing and up-rooting as many roots as possible and burning them and isolating the sites of the tree or trees destroyed, by trenches 18" deep.

At Amedjope the attacks were very bad. They were not so bad at Akome. The number of farms treated was 383, few of them being small ones. Inspection of the areas first worked has shown no cases of disease re-appearing.

In no case has there been any opposition to the work, but many of the farmers did not appear to realise the benefit.

The Provincial Superintendent of Agriculture, Eastern Province, the Assistant Mycologist, the Assistant Entomologist and the Agricultural Instructor of Kpalime in French Togoland visited the area being worked and investigated the methods and results.

In consequence of roots of bush trees being found to be affected, the work of tracing adjoining roots became greater, reducing the rate at which the work was being done and increasing the cost.

I am, Sir,

Your obedient servant,

C. H. KNOWLES,

Director of Agriculture.

X.—APPENDICES.

A. Report of the Mycological Division.

(a) The Government Mycologist was absent from the Colony on duty and vacation leave from the 7th June to the 14th October 1924, and the Assistant Mycologist left the Colony on vacation leave on the 13th January, 1925.

During the year the Mycologists spent 441 days at their headquarters, and the following tours were undertaken:—

16th—22nd April—Kumasi—to select sites for laboratories.

5th—31st May—Togoland—to inspect collar-crack area.

13th—23rd December—Juaso and Ejura—to investigate diseases of cereal, and

30th March—en route for Hemarg—to investigate coconut and other diseases.

The Government Mycologist attended the Imperial Mycological and Botanical Conferences held in London during July.

(b) Collar crack of cocoa.

The causative fungus—*Armillaria mellea* (Vahl.) Fr.—was found on the roots of "Lakpa" (Ewe) trees, on moribund lime trees, and on cassava: also on the dead roots of "Ewu" (Ewe), and of Silk-Cotton trees. Infection of cocoa trees from lakpa roots, and along a length of 33 yards of silk cotton root, was demonstrated, and the theory that infection takes place in the field chiefly by contact has been confirmed by the absence of rhizomorphs in Togoland.

A cocoa tree recently examined in Ashanti was found to be affected by this disease and showed the usual radial fissures in the wood. There was no splitting of the bark as has been previously observed as a symptom of this disease on cocoa, but felty plates of mycelium had been formed between the wood and the bark as is the customary habit of the parasite on other hosts.

(c) Other cocoa diseases.

A case of extensive teratoid hyperlasia, probably caused by *Bacterium tumifaciens*; from Ashanti was examined, an organism isolated and treatment advised.

Red-rust of twigs and leaves, caused by the alga—*Cephaleuros mycoides* Karst.—was reported from Asamangkese. The presence of the organism on twigs causes die-back, but only occurs on weak plants.

Cocoa-beans bearing small spots between the cotyledons and their integuments were first received from Ashanti, and later from the Colony, immediately after the recent severe harmattan. No organism was found and it was concluded that the spots were caused by climatic conditions.

(d) Corn Smut.

The occurrence of *Ustilago Zeae* (Berk.) Ung.* on maize was recorded from the Central Province in July. Since then, and especially during the second crop, the disease had radiated to such distant places as Western Appolonia, Wioso, Sunyani, Ejura, Abetifi and Kibi.

No record exists of it having been found previously in this country, nor is it known by agricultural officers in neighbouring colonies. Local farmers stated that they had not seen it before, but some Hausa-men are reported to have said that it occurs in their country, whilst one Government Official asserted that it occurred in Ashanti in 1919, and another that he collected it in the Central Province several years ago. The fact that this conspicuous disease of a crop of recognised importance has not been reported in the interim seems significant either of a new infection during 1924, or that a mistake in diagnosis occurred previously. It is extremely unfortunate from a control point of view that definite information on this point is not available.

Corn-smut on one farm at least was so prevalent as to cause the second crop to be abandoned, and in other localities as many as 968 cases per acre were estimated. A poster and two pamphlets were prepared and issued, warning farmers of the danger of smut on maize, and advising methods of control.

(e) Other diseases of maize.

The year under review appeared, in many districts, to offer favourable conditions for the development of fungous diseases which affect cereal crops.

Of these probably **Dry Rot of maize**—caused by *Diplodia macrospora* Earle*—was the most serious. The fungus occurs on the leaves and outer husks of the cob in large straw coloured patches dotted with minute spots, and may be recognised in the cob by the dull, mouldy appearance of the grain. Not only does it inhabit the normal function of affected leaves, but its occurrence in the ears causes a direct loss of crop.

Another maize disease—**Black-Spot**, due to the attack of *Physoderma Zeae-maydis* Shaw*—occurred with unusual severity in some districts on the leaves and stems, causing disintegration of tissues and frequently the breaking of the stem near soil level.

Leaf Blight of maize (*Helminthosporium turcicum*, Pass.)* was widely distributed, and caused considerable loss of crop. The disease occurs at first as pale blotches which become withered and ultimately covered with a dark velvety mould.

Other species of *Helminthosporium*, have been found associated with a leaf spot on maize, and with a blackening of the sheaths and auricles of the leaves, nodes of the stem, and tassels.

Until investigations on these fungi are complete, the methods of control advised are,—1) the destruction by fire of all affected material, 2) the use of seed from unaffected sources, and 3) the rotation of crops on at least a three years basis. It is of interest to record in this respect, that the zoospores of *Physoderma*, and the spores of one of the species of *Helminthosporium*, were found in the excreta of snails infesting diseased maize plants at Juaso and were subsequently germinated.

(f) Diseases of millet.

Grain-smut of guinea corn. At Ejura a large farm of this millet was found badly attacked by *Sphacelotheca Sorghi* (Lk.) Clint.* Subsequently similar material was received from the Principal Veterinary Officer, Tamale who put forward the interesting theory that the disease had been introduced from the Mediterranean region many years ago.

The best method of preventing a serious re-occurrence of grain-smut in Guinea-corn consists of steeping the seed in a suitable antiseptic solution.

Red Leaf-Spot. Guinea-corn on the farm referred to in the preceding paragraph was also extensively attacked by *Collétotrichum graminicolum* (Ces.) Wils.*—a fungus which usually restricts its development to localised areas of the leaf, thus causing but slight damage.

Smut of bulrush millet.

The first recorded case of *Tolycoporium penicillariae* Bref.* in this country, was received from the Principal Veterinary Officer, Tamale with the information that Bulrush Millet Smut had been known in the Northern Territories for many years.

The disease affects individual grains in an ear, and usually the majority remain normal. The spores by which the causative fungus is propagated are capable of remaining alive in the soil for some years, so that—seed disinfection having proved useless as a method of control—it is necessary to practise rotation of crops, and destruction of affected ears in bad cases, in an attempt to prevent infection.

Rusts.

Bulrush Millet grown at Aburi was heavily infested on the leaves and stems by *Puccinia penniseti* Zimm.* This parasite had not previously been reported from other countries than India and East Africa. The plants on which it occurred were never robust and the rust did not appear until the end of the season. Maize leaves at Kumasi and Ejura were found affected by *Puccinia Maydis* Bereng* in December. The rust did not appear to have caused such extensive damage as the maize diseases mentioned above.

An aecidial stage on species of *Oxalis* has been demonstrated in other countries.

(g) Ring spot of sugar-cane.

Leptosphaeria sacchari van. Breda was found on the foliage of Sugar-cane near Aburi, but did not appear to cause much damage to the crop.

(h) Oil palm diseases.

Two interesting, but not very prevalent, diseases were recorded on Oil-palms for the first time during 1924.

A case of stem-rot was received from Anaji, and species of *Thielaviopsis* isolated which is morphologically similar to *T. paradoxa*, the cause of disease on Pine-apple, Sugar-cane, Coco-nut and Banana stems. The fungus gave positive results when inoculated into pine-apple stem.

Sessile specimens of *Ganoderma lucidum* were sent in from Odumase. The fungus was reported to be causing a collar-rot on a few palms, and examination on the plantation later confirmed the report.

(i) *Mimusops* fruit rot.

The complete crop of *Mimusops* Elengi tree at Aburi was destroyed by a species of *Phytophthora*, which differs from *Ph. Faberi*, the common cause of black-pod of cocoa. Work on this parasite has not been completed. A fungus parasitic cultures of the *Mimusops Phytophthora* and of other fungi was provisionally determined as *Cephalosporium acremonium* Corda.

(j) Diseases of Weeds.

The troublesome weed, lalang (*Imperata arundinacea*) was severely attacked at Aburi by *Puccinia rufipes* Diet.* But the attack was unfortunately modified by the hypoparasite *Darluca filum*.*

Uredo ochracea Diet.* Was found on leaves of *Commelina* sp. at the same place. *Pennisetum Setosum* at Ejura was attacked by *Cerebella cenchroidis* Subram.*

(k) Entomogenous fungi.

The fungus recorded as *Beauvaria bassiana* on Cola weevils in the 1922-3 report has been transferred to *B. globulifera* (Speg.) Pic: and on a grasshopper. *Gibellula pulchra* (Sacc.) Cav. occurred on a spider: *Hirsutella citriformis* Speare on the oil-palm beetle and *Pseudomicrocera Henningsii* var. *longispora** on an *Aspidotus* scale affecting rose trees.

(l) Scierotial diseases.

A number of host—plants were affected by fungi consisting of sterile mycelia. The most serious of these affections was the Achimota fuel plantation.

R. H. BUNTING,

Government Mycologist.

*Fungi which have not been previously recorded for this country are marked with an asterisk.

B. Report of the Entomological Division.

The Government Entomologist Mr. W. H. Patterson, was absent from the Colony on duty in connection with the British Empire Exhibition, during the whole year under report.

The Assistant Entomologist was absent on leave from May 24th, 1924 to October 15th, 1924, during which period there was no Entomologist in the Colony.

Pests of Cocoa.

No further work has been done on Cocoa pests during the year. A special study of pests is to be made at Asamangkese and neighbourhood in the Eastern Province during the present year. From reports received from District Officers there has been no increase or decrease of the major pests, a state of equilibrium apparently having been obtained.

Pests of Food Crops.

Corn has been reported as seriously attacked by Corn Borer, *Sesamia* sp., 70 % of plants at Kumasi Station being ruined. No information has been obtained as to extent of damage on native farms in the vicinity. A visit by the Entomologist was impossible owing to his being engaged on work elsewhere. It is suggested that the damage was primarily caused by lack of rain at time of germination weakening the plants and other possible climatic factors being unfavourable to normal development of natural enemies.

Pests of Palms.

(a) Rhinoceros Beetles—*Oryctes monoceros* has been reported as damaging coconuts at Atwabo, Western Province. This species of Rhinoceros Beetle is common along the coast where there is sufficient decaying vegetable matter in the vicinity for them to breed.

The Rh noceros beetle reported last year attacking Borassus Palms in Southern British Togoland has since been found attacking coconuts in the neighbourhood.

(b) Oil Palm Leaf Miner—(*Coelonomenodera clacidis*). The life-history and habits of this beetle, which was reported last year as causing damage to Oil Palms in the Eastern and Western Provinces, have been worked out. This work has been made the subject of a separate report which will be published shortly in the *Bulletin of Entomological Research*. A summary is given below.

Damage is caused by the larvae mining in the leaflets and the adults beetles eating the lower epidermis of the leaflets. As many as 10 egg-masses may be oviposited per leaflet during a serious attack, and as the larvae resulting from each egg mass are capable of eating out an area 6" x 1" almost complete destruction of the foliage occurs.

The life cycle from egg to egg has been found to be three months.

There are a number of egg and larval parasites which normally keep the beetle down to almost negligible quantities.

An increase of the beetle may occur locally owing to some, as yet unknown, factor being unfavourable to the normal development of parasites. Migration in the adult stage then occurs. This migration follows a definite direction and may cover a distance up to 15 or 16 miles unaccompanied by the parasites. The beetle then becomes a serious pest at the place of settlement, until the parasites in the neighbourhood reach the normal proportion in number to the host. This has been found to take two generations of the host or approximately six months.

No economic control has yet been found possible. Owing to the palms being uncultivated the difficulty of obtaining an economic control is great. Possible controls can only be successfully applied in the adult stage to prevent or limit migration. The breeding and releasing of parasites at points where the adults settle might be attempted but would be costly and could not be considered until the actual damage to the crop is ascertained.

Pests of cotton.

During the final five months of the year under report the Assistant Entomologist was engaged on the pests of cotton in the Mandated Area of British Togoland. The major part was done at Kpedschu. The following is a list of pests attacking cotton:—

Attacking Leaves.

Cotton Leaf Roller (*Sylepta* sp.)—Caterpillars roll up leaves and cause small amount of defoliation. A minor pest and heavily parasitised.

Cotton Aphis (*Aphis gossypii*)—Cause rapid defoliation during heavy infestation by sucking leaves. Becomes serious during dry weather and disappears on commencement of first rains.

Normally kept under by a number of predators.—A major pest.

Cotton Leaf Hopper—Cause a slight crinkling of the leaves, not important, although cotton is commonly heavily infested.

Attacking Stems.

Shoot Borer (*Earias* sp.)—Borers into young growing shoots. Common early in season. Also a Boll-worm (see under insects attacking Bolls).

Helopeltis—Sucks herbaceous stems causing stunting. Only a pest at beginning of season. Disappears entirely at end of rains.

Attacking Bolls.

Stainers (*Dysdercus* spp.)—Cause abortion, partial abortion of the bolls or staining of developing lint according to age of boll at time of puncturing. Capable of carrying over non-cotton season on perennial cotton (cotton left over from previous years) and on a number of other malvaceous plants. Occurs in largest numbers at beginning and end of season and decreases during dry weather. A pest of major importance accounting for 40% to 50% of the potential yield in some parts.

Boll-Worms ;—(*Earias* spp. *Mometa* sp. etc.)

Bore into bolls of all ages, commonly before flower has fallen. Total life-cycle not necessarily completed in one boll, one larva being responsible for the destruction of a number of bolls. *Earias* spp. are pests of major importance.

Dusky Cotton Bug—(*Oxycaraenus* sp.).—Sucks seeds after bolls have opened. Does not cause staining but possibly causes devitalisation of the seeds.

This work, the field work of which has only just been completed and is now in the process of being summarised, will form the subject of an Entomological Bulletin.

Minor Pests.

Para Rubber trees at Tarkwa Station have been reported as damaged by borer in some cases young trees being killed. Adults sent in have been determined as *Mallondon downesi* not hitherto reported as attacking rubber. Attempts to breed out the larvae were unsuccessful owing to the Entomologist proceeding on leave.

A species of *Ficus* in the Courtyard of Government House, Accra attacked by the larva of moth, *Hypsa undulifera*, was dealt with by the use of dusts and sprays consisting of Lead Arsenate, and fumigating of the soil with para-di-chlor-benzene where the larvae were pupating. A further outbreak did not occur.

Fruit Moth. *Othreis fullonica* and *Achraea* sp. were not reported as damaging fruit this year.

Banana Borer. *Cosmopolites Sordidus*, has not yet been recorded as occurring in this country. In view of the possible increased production of bananas for local consumption and for export it has been suggested that the Banana should be made a declared plant under the Injurious Pests Ordinance.

Apiculture.

The Colony at Aburi established two years continued to flourish but showed no instinct to store honey in quantity. A small amount of honey was found stored in December. Results to date indicate that Aburi, and presumably all forest and deciduous forest areas, are unsuitable for bee-keeping. An attempt is to be tried on the Accra plains.

A further study was made of the honey industry in the Adaklu division of Southern British Togoland. This consists of Orchard-Savannah country and appears to be ideal from an apicultural point of view. Honey is obtained in January and February. Stores are apparently laid up to carry over the period following the burning of the grass in February, flowering grasses being the major food plant in that district. The majority of the honey is bought by native merchants for sale in Palime (French Togoland), Keta and Accra. It is hoped that the local industry may be increased with a view to increase consumption.

G. S. COTTERELL,
Government Entomologist.

C. Report on Chemical Division.

Staff.—The Agricultural Chemist was absent on leave from 16th August, 1924 to 3rd February, 1925.

Mr. R. D. J. M'Cauley joined for duty on the 1st April, 1924.

Laboratory accommodation.—The alterations referred to in last report were not completed till January, 1925.

Tours.—The Chemist visited the Central Province in July, 1924 in connection with the palm-oil industry and the local manufacture of lime juice.

In February, 1925, part of the Trans-Volta district was visited for the purpose of obtaining soil samples.

Palm-oil.—The following summarises the work done to date.

(a) Varieties. As the basis of investigation the native method of classification is adopted. These "varieties" are differentiated and named primarily from the colour of the fruit. By this means four varieties are recognised. Further differentiation on the thickness of 'pericarp' and thinness of endocarp gives two other forms.

(b) Differentiated by the colour of the ripe fruits four varieties are recognised.

Twi (Akwapim)	English.	Ewe.	English.
Abepa	The good palm	Degba	The good palm.
Abetuntum ..	The black „	Deibo	„ black „
Abedam	The orange „	Blede	„ green „
Abefita (fufu) ..	„ white „	Dege	„ white „

Based upon (a) thickness of 'pericarp' and (b) thinness of shell we have two further variation.

Adibe	The Edible Palm.	—	
Abobobe ..	The brittle palm ..	Duye	bite and break.

(c) Description of fruits.

Abepa.—The ripe fruit is of a chocolate or dark brown colour in the upper portion and is usually orange at the base but may be uniformly brown. Size and shape vary and when the shell can be cracked with the teeth it becomes Abobobe.

Abetuntum.—The ripe fruit is black instead of brown as in above. The fruit is generally more rounded in outline. There are intermediate forms which natives refer to either of the above varieties.

Abedam.—This form is unmistakable and is recognised by the fact that it is green when unripe. The green colour may persist at the tip of the ripe fruit, but generally it is of a uniform light orange colour when ripe. Size and shape in this variety also vary.

Abefita.—In this type the characteristic is the much paler colour. The ripe fruit is black in the top third, the lower two-thirds are light orange. Streaks of this colour frequently run up to the tip. A sample of oil from this form examined at the Imperial Institute was reported to have a much lower iodine than is usual. This variety is very scarce but the scattered individuals are well known to the natives of villages near which they occur.

Abehene.—The King Palm (Fiade in Ewe) has distinct vegetative characters in that the pinnae on the younger leaves are joined at the base. It is very scarce in this neighbourhood and the individuals are also well known. I have however been unable to see the ripe fruit.

Abobobe.—This name is given to fruits whose shell can be broken with the teeth. The fruits are generally smaller and the proportion of oil is larger. It has not yet been determined whether the higher percentage of oil compensates for the smaller weight of the bunches. According to colour these forms are known as Abedam—abobobe, etc.

Adibe. This name is given to any variety with very thick pericarp and in which the seed is absent or nearly so. This is generally used by the women in making palm oil for culinary purposes. According to colour this is similarly known as Abedam-Adibe, &c.

(d) Attempts have been made to raise these varieties from seed. No precautions however seem to have been taken to ensure that the seeds used were of known parentage. The risk of cross-fertilisation must therefore be considered in drawing any inference from the results.

At Kibi out of nine seeds sown as Abetuntum only three came true. One is Abedam and the remainder Abepa. Of 20 Abobobe only three grew as such; 15 are Abepa and two Abetuntum. Of 22 Abepa 15 came true; two were Abedam and two Abetuntum.

At Aburi the experiment was on a smaller scale five seeds each of Abobobe, Abedam, Abefita and Abetuntum were sown. There remain now 3, 5, and 4 respectively. Of the Abobobe 2 are Abepa and 1 Abedam; Abedam, 4 Abepa, 1 Abetuntum; Abefita, 1 Abefita, 3 Abepa; Abetuntum all true. No attempt has been made departmentally to grow adibe from seed. Mr. J. P. Taylor of West African Oils Limited, informs me that he has never succeeded in getting this to germinate and attempts made here have been equally unsuccessful. Adibe consists almost entirely of pulp and the seed if present is very minute. It will possibly be found that such seeds are not complete of germinating.

(e) Oil content of fruits.

The results of analyses of the ripe fruit of ten trees from Aburi gardens are given in Table A. It was proposed to use these trees to determine seasonal variation in oil-content.

In Table B. the attempt is made to determine chiefly the mean oil content of varieties collected in the neighbourhood of Aburi.

It will be seen that there is a large variation within each so-called variety. Of the rarer kinds it has not yet been possible to obtain many samples. The bunches used were all ripe in the sense that the fruits had become loose. The mean figures for oil and kernel content indicate that Abobobe if it can be grown true will yield the highest percentage of oil and kernel. It has been stated that the proportion of kernels is smaller in this form but this does not appear to be so. There seems to be an almost constant ratio of kernels to fruit in all the varieties. The mean oil content varies between 33% in Abobobe and 16.8% in Abetuntum.

To determine the rise in free-fatty acids after the bunch is cut from the tree, ripe nuts were kept on a concrete floor, sampled at intervals and the rise in free fatty acid as palmitic acid determined.

Time from cutting	18 hrs	2 days	4 days	7 days	8 days	10 days	14 days
F. F. A. %	0.5	0.6	1.5	2.7	5.4	7.6	20.2
Time from cutting	15 days	17 days	21 days				
F. F. A. %	22.9	25.2	30.9				

(f) Preparation of oil by native methods.

The method of preparation is very primitive and naturally yields an oil with a fairly high percentage of free fatty acids. It however appears to find a ready market in many districts at prices which would prohibit it from being bought for export. The local price sometimes reaches £50 per ton. While improvement in native methods at once suggest themselves, these involve the expenditure of much more care in manufacture than is now devoted to this industry and would not yield a proportionate return in money. It therefore appears to me to be economically unsound to direct investigations along this line. The only possible method, under existing conditions, of developing any considerable export industry in oil-palm products is either by the erection of central factories or by the introduction of simple hand-operated machinery. It seems that a central factory run by Government would at least ensure an adequate financial return and have educational advantages which would act as a great stimulus to the development of the industry.

On the other hand the introduction of hand-operated machinery would in my opinion, although not the most economical method, tend to cause the least dislocation of labour conditions in the oil-palm areas and would foster the development of the industry along lines suited to existing economic conditions.

The bunches are cut down and lie on the ground for a day or two to facilitate the removal of the fruits. The cleaned fruits are carried to the "factory" and there put into a conical hole lined with flat stones and then with banana leaves. Water is sprinkled on the fruit and the whole covered with banana leaves and allowed to ferment for 6-7 days. The object of this is to soften the pericarp. The free fatty acids in the pericarp oil at the end of this period rise to about 8%.

The fruits are transferred to another similar hole and depericarped by being worked by long staves by a number of men surrounding the hole. The nuts with pericarps thus loosened are now heaped up and allowed to drain for several days during which an oil of better quality exudes. This is collected and used for cooking. The free fatty acids in this are 12%. The nuts and fibre are then transferred to a shallow hole containing water and beaten up with wooden hammer-headed pestles. The oil and a certain amount of fibre rises to the surface as a yellow scum and is skimmed off with calabashes. This is boiled in an iron pot and strained while hot through a net into the storage cask.

The process does not lend itself to the production of a high-grade oil. In addition to this it is exceedingly wasteful. The yield of oil by this process is 8-10%. The free fatty acids in this oil amount to 25%.

Small quantities of oil are made for household use by a process of boiling. The fruits are boiled in an iron pot till the pericarp is soft. The fruit is then pounded in a mortar and the pounded mass transferred to a pot with water. The fibre and nuts are squeezed by hand expressing most of the oil and are transferred to another pot where the process is repeated. The mixture of oil and water is boiled for about two hours and on cooking the oil is skimmed off. Further boiling of the skimmings drives off any moisture; sludge and fibre sink and the pure oil is decanted off.

A yield of 12-13% of oil can be obtained by this process. Such oil is of much better quality and has usually 8-9% free fatty acid.

It is surprising that this method which gives a better extraction and a much higher grade of oil is not widely used. Natives state that it gives a lower yield of oil. This however is incorrect. Sixty seven per cent extraction has been obtained here against forty per cent for the usual process.

In the area behind Saltpond the method adopted is different and with care a uniformly good oil should result.

The bunches after being cut down are left on the ground for a day or two to loosen the fruits. The cleaned fruits are carried to the village and kept dry under cover till sufficient have been collected. This usually takes four days.

The fruits are boiled to soften the pericarp and pounded with sticks in the usual way to loosen the pericarp. The pounded mass is transferred to a large circular wooden tray when women pick out the pericarp which is boiled again with a small quantity of water and the oil squeezed out by means of a net and simple levers into a tub. After settling the clean oil is skimmed off and boiled to remove water. This is a great improvement on the usual process in that the fermentation to soften the pericarp, is replaced by boiling. The free fatty acids in the resulting oil are much lower; viz. 12-16% and with greater care could be reduced.

(g) Mechanical extraction of oil.

One firm in the Colony has had a mechanical process in operation for several years and a uniformly high grade of oil is produced.

There was exhibited at the British Empire Exhibition a hand operated plant which I am of opinion would meet local requirements in the oil-palm districts generally and particularly in those areas where oil-palms are dense but do not cover large areas. There are three distinct units in the set (a) a depericarper (b) a screw-press (c) a nut-cracking machine.

In addition apparatus is necessary for the preliminary heating of the fruits. This would be readily improvised however from materials locally available. The advantage of the process is that fermentation does not take place and water does not come in contact with the oil at any stage.

(h) Summary.

(a) Yields of pericarp oil from Abepa, Abetuntum, Abedam and Abefita vary within wide limits, average figures being 21%, 16%, 20% and 17% respectively.

(b) Abobobe and Adibe give higher yields of pericarp oil but in the latter case no kernels.

(c) Previous planting experiment ought to be repeated on a larger scale neglecting the native classification and choosing seeds from trees yielding a high percentage of oil and kernels.

(d) By artificial pollination the attempt should be made to ensure that pure strains are sown.

(e) Improved "native" methods of preparation are not likely to be adopted.

(f) Meantime hand operated plant has been designed which is on sale in the Colony and which with some departmental propaganda is likely to be taken into use in at least parts of the Central and Eastern Provinces.

Soil.

Since the Chemist's return from leave instructions have been received to examine various soils in the Colony. This is now being done.

Manurial Experiments.

The yields of the manurial plots at Kumasi show that there is so much inherent variation in yield from these plots that an extension of the area under experiment is necessary.

"Adco. —Two drums of this substance for converting waste material into an organic manure have been received. In conjunction with the Government Mycologist and the Superintendent of Agriculture, Aburi, the use of this on banana refuse is being tried.

Assistance has been given to the other sections and to the Superintendent of Agriculture whenever possible.

Cocoa.—Several samples of cocoa cured at the end of the main season which were affected with small white spots below the seed coat and in the convolutions of the cotyledons could not be referred to any insect or fungus damage. The condition is a purely physical one due to the extremely dry atmospheric conditions causing rapid evaporation of moisture from the pulp and interfering with the normal flow of "sweatings." Reports are expected from manufacturers as to the value of this cocoa.

R. COULL,
Agricultural Chemist.

Table A.

No.	Fruit sampled.	Peric. %	Oil %	Fibre %	Moisture %	Nut % fruit.	Kernels % fruit.	Kernels % nuts.
1.	100 Grms.	50.5	25.0	—	10.2	49.5	12.4	25.7
2.	100 "	38.6	14.3	12.5	11.8	61.4	10.6	15.7
3.	100 "	41.1	14.7	11.2	14.5	58.9	10.4	17.0
4.	100 "	50.2	23.0	—	13.6	49.8	12.6	25.2
5.	100 "	38.7	17.1	7.8	13.8	61.3	12.5	20.3
6.	100 "	72.8	31.7	15.5	25.6	27.1	12.8	46.9
7.	100 "	45.9	13.5	10.0	22.4	54.1	13.6	—
8.	100 "	57.2	23.1	12.7	21.4	42.8	10.7	—
9.	100 "	54.4	23.4	11.3	19.7	45.6	11.4	—
10.	100 "	42.8	15.4	8.7	18.7	57.2	14.3	—

Table B.

Abepa.

From 10 samples of 100 gr. each.	Pericarp %	Oil %	Fibre %	Moisture %	Nuts % of fruit.	Kernels % of fruit.	Kernels % of nuts.
Maximum	61.3	32.1	14.7	22.4	70.4	26.1	45.4
Minimum	29.9	13.0	5.7	8.2	19.6	7.2	19.4
Average	43.6	21.1	9.2	13.5	51.4	14.2	28.9

Abedam.

Maximum	66.9	39.6	15.9	25.9	64.4	19.2	38.9
Minimum	21.4	8.7	2.5	9.0	31.0	5.6	12.1
Average	44.3	20.7	9.1	16.3	52.7	12.6	23.1

Abetuntum.

Maximum	72.8	31.7	16.0	25.6	70.5	21.1	34.4
Minimum	29.9	8.1	6.1	5.5	27.1	8.7	13.5
Average	39.7	16.8	9.4	13.9	59.7	13.2	21.3

Abefita.

Maximum	60.1	22.2	9.5	18.6	66.7	22.2	45.5
Minimum	32.7	13.2	4.9	7.2	38.6	9.7	20.3
Average	39.7	17.7	7.3	13.3	60.1	16.0	28.9

Abobobe.

Maximum	72.5	37.7	18.2	21.1	45.6	17.4	45.9
Minimum	37.0	29.0	9.4	13.8	8.4	7.6	9.1
Average	56.9	33.0	12.2	18.2	32.5	13.2	33.5

D.—REPORTS BY DIRECTOR OF IMPERIAL INSTITUTE ON
PRODUCTS SENT FOR INVESTIGATION.

Kisidwe.

I have to acknowledge the receipt of your letter No. 78/7/24 of the 26th January on the subject of Kisidwe nuts together with the herbarium specimens referred to therein.

These specimens were submitted to the Royal Botanic Gardens, Kew, and found to represent *Pentadesma butyracca*, Don. In view of identification a further specimen of the original Kisidwe nuts, which were provisionally identified in 1922 as a species of *Allanblankia*, was forwarded to Kew, and the Director has now reported that as previously stated they appear to be *Allanblackia floribunda* Oliv. but he confirms his identification of the present herbarium specimens as *P. butyracca*. He adds that the seeds of the two species are very similar (differing mainly in size), but that the leaves and flowers are entirely different.

It would thus appear that some confusion has arisen in connection with the specimens recently forwarded, and I shall therefore be glad if you will kindly send for further identification authentic herbarium specimens of "kisidwe," representing the tree which yielded the nuts sent to the International Rubber and Tropical Products Exhibition in 1921 and subsequently transferred to the Imperial Institute.

In continuation of my letter of the 21st February, I have to acknowledge the receipt of your letter No. 246/7/24 of the 6th February, together with the supposed *Allanblackia* fruits referred to therein.

These fruits have been submitted to the authorities at Kew, who report that they are undoubtedly *Pentadesma butyracea*, Don. The seeds are much larger than the "Kisidwe nuts" (*Allanblackia* sp.) examined here in 1922, although as stated in my previous letter the two kinds of seeds are otherwise very similar in appearance.

With further reference to your letter No. 682/7/24 of the 3rd April last on the subject of "Kisidwe" nuts, I have to inform you that in February last a sample of *Pentadesma butyracea* kernels, labelled "Oil seeds for scientific investigation," was received here from your Department.

The kernels yielded a fat having the usual characteristics of that of *P. butyracea* seeds, as described in the Bulletin of the Imperial Institute, Vol. XI (1913), pp. 569-572 and Vol. XVI (1918), pp. 35-37.

In view of your letter of the 3rd April it seems probable that the sample was sent in mistake for *Allanblackia* nuts, and it therefore does not appear necessary to furnish a detailed report upon it.

With reference to the known unsuitability of the residual meal of *Pentadesma butyracea* kernels for use as a feeding-stuff, it may be mentioned that the meal obtained from the present sample was found to contain over 29 per cent. of tannin.

I have to acknowledge the receipt of your letter No. 821/7/24 of the 2nd May, together with the botanical specimens from Ashanti which are referred to therein. The specimens have been forwarded to the Director of the Royal Botanic Gardens, Kew, who has reported that they are undoubtedly *Allanblackia floribunda*, Oliv.

It is therefore clear that the "Kisidwe" nuts exhibited at the International Rubber and Tropical Products Exhibition in 1921 and subsequently examined at this Institute (see report of the 15th August, 1922) were the seeds of *Allanblackia floribunda*.

REPORT ON "NEELE SEED" FROM THE GOLD COAST.

The Neele seed which is the subject of this report was forwarded to the Imperial Institute by the Director of Agriculture, and is referred to in his letter No. 443/7/24 dated 1st March, 1924.

The sample was sent in accordance with a suggestion made in Imperial Institute Report of the 28th November, 1923 on Neele seeds from the Northern Territories and Western Province, that as the seed from the latter area contained much less oil than that from the Northern Territories a further sample should be forwarded to determine whether this inferiority in yield is a constant feature of the seeds of the Western Province.

Description.

The sample which was labelled "Neele or Niriseed (Akitaiwa) from Appolonia," weighed 1 lb., and consisted of flat, oval, cream-coloured seeds, which differed somewhat in colour, size and form from the previous sample of Neele seeds from the Western Province and also from the seeds collected in the Northern Territories.

Results of examination.

The seeds contained 8.3 per cent of moisture and on extraction with light petroleum yielded 37.2 per cent of a greenish-yellow oil, equivalent to a yield of 40.6 per cent from the moisture-free seeds. This is a somewhat better yield than that from the earlier sample from the Western Province, viz.—36.8 per cent from the moisture-free seeds.

Remarks.

These seeds are slightly richer in oil than those previously received from the Western Province, but both samples yielded considerably less oil than the two samples of Neele seed received from the Northern Territories, which furnished 47.7 and 48.4 per cent. As already mentioned the two samples from the Western Province are distinct in appearance, and also different from the seeds forwarded from the Northern Territories.

The samples of Neele seed forwarded from the Gold Coast therefore represent three different types. The two types previously received are being grown at Kew in order to determine whether there are corresponding differences in the plants. A quantity of the present samples from the Western Province is also being forwarded to Kew for the same purpose. In this connection it should be of interest if observations on the plants occurring in the Northern Territories and Western Province could be made in the Gold Coast.

RESULTS OF THE EXAMINATION OF SISAL HEMP FROM THE GOLD COAST.

Weight of sample—2½ lbs.

Description—Lustrous Sisal hemp of dark cream colour, well prepared on the whole though a small quantity of extraneous matter (chiefly pith) was present at the ends of some of the strands of fibre.

Strength—Good.

Length of staple—Somewhat irregular, ranging from 2 feet to 4 feet 4 inches with an average of 3 feet 6 inches.

		Present sample.	East African Sisal hemp of good quality.
Results of examination—	Moisture percent ..	9.8	9.6
	Ash	1.0	0.8
	a—Hydrolysis, loss ..	9.9	11.3
	b—Hydrolysis, loss ..	13.3	14.8
Calculated on the dry fibre—	Acid purification, loss ..	2.7	2.1
	Water washing, loss ..	1.3	not determined.
	Cellulose	75.7	77.4
	Length of ultimate fibres	—	—

The fibre is of satisfactory composition, although the quantity of cellulose present is not quite so high as in the sample of Sisal hemp from East Africa with which it was compared.

Commercial valuation.—The fibre was regarded by merchants as equal in value to No. 1 East African Sisal, which is now quoted in London at about £45 per ton. They pointed out however that prices are abnormally high at present, and that the average price for such fibre over a series of years would probably be about £35 per ton.

Remarks.—This sisal hemp is on the whole of good quality and such fibre would be readily saleable in the London market.

REPORT ON HONEY FROM BRITISH TOGOLAND.

The sample of honey which is the subject of this report was forwarded to the Imperial Institute by the Acting Government Entomologist, and is referred to in his letter No. 7/E8/24 dated the 24th April, 1924.

The honey was obtained from native bee-hives in the Adaklu District of British Togoland, where there is a considerable local trade in the product, and it was stated that the output could be largely increased if a demand arose.

Description.

The sample, which weighed 1 lb. was golden-brown, slightly cloudy viscous, and somewhat lacking in the characteristic aromatic flavour of honey.

Results of Examination.

The honey was chemically examined with the following results:—

Moisture	19.2	per cent.
Ash	0.2	„ „
Invert sugar	70.8	„ „
Sucrose	2.5	„ „
Acidity (expressed as formic acid)	0.2	„ „
Polarisation (at 20°C), before inversion, 6.8°		
Do. do. after inversion, 8.2°		

These figures show the sample to be of normal composition.

Commercial value.

The honey was submitted to a firm of importers specialising in this product, who regarded it as lacking in definite flavour and expressed the opinion that this might be due to the honey having been heated in order to liquefy it and too high a temperature having been used. It appeared to them that the honey would not "set" again, and this would somewhat reduce its commercial value as the best price is obtained in the United Kingdom for "set" honey of good colour.

The firm considered that honey of the quality of the present sample would be worth 37s. 6d. to 40s. per cwt. c.i.f. London (July, 1924). They stated that they would be pleased to assist in popularising the honey in the United Kingdom, and suggested that in the place a trial shipment, of not more than one ton, should be forwarded for sale. The honey should be packed in good serviceable barrels, ranging from one cwt. to three cwt. in capacity, or, if these are not available, in 60 lb. tins, two tins being included in each case.

Remarks.

Honey represented by this sample would be marketable in the United Kingdom, and if it is desired to create an export trade steps should be taken to forward a consignment of about one ton for trial sale. This should be consigned to the Imperial Institute, when arrangements will be made for its disposal by the firm who have reported on the present sample.

Care should be taken that the honey is not overheated during preparation, as this is liable to affect the quality adversely.

E.—APPENDIX—X,

TOTAL AND AVERAGE RAINFALL TO END OF 1924.

1st line—Total rainfall in inches.
 2nd „ Average rainfall for month in inches.
 3rd „ Total and average number of wet days.

Station.	Pro- vince.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Abomposu ..	Ash- anti.	3	3.62	5.41	15.17	21.26	23.38	28.62	18.64	3.04	15.04	35.57	20.84	8.42	199.01
			1.21	1.80	5.06+	7.09+	7.79	9.54	6.21	1.01	5.01	11.86	6.95	2.81	66.34
		3	7/2.3	20/6.7	29/9.7	44/14.7	46/15.3	53/17.7	45/15.0	29/9.7	56/18.7	66/22.0	50/16.7	12/4.0	457/152.5
Abra	C.P.	3	2.27	1.79	8.12	8.09	20.98	30.99	4.97	0.50	5.36	13.52	6.94	5.18	108.71
			0.76+	0.59	2.71	2.69	6.99	10.33	1.66+	0.17+	1.79+	4.51+	2.31	1.73	36.24
		3	4/1.3	5/1.7	18/6.0	19/6.3	28/9.3	33/11.0	15/5.0	4/1.3	19/6.3	24/8.0	15/5.0	8/2.7	192/63.9
Aburi.. ..	E.P.	34	36.85	74.54	127.60	180.19	209.21	247.98	126.02	74.66	117.94	191.70	158.15	70.73	1,615.57
			1.08	2.19	3.75	5.30+	6.15	7.29	3.71+	2.20+	3.47+	5.64+	4.66	2.08	47.52
		34	80/2.3	150/4.4	230/6.8+	275/8.1+	367/10.8+	385/11.3	354/10.4	285/8.4+	355/10.4	419/12.3	324/9.5	195/5.7	3,419/100.4
Accra.. ..	E.P.	9	5.23	5.08	18.80	27.81	47.45	60.87	22.07	5.09	20.08	34.49	13.06	5.35	265.38
			0.58	0.56	2.09+	3.09	5.27	6.76	2.45	0.57+	2.23	3.83	1.45	0.59	29.47
		9	12/1.3	12/1.3	29/3.2	47/5.2	70/7.8	80/8.9	45/5.0	31/3.4	52/5.8	70/7.8	23/2.6	9/1.0	480/53.3
Adebrem ..	W.P.	2	3.23	5.99	7.66	21.15	21.87	35.89	14.88	3.16	9.02	15.78	12.98	3.33	154.94
			1.62+	2.99	3.83	10.58+	10.94+	17.95+	7.44	1.58	4.51	7.89	6.49	1.67+	77.49
		2	9/4.5	9/4.5	16/8.0	23/11.5	37/18.5	41/20.5	22/11.0	19/9.5	22/11.0	27/13.5	27/13.5	7/3.5	259/129.5
Adjua	W.P.	5	5.02	7.44	12.35	16.82	37.42	57.91	17.74	5.23	9.97	33.15	11.72	9.95	224.72
			1.00	1.49+	2.47	3.36	7.48	11.58	3.55+	1.05+	1.99	6.63	2.34	1.99	44.93
		5	16/3.2	8/1.6	19/3.8	30/6.0	61/12.2	70/14.0	41/8.2	22/4.4	40/8.0	54/10.8	28/5.6	13/2.6	402/80.4
Akuse	E.P.	10	7.28	14.99	36.93	57.42	56.56	62.69	33.33	14.63	40.38	45.62	37.96	14.00	421.79
			0.73	1.50	3.69	5.74	5.66	6.27	3.33	1.46	4.04	4.56	3.80	1.40	42.18
		10	18/1.8	35/3.5	59/5.9	70/7.0	83/8.3	94/9.4	56/5.6	40/4.0	87/8.7	89/8.9	79/7.9	35/3.5	745/74.5
Anyinan ..	E.P.	18	22.23	49.20	116.63	109.86	148.01	175.08	134.77	67.75	135.48	141.34	59.80	29.27	1,189.42
			1.24+	2.73	6.48	6.10	8.22	9.73	7.49	3.78	7.52+	7.85	3.32	1.62	66.08
		10	14/1.4	35/3.5	69/6.9	73/7.3	83/8.3	98/9.8	69/6.9	41/4.1	87/8.7	99/9.9	58/5.8	25/2.5	751/75.1

E.—APPENDIX—X—contd.

TOTAL AND AVERAGE RAINFALL TO END OF 1924.

1st line = Total rainfall in inches.
 2nd „ = Average rainfall for month in inches.
 3rd „ = Total and average number of wet days.

Station.	Province.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Asamangkese	E.P.	2	4.78	5.70	13.24	15.76	15.24	18.12	10.19	2.47	5.47	13.46	12.41	4.14	120.98
		2	2.39	2.85	6.62	7.88	7.62	9.06	5.10+	1.23	2.74+	6.73	6.20	2.07	60.49
			10/5.0	18/9.0	16/8.0	24/12.0	27/13.5	26/13.0	24/12.0	10/5.0	16/8.0	17/8.5	13/6.5	8/4.0	209/104.5
Assuantsi ..	C.P.	16	26.22	44.42	62.39	92.22	116.36	137.29	69.82	42.34	51.05	76.46	56.09	40.28	814.94
		12	1.64+	2.78+	3.90+	5.76	7.27	8.58	4.36	2.65+	3.19	4.78+	3.51+	2.52+	50.94
			40/3.3	63/5.3 +	94/7.8	110/9.2+	170/14.2+	197/16.4	178/14.8	121/10.1	162/13.5	142/11.8	112/9.3	78/6.5	1,467/122.2
Axim ..	W.P.	10	15.06	18.63	44.09	49.26	147.68	152.45	92.07	22.72	31.17	75.28	82.68	33.62	764.71
		10	1.51+	1.86	4.41+	4.93+	14.77	15.25+	9.21	2.27	3.12+	7.53+	8.27+	3.36	76.49
			24/2.4	29/2.9	66/6.6	83/8.3	153/15.3	144/14.4	105/10.5	36/3.6	71/7.1	87/8.7	112/11.2	57/5.7	967/96.7
Ayinasu ..	C.P.	7	1.86	25.74	38.46	49.07	55.99	55.99	20.81	7.04	30.99	48.40	33.87	17.89	386.11
		7	0.27+	3.68+	5.49	7.01	8.00+	8.00+	2.97	1.01	4.43+	6.91	4.84	2.56+	55.17
			11/1.6	53/7.6	56/8.0	74/10.6	86/12.3	90/12.9	43/6.1	37/5.3	74/10.6	85/12.1	67/9.6	41/5.8	717/102.5
Begoro ..	E.P.	3	8.63	14.88	18.26	43.51	24.50	26.14	6.46	2.84	25.80	39.56	11.57	3.30	225.45
		3	2.88	4.96	6.09	14.50	8.17	8.71	2.15	0.95	8.60	13.19+	3.86	1.10	75.15
			13/4.3	27/9.0	27/9.0	44/14.7	36/12.0	42/14.0	21/7.0	11/3.7	49/16.3	59/19.7	24/8.0	14/4.7	367/122.4
Bekwai ..	Ash-anti.	11	10.70	35.66	58.74	89.75	101.45	112.94	63.00	25.02	64.25	95.96	63.96	16.44	737.87
		4	0.97	3.24	5.34	8.16+	9.22	10.27+	5.73+	2.77	5.84	8.72	5.81	1.49	67.06
			1/0.3+	23/5.8+	23/5.8+	36/9.0	41/10.3+	45/11.3+	41/10.3+	17/4.3+	44/11.0	54/13.5	44/11.0	13/4.3+	382/96.9
Dunkwa ..	W.P.	10	8.15	19.74	48.46	70.77	65.81	85.13	44.23	23.65	48.45	58.22	43.99	13.31	529.91
		10	0.82+	1.97	4.85+	7.08+	6.58	8.51	4.42	2.37+	4.85+	5.82	4.40+	1.33	53.00
			21/2.1	50/5.0	106/10.6	131/13.1	155/15.5	158/15.8	138/13.8	85/8.5	150/15.0	164/16.4	115/11.5	33/3.3	1,306/130.6
Ejura..	Ash-anti.	9	5.75	18.75	38.89	46.40	70.06	67.26	34.83	23.61	87.41	72.77	41.52	12.23	519.48
		9	0.64+	2.08	4.32	5.16+	7.78	7.47	3.87	2.62	9.71	8.09+	4.61	1.36+	57.71
			6/0.7+	35/3.9+	59/6.6+	84/9.3	95/10.6+	122/13.6+	77/8.6+	65/7.2	123/13.7	150/16.7	81/9.0	27/3.0	924/102.9

(45)

E.—APPENDIX—X—contd.

TOTAL AND AVERAGE RAINFALL TO END OF 1924.

1st line = Total rainfall in inches.
 2nd „ = Average rainfall for month in inches.
 3rd „ = Total and average number of wet days.

Station.	Province.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Goaso ..	Ash-anti.	3	1.02	4.27	7.76	28.11	16.90	20.75	11.87	1.68	14.60	21.77	13.94	1.43	144.10
			0.34	1.42	2.59+	9.37	5.63	6.92+	3.96+	0.56	4.87+	7.26+	4.65+	0.48+	48.05
		3	1/0.3	10/3.3	21/7.0	27/9.0	30/10.0	40/13.3	34/11.3	17/5.7+	44/14.7+	56/18.7+	29/9.7	6/2.0	315/105.0
Half-Assinee..	W.P.	3	4.27	12.78	25.71	19.35	28.81	56.11	10.78	1.97	8.14	28.38	18.78	15.66	230.74
			1.42	4.26	8.57	6.45	9.60	18.70	3.59	0.66+	2.71	9.46	6.26	5.22	76.90
		3	4/1.3	12/4.0	21/7.0	26/8.7+	36/12.0	39/13.0	21/7.0	12/4.0	37/12.3	39/13.0	35/11.7	23/7.7+	305/101.7
Hemang ..	C.P.	8	8.16	29.39	53.18	53.88	67.71	61.62	43.00	25.74	40.83	71.43	55.90	25.69	536.53
			1.02	3.67	6.65+	6.74+	8.46	7.70	5.38+	3.22	5.10	8.92	6.99	3.21	67.06
		8	23/2.9+	44/5.5	72/9.0	86/10.8+	121/15.1	115/14.4+	97/12.1	52/6.5	95/11.9+	115/14.4	82/10.3+	47/5.9+	949/118.8
Ho	E.P.	3	1.93	17.42	11.27	22.09	18.04	23.65	6.87	4.52	24.84	30.57	9.32	4.59	175.11
			0.64	5.81	3.76	7.36	6.01	7.88	2.29	1.51	8.28	10.19	3.11+	1.53	58.37
		3	5/1.7	24/8.0	26/8.7	33/11.0	35/11.7	47/15.7	23/7.7	14/4.7	45/15.0	52/17.3	25/8.3	11/3.7	340/113.3
Juaso.. ..	Ash-anti.	9	7.52	19.21	56.30	59.03	69.58	85.31	50.03	20.78	75.32	77.21	41.61	17.26	579.16
			0.84+	2.13	6.26	6.56+	7.73	9.48+	5.56+	2.31	8.37+	8.58+	4.62	1.92+	64.36
		9	17/1.9+	45/5.0	91/10.1	100/11.1	114/12.7	139/15.4	119/13.2	62/6.9+	137/15.2	150/16.7+	98/10.9+	42/4.7+	1,114/123.8
Keta	E.P.	19	11.87	17.64	27.59	56.82	85.92	112.67	39.21	15.10	20.33	58.69	29.59	9.47	484.90
			0.63	0.93	1.45	2.99	4.52	5.93	2.06	0.79	1.07	3.09	1.56	0.50	25.52
		9	6/0.7	8/0.9	27/3.0	54/6.0	78/8.7	74/8.2	31/3.4	19/2.1	37/4.1	68/7.6	20/2.2	7/0.8	429/47.7
Kibi	E.P.	12	14.22	36.56	69.30	85.08	75.82	112.41	57.34	36.50	69.74	99.93	73.43	35.96	766.29
			1.19	3.05+	5.78	7.09	6.32	9.37+	4.77	3.04	5.81	8.33	6.12	2.99	63.86
		12	33/2.8	83/6.9	146/12.2	150/12.5	167/13.9	200/16.7	173/14.4	113/9.4	180/15.0	213/17.7	157/13.1	77/6.4	1,692/141.0
Kintampo ..	Ash-anti.	10	3.13	19.19	48.12	68.94	85.59	111.20	68.79	46.94	133.98	98.21	42.55	4.29	730.93
			0.31	1.92+	4.81	6.89	8.56+	11.12	6.88+	4.69	13.40+	9.82	4.26+	0.43	73.09
		10	7/0.7	32/3.2	70/7.0	95/9.5	115/11.5	133/13.3	101/10.1	87/8.7	207/20.7	156/15.6	67/6.7	9/0.9	1,079/107.9

E.—APPENDIX—X—contd.

TOTAL AND AVERAGE RAINFALL TO END OF 1924.

1st line = Total rainfall in inches.
 2nd „ = Average rainfall for month in inches.
 3rd „ = Total and average number of wet days.

Station.	Pro- vince.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Koforidua ..	E.P.	3	1.53	9.16	9.11	15.26	17.02	28.41	12.29	2.24	15.54	20.60	8.65	7.11	146.92
			0.51	3.05	3.04	5.09	5.67	9.47	4.10	0.75	5.18	6.87	2.88	2.37	48.98
		3	6/2.0	12/4.0	17/5.7	31/10.3	33/11.0	37/12.3	20/6.7	6/2.0	33/11.0	37/12.3	27/9.0	14/4.7	273/91.0
Kpedshu ..	E.P.	2	3.14	8.36	16.18	10.88	14.44	13.86	4.79	1.23	9.92	23.13	7.51	4.09	117.53
			1.57	4.18	8.09	5.44	7.22	6.93	2.40+	0.61	4.96	11.57+	3.75	2.05+	58.77
		2	4/2.0	10/5.0	12/6.0	24/12.0	23/11.5	22/11.0	12/6.0	8/4.0	20/10.0	33/16.5	12/6.0	4/2.0	184/92.0
Kratchi ..	N.T.	6	2.37	11.60	16.03	25.73	30.16	42.34	39.77	16.07	52.81	37.36	13.01	2.06	289.31
			0.40+	1.93	2.67	4.29+	5.03	7.06+	6.63+	2.68+	8.80	6.23+	2.17+	0.34	48.23
		4	7/1.7	23/5.7	33/8.2	44/11.0	43/10.7	54/13.5	54/13.5	44/11.0	87/21.7	71/17.7	32/8.0	4/1.0	496/123.7
Kumasi ...	Ash- anti.	18	10.63	42.00	90.47	110.04	116.77	156.84	97.78	56.01	129.34	140.30	70.75	23.02	1,043.95
			0.59	2.33	5.03	6.11	6.49+	8.71	5.43	3.11	7.19+	7.79	3.93	1.28+	57.99
		10	11/1.1	44/4.4	96/9.6	104/10.4	109/10.9	133/13.3	110/11.0	82/8.2	126/12.6	144/14.4	89/8.9	29/2.9	1,077/107.7
Labadi ..	E.P.	2	1.66	3.14	6.80	7.48	11.46	6.06	2.17	0.12	3.85	8.55	0.17	3.36	54.82
			0.83	1.57	3.40	3.74	5.73	3.02	1.09+	0.06	1.92	4.28+	0.08	1.68	27.41
		2	4/2.0	4/2.0	10/5.0	11/5.5	12/6.0	9/4.5	8/4.0	2/1.0	5/2.5	7/3.5	1/0.5	3/1.5	76/38.0
Mansu ..	W.P.	11	29.74	28.41	46.63	69.43	100.42	108.44	51.27	20.33	48.33	69.63	61.73	38.77	673.13
			2.70	2.58	4.24+	6.31	9.13+	9.86+	4.66	1.85+	4.39	6.33	5.61	3.52	61.18
		3	17/5.7	15/5.0	19/6.3	24/8.0	41/13.7+	48/16.0	21/7.0	10/3.3	39/13.0	40/13.3	28/9.3	13/4.3	315/104.9
Mpraeso ..	E.P.	7	7.35	17.47	32.23	42.27	57.29	70.32	55.57	29.44	62.82	54.52	37.30	18.55	485.13
			1.05	2.50	4.60	6.04+	8.18	10.05+	7.94	4.21	8.97	7.79	5.33+	2.65	69.31
		7	19/2.7	34/4.9	76/10.9	58/8.3+	103/14.7	143/20.4	120/17.1	74/10.6+	149/21.3+	118/16.9	71/10.1	30/4.3+	995/142.2
Oda ..	C.P.	10	10.08	21.11	51.17	68.45	70.62	85.43	42.74	23.31	61.98	81.68	75.21	23.97	615.75
			1.01+	2.11	5.12+	6.85+	7.06	8.54	4.27	2.33	6.20+	8.17	7.52	2.40+	61.58
		10	27/2.7	53/5.3	107/10.7	119/11.9	134/13.4	151/15.1	136/13.6	110/11.0	146/14.6	177/17.7	162/16.2	61/6.1	1,383/138.3

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E.—APPENDIX—X—contd.

TOTAL AND AVERAGE RAINFALL TO END OF 1924.

1st line = Total rainfall in inches.
 2nd „ = Average rainfall for month in inches.
 3rd „ = Total and average number of wet days.

Station.	Province.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	
Odumase ..	E.P.	3	5.21	8.72	6.91	14.58	15.65	23.85	No records taken.							
		3	1.74+	2.91+	2.30	4.86	5.22+	7.95								
			8/2.7	17/5.7+	20/6.7+	27/9.0	33/11.0	41/13.7								
Peki ..	E.P.	10	7.27	19.54	40.13	55.29	45.72	93.75	47.63	33.45	66.35	63.91	39.07	14.68	527.29	
		10	0.73+	1.95	4.01	5.53+	4.57	9.37	4.76	3.34	6.63	6.39	3.91	1.47+	52.73	
			18/1.8	43/4.3	70/7.0	96/9.6	96/9.6	120/12.0	93/9.3	58/5.8	112/11.2	124/12.4	80/8.0	25/2.5	935/93.5	
Salaga ..	N.T.	10	2.86	6.15	23.73	51.41	49.61	72.91	55.94	62.32	101.88	58.44	14.27	1.02	500.54	
		10	0.29+	0.62+	2.37	5.14	4.96	7.29	5.59	6.23	10.19+	5.84	1.43+	0.10	50.05	
			6/0.6	20/2.0	51/5.1	74/7.4	111/11.1	102/10.2	105/10.5	93/9.3	164/16.4	118/11.8	41/4.1	4/0.4	889/88.9	
Saltpond ..	C.P.	10	4.51	4.31	24.72	32.76	68.77	80.81	25.31	8.24	16.70	26.89	20.11	9.87	322.80	
		10	0.45	0.43	2.47	3.28+	6.88	8.08	2.53	0.82	1.67	2.69+	2.01	0.99+	32.30	
			11/1.1	14/1.4	31/3.1	54/5.4	87/8.7	99/9.9	58/5.8	34/3.4	51/5.1	45/4.5	26/2.6	15/1.5	525/52.5	
Sekondi ..	W.P.	11	12.69	9.25	26.86	46.95	86.94	84.84	45.75	22.97	17.78	43.23	39.17	15.16	451.59	
		10	1.15	0.84+	2.44+	4.26+	7.90	7.71	4.15+	2.08+	1.61	3.93	3.56	1.37+	41.05	
			20/2.0	19/1.9	48/4.8	70/7.0	110/11.0	117/11.7	93/9.3	72/7.2	93/9.3	89/8.9	60/6.0	35/3.5	826/82.6	
Seyisie (Butre) ..	W.P.	4	5.69	6.65	11.10	15.84	26.37	48.58	16.08	3.13	10.99	22.03	6.40	10.63	183.49	
		4	1.42	1.66	2.78+	3.96	6.59	12.15+	4.02	0.78	2.75+	5.51+	1.60	2.66+	45.88	
			9/2.3+	12/3.0	22/5.5	35/8.8+	62/15.5	73/18.3+	42/10.5	26/6.5	37/9.3+	43/10.8+	24/6.0	19/4.8+	404/101.3	
Siwum ..	W.P.	3	2.41	6.13	13.62	16.32	29.25	28.27	17.01	3.21	15.99	23.30	16.30	6.30	178.33	
		3	0.80	2.04	4.54	5.44	9.75	9.42	5.67	1.07	5.33	7.77+	5.51+	2.10	59.44	
			6/2.0	13/4.3	25/8.3	37/12.3	36/12.0	39/13.0	31/10.3	12/4.0	32/10.7	41/13.7	34/11.3	11/3.7	317/105.6	
Sunyani ..	Ash- anti.	10	7.00	23.24	51.86	70.36	62.09	63.09	50.41	21.00	72.86	75.31	41.02	4.51	542.74	
		10	0.70	2.32	5.19+	7.04+	6.21+	6.31+	5.04	2.10	7.29+	7.53	4.10	0.45	54.28	
			14/1.4	42/4.2	82/8.2	113/11.3	114/11.4	134/13.4	107/10.7	72/7.2	148/14.8	157/15.7	84/8.4	16/1.6	1,083/108.3	

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E.—APPENDIX—X.—contd.

TOTAL AND AVERAGE RAINFALL TO END OF 1924.

1st line = Total rainfall in inches.
 2nd „ = Average rainfall for month in inches.
 3rd „ = Total and average number of wet days.

Station.	Province.	No. of years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Tamale ..	N.T.	15	0.79	3.53	40.10	45.84	68.83	86.12	79.82	119.68	130.63	40.35	10.21	1.90	627.80
		10	0.05 3/0.3	0.23 9/0.9	2.67 38/3.8	3.05 58/5.8	4.59 87/8.7	5.74 95/9.5	5.32 99/9.9	7.98 114/11.4	8.71 167/16.7	2.69 73/7.3	0.68 19/1.9	0.13 4/0.4	41.84 766/76.6
Tarkwa ..	W.P.	21	40.64	71.92	126.40	154.87	186.11	220.90	123.44	44.19	92.08	174.91	138.40	71.42	1,445.28
		13	1.94+ 56/4.3	3.42 98/7.5	6.02+ 137/10.5	7.37 148/11.4+	8.86 208/16.0	10.52+ 218/16.8+	5.87+ 175/13.2+	2.10 127/9.8+	4.38 199/15.3	8.33+ 239/18.4+	6.59 190/14.6	3.40 102/7.8	68.86 1897/145.6
Wa ..	N.T.	8	4.71	4.58	11.82	31.26	40.28	44.87	45.67	61.72	76.98	22.25	8.04	5.47	357.65
		8	0.59+ 6/0.7	0.57 9/1.1	1.48+ 28/3.5	3.91+ 59/7.4	5.04+ 70/8.8	5.16+ 73/9.1	5.71+ 81/10.1	7.72+ 94/11.8+	9.62 128/16.0	2.78 57/7.1	1.01 24/3.0	0.68 7/0.9	44.72 636/79.5
Wenchi ..	Ashanti.	3	0.94	8.55	8.47	23.27	15.00	21.75	5.63	3.46	23.32	29.01	14.77	1.50	155.67
		3	0.31 2/0.7	2.85 11/3.7+	2.82 11/3.7+	7.76+ 34/11.3	5.00 29/9.7	7.25 32/10.7	1.88+ 13/4.3	1.15 13/4.3	7.77 47/15.7	9.67 57/19.0	4.92 25/8.3	0.50 3/1.0	51.88 277/92.4
Wioso ..	W.P.	9	12.06	18.91	52.11	45.63	61.35	81.75	42.21	18.19	47.32	62.50	40.32	14.48	496.83
		9	1.34 20/2.2	2.10 42/4.7	5.79 82/9.1	5.07 100/11.1	6.82+ 105/11.7	9.08 134/14.9	4.69 99/11.0	2.02 70/7.8	5.26+ 112/12.4	6.94 111/12.3	4.48 83/9.2	1.61 27/3.0	55.20 985/109.4
Yendi ..	N.T.	3	4.31	0.85	6.05	25.70	13.12	16.48	24.57	10.35	48.36	14.33	2.62	—	166.74
		3	1.44+ 3/1.0	0.28 3/1.0	2.02+ 5/1.7+	8.57+ 18/6.0	4.37 18/6.0	5.49 23/7.7+	8.19 22/7.3	3.45 12/4.0	16.12 41/13.7	4.78+ 27/9.0	0.87 4/1.3	—	55.58 176/58.7
Zuaragu ..	N.T.	7	0.71	0.10	3.88	28.24	22.77	43.57	37.92	79.31	76.52	13.41	4.87	0.42	311.72
		7	0.10 3/0.4	0.01 1/0.1	0.55 12/1.7	4.03 42/6.0	3.25 38/5.4	6.22 57/8.1	5.42+ 65/9.3+	11.33 76/10.9+	10.93 101/14.4	1.92+ 31/4.4	0.70+ 7/1.0	0.06 1/0.1	44.52 434/01.8

E.—APPENDIX—X.—contd.

METEOROLOGICAL OBSERVATION RECORDED AT ABURI, 1,500 FEET ABOVE SEA LEVEL DURING THE YEAR, 1924.

Month.	Temperature (Degrees F.)							Rainfall in inches.	Clouds Amount.	Wind Force.
	Shade Max.	Shade Min.	Dry Bulb.	Wet Bulb.	Solar Max	Terris Min.	Relative Humidity.			
January ..	87.83	70.06	76.16	73.16	145.29	66.22	84.44	1.33	6.83	2.25
February ..	90.37	70.48	77.62	74.13	156.10	66.58	82.27	3.60	7.27	2.86
March ..	90.64	70.83	78.35	75.	154.70	65.03	82.87	.75	6.90	2.29
April ..	88.09	69.53	77.06	68.2	119.8	65.56	84.43	5.84	7.7	2.43
May ..	88.61	71.35	78.48	74.74	163.58	68.77	81.16	7.40	7.67	1.77
June ..	84.17	69.9	75.15	73.3	144.15	67.25	86.28	3.96	7.34	1.77
July ..	82.32	67.77	73.00	70.83	146.35	66.64	87.93	2.62	8.61	1.19
August ..	82.87	68.12	72.19	70.51	143.51	66.22	90.77	1.15	8.93	2.22
September ..	82.53	66.5	72.46	70.5	145.1	66.3	89.08	5.20	11.63	1.9
October ..	83.51	65.74	73.58	71.61	154.80	64.48	89.35	7.03	8.35	1.51
November ..	84.06	62.5	75.43	73.8	156.1	68.56	93.08	7.78	7.93	1.53
December ..	84.06	63.70	74.93	73.48	146.19	67.77	92.06	7.48	8.16	2.06

Monthly Averages.

Average for 1924 .	85.75	67.89	75.36	72.30	147.64	66.59	86.97	4.51	8.05	1.91
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F.—APPENDIX "X."

VALUE AND QUANTITY OF THE PRINCIPAL VEGETABLE PRODUCTS EXPORTED FROM THE COLONY DURING THE LAST TEN YEARS.

Year.	Cocoa.		Cola-Nuts.		Guinea Grains.		Palm Kernels.	
	Tons.	Value. £	lbs.	Value. £	lbs.	Value. £	Tons.	Value. £
1916	72,123	3,846,090	6,742,898	130,571	2,280	38	5,857	85,899
1917	90,964	3,146,851	11,984,645	239,134	5,253	173	4,768	74,911
1918	66,343	1,796,985	13,254,538	262,144	32,799	1,407	8,933	152,922
1919	176,155	8,278,166	16,319,972	350,249	12,868	513	9,892	253,243
1920	124,773	10,056,298	16,203,851	452,745	18,534	530	7,664	224,684
1921	133,195	4,764,067	13,693,412	463,597	13,846	285	1,650	30,820
1922 (January-March quarter)	71,777	2,562,274	3,497,116	90,328	1,664	25	515	9,257
1922-1923	176,245	6,445,384	12,825,127	332,923	2,820	25	3,039	43,003
1923-1924	197,444	6,058,223	15,489,255	351,865	1,029	16	4,563	69,863
1924-1925	220,355	7,896,917	16,434,761	361,164	—	—	7,554	122,437

Year.	Palm Oil.		Rubber.		Cotton.		Copra	
	Gallons.	Value. £	lbs.	Value. £	lbs.	Value. £	Tons.	Value. £
1916	450,360	38,302	2,215,973	78,865	18,896	447	633	14,386
1917	198,900	24,770	2,961,204	110,272	43,870	227	736	19,916
1918	670,867	83,689	1,391,097	57,006	20,640	211	99	2,772
1919	938,595	140,163	721,588	33,637	Nil	—	983	30,091
1920	629,612	114,084	299,180	27,331	24,394	234	427	17,501
1921	67,447	7,718	102,780	6,744	19,068	755	443	10,488
1922 (January-March quarter)	702	91	7,618	215	—	—	15	302
1922-1923	298,979	28,999	15,282	430	7,704	251	1,694	33,987
1923-1924	408,360	43,301	364,664	11,442	131,295	2,703	1,305	29,333
1924-1925	1,588 tons	40,154	224,334	7,624	452,941	5,724	1,075	24,758

G.—APPENDIX—X.—contd.

STAFF OF DEPARTMENT OF AGRICULTURE AS AT 31st MARCH, 1925.

Title.	No.	Names.
Director	1	C. H. Knowles, B.Sc. (Lond.)
Deputy Director	1	Vacant.
Secretary	1	J. M. Dunbar.
Assistant Director of Agriculture for Research ..	1	R. H. Bunting, F.L.S.
Government Mycologists ..	2	R. H. Bunting, F.L.S., H. A. Dade, A.R.C.S.
Government Entomologists ..	2	W. H. Patterson, G. S. Cotterell, A.R.C.S., D.I.C., F.E.S.
Agricultural Chemists	2	R. Coull, B.Sc. (Edin.) One vacancy.
Botanist	1	F. N. Howes (a), B.A., F.L.S.
Chemist's Assistant	1	R. D. J. M'Cauley.
Laboratory Apprentices	3	Three.
Provincial Superintendents ..		A. C. Miles, C. Saunders, N.D.A., N.D.D., A. B. Culham. One vacancy.
Superintendents		G. H. Eady, W. C. Fishlock, J. Steele, N.D.A., N.D.D.
Assistant Superintendents ..	19	M. Vardy, A. W. Paterson, N.D.A., N.D.D., H. K. Hewison, H. Nicholas, B.A. (Cantab.), W. H. Beckett, B. T. Steemson (a) J. C. Muir (a) B.Sc. (Glasgow), F. A. Robb (a), B.Sc. (Glasgow), N.D.A. E. A. Brew (b), J. S. Martinson (b) M. Alexis (b) One vacancy.
Superintendent, Agricultural and Forestry Training Centre ..	1	T. Hunter.
Assistant Do.	1	W. T. O. Maidment (a) B.A. (Cantab.).
1st Division Officers.		
Travelling Instructors	2	N. T. Clerk and G. H. Amoo.
2nd Division Officers.		
Overseers		R. B. Pobee, A. B. Mensah, J. N. Akwafoe.
Assistant Overseers	38	S. G. Opata, E. K. Sese, W. F. Adakwa, F. A. Paku, F. T. Hammond, I. N. Acquah, A. K. Nkpe, G. K. Seth, R. O. Antwi, J. K. Pera, E. C. Gyabah, S. K. Ameko, E. W. Dankwa, S. P. Pobee, J. E. Onyinah.
Junior Assistant Overseers ..		I. N. Frimpong, S. R. B. Fletcher, T. V. Danso, G. Asima, D. A. Reynolds, A. Y. Abbah, N. K. Ababio, E. K. Ge, E. M. Addipah, C. A. Boateng, E. V. Sackey, T. E. Asiedu. Eight vacancies.
Learners	34	27. Seven vacancies.
Special Appointments.		
Superintendent Sisal	1	J. E. Symond.
Assistant Do.	1	J. M. Wingate.
Coconut Instructors	2	T. H. Carry, P. A. Herft (a)
Clerical Staff.		
1st Division Clerk	1	H. G. Wilmot.
2nd Division Clerks	10	F. K. Robertson, G. A. Saforo, E. R. Amoah, I. L. Mensah, P. K. A. Badoo, J. M. Adams, G. B. Ofei, J. T. Almoah, R. Newton, W. D. Duncan.
Temporary Clerk	1	E. D. Addo.
(a) Not yet assumed duty.		
(b) African.		