

VISIT TO THE GOLD COAST

1st to 14th November, 1953

by

Thos. D. Hall.

As the result of certain discussions Dr. J. F. V. Phillips, Professor of Agriculture at the University College of the Gold Coast, had with Imperial Chemical Industries, Limited and Sir Ernest Oppenheimer in London early in 1952, and subsequent information supplied to African Explosives and Chemical Industries, Limited, our Board decided in December, 1952 to make a grant of £1,500 for two years for the appointment of an officer, whom Professor Phillips says would be at Senior Lecturer level and would be titled, "Research Fellow in Ecological Land Utilization and Planning". He also stated in his memorandum of 5th May, 1952 that existing and prospective arrangements do not specifically provide for a senior appointment by the College in this subject and pointed out in considerable detail how necessary and important such an appointment was. Furthermore, "The setting up of a small sub-department for research and for the training of men in this kind of survey and planning would probably have important bearing on the course of agricultural development in the Gold Coast, and, it is expected elsewhere in British West Africa." There is apparently considerable demand for men trained along these lines not only in Africa but on a world-wide basis.

Professor Phillips also told me that I.C.I.'s contribution is to be a senior staff member in the person of Mr. Peacock, an Entomologist, and a specialist in eelworm research, who will come out for two years, but may possibly be reappointed for a further period or replaced by someone else. This biological scientist will further strengthen Professor Phillips' team, as there are many insect pests which must be taken into consideration when compiling the conclusions on the data of a land-use survey.

This then is the set-up into which I was asked to look and get more background and report on after visiting the Gold Coast, which I did in the period 1st November, 1953 to 14th November, 1953.

The Country and Climate:

Professor Phillips had prepared a comprehensive programme which would give me a good idea of agriculture in the principal zones, also enabling me to meet many important persons, from ministerial level down to junior research officers.

The Gold Coast in area is 91,842 square miles, about 20,000 square miles smaller than the Transvaal. What it concedes in area, however, it more than makes up in rainfall and rivers. It has 334 miles of coast, a waist of 200 miles and a length of about 470 miles. The chief climatic zones are the dry coastal belt, the central forest belt, where the cocoa is grown, and the northern guinea savannah, which is a kind of high rainfall tropical bushveld, which reminded me very much of portions of Southern and Northern Rhodesia. The rainfall is around 29 inches in the coastal area, 58 to 83 inches in the forest belt, and 40 to 45 inches in the hot bushveld.

The mean maximum temperature is given as 85° to 92°F, and the mean minimum 69° to 73° with a relative humidity of 61 per cent in the hotter north and 82 to 86 per cent in the coastal and forest zones.

Population:

Out of a population of 4,117,779, non-Africans amount to only 6,770 of whom 4,211 are British, 1,213 Lebanese, while 26 other nationalities comprise the rest. The Africanization of the Service is proceeding as rapidly as men can be trained. Whereas only 40 senior posts were occupied by Africans in 1938, by 1952 there were nearly 480 so placed.

The most populous town is Accra the capital right on the coast with 133,192 persons; next Kumasi the capital of the Ashanti Province with 77,689; Sekondi-Takoradi, the main harbour town 43,743, while Cape Coast, the oldest British settlement has 23,206. There are a further seven towns with a population of over 10,000. It will be seen that far the greater number of the people are on the land and in small towns and villages.

Agriculture - the Basic Industry:

This colony produces more cocoa than any other country. Cocoa is in fact its life blood. Over 220,000 tons are sold yearly, mostly to the United States and Great Britain. Its value is around £60 million while exports of gold are only £8.5 million, diamonds £6 million, manganese ore £7 million and timber just under £5 million. Other exports are palm kernels, copra, shea nuts and kola nuts.

In addition to the above the country is largely self supporting in food crops, with the exception of dairy products, meat and eggs.

The principal food crops are:

Northern Zone: Yams, millet (*Pennisetum*), guinea corn (sorghum, a giant kaffircorn), maize, rice, cowpeas, groundnuts, bambarra groundnuts, fra-fra potatoes (coleus), and "neri" (*Cucumis yelo*).

Forest Zone: Plantains, yams, cassava, coco-yams, maize, rice and groundnuts.

Dry Coastal Zone: Cassava, maize, groundnuts, cowpeas, bambarra groundnuts.

Cattle:

These are officially estimated at 339,000. They are very small but hardy, and certain strains resistant to tsetse-borne diseases are being improved by selection and breeding. A certain amount of cross breeding is also taking place. Fulanis, a zebu type with much higher milking qualities, have been introduced, but they are not tsetse fly resistant. An experimental herd of the latter is doing well at Nungwa on the Accra plains. West African shorthorns, and N'Damas from French Guinea, are being crossed at the Nyankpala Experiment Station, and also the Fulani (zebu) with the local strain. The local strain gives only 100 gallons of milk a year and less. At the experiment stations, in addition to breeding and selection, the cattle are being improved by better grazing management and nutrition.

The goats in the coastal area are the smallest I have ever seen, and so are the sheep, but in the north they are larger. Some cross-breeding experiments with mutton rams, like Wiltshires, will be tried. Pig breeding appears to be most promising and good results have been obtained from crossing Large Whites with Essex and local pigs.

According to the government statistician about two thirds of the adult male population is engaged in agriculture. Probably one sixth or more is engaged in cocoa production, and about half in the growing of food. This makes a bad showing compared with Europe and the United States where the proportion is one eighth to one sixth of the adult male population, and suggests that with more education and a higher standard of living there will be more mechanisation and so more efficient production as far as man-power is concerned.

Having given you a brief outline of the agricultural activities on the land I now wish to give you some idea of the technical and educational facilities which exist for the improvement of agricultural practice, and for so small a colony I assure you they are considerable.

Administrative, Advisory and Technical Services, for Promoting Agricultural Progress:

At the head of these services is the:

Ministry of Agriculture and Natural Resources

which includes

Agriculture	Forestry
Animal Health	Game
Cocoa Rehabilitation	Tsetse Control
Fisheries	Rural Water Development.

The Minister today is the Hon. A. Casely-Hayford, with whom I had two interviews and who gave me considerable information. He also asked me to thank personally the Research Section of the Union Department of Agriculture for all the help they had given him. He also wished to know if we could not help him with some suitable agricultural films, and said he would like one of the Witwatersrand Agricultural Show, and also some posters for his educational kiosk at Accra.

Good interdepartmental liaison is maintained between all the departments of the Ministry.

The Director of Agriculture, Mr. E. W. Leach, also serves on seven boards and committees which are doing good work in changing the agricultural pattern: these are:

1. Agricultural Advisory Committee.
2. Gold Coast Cocoa Marketing Board.
3. Agricultural Produce Marketing Board.
4. Board of Education.
5. Management Committee of West African Cocoa Research Institute.
6. Gold Coast Agricultural Development Corporation.
7. Board of Gonja Development Company.

There is also a Central Land Utilization Company. I saw something of the work of Nos. 5 and 7 which will be discussed further on.

The Department of Agriculture is well organized under a director and two deputy directors. One of the latter, Mr. Ward, is in charge of general agriculture, education and research, and the other, Mr. Broach, of cocoa disease control and rehabilitation. I was told that the general division had 60 senior staff, while for cocoa disease control there were 200 officers. With all the juniors there is a large staff, and with labourers it goes into thousands. Some 19 experiment stations are listed but whether all are functioning I cannot say: the only one I visited, Nyankpala, was doing good work.

Education:

The Agricultural Training Centre, Cadbury Hall, Kumasi, undertakes the training of junior technical staff. An important section which I did not see was that of Soil Conservation and Land Planning in the Northern Territories, which has been controlled by the Central Land Utilization Committee, of which the Chief Regional Officer, Mr. A. J. Loveridge O.B.E., is the chairman. He did, however, tell me a great deal about the good work being done in the north east and north west corners, and I was told by Professor Phillips that the Minister had spoken appreciatively of the work of two South African conservation officers in that area.

Another important department which I did not see was The Department of Soil and Land-Use Survey at Kumasi, which developed out of the Soils Division of the Department of Agriculture, but was made autonomous in May, 1951. It started work originally in the cocoa areas, but its duties have now extended all over the colony. It has carried out a big soil survey in Accra-Akuse-Ada plains in connection with the Volta River Project and others are planned around Takoradi, and in the Northern Territories. It is considered that the need for soil and land-use surveys will continue for many years, as this knowledge will be required in problems of land conservation and resettlement on a better scientific basis.

It will be largely in training personnel for this department that the grant our Company has made Professor Phillips will be used.

In addition to the many activities of a strong Department of Agriculture, there are also Inter-territorial Institutes carrying out research required by other West Coast Colonies as well, and controlled by the West African Inter-territorial Secretariat:

- West African Cocoa Research Institute at Tafo
- West African Oil Palm Research Institute at Benin, Nigeria
- West African Rice Research Institute in Sierra Leone
- West African Veterinary Research Institute, Vom, Nigeria.

This should give an intelligent idea of some of the administrative and research activities in the Gold Coast and I can now discuss what relation the new faculty of Agriculture, a Department of the University College of the Gold Coast, has to them.

To this faculty have been or will be appointed specialists in soils, crop production, grassland management, animal production, soil and water conservation, farm mechanisation, economics of production, ecological land-use survey and planning, and entomology. They will do research on special projects in consultation and in co-operation with the Department of Agriculture, so that there will be no overlapping.

The investigations of this team will supplement or give the Department of Agriculture new information in many fields - e.g. the soil studies, and crop, pasture and irrigation investigations on the Akuse black soil and the grey sandy soil at the Nungwa Station will supplement the data obtained at the Kpong Station under higher rainfall by the Department of Agriculture and F.A.O. team. On account of special facilities and freedom from administrative and routine advisory services, this team should be more able to accumulate data of use to:

- (i) The Volta River Project
- (ii) The National Food Board
- (iii) Soil and Land-Use Survey and Planning.
- (iv) Technical Advisory Committee for the Development of Agriculture and Natural Resources.

Courses in Agriculture:

The course is a comprehensive one and will take students four to five years to complete, before they receive the coveted diploma of B.Sc. (Agriculture) London. The syllabus is, of course, modified to meet tropical crop conditions, and should be a popular course in time, and also with Africans from other colonies who wish to enter Agricultural Departments. It may even come to rival Trinidad in the future. There are few students now, but there is little doubt their number will increase when men realize the demand and also the great need of their country for men so trained. To provide a large number of trained and inspired personnel will be perhaps the most important work of this Department. A scholarship for an overseas student has already been awarded and Mr. Foster, a post graduate student from Oxford, is working for his D. Phil. London in this Department, on the technique of radio active phosphorus studies in relation to selected cash and other crops in the Gold Coast. He is the only non-African student at Legon Hall, and is finding it an interesting and well worthwhile experience.

Professor Phillips in his letter of 15th December, 1952 did discuss the possibility of collaborating in other work - e.g. soil nutrition studies. However, within the limitations of the grant, and considering the importance of training men for field work and research along Ecological Land-Use Survey and Planning, I think our association can well be left there for the present. Mr. P. Nye has done outstanding work on soil studies and fertilizer requirements, and I feel that he has laid a firm foundation for future developments along these lines.

Professor Phillips had arranged a well planned programme for me so I think I should mention briefly some observations made on these visits, which will shed further light on agricultural activities in that country.

The Volta River Project:

This project has been much in the news overseas and is perhaps the most important topic of conversation on the Gold Coast, after cocoa production and swollen shoot disease control. This vast project which will take at least £150 million to complete is one that will in time transform the whole aspect and economy of that country. It has been under consideration for five years or more and numerous experts are studying various phases of the plan. Civil, electrical and irrigation engineers, economists, sociologists, doctors of tropical medicine, agriculturists, railway contractors, harbour builders, bauxite miners, and aluminium manufacturing technicians are examining the possibilities and implications,

as everyone is determined they do not want another Groundnut Scheme.

We were taken to the most favoured dam site at Ajena, where there is an island in a fairly narrow gorge, about 50 miles from the Volta mouth. The hills on both sides are well forested except for an area which has been cleared for the hydro-electric station on the east bank. Engineers were comfortably installed and boring was in progress to prove the nature of the bottom. We were amazed to be told that the walls of this huge dam would be of packed stone on to a wide and deep core of clay.

The Dam and Its Accessory Implications:

The dam wall and the power house are to cost £50 million. A railway will, however, have to be built to the bauxite deposits, and from Ajena to Tema, the new port 17 miles east of Accra and about 50 miles from Ajena, and, of course, the factory for aluminium production has to be built as well. Forty thousand cusecs of water will keep the turbines turning and produce 500,000 kilowatts, about ninety per cent of which will be used by the aluminium producing company. It is estimated that about 240,000 acres on the Accra-Akuse-Ada plain could be brought under irrigation. At the time of our visit, shortly after the cessation of the rains, an engineer told me the river was running 150,000 cusecs, which is the figure given me for the Vaal in flood. The Volta in flood runs 240,000 to 340,000 cusecs, and is believed occasionally to go as high as 900,000 cusecs. The Vaal below the barrage when flowing normally in the dry season runs 500 - 3,000 cusecs. Some miles back of the gorge, through the Akwapim Hills, the country flattens out and is of low altitude, and it is estimated that 2,500 square miles will be flooded when the dam is completed, which means 1,600,000 acres. This in itself raises all kinds of problems - sociological, economical and health - and meant a thorough survey of the river system for hundreds of miles, which is taking up much time. The river goes through large forested areas - what shall be done to the trees? If they are left they may be a danger to navigation for a quarter of a century or more, as some are 200 feet high. I was told that just to push them over would cost £1 - £10 per acre, to push over and burn £10, but to clear £100. How far could this cost be offset by making charcoal? The Gold Coast is short of fuel and one of its imports from South Africa is coal. At present it uses 250,000 tons of charcoal a year. Another asset would be navigation for a long distance inland, and a great increase in fish potential. The latter is important as the area is short nutritionally in high quality protein. Another important factor - could not crops be grown on the cleared areas, as the river receded in the dry season, as is done in Egypt - e.g. guinea corn (kaffir corn), rice, maize?

These were all questions posed by Dr. A. S. Morgan, a former chairman of the T.V.A., and a famous hydro-electrical authority. We also had a discussion with Commander R. G. A. Jackson who is the special commissioner for the Volta River Project, and liaison officer at a high level between the various interests in Africa and Britain, Canada and America. Non-mechanical peasant agriculture takes up so much man power at present that labour looms up as a big problem, as it will be needed for dam, power-house and factory building, railways and harbour, housing, sanitation, navigation, irrigation, fisheries, bush clearing and increased food production.

Work in Progress:

Certain parts of the project are already being worked, like the railway to Tema Harbour and the harbour itself. There is a simple but adequate head office building in Accra for the top level administrative and engineering staff, and Sir William Halcrow and partners have already put up an impressive lot of flats for their staff.

Mr. P. Hall, who has had years of practical experience in that successful irrigation and sociological project in the Sudan at Gezira, is the irrigation engineer-in-chief for the project. I understood him to say that at Gezira the dam was built by the Government, and a private company ran the scheme; the occupier looked after the crops, and the Government took 40 per cent of the harvest, the worker 40 per cent and the Sudan company 20 per cent.

They had British inspectors going round the various tribes in this large settlement, telling them what to do, how best to do it to get maximum production, and urging them to do it. Now they have been replaced by Sudanese Inspectors, and matters are not going so well, as they are not persona grata with all tribes on account of religious differences.

I think I have told you enough for you to appreciate how important and difficult a project this Volta Scheme is, and what great possibilities it has for the economic growth of this state.

Nungwa Experiment Station:

Professor Phillips' Department has secured on long lease 1,000 acres on the Accra flats, not far from the University College site at Legon Hill. This will be its main experimental farm and research centre, and will also be used for giving students practice in field research.

Experiments have already been started on the two main soil types - the Akuse black clay loam and the grey sandy loam - with such crops as:

maize, sorghums, guinea corns, millets, rice, cowpeas, soyas, crotalaris, velvet beans and other legumes, and later on perennials such as cassava, pineapples, bananas, plantains, sugarcane, citrus, avocado, mango and tung nuts will be added to the range.

Variety trials, spacing, rotations, cultivation and fertilizer experiments are also in progress. Crop costing, land clearing, soil and water conservation and a proper study of large scale mechanical production will also be carried out.

As soon as the irrigation dam is completed then all types of irrigation farming will be investigated so as to be in a position to advise on such matters if ever the flats are developed for irrigation from the Volta.

The Senior Lecturer in Animal Husbandry is carrying out on both types of soil at the University Research Station at Nungwa, grazing experiments on fertilized natural pastures. He is also doing investigations on the Fulani (zebu), West Coast shorthorn and N'Dama cattle in selecting the progeny on a phenotype rather than a genotype basis.

Sheep: he is also collecting basic data on the Gold Coast Dwarf Sheep, and the longer legged, long and sad

faced Northern Territory sheep. Some crossing experiments will be done with these indigenous breeds and also with the Wiltshire Horn (non-woolled), and the Blackhead Persian, on the two local breeds.

Pigs: experiments with crossing Large White and native pigs will be made.

Poultry: crosses with Light Sussex and Brown Leg-horns will be studied.

Nungwa Veterinary and Animal Husbandry Station of the Department of Agriculture:

Adjacent is the Nungwa Veterinary and Animal Husbandry Station of the Department of Agriculture, which Dr. F. Thomas showed me over. They have White Fulanis (zebu) cattle which give 300 gallons of milk per year, are good breeders, no sterility, but they are not resistant to tsetse. There were also the small but neat bodied N'Dama cattle from French Guinea, and the West Coast Shorthorns. Promising experiments with Large White pigs crossed with Essex were in progress. All the animals looked in good condition and well cared for. Animal production has a long way to go, however, and a difficult road to follow.

Aburi Experiment and Research Station:

This is 20 miles away on top of the Akwapimian scarp, is the forest area and there in cocoa there to work on and also a very rich flora, as this was developed as a tropical botanical garden in times past. It is at present in the charge of an African graduate, G.K.A. Amoah, who came round with us. This will be used for forest belt studies and tropical crops in the same way as Nungwa is used for the plains.

Professor Phillips is hoping to have two more stations for research - one in the uplands of Togoland and one in the Northern Territory.

West African Cocoa Research Institute:

This famous research station is just outside of Tafo in the heart of the cocoa belt and just over two hours by road from Achimota. It has a management committee whose chairman is the Chief Secretary, West African Inter-territorial Secretariat, with four representatives each from Nigeria and the Gold Coast, together with the Director of Cocoa Research, Mr. J. West. After a preliminary interview with the Director and Dr. S. N. Adams, Soil Chemist, I was taken round the plantations in the square mile, which is cut up into 40 acre blocks, by Mr. R. Wickens, Agronomist, and Dr. Adams and shown some of the mysteries of producing cocoa, varieties, spacing, replacements, pruning, spraying and treatment for ants. The chief variety was Amelonado, but a promising Amazon - robust and a heavy bearer - was being tested extensively.

The importance of controlling the virus disease, "Swollen Shoot", overshadows everything else, so that virus research by the Division of Pathology is of the greatest importance. Work is also being done on the black-pod disease, Phytophthora palmivora Butl. This is strongly supplemented by the work of the Division of Entomology on mealy bug. Species of parasites from all over are being studied in an endeavour to get biological control of this pest which spreads the virus.

Control by spraying is difficult and ineffective on account of the nature of the crop and the small number of mealy bug per acre - not more than a few hundred, often less. Systemic insecticides, like dimefox, have also not been very successful. Research on Capsid control also occupies an important place. Other research included the chemistry of cocoa beans, plant physiology and horticulture, plant breeding and agronomy.

Soils and Fertility Experiments:

I was associated chiefly with Dr. S. M. Adams, who was carrying out soil and fertilizer studies. Reports of earlier experiments on young cocoa, showed no responses in girth. Is that a sufficient criterion? All the fertilizer was broadcast through the bush between rows 8' x 8' or sometimes 5' x 5'.

Dr. Adams is trying plots of 36 trees and having six replications of eight treatments: O, P, PN, PK, NK, PNK, N as ammonium sulphate and K (KCl.). He also wishes to try sulphur alone to make sure that has no effect.

Fertilizers are applied at the rate of $\frac{1}{4}$ lb. per tree per annum, which works out at approximately 448 lb. per acre. It may be, of course, with the comparatively low cocoa yields per acre that the humus being constantly produced by the lush tropical forest supplies all that is necessary for its maintained production. Furthermore these soils may have been very rich to start with. Certain questions arise, however,

- (i) Would fertilizers give paying results on poorer soils or in marginal areas?
- (ii) Would a more vigorous and higher yielding variety like the Amazon give results if a basic phosphatic and potash dressing were put into the holes before planting? We got no results to speak of on our local Uba sugarcane or the Queen pineapple. It was only after introducing heavier yielding varieties from India and Java that substantial and paying results were obtained on sugar, and only the heavy yielding smooth Cayenne pineapple has responded profitably to fertilizers.
- (iii) Should not the experiments be carried out on more uniform plant material - e.g. clones? I was given to understand that the yield of pods per tree can vary as much as 1 to 33: in some cases 1 to 100. Such a condition would certainly upset results. For this very reason at our Government Sub-Tropical Horticultural Research Station at Nelspruit great pains were taken to ensure uniformity of citrus trees. First of all uniform stocks were obtained, then uniform budwood, and then yields were taken for two years to ascertain if there were any remaining differences, so that they could be assessed and allowed for. In this way very reliable results were obtained, of great value to our citrus industry. From what was shown me in Clonal Nursery it would be a comparatively easy task to get uniform trees and in a short time, compared with the difficulties in getting uniform trees for a citrus experiment.

- (iv) As the Amazon is a vigorous grower and a high yielder I should suggest a future fertilizer experiment be carried out with this variety even if it is not yet being given out to farmers. The object of the experiment is to establish whether cocoa shows any benefit at all from fertilizers, or whether the natural humus of the forest is all sufficient, and to get the answer you need uniform trees of a high yielding strain now and not after they have been issued to farmers.

The Northern Territories:

After spending some time in the coastal and cocoa belts I went on to Kumasi by car accompanied by Mr. P. Nye and Mr. R. Low. Kumasi with its wide streets gave the impression of a well laid-out town full of activity and vitality, and had an enormous bus-centre. Flying from here to Tamale Mr. Nye and I got a good idea of the numerous villages in the forest and cocoa country. When once clear of the forest we saw little sign of any habitation in the guinea-savannah or tropical bushveld until nearing Tamale. There we were met by Mr. Panton, Managing Director of the Gonja Development Company. Major Panton was in charge of the heavy machinery when Professor Phillips' Soil Conservation students were working in the Magaliesburg Conservation District, subsequently he worked for the Groundnut Scheme, so has had plenty of experience in large scale development. This Gonja project is a new type of approach in opening up uninhabited country, of which there is much in the Northern Territories, and hence of the greatest importance. It is so well described in the Gold Coast Official Report for 1951, page 31, that I am going to quote it verbatim:

"The Gonja Development Company was set up in 1949 as a subsidiary of the Agricultural Development Corporation to carry out a mechanised agricultural pilot project covering an area of approximately 32,000 acres at Damongo in the Northern Territories. Modern methods of agriculture require capital expenditure on mechanical equipment, improved water supplies and soil conservation measures which the small farmer is unable to provide for himself. Accordingly, one of the main purposes of the project is to secure to small farmers settled on individual holdings in village groups the benefits of mechanisation and improved essential services, while not interfering with the powers of the farmers to increase their incomes by their own efforts. The project is being carried out in an area which is practically uninhabited, and it is hoped to attract people from over-populated areas to come and settle there with their families.

When the project is fully developed, the settler farmers will each have a clearly defined plot of land of about 30 acres which they will be required to farm in accordance with the directions of the agricultural experts employed by the Company. The main cash crops are expected to be grains and groundnuts, and it is hoped to produce a surplus of vegetables and fruit for sale. The cash crops will be sold to the Company which will market them, handing over the proceeds to the farmers after deducting the expenses of marketing and the cost of the services provided (i.e. loan of mechanical equipment, administration, technical direction, house rent and interest on capital).

"Rapid progress has been achieved in providing services such as roads and housing, which are essential to the success of the project, and it is hoped to clear 3,000 acres in 1951-52 and to have 2,000 acres under cultivation.

The Government regards the project not merely as an experiment in economic development but also as an experiment in social advancement. Good houses are being provided for the settlers within easy reach of their farms, and piped water supplies and medical facilities (including a properly equipped hospital with a doctor and a matron) are also provided. It is hoped eventually to station a Welfare Officer at Damongo to run night schools and initiate and supervise social welfare activities".

We were taken down by Major Pantton and the medical doctor, a young Scot, in charge of the hospital there. This experiment is about 55 miles South West of Tamale on a good road, but the White Volta has to be crossed on a pont. We found that 4,000 acres had been cleared and that approximately 2,500 acres had been cropped.

On the fields at that time were, we were told:

<u>Acreage under Crop</u>	<u>Kind of Crop</u>	<u>Expected Yield (or obtained) per acre.</u>
750	Dwarf Sorghum	780 lb.
220	Rice	1,800 lb.
760	Guinea Corn	1,500 lb.
110	Maize	938 lb.
300	Groundnuts	500 lb.
21	Tobacco	550 lb.
30 (?)	Pigeon Pea	Green manure
3	Teak (Burma)	only 2 years old.

The guinea corn is sown in June and should be ready to harvest in December. This sorghum often grows 15' to 20' high. On new land it is not so good: it definitely shows a nitrogen shortage. The experience is that on new land there is sufficient phosphate for two years, but that a dressing of sulphate of ammonia gives returns the first year, as the soil nitrogen is locked up by the bacteria and organic matter. The second year nitrogen is not necessary. The cost of a long ton of sulphate is high, £50, but transport costs are high and there is lorry haulage for 340 miles. Super costs £22 per ton landed at Kumasi and then the motor transport starts. The approximate costs were given as follows:

Super cost overseas per long ton	£12.10. Od.
Sea freight	7. 0. Od.
Railage	3. 0. Od.
Transport: Takoradi, Tamale, Gonja	<u>12.10. Od.</u>
Cost of super per long ton at Gonja	<u>£35. 0. Od.</u>

These high costs make fertilizing difficult, but transport also adds a great deal to the costs of traders' upkeep and fuel: e.g. a crop of pigeon pea costs per acre:

80 lb. seed - 18/- to 20/-: ploughing, cultivating, seeding and ploughing under - £6.10. Od. : Total £27.10. Od.

For this you could apply 300 lb. ammonium sulphate per acre, which high amount would not be necessary for most cultivated crops. The pigeon pea is, however, a good smother crop for weeds and grows so luxuriantly it would supply a very high tonnage of green manure and organic matter per acre, which may be highly necessary for soils in the tropics.

The cost of production of tobacco was given as 2/6d. per lb. and prices were:

	<u>1st Grade</u>	<u>2nd. Grade</u>	<u>3rd Grade</u>	<u>4th Grade.</u>
	4/6d.	3/6d.	1/9d.	9d.
of the crop	50%	25%	- ?	- ?

The crop averaged out 3/6d. a lb. I was told and it did not pay to grow. Labour costs were 4/- a day. At the yield given me 550 lb. at 3/6d. would mean £96.10. 0d. There must be something very wrong if a crop bringing in this amount per acre does not pay. The overhead and supervision costs must be too high.

The rice crop which needed a minimum of handling, and got a good market price - £10. per bag - did pay and I heard reported that 350 more acres suitable for rice growing had been located. The rice crop is dried twice on account of being harvested fairly green. It was found that by this method cracked grains were reduced from 90 per cent to 10 per cent.

One thing that impressed me a lot was the pleasant lay out of the staff residential area, and the low cost of most attractive, airy bungalows - £1,200 each - using local timber and palm stems for pillars. Administrative buildings, the hospital and residences in the settlers' village were also put up at low cost. The aluminium workshops and store pre-fabricated by the Buxton Estate Company, and giving a building 210' x 100' x 30' high in the centre and 9'6" at the sides, with a concrete floor, was quite a new idea. All the material was carried on 3 x 8 ton lorries, and with centre steel poles and wire ropes, was pulled up like a huge circus tent in a short time. The cost was given as £21,000.

A great deal of good work has been done at Gonja under difficult circumstances and far away from supplies and amenities. There is no doubt the quality of the crops grown has impressed the Gold Coastians, and there is no lack of prospective settlers. There are also hundreds of hangers-on and traders and tradesmen swarming in to an area which a few years ago was quite uninhabited.

It has been a valuable project but there is still much to be done, and the Managing Director thinks it will not really get going until a new generation has grown up accustomed to mechanical farming, and with quite a different attitude to agricultural production. My only regret is our time was really far too short to get a good grasp of this project.

Nyankpala Experiment Station:

One late afternoon and a morning were spent with Mr. Castle, Acting Chief Agricultural Officer for the Northern Territories out at the Nyankpala Experiment Station. This is the largest of the Department of Agriculture's Experiment Stations, being 2,478 acres in extent. This Station has 400 acres or more under cultivation, about 132 cattle, and 37 sheep, and also a fair number of pigs. It is the Central Research Station for the Northern Territories and mechanisation experiments are also carried out here.

During our afternoon visit attention was paid only to the stock, which on the whole were in good condition, and also the West African dwarf sheep. We saw the heifers - 12 months, 18 months and 30 months old. They too looked far better than anything we had seen around the native villages. I was interested to see that offspring from West Coast cattle crossed with Zebu had no hump: I did not expect that. The West African short-horns have also been crossed with the N'Damas, and we saw this cross licking salt. Cows were getting two pounds of a mixture containing:

65% { Guinea corn
 { millet
 { maize

5% Soya

15% Groundnuts

5% Cowpeas,

and 2 ozs. of a mineral mixture containing bonemeal ash, blood-meal and salt. Apparently at this time of the year the pasture was so good that the cows getting the mixture did not weigh any more than those getting none. Calves were wormed every two months. Gold Coast cows put to a Gold Coast bull produced calves weighing 28 to 39 lb. at birth. Females in calf weighed as little as 450 lb., and the amount of milk produced by this breed is only 100 gallons a year. Our calf weights by comparison are - light breeds like Jerseys 45 - 60 lb.: heavier breeds like Frieslands and beef animals - 70 - 80 lb. at birth.

In this area the Africans are now being taught to use oxen as a source of draft power, and for ploughing. I was amazed though at the type of yoke used for these small animals: it was every bit as heavy as ours for large oxen; in fact heavier still for, whereas our skeys are joined below the neck by thongs, theirs had a thick piece of heavy wood. In my opinion the round yoke, which transmits power from one vertebra in the neck is the most inefficient method of power transmission ever conceived, and told Mr. Castle about head yokes, and promised to get some illustrations. These give four to five times the efficiency, are light and have the whole weight of the animal behind them. Mr. Castle said that, as they were only just teaching the Africans the use of yokes, if he could introduce the improved head yoke, now would be the time. I have not yet been able to secure the illustration as most of our farmers are using tractors now-a-days, but I hope to soon.

The next morning I met some of the staff, including Mr. O. Lands Kroner, the Agricultural Officer, Dr. E. V. Waller, the lady plant breeder, Mr. Tagoe, B.Sc., the African Agricultural Officer, and Mr. Likeman, the Farm Manager.

Rice threshing was in progress and from there we went to see the rice in the fields. Guiana rice had averaged 1,800 lb. over 10 acres, and has been known to produce 3,000 lb. under paddy conditions. It is not bothered with stem borer, whereas Mende, which has a larger grain, gets stem borer badly. Rice, when broadcasted by fiddle drills needs 60 lb. of seed per acre, when dibbled 40 lb., and when transplanted only 10 lb., but the people do not take kindly to transplanting. I am told that in the U.S.A. today all paddy rice is broadcast from the air. I got the impression that the Gold Coast had an enormous rice producing potential and no doubt in a few years' time this crop may exceed in production any other grain. We saw many of the rotation and fertilizer experiments, but my visit was really too rushed to take in much detail. Phosphates and nitrogenous fertilizers are, however, giving quite good results.

Experiments on yams, which I had never seen grown, interested me a great deal. The grass variety plots were of interest and there were several promising ones. A promising Brachiaria falsifieria did not appear to have been taken up as yet. I was, however, very pleased to see grass leys in the rotation, which had been sown with seed of indigenous grasses, Andropogon gayanus Kunth and Pennisetum polystachyon.

Tsolo yellow maize from our Transkeian Agricultural College is playing quite a part in being a variety showing some resistance to the bad rust of South American origin now identified as Puccinia polysora Underw. Losses from this have been very severe and it has never before been recorded in Africa. Such a serious view of this is taken that it has been decided to start a joint West African Maize Rust Research Project based in Nigeria.

I think I have given enough data to show the nature of the agricultural problems and their great difficulties, but also the large potential there is in the Gold Coast. I think the agronomists will have a far easier time than the animal husbandry officers. Climate and disease have been hard on livestock and not only must it be much improved to make it valuable for meat and dairy products, but the African has to be taught how to manage his veld and feed his stock - no easy task and one that will take a generation at least. I think our directors will agree that on a long term basis the grant made to Professor Phillips for his research on and teaching of Ecological Land-Use Survey and Planning will be well worthwhile.

I should like to conclude by quoting from Professor Phillips' report of 27th October, 1953, entitled:

"The Role of the University College in the Study and the Development of the Country's Basic Industry: Agriculture"

"The Challenge and the Opportunity:

From this necessarily condensed survey of the problems presented by Gold Coast agriculture and the facilities that may be expected to grow in reasonable time within the College Department of Agriculture, it is clear that, while there is a great deal of challenging scientific and applied research to be envisaged, selected, organised and planned in relation to the availability of funds, experienced personnel and existing scientific and technical knowledge, there is, at the same time, a great opportunity of service. A University Department of