

Uganda Protectorate
Nutrition Committee

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REVIEW OF NUTRITION IN UGANDA.

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I.—INTRODUCTORY.

As the Nutrition Committee we have been entrusted with collating information, co-ordinating effort and advising the Protectorate Government on matters affecting the state of nutrition in the Protectorate. It is with the object of fulfilling the first of these duties that this review is primarily concerned and in preparing it we have endeavoured to follow the directive contained in paragraphs 14 and 15 of C.O. Cmd. Paper No. 2 dated December, 1943, and have been guided by the recommendations of the United Nations Food Conference held at Hot Springs, Virginia, in May/June, 1943.

In the course of our preliminary stock-taking we have been impressed by convincing evidence that there exists in the Protectorate an obvious consciousness of the vital part that all the complexity of the science and practice of human nutrition must play in the social and economic advancement of the peoples of the Protectorate. This is obviously no new state of mind and, directly or indirectly, the various Government departments, missionary organisations and advisory committees have been striving individually and collectively to probe into the basic causes of malnutrition and to seize every opportunity of recording information and correcting faults. We have noted too with great satisfaction that the native governments and the native administrations are becoming alive to existing shortcomings and the potentiality of improvement.

At the outset we must make it perfectly clear to those who may not know Uganda intimately that we are dealing with a people who, in normal times, are comparatively well set up and outwardly healthy. This broad statement does not mean that malnutrition does not exist. It does; the point to be remembered is that often enough it is not due so much to absolute poverty as to ignorance, conservatism and superstition. For example, in Lango, with a cattle population of some 400,000 head, few people drink milk; in Teso, with 600,000 head, few eat meat, other tribal predilections or taboos deny first class animal protein to females and so it goes on.

When we came to consider the subject matter of the review in detail we found ourselves faced with the difficulty of portraying in true perspective the effects of war-time conditions on a people susceptible to change and themselves in a state of rapidly progressing enlightenment. We realised, too, that it was no easy task to describe the trend of dietetic custom with sufficient definition to enable us to forecast with any assurance whether the fashions which are developing are likely in the long run to lead to conditions which, although outwardly advances, are, in reality, fundamentally unsound if examined closely in the light of modern dietetic theory. It was also apparent to us that we were endeavouring to assess at an arbitrary point in the general forward march the ultimate value of progressive plans and experiments, the true worth of which could only be reckoned after a long period of consolidation.

We have a certain confidence based on our own experience and on the recorded opinions of specialists in other parts of the world, but we well know that there are many pitfalls in the path of arbitrary direction of the social advancement of indigenous races in any country, and we hesitate to dogmatize. Our review, therefore, will consist of a statement of historical record, a summary of investigation which we believe to have the background of scientific accuracy, a report of present activities, an appreciation of use and wont emerging from the unstable conditions of recent years and, finally, an outline of a plan of campaign for the future.

We have regarded our record as a symposium and have endeavoured to acknowledge, either in the text or in the bibliography, all sources of information

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II.—HISTORICAL.

This section consists entirely of selected extracts from "Uganda", a comprehensive work by Thomas and Scott (1935). These outline with brevity but clarity the variation of dietetic customs which are the natural corollary to varying meteorological and ethnological conditions which prevailed in different parts of the Protectorate when they were written in 1935. They will serve better than retrospective observations of our own as a basis for future estimation of the effects of the influences which have since been operative.

"In a country such as Uganda, with its wide range of soil and climate, and with its multiplicity of tribes with varying social conditions, native agriculture is much more diversified in accordance, primarily, with the dietetic requirements of the people, and these requirements are largely determined by the soil and climatic conditions under which the people live. In general, apart from the arid north-eastern portion of the Protectorate, these conditions have created two broad types of vegetation belts, of which the first may be termed the rain forest, elephant-grass, plantain type, and the other the short-grass, grain type. The former type is usually associated with a fairly heavy loam soil which through its formation resists erosion to some extent although normally subjected to heavy rainfall, whereas the latter is usually associated with a lighter, more sandy soil, which is very liable to serious erosion. These two main types of vegetation affect the distribution of domestic animals; it will be found that cattle are much more abundant in the short grass, grain country and this factor of course, has a bearing on the agricultural practice of the neighbourhood.

"The main plantain areas of the Protectorate are the Buganda Province, the districts of Busoga, Bugishu, and part of Budama in the Eastern Province, part of Bunyoro in the Northern Province, and Toro, Kigezi, and part of Ankole in the Western Province. Throughout these areas the principal source of food supply is plantains, which are supplemented by sweet potatoes and cassava. This starchy diet is augmented by simsim, ground-nuts, beans, and miscellaneous vegetables which provide an ingredient of protein and fat and add a relish to what is generally considered to be tasteless food. A few plants of sugar cane, chillies, and ginger can usually be found on any holding, often in the plantain garden itself, but these are merely subsidiary and only grown in small quantities.

"Throughout the non-plantain areas, and particularly in the Eastern and Northern Provinces, food shortages are by no means infrequent. It is customary for each chief to ensure that his people shall plant cassava as a standing food reserve, for the better control of which plots are grouped together, but each man retains his own plot, although the chief decides when the food may be used. Each man is also required to contribute annually to the stock of grain in the famine granaries which are kept at the chief's headquarters. In this case the store of grain belongs to the community and not to the individual. The food crops are millets, sweet potatoes, cow-peas, pigeon peas, beans, cassava, and maize. Various indigenous vegetables such as the edible hibiscus and plants of the marrow family are popular.

"The diet of the majority of the people of Uganda is in the main vegetarian, consisting of a bulky starchy food to which are added oil seeds and legumes to provide proteins and concentrated, energy-producing constituents. Fish, fresh and dried, is a popular food wherever it is obtainable. While all tribes eat meat occasionally, it is not yet a regular item of diet, although the Protectorate Government's efforts to stimulate its consumption have met with considerable success. Some tribes have no objection to using stock which has died from natural causes as food. Others eat all kinds of birds, rats and mice; and locusts, grasshoppers and white ants are generally relished as delicacies. Varieties of figs, tamarinds, shea-butter fruits, and the fleshy part of borassus palm fruits are commonly regarded as acceptable additions to the regular diet. In cattle country milk is generally curdled or mixed with blood prior to consumption. Cooking-fats are obtained from simsim, shea-butter trees and, in Bwamba only, from oil

palm. Whether beer may be considered an article of food or not, it is important in native life. It is made from grain or plantains, of which there are varieties grown purposely for beer-making.

"Native crops may be divided dietetically into three main classes: those rich in starch, those containing a high proportion of protein, and those containing a large percentage of protein and fat. In the first class are found the staple foods of the majority of tribes: plantains, sweet potatoes and cassava. In the second and third classes are the supplementary foods; beans and peas being representative of the second group and ground-nuts and simsim of the third. The small and large millets are well balanced foods when, as is usual, they are ground whole."

III.—SUMMARY OF PREVIOUS INVESTIGATIONS AND REPORTS.

A. MEDICAL.

The Present State of Nutritional Research in Uganda*.

The Initial Stages.—It is both the privilege and the penalty of nutritional research in Uganda, as in other parts of the tropics, that it has grown up under the influence of the knowledge of mal-nutrition as seen in the more temperate parts of the world. Thus doctors came to the tropics with adequate knowledge of the mal-nutritional diseases of the temperate regions and as they did not find signs of rickets, pellagra, scurvy, and even no beri-beri, which is a disease of the rice-eaters of the East, the conclusion was formed in certain quarters that there existed little malnutritional disease in the natives of the tropics. At the same time there was much ill-health, but this was ascribed to the presence of tropical parasitic complaints. Tropical medicine grew up under the influence of the knowledge of parasitology and almost all our efforts were directed towards the reduction of parasitic complaints such as malaria, helminthic disorders and so on. Public health has therefore largely been dominated by the desire to decrease infectious and parasitic disorders and has taken but little note of the need of an improved diet.

The Prisons.—The first section of the community in which nutritional disease was detected was in the inmates of the prisons. This was probably due to the fact that these people were more closely supervised than persons in the general population, and at the same time it was probable that from time to time the diet of the prisoners suffered seriously by reason of a shortage of supply and also because it was not always appreciated that it was necessary to provide a balanced diet in the case of Africans, who were thought to be quite healthy on a diet of one or two staple carbohydrates. Thus Boase (1928) noted the presence of pellagra among prisoners in Lango; and Mitchell (1933) reported the presence of nutritional diarrhoea and of Vitamin A deficiency in the Central Prison at Luzira.

Vitamin A.—The first work on Vitamin A deficiency in Africa was carried out in Uganda. Indeed when Loewenthal (1933) originally described the skin manifestations in the inmates of the Central Prison he was under the impression that he was describing a new condition, but in this his reports had been anticipated by Frazier and Hu in China (1930).

His descriptions and conclusions have been confirmed by other workers in the same field, and the relationship of the cutaneous manifestations to the ocular disease of xerophthalmia has been closely demonstrated in other parts of the world. Subsequent work by Loewenthal (1935 *a* and *b*) and by other workers in Uganda has shown that a deficiency of this vitamin is a common occurrence in most parts of the Protectorate. As this vitamin protects to a certain extent the mucus membranes from infection, a deficiency of this vitamin must contribute to the presence of other diseases. Nevertheless the tendency at the present time is to minimise the anti-infective powers of the vitamin A, the effect of which in the past may have been exaggerated in some quarters.

* A report, quoted verbatim, by H. C. Trowell, M.D., M.R.C.P., Lecturer in Medicine in the Mulago Medical School.

Tropical Ulcer.—Loewenthal (1932, 1933) reported that there was some evidence that tropical ulcer was associated with a deficiency of calcium in the diet and somewhat low levels of calcium in the blood, and that injections of calcium salts produced a marked improvement in the rate of healing. In this it now appears that his conclusions were premature; but the idea has lingered that leg ulcer is a manifestation of deficiency disease, as illustrated by the observations of Forbes Brown (1935).

Although this conception has gained much support from clinical workers in other countries yet the relationship of leg ulcer to malnutrition is as yet an undecided matter. In all his field surveys Loewenthal considered that tropical ulcer was a manifestation of malnutrition and even that it was connected with a poor intake of protein, but the matter must still be considered undecided.

Field Surveys and Experiments on Labourers.—Probably one of the most valuable contributions to the study of malnutrition in Uganda has been the field surveys of Loewenthal. Starting in Teso country, Hooper and Loewenthal (1936) paved the way by their preliminary observations. Loewenthal (1937) extended his work and attempted to correlate the evidence of malnutrition with the agricultural condition found in Teso country. In a subsequent report (1939) he limited his observations of malnutrition to the occurrence of five diseases: leg ulcer, dental caries, phrynoderma (vitamin A), xerophthalmia (vitamin A) and angular stomatitis (vitamin B—riboflavin); out of these five signs he calculated his "Health Index", and thus the amount of malnutrition present in the persons examined.

As a result of his observations he considered that there was a close connection between malnutrition (as he understood that term) and the fertility of the land, as shown by soil erosion; and that this might be offset by too large an area under cotton or other cash crops.

Loewenthal (1939) also studied and reported on the question of the physique of immigrant Banyarua labourers. This tended to show that the efficiency of these porters could be considerably increased by issuing a more balanced diet and by administering a small daily dose of quinine. The addition of small amounts of cod liver oil was of little effect. In a similar manner the addition of a small amount of Marmite to supply a supposed deficiency of vitamin B was found to have little effect on the labourers.

Anaemia—The problem that lay in front of much of this study of malnutrition was that very little was known of the normal African standards in health, so that it became impossible to state when a state of slight malnutrition was present. Thus Loewenthal was quite unable to state exactly when malnutrition was present and it became purely a matter of opinion to decide the degree that was present in any particular person.

An attempt was made in the first place to decide the normal standard that could be considered healthy for the blood. Hennessey (1937) attempted to estimate the normal red cell count and the haemoglobin content of the blood of prisoners in the Central Prison; and he found that almost all of them fell distinctly below that of the European. It was therefore assumed that the African had a lower blood count than that of the European; for at that time it was not realised that diet played a large part in determining the degree of anaemia present. In addition it was ascertained that the African had a larger red cell than that of the European; but it is now considered that many of these prisoners were suffering from a mild degree of macrocytic anaemia.

Trowell (1939) reported the presence of much hypochromic anaemia in cases seen in the hospital at Mulago, Kampala. This was considered to be due to a deficiency of iron in the diet and also to the presence of hookworm disease in many of the patients. These studies were based only on a bare survey of the blood count in the peripheral blood.

By improved techniques Trowell (1942, 1943) was able to study the question of anaemia from a new aspect. Most cases of anaemia under his care at Mulago Hospital showed some evidence that both iron and some substances present in

liver were required to cure them. These facts could not be explained by our present classification of anaemia, so that he was forced to postulate the creation of new aspects of anaemia to explain the results observed. These results have not been confirmed by other observers in Africa but then as yet no others have surveyed anaemia from the aspect of cell size, being content with using the less informative examination of the blood count. Trowell was forced to postulate the existence of much macrocytic anaemia, and as the literature on this anaemia was somewhat confused he reviewed our knowledge of this anaemia; Trowell (1943).

It soon became apparent that the problem of anaemia could not be studied in isolation and that it was necessary to consider whether cases of anaemia did not present other signs of deficiency.

A Common Malnutritional Syndrome found in Tropical Africa.—In most countries the advance in the study of malnutrition has usually followed the recognition of one prevalent type when it has been slowly recognised that large sections of the population suffer from a milder state of the same deficiency. In the tropics of Africa reports have come in during recent years that a new type of malnutrition should be recognised in these parts and that it is very common. Reports have come from Kenya where observations were first made in East Africa; they have been confirmed in West Africa and in the Belgian Congo and in Tanganyika; and at last reports have come in from South Africa. They all report the same clinical picture; and there is a general agreement that this is a new clinical entity.

Stones (1935) described one case in Uganda and Trowell (1937) reported several other cases and stated that in his opinion the condition should be regarded as pellagrous. With the production of nicotinic acid and its trial in these cases it became obvious that cases did not do well on nicotinic acid although the skin peeled: at the same time the relationship of a deficiency of nicotinic acid to pellagra became much clearer so that it became impossible to regard this disease as merely one of pellagra. Trowell (1941) published illustrations of the response of the dermatosis to nicotinic acid, but further work threw some light on the ways in which this syndrome differed from pellagra. Thus he was able to show that the majority of the cases of this syndrome had radiological changes in the small intestine—Trowell (article accepted by the *Lancet* in 1943). The significance of these changes was difficult to interpret as few other observations have been made on this aspect of malnutrition; in point of fact all the observations have been made in America, and no others have been made in Africa. In America these changes, called "deficiency bowel pattern" have been ascribed to a deficiency of the entire vitamin B complex.

Other aspects of this syndrome have now been investigated and will be the subject of two further communications. The oedema is always associated with a deficiency of the plasma proteins, due to a deficiency of protein and of total calories in the diet; and may be regarded as nutritional oedema. There is also a failure to utilise food, much of which is passed undigested in the stools.

This aspect of malnutrition must be regarded as only at its inception and must await further confirmation. Nevertheless the syndrome occurs very frequently in babies of one or two years of age, and in them it is shown as a brownness of the hair and a pallor of the skin. These babies if weighed are found to be from 30–60% under the anticipated weight for babies of the same age and it appears probable that the cause of the high infant mortality among African children lies in the elucidation of this syndrome. The majority of children in Buganda show signs of this disease in the second year.

B. AGRICULTURAL.

It is axiomatic that malnutrition in any part of the world may be due to defects in quality, quantity or both and, as far as Uganda is concerned, the greater divergence of conditions which exist makes it impossible to generalise as to which factor, or factors, must predominantly operate.

It may be said, broadly speaking, that in the elephant grass, plantain areas any malnutrition would tend to be due to quality; whereas, in the short grass areas of poorer soil and less dependable rainfall, large numbers of people are underfed in every way. Apart from less favourable conditions for growing crops in the short grass areas the dry season is longer and more pronounced than in the plantain areas; this entails longer storage and if the harvest has not been too good the seed reserve for the following season is encroached upon. The result of this is less crops sown (and if these fail in any way a resowing may not be possible) hence another small crop and a vicious circle which is difficult to break through and which may become accepted as a normal state of affairs.

It is not proposed to describe in any detail the methods which the Agricultural Department have found by experience to be of value in attempts to put this right, but they may be briefly mentioned. They include production of the higher yielding and, in some cases, earlier maturing varieties, seed rates and selection cultivation methods and general soil management, encouraging of famine reserve crops such as sweet potatoes and cassava, manuring by cattle including stall feeding, conservation of crop residues, rotation and proper resting of the land, introduction of new crops and so on. Communal cultivation with further mechanisation has not been developed to any extent but has possibilities.

For many years now Agricultural Officers have been carrying out agricultural surveys which have elicited all kinds of information having a direct and important bearing on nutrition. A report of nineteen such surveys has been recorded in a publication by the Department of Agriculture (1938) which constitutes a most valuable statistical record on which further nutritional investigations may well be based. Before the war it was a departmental instruction that every Agricultural Officer was required to complete one such survey every year and that a certain number had to be resurveyed after a lapse of five years in order to ascertain what changes had taken place. Unfortunately, except in special instances, this work has had to be discontinued during the war.

Ireland, Hoskins and Loewenthal (1937) carried out a combined agricultural and health survey from which a number of important conclusions were made and significant correlations were obtained between nutritional health and certain agricultural and economic factors.

A large amount of detailed information on matters allied to nutrition is at present being obtained from Ajeluk, a village in Teso in which a carefully planned and long term experiment on all matters bearing on the economic and social life of a small community is being carried out. It is too early as yet to record definite conclusions but interim official reports are available for reference.

Purseglove (1943) has made a detailed study of pot-herbs found in Uganda giving native methods of cooking these and emphasising their dietetic value and importance.

C. VETERINARY.

Randall (1943) has published a comprehensive review of "Livestock Production in Uganda" based on surveys of all districts. In his summary he states: "It is clear that the three basic problems at the present time are over-consumption of existing and available supplies, the extension of tsetse infestation and the relative neglect of animal husbandry, all of which must affect materially livestock production in the future."

Many other valuable pointers to the extent which livestock is being, and has been, fostered are contained in the annual reports of the Veterinary Department.

D. EDUCATIONAL.

Government Institutions.

Since the inauguration of the Education Department in 1925, particular attention has always been paid to the question of diet in boarding institutions directly maintained by Government. The earliest of these institutions was

Makerere College, for which a diet scale was drawn up by the medical tutor—Dr. H. B. ... This scale included 1 lb. meat per student per week. For many years in accordance with local custom, only two meals a day were provided at the College, but about ten years ago it was decided to provide also a light breakfast. Even previous to this it was a custom of a large number of students to regale themselves at their own expense with a morning cup of tea which did duty for breakfast and was supplemented often by a bit of sugar-cane which was part of the weekly ration included in the diet scale.

Originally there was one diet scale only, *viz.*, that considered suitable for Uganda students who constituted the vast majority of the College enrolment. Later, however, it became necessary to cater for the needs of the growing number of extra-territorial students, with the result that eventually there were four different scales.

A further point of interest is that attempts were made to persuade Baganda and other non-maize-eating tribes to eat a maize ration which was included in the scale. These attempts were entirely unsuccessful, probably in the light of present knowledge a good thing.

From the first terminal medical examinations were made of all students, and records were kept of their heights and weights, etc. The statistics thus collected appeared to indicate the beneficial results of the diets on the physical development of those students who before entering the College had not enjoyed the advantage of a balanced diet. The procedure as regards the feeding of students at the technical schools and other boarding institutions has been similar to that adopted at the College.

Theoretical Instructions of School Children.

Simple instruction on nutrition was introduced into the schools many years ago. Syllabuses for Hygiene included lessons on food and food values with especial reference to foods of particular value. There were also syllabuses concerning child welfare which included diet sheets drawn up by Dr. A. T. Schofield for children of ages 1-14 years.

In a report following on a domestic science survey (Mrs. Cavers, 1937), it was stated that "in isolated cases an active interest is shown in dietetics and a balanced menu". Attention was also drawn to the need for more guidance and closer supervision in connection with the teaching of cookery and other health-training subjects.

Practical Instruction for Children.

In 1938, departmental domestic science syllabuses (with emphasis on graded instruction as compared with the mere carrying out of household routine jobs in the school) were issued. These were later amended (1940) to give guidance in all Teacher Training Centres, Primary Schools and Secondary Schools, and in order to give the work a more African bias, instructions were included to the effect that (with few exceptions) all cookery lessons should involve the cooking of a balanced meal. Subsequently schemes have been provided for use in Government Indian Secondary Schools and for girls over normal school age in Primary Vernacular Schools.

Teacher Training.

In addition to the training of a few specialists, all Training Centres for women now provide courses in homecraft. Instruction on school hygiene is included at both men's and women's Centres in connection with lessons in school hygiene and school organisation.

Refresher courses organised by both the Education Department and ... have included lectures on nutrition given by District Medical Officers and qualified laymen.

From time to time articles on this subject have appeared in the *Teachers' Journal*, and in some of these the importance of not only a balanced diet, but of balanced agriculture has been pointed out.

Instruction for Adults.

In addition to work done at prenatal clinics and maternities, Missions have organised courses for married women in connection with:—

- (a) Mothers' Union groups (for which the C.M.S. has a full-time itinerant organiser),
- (b) Training for Ordinands' wives taking 1- or 2-year courses at Mukono and Buwalasi.

The Education Department employed in 1941 an itinerant African home demonstrator who gave short courses to groups of women in rural and urban areas. Due to the lack of suitable personnel for this work, the scheme is temporarily in abeyance, but courses are now being started at Serere and Bukalasa where the wives of Rural Assistants in training are expected to attend.

Literature.

Barrett (1944) has prepared a handbook for the guidance of teachers responsible for health education in schools which is now in press, and the same author (1941) has discussed health education in schools with special reference to correct feeding.

Other contributions in local educational journals germane to the subject of nutrition have been made by Anna (1939), Clark (1940, 1942), and Flack (1940).

IV.—PRESENT POSITION.

A. LABOUR AND INSTITUTION DIETS.

Labour.—A Bill to replace the present Masters and Servants Ordinance is now being studied prior to presentation to the Legislative Council. Our interest in this legislation, from the point of view of nutrition, is focussed on the draft Rules which make provision for dietary scales for contract labour. As drafted the diet scales follow closely the type scale of rations transmitted under cover of the Secretary of State's despatch No. 88 of 25th July, 1943, and when the legislation is enacted a well balanced diet with adequate energy value will be assured for all labour. Meanwhile, although the existing official diet scale stands as the legal minimum, the Labour Department, backed by some of the larger employers of labour, is endeavouring to anticipate the coming change and appreciable improvement in quality and preparation of labour diets is becoming evident. At least one large industrial concern is now issuing a hot meal daily in addition to the rations cooked by the labourers themselves and, although there is still a long way to go until the ideal is reached, there is reason for satisfaction in the interest shown by employers in the value of optimum feeding of their employees.

The Township Authority of Kampala is actively investigating the administrative arrangements necessary for the provision of a daily meal for municipal labour and their experience will undoubtedly be of value for future schemes of this nature.

Prisons.—The occurrence of diseases due to deficiency in prison diets in past years has been referred to in Section III A. The obvious faults were at once corrected and it is satisfactory to note that in recent years there has been no reason to suspect any inadequacy in the protective elements of the diet scales, although there are times when prevailing conditions in the Protectorate have made the regular supply of fresh vegetables a serious administrative problem.

Various supplements have been made to the official scales laid down by existing legislation and with the co-operation of the officers of the Prisons Department, a balanced ration has been maintained. A new Prisons Bill is now approaching its final stages and the draft Rules to be enacted include schedules of diet scales which will ensure adequacy of all factors.

Hospitals.—It has been recognised for some time that the standard diets issued to the patients in Government hospitals have been unimaginative with variation, palatability and scientific composition tending to be subservient to

administrative convenience. The Director of Medical Services, recognising these weaknesses, has appointed a committee to investigate the whole question and to submit recommendations. The deliberations of this committee are not yet completed, but we understand that a great deal has been accomplished and that their recommendations will lead to the adoption of diet scales which will not only meet the strictly medical requirements but will have an educative value in that they will present a variety in cooking and composition of meals while utilising only such range of foodstuffs as is readily accessible at reasonable prices in each district.

Boarding Schools.—We have realised that the dietaries of boarding schools require revision but we are also painfully aware of the shortage of personnel with which to carry out the necessary preliminary investigations and the subsequent detail of correction. We note this accordingly as a subject for enquiry as and when circumstances permit.

B. FEEDING OF SCHOOL CHILDREN.

While the medical authorities, the Department of Education and the Missions have not been unmindful of the very obvious desirability of providing mid-day meals for school children and while attempts have been made to introduce the practice in various parts of the Protectorate individual effort has in most cases broken down owing mainly to administrative difficulties and the absence of the financial backing of a State-aided scheme.

Few of the trials made have been published in technical literature but that does not mean that they have been entirely without value as the results remain in the memories of those responsible for the management of the schools and the experience gained in regard to cooking arrangements, provision of foodstuffs and the possibilities of school gardens will serve a most useful purpose when the system becomes more general.

Loewenthal (1938, 1939) tried out the effect of adding one or two supplements to the diet of school children and Barrett (1943), with the assistance of Miss Laight and Miss Mance of the C.M.S., used a small monetary allocation made by the Native Administration of Busoga District to test the effect on growth and physical standards of a standard meal.

Barrett (1944) has reported on a further experiment, also carried out with the active co-operation of the authorities of the C.M.S., in a girls' school at Iganga. This experiment had particular interest as it was not a financially aided scheme but was fundamentally an attempt to persuade parents to give their children a mid-day meal at home if they lived near enough, or to provide them with cooked food to be eaten at school if they lived too far away. Some comments of those who supervised the scheme are:—

"The food brought was mainly of a starchy content, cooked potatoes or maize or millet flour chiefly. Some children, however, brought cooked peas, groundnuts roasted as a relish or pumpkin. It was encouraging to note that a good number brought fruit, oranges or mangoes. Often a group of friends pooled their food so that they got variety. Attendance was unfortunately irregular and this type of feeding cannot be regarded as of very much value in building up children. The great weakness is that it fails in time of seasonal food shortage, just when it is most needed."

Recently, as a result of personal interest taken by His Excellency the Governor, the whole question came under detailed review and certain monies were voted by the Protectorate Government for the carrying out of a controlled experiment. This had the object of testing the administrative possibilities and ascertaining the financial implications of general application of the principle.

The management of this experiment was put in the hands of a sub-committee and although their report and recommendations have not yet been fully considered by Government we understand that some valuable information has been obtained. It has been shown, for instance, that headteachers, both European and African,

are quite capable of organising the provision of mid-day meals in addition to their normal duties and it has demonstrated that, excluding capital costs of kitchens, etc., the cost is unlikely to fall below ten cents per child per day.

It is obvious that a universal scheme on this basis would be a heavy drain on the Protectorate resources but modifications of the principle are obviously practicable. We feel that there is little doubt that the healthy interest now aroused will not flag, and we are confident that this important aspect of nutritional policy will receive the consideration which it merits.

C. EXPECTANT AND NURSING MOTHERS AND YOUNG CHILDREN.

We need no persuasion to convince us of the importance of this vulnerable group but, while we are prepared to sponsor any concrete scheme for the direction of special effort towards this section of the community, we feel that it, more than all others, will reap the benefits of a progressive educational and medical policy.

We are fortunate in Uganda in having organised maternity services in both urban and rural areas with more than 300 registered African midwives on the roll, and although, naturally, this has not yet expanded to an extent commensurate with the needs of the population it serves a most useful purpose and is steadily gaining in popularity.

Infant welfare work has not developed to the same extent but we agree with the opinion of the Director of Medical Services that the first step in breaking down harmful, indigenous, obstetric custom is to encourage mothers to attend antenatal clinics and come to district hospitals or rural maternity centres for childbirth. Later, effort will be concentrated on the more difficult task of persuading African women to carry apparently healthy children to infant welfare centres.

During the course of their training African midwives are given instruction in food values and the special dietetic requirements of pregnancy, and lactation and this also forms a part of the syllabus for Government and Mission trained nurses. The conversion of this theoretical knowledge into practical application depends to a great extent on the financial and administrative arrangements which are possible. In Government hospitals the diet scales referred to in IV A have specific reference to the special requirements of pregnancy and in the rural centres there is a growing tendency, which is receiving all possible encouragement, for full diets to be provided for all lying-in women. This is an advance on the custom which formerly obtained in rural centres of relying on friends and relations to bring food to the patients; the correct system is by no means fully established but rapid strides are being made and, in most cases, the native administrations are showing a ready co-operation and are subscribing the necessary financial subsidy.

The powerful influence of education in this field is fully appreciated by us and we feel that the appointment of highly qualified ladies to administrative posts in the Department of Education is a guarantee that the purely feminine aspects of education will receive full attention. Domestic science and mothercraft now have their place in the curriculum of many schools, and those of the future mothers of Uganda who are able to benefit from the rapidly increasing facilities for education which are offered to them will have their minds directed to those principles of home life which are the foundations of healthy motherhood.

D. ANIMAL PRODUCTS.

Little over a decade ago the annual toll taken by epizootic and endemic diseases acted as a powerful deterrent to sales of livestock, for the African considered it essential to conserve most jealously every animal, irrespective of its productive value, as an offset against probable future losses.

With improved methods of disease control the stockowner has gained confidence, and, with a widespread market system, tapping almost every area, the outlook has changed appreciably.

Today it can be asserted that there is a marked change in the outlook of the African, since it has been realised that a monetary return can be obtained from the rearing of stock and the regular culling for sale of surplus and uneconomical

animals; this applies not only to the chief stock raising areas of the Protectorate where cattle are produced for slaughter, but also to the more densely populated areas of Buganda Province where there is now a marked increase in the number of African owned dairies supplying the ever increasing demand for milk.

The steady development of the market system, which is carefully supervised, has resulted in a progressive increase in the number of cattle sold, and a corresponding increase in the number of cattle slaughtered in the innumerable meat markets throughout Uganda, so that today a meat ration is becoming a regular part of the native dietary in many areas.

Unfortunately, progress has been so rapid that a state has now been reached when consumption exceeds replacements, and immature and female stock are being utilized to an increasing degree to fill the demand for meat, in fact the consumption of meat in the main consuming centres is now limited solely by the supply of stock available.

It is difficult to estimate the exact consumption rate of livestock in Uganda, as considerable numbers of stock are slaughtered outside markets but, based on the export of hides and skins, it is now probably in the region of 500,000 cattle and a million sheep and goats, this representing approximately 20% of the total cattle population and 30% of the sheep and goat population.

A recent development has been that of pig breeding, which is proceeding satisfactorily throughout Buganda, and the production of pigs is at present sufficient to satisfy the local requirements (including large supplies to the Polish Refugee Camps. Pork markets are being established throughout Buganda and there is now a definite increase in the consumption of pork by the African population.

As regards pork and pork products, it is appreciated that particular care and attention will have to be paid to the development of the pig industry, so as to prevent widespread infection of the human population with *Cysticercus Cellulosae*, and the introduction of legislation is envisaged for controlling and licensing approved breeders and governing conditions under which pigs may be kept.

With a view to ensuring that only fresh and disease-free meat is offered for sale, a standard system of meat inspection has now been initiated in most of the larger townships; it is hoped that eventually this will be extended throughout the country.

The cessation of imports of ghee from Tanganyika and Kenya has stimulated local production, and it appears that already the supply of the locally produced article is sufficient to satisfy local requirements, with a substantial surplus available for export. In addition some 8,000 lbs. of butter is produced per month at a creamery in Mbale District.

The question of milk supply for all sections of the community is one which is seriously exercising the minds of those responsible for hygienic and equitable distribution. In and around large townships, such as Kampala and Jinja, where the normal European population has been increased out of all proportion by the presence of troops, refugees and internees there is already proof that the monetary return for marketing is acting as a deterrent to home consumption by the small peasant producer and his family. It is probably sufficient at this stage to note that it has been recorded and is receiving attention although the solution of the problem is not quite so easy.

Reference must be made here to the menace of tsetse fly encroachments on the cattle of Uganda. The results of observations made in recent years are, to say the least, alarming, and it is quite obvious to us that there can be no question of academic discussion of the possibilities of meat and milk supply without due regard being paid to the annual surrender of hundreds of square miles of cattle-bearing country to the tsetse fly.

Fish is a source of animal protein popular in most districts, and evidence of the interest taken by the Protectorate Government in the fishing industry

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is shown by the following extract from the report* by the Standing Finance Committee and the Development and Welfare Committee (1944):—

"The annual wholesale value of fish caught in Uganda waters during 1939 was estimated at not less than £100,000 of which Lake Edward accounted for £25,000. Since then the total value has increased still further and in 1943 Lakes Edward and Albert alone were responsible for more than thirty-eight thousand and eighteen thousand pounds sterling worth of fish respectively. Economically the fishing industry is thus of considerable importance but its value from the aspect of nutrition is even greater. From both points of view it must be promoted and safeguarded in every possible way."

The report goes on to describe control and research from a practical angle and records that, among other activities, the Game Department "is engaged in stocking the smaller lakes, ponds and dams with a valuable exotic species originating in the lakes of North America, which promises to provide a valuable source of food for the African population".

Further detailed information is contained in reports published by Worthington (1928, 1941), and Graham (1928).

E. AFRICAN EATING HOUSES.

The potentiality of African eating houses as an instrument of nutritional propaganda was considered by us at a recent meeting and has since been the subject of investigation in the course of which the views of medical and administrative officers in the districts were obtained.

It appears that although eating houses are tending to spring up in different parts of the Protectorate they have not yet become permanent institutions except in the townships and at a few trading centres, cattle markets and cotton markets. The foodstuffs sold in these eating shops are normally those to which the local inhabitants are accustomed with the addition of tea, sweetmeats and, mainly in the townships, white or brown bread.

In some districts, notably Toro and Ankole, tribal taboos and predilections are very obviously reflected in the commodities offered for sale and this gives rise to considerable doubt as to the immediate educational value of the eating houses and pessimism with regard to the practicability of their exploitation as a means of propaganda.

The only ray of hope indicated in the reports which have been received lies in the possibility of municipal action in the larger townships. It is felt that properly organised native restaurants sponsored by civic authority, where palatable and balanced meals could be provided, would tend to inculcate a taste for the right kind of food cooked in the right kind of way. Concrete plans have already been made in Kampala for this innovation combined with a municipal beer garden.

V.—WAR-TIME CONDITIONS.

A. ARMY RATIONS.

The extracts from a memorandum on this subject from Headquarters East Africa Command quoted below give details of the scale of rations issued to African troops and comment briefly on tastes which are likely to be inculcated. Soldiers have not yet returned to Uganda in sufficient numbers to warrant anything more than conjecture, but our impressions are that once the first flush of affluence immediately following demobilisation has passed there will be a tendency to revert to hereditary custom, except in townships and the more advanced districts where additional foodstuffs are even now in fairly general use. This question is linked, however, with the trend of food fashion resulting from war-time production which we consider is likely to be more permanent than acquired army habit. The extent and implications of this aspect are discussed in more detail later in this section.

* Submitted to the Secretary of state under cover of H.E. the Governor's Despatch dated 17/5/44.

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(viii) Sugar 2
(ix) Salt 1/2 c
(x) Tea 1/2 c

"(a) The ration scale to which the African has become accustomed is, in general, made up of commodities which are obtainable locally. The chief difference between the Army diet and the food to which the African is accustomed under tribal conditions is that many of the items which are supplied daily in the Army are only rarely included in tribal diet, and are normally considered as luxuries.

(b) It is probable that the African has realised that a balanced diet such as he obtains in the Army has resulted in better health and feeling of well-being, and that he will demand or try to obtain something similar in the post-war period.

(c) The various items in the East Africa Ration Scale, and in the ration scales of other Commands in which Africans are serving may be considered separately.

East Africa Ration Scale.

(i) Maize meal 16 oz. . . . .	..	No comments.
(ii) Rice 4 oz. . . . .	..	This has been a fairly regular issue throughout the war, and is very popular. It is probable that rice will be increasingly demanded after the war. If this is so, it is important that it should be unpolished; only unpolished rice is supplied to the Army.
(iii) Fresh meat 8 oz. <i>or</i> preserved meat 6 oz. . . . .	..	This has been a daily issue. It is an important item from a nutritional point of view as it is the only source of animal protein in the ration. It is probable that the ex-soldier will realise that this is a necessary addition to his diet and not an occasional luxury.
(iv) Vitaminised ghee substitute 1 oz. . . . .	..	This is a mixture of vegetable oils, it is not so well liked as ghee, but the African soldier has now become accustomed to a regular issue of fat.
(v) Fresh vegetables 4 oz. <i>or</i> dehydrated vegetables $\frac{1}{2}$ oz. . . . .	..	Fresh vegetables have been the usual, dried vegetables an occasional issue. Cabbage, carrots, and pumpkin are the vegetables most commonly supplied. Turnips are not liked. Carrots were unpopular at first, but the men are now well used to them. It is possible that dried vegetables may be in demand when fresh vegetables are unobtainable.
(vi) Potatoes 7 oz. (with pulses 1 oz.) <i>or</i> sweet potatoes 7 oz. <i>or</i> groundnuts, beans, soya beans, peas, <i>or</i> dates 4 oz. . . . .	..	Most of these alternatives are popular, dates are seldom supplied. A special plea is made that the production of soya beans should be encouraged. This is one of the most nutritious of all vegetable foods as it is rich in protein, calcium and vitamins.
(vii) Orange one, <i>or</i> fresh fruit 4 oz. . . . .	..	This is included solely as a means of supplying Vitamin C. Oranges if ripe are well liked, but lemons, limes and unripe oranges are not popular.
(viii) Sugar 2 oz. . . . .	..	A very popular item.
(ix) Salt $\frac{1}{2}$ oz. . . . .	..
(x) Tea $\frac{1}{4}$ oz.	Also very popular. An increase in both the sugar and tea ration is often asked for.

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Ration Scale for East Africans in the Middle East.

This is based on the East Africa Scale, but includes bread 12 oz. in lieu of maize meal. This is very well liked.

The quantities of meat, vegetables and rice issues are greater than in the East Africa Ration Scale.

Jam $\frac{1}{2}$ oz., onions 2 oz., and curry powder $\frac{1}{8}$ oz., and milk $2\frac{1}{2}$ oz., are also included in this scale.

Ration Scale for East Africans in Ceylon.

This is also based on the East Africa Ration Scale. The main difference is that Atta Flour is supplied instead of maize meal. This is generally cooked in the same way as "ugali" but it is believed that Africans are learning to make chupatties. The amount of rice and sugar is greater than the East Africa Scale. Ghee is given instead of vegetable oil.

It is perhaps reasonable to suppose that the rice issue will increase at the expense of other cereals when the theatre of operations moves into the rice growing countries.

In addition to the Army ration, large quantities of tea, with milk and sugar, buns and bread, and jam are consumed by Africans in Canteens.

To the above it may be added:—

It can be stated that the African Ration Scale has been accepted without complaint, although naturally some items are more popular than others. Tea is preferred to coffee and sugar to jaggery, while those varieties of vegetables that can be obtained all the year round and which travel best, *i.e.*, carrots, turnips, etc., are never as popular as cabbage and cauliflower.

It may be of interest to note that with the exception of dates every item on the African scale is produced in the East African territories, although at present available supplies do not in all cases meet W.D. requirements.

Bread is not a normal issue to Africans. Biscuits are issued on special occasions, *e.g.*, for train rations when there are no facilities for cooking maize meal."

B. EFFECTS OF THE AGRICULTURAL, WAR-TIME DRIVE ON PRODUCTION AND DIETETIC CUSTOM.

The war-time agricultural production drive has been in respect of certain crops for food required by the Army, prisoners of war, internees, evacuees (mostly Poles) and labour. In the case of some crops, for example, rice, it was important to encourage maximum production owing to the loss of territories which had formally produced these crops.

This effort for increased production during the years 1942 and 1943 coincided with unusually adverse weather conditions which resulted in a serious shortage of food in many parts of East Africa so that in addition to the special demands by the armed forces Uganda was called upon to help out neighbouring East African Territories.

The effect which this drive has had on dietetic custom has varied considerably in different localities. In some areas there has been little or no effect, as in these no new crops have been introduced owing either to unsuitability of soil and climatic conditions or to transport which would have been somewhat wasteful of tyres and petrol and would have made the final price to the consumer prohibitive. This is not to say that such crops as soya beans and rice (which are comparatively new to Uganda) have not been encouraged in these marginal areas; this has been done, but they have not made such headway as in areas where there has been a ready market for them.

One effect which the war-time drive has had on such marginal areas is, however, that as the period during which the war-time drive was made for crops normally grown in these areas (mostly groundnuts and sesame) coincided with extremely adverse weather conditions, the people were in a better position to

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weather the food shortage than would otherwise have been the case. They retained the results of the special drive instead of disposing of them for cash. An outstanding example of this was in Teso, where during 1942/43 many thousands of tons of groundnuts which were produced as the result of special war-time propaganda never came on the market at all when the general food situation looked serious. It is also reasonable to suppose that even if there had not been a general food shortage growers would have retained for their own use larger amounts of these valuable foods for their own consumption than they would have done had the special war production drive not taken place.

It is in the areas, where special efforts have been made to encourage the production of soybeans and rice, that war-time conditions and demands have had the greatest effect on dietetic custom. Previous efforts to encourage these two crops (particularly soybeans, as rice was always obtainable at a reasonable price from Tanganyika) have met with little success since they could only be encouraged for consumption by the growers, whose tastes are conservative. When it became possible to offer an attractive price they were readily grown as a "cash" crop. This applies more to soybeans as rice is quite readily eaten and when the food shortage of 1942/43 occurred many thousands of tons of rice, which were expected to come on to the market, were consumed by the growers themselves and a negligible amount only was offered for sale. Soybeans were not nearly so readily absorbed into the native diet, and sales in the first year of the drive for this crop amounted to about 4,000 tons in the area (Mengo and Masaka Districts) where production was being specially encouraged. Here again the food shortage tempted people to try the crop and certain amounts were eaten by the producers, mostly in the "green" state. The next year further interest was shown by the producer in this crop as a food for himself. It also seemed that there was something in the theory, that the best way to convince an African to adopt some new food is to demonstrate that other people want it and are prepared to pay good hard cash for it.

Whilst it cannot be said that the soybean has become an established part of the diet of the African in those areas where it is now grown (mainly in Buganda, Ankole, Toro, Bunyoro, Lango), it can be claimed that most promising progress is being made in this respect and that owing to production for war purposes the position concerning the utilisation of soybeans is many years in advance of what it would otherwise have been.

At the same time as the soybean was being encouraged for war production purposes, demonstration plots were planted at schools so that the children could take back home some knowledge of the crop, and a European and African lady in one Province evolved together suitable methods of cooking for the African peasant. The latter toured the Province and conducted demonstrations at the most important county and mission headquarters. Recently local observations have been supplemented by literature on the subject received from the Adviser on Nutrition to the Secretary of State and this is being given publicity.

The building of a soybean flour factory has now been completed at Jinja, a large amount of literature on the production of flour, etc., from soybean was obtained from America by the Agricultural Department and placed at the disposal of the owners of the factory, which has not yet actually begun production. Soybean flour cakes are not uncommon in native markets, Indian shops, etc., in various parts of the Protectorate.

Locally grown rice is not highly polished for the reason that the only machines available here will not do this. Rice milled in this way is marketed for sale to, and consumption by, Indian and Arab communities, but the rice eaten by the African producers is almost invariably hulled in a wooden pestle by hand which, as far as is known, destroys none of the protective value.

Experiments have also been conducted in the manufacture of parboiled rice. This method is said to cause diffusion of the Vitamin B¹ throughout the kernel and the general nutritive value is generally accepted as being better than that of

milled rice. Such rice, however, is used more as a sweetmeat and not as a staple food.

It should perhaps be pointed out, however, that as regards the sale of milled rice in Uganda the consumer is at present being forced to take the unpolished rice, but if after the war he demands the highly polished article he will get it from Tanganyika and elsewhere so that the only solution seems to be the educating and encouraging of the natives of Uganda to grow and mill their own rice.

During the past two seasons, 300,000-400,000 bags (30-40,000 tons) of maize have been exported from Uganda to Kenya—after the Uganda requirements had been met. This is a fairly spectacular result of the war production drive as Uganda normally imports maize. From an agricultural point of view (and possibly from others too) the growing of maize on a large scale is regarded as very much in the nature of a war-time measure which should be discontinued as soon as possible. Maize is a soil exhausting and erosion permitting crop and it has to be grown (for transport reasons) in areas close to the railways where other and more valuable crops can well be encouraged. For these reasons it is hoped to be able to discontinue this encroachment on the capital assets of the soil whenever the supply position permits. It is doubtful if this increased war production of maize is having or will have any appreciable effects on dietetic custom. It is being grown mostly in the elephant grass plantain eating areas where little maize is consumed normally, although during the food shortage of the last two years quite large quantities were consumed—mostly in the "green" state.

The increased demands for vegetables and eggs will no doubt have some effect on dietetic custom, especially as the demand is very fluctuating and producers frequently have surpluses left on their hands, particularly of the European type of vegetables. The ready demand for eggs is also affecting a different outlook towards poultry which owing to previous small demand and poor prices were previously given little or no attention, and were just left to fend for themselves.

Fruit has become an important item of revenue to Africans in some areas and this should be of assistance in furthering the efforts which the Agricultural Department has made for several years now, without marked success, to encourage the planting and care of citrus and other fruits, although in a few areas, Lango in particular, some progress has been made, and nurseries established at numerous centres were quite well patronised.

In those areas which are suitable for the crop, wheat has been grown on a much increased scale, owing to better prices. This results in a larger quantity being consumed by the producers and should it be uneconomic to produce this crop for sale later on cultivators, having got into the habit of putting in an increased acreage under this crop, may well continue to do so, and consume it all themselves. A habit once established takes a hold which is not easily shaken off and, in respect of many crops, it was only war conditions (*i.e.*, the production drive linked with the better prices) which have made it possible to initiate such habit.

In addition to the crops which have been referred to in the foregoing paragraphs the agricultural drive extended to other crops normally grown in Uganda, particularly cotton, coffee and tobacco. The effect of this has been that more money from the sale of produce has become available for the peasant and the trader with the result that increased purchases of various foods has become possible. The main nutritional importance of this is the consumption of meat and fish, much more generally than previously and in larger quantities. There is evidence to show that this is becoming a habit which will not readily be given up if economic conditions permit its continuance, and it may well be that the desire for a better and more varied diet will tend to incite the people to greater efforts to obtain money by the sale of the produce of the land.

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J. C. R. BUCHANAN,

* Submitted to the Sec

VI.—FUTURE POLICY.

We have been conscious for some time past of the desirability of a formulated programme on the lines of the recommendations made in the Report of the United Nations Conference on Food and Agriculture (Cmd. 6461, pp. 10-12); but we have also appreciated that the knowledge and experience of local conditions which are provided by individual and departmental endeavour on which any such programme would be based should be supplemented and co-ordinated by the work of an expert team.

It was for this reason that we strongly advocated that a nutritional survey should be carried out to provide further data on which we could base our plans, and as a result of our advocacy an application has now been submitted by the Government of Uganda for assistance from the Colonial Development and Welfare Vote for the specific purpose of financing this scheme. In the memorandum covering the application it was made clear that "the scope of the survey is regarded as being not merely an aggregation of clinical, anthropometrical and ethnological data which are accepted as having a direct bearing on malnutrition, but to go further and include a broad and co-ordinated study of the many factors in the field of production and distribution which have an interest, but by no means unimportant, bearing on the nutritional state of the people". It was also stressed that "special arrangements are now called for whereby not only will scientific facts be disclosed which will be of value at a later date, but practical guidance will be offered to those concerned with planning for the betterment of conditions in the present and the immediate future".

In the hope that this specialised assistance will speedily materialise we feel that it would be imprudent to formulate a set programme at this stage. This by no means denotes a pusillanimous attitude of *laissez-faire*. On the contrary, we have before us the "Joint Report of the Standing Finance Committee and the Development and Welfare Committee on Post-War Development*" and we find therein a Protectorate policy which is in effect a comprehensive scheme directed towards the goal we ourselves are seeking. With this guide our duty appears to be to watch the plan as it unfolds, to guard against divergence or duplication of effort and, as side lights and new knowledge emerge as a result of experience or research, to ensure their efficient application to the task in hand.

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G. W. NYE, *Acting Director of Agriculture*.

R. J. SIMMONS, *Director of Veterinary Services*.

J. SYKES, *Deputy Director of Education*.

} *Members.*

J. C. R. BUCHANAN, *Deputy Director of Medical Services (Secretary)*.

* Submitted to the Secretary of State under cover of H.E. the Governor's despatch dated 17/5/44.

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