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dry season grazing areas, camel's milk, ghee and mutton have become more plentiful and the physical condition of the tribes has correspondingly improved.

5. *Researches and Surveys.*—Hitherto very little has been done beyond the researches of Buchanan referred to above. At present there are small laboratories attached to the Medical and Veterinary Departments. The Committee recommend as highly advantageous a direct and intimate research co-operation with the Anglo-Egyptian Sudan which faces nutritional problems of a similar nature.

6. *Practical Measures for Improvement of Nutrition.*—The Committee strongly recommends the establishment of a Maternity and Child Welfare Centre. See also under paragraph 4 above.

KENYA.

Area: 224,960 sq. miles.	Birth Rate:	} No reliable statistics available.
Population (1936).	Infant Mortality:	
Europeans ... 18,269	Death Rate:	
Asiatics ... 54,690		
Natives ... 3,186,976		
Others ... 1,587		
Total ... 3,261,522		

1. *General.*—No special Committee has been appointed. The opinion is expressed that the necessary co-operation in nutrition work between the Administration, Agricultural, Veterinary and Medical Departments can be secured without the appointment of a local Nutrition Committee. In the memorandum forwarded by the Kenya Government, it is emphasised that the knowledge already gained regarding the nutrition of Kenya natives is very considerable and that, indeed, research has tended in recent years to move ahead of agricultural practice and policy. The report submitted from Kenya deals chiefly with the necessity for reflecting in agricultural policy the knowledge of nutrition already available, second place being given to the medical and research outlook on the subject.

2. *Composition and Nutritive Value of Dietary.*—[For a summary of the numerous published papers on Kenya dietetics reference may be made to *Nutrition Research in the British Colonial Empire*, Imperial Bureau of Animal Nutrition, Tech. Communication No. 8, 1937, pp. 6-10. Price 1s.]

The diet of the native in the reserves is varied in quantity, although in some respects qualitatively deficient. Different tribes have entirely different dietary habits. For example, the diet of

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the Masai consists chiefly of meat, blood and milk, whilst that of the Kikuyu, and, indeed, of most other tribes in Kenya, mainly composed of cereals (maize), tubers and legumes. The chemical composition of local foodstuffs has been extensively studied, analytical data being available in a number of publications. On the whole it is true that the food supply available for the native population is adequate in total, and that any deficiency results from maldistribution, poverty and ignorance.

3. *Diet and Health (deficiency diseases and other relevant considerations).*—In the well-known study by Orr and Gilks, medical examination proved beyond dispute the great superiority in weight, stature and fitness of the milk-nourished and carnivorous Masai to the vegetarian Kikuyu. The Kikuyu diet was as a whole found to be deficient in calcium and sodium, elements which, in the case of women, were made good by the eating of leaves rich in these minerals. Marked differences were also noticed in the incidence of disease in the two tribes. Common among Kikuyu were bony deformities, dental caries, anaemia, pulmonary conditions and tropical ulcer. The diseases of the Masai were of a different type, rheumatoid arthritis being common and possibly related to their high meat consumption.

Despite the improvements made in institutional diets, and the care taken to ensure that these are adequate, sporadic cases of deficiency diseases (*e.g.* Rand scurvy) occasionally occur. The incidence of night blindness and xerophthalmia among prisoners and of pneumonia, tuberculosis and ulcers in the free population suggests a general vitamin A deficiency. There is probably no deficiency of vitamin D. Other observations suggest a possible iron deficiency.

4. *Economics of Diet (relation to local agriculture, cost, tariffs, etc.).*—As indicated in paragraph 1, local authority is concentrating on bringing native agricultural practice into harmony with the nutritional needs of the people. The opening up of markets and the organisation of trade between agricultural and pastoral tribes has led to a better distribution of foodstuffs than existed, say, 10 years ago, with a consequent improvement in the dietary of the people on the land. (See paragraph 6.) With the object of increasing the native consumption of local foodstuffs (meat, etc.) agricultural policy has a two-fold concern (*a*) to increase cultivation of food crops in the agricultural areas and to improve their variety and quality, and (*b*) to improve animal husbandry in all areas both agricultural and pastoral. In regard to the former some appropriate system of permanent rotation is aimed at, the greatest difficulty so far encountered being the unwillingness of the natives to grow a leguminous green manure crop for the purpose of turning under

to assist maintenance of fertility. The planting of Napier grass will be helpful for this purpose and a similar effect is claimed for the wattle tree in the case of worn-out cultivated lands in certain areas. As regards pastoral areas, the presence of disease and the lack of markets in the past for meat and livestock generally have hampered development, but it is hoped by intensifying sound grassland management and encouraging modern breeding methods to effect improvements which will provide greater returns from stock products and eventually result in a general raising of the standard of living among stock-owning natives.

5. *Researches and Surveys.*—[See also Note on the work of the Standing Medical Research Committee for East Africa, p. 10 above.] No recommendations are made for extension in the present research programme being carried out in the Medical Laboratory at Nairobi. This is mainly concerned with studies on the basal metabolic rate of and energy exchange in the East African native, which are locally regarded as of importance in order to find out whether or not the results of nutritional investigations under European conditions can be applied without modification in Africa. There has recently been completed a long term rat-feeding experiment to determine the rate of growth and reproduction of animals receiving a typical institutional dietary and to discover the effects of an addition of milk to that scale, and a survey of the milk consumption by Europeans in a number of households. Specialized investigations on calcium and phosphorus metabolism, analytical work on foodstuffs, and examination of the results of free issues of milk to native school children in Nairobi are also being continued.

6. *Practical Measures for Improvement of Nutrition.*—These cover two aspects, agriculture and health, and involve (*a*) instruction at veterinary training depots on the improvement of native cattle; the establishment of small holdings, demonstration gardens and plots; the improvement of food crops by the introduction of new varieties of cereals, pulses, vegetables and fruits (particularly the citrus and the avocado pear), as well as by local selection for high yields and resistance to disease; introduction of mixed arable and stock farming; instruction in pasture management and conservation of fodder; and (*b*) the provision of properly balanced diets in hospitals, schools and prisons; the establishment of child welfare centres; propaganda on the public health aspects of nutrition at exhibitions and shows; education on diet and nutrition in schools.

In an article\* by the late Director of Education in Kenya, a description is given of measures undertaken by the Educational Department towards providing the West Suk tribe with

\* "Africa", 1937. 10, 458-471.

the means of securing a greater variety of crops and so improving their dietary. A boarding school for 40 youth was opened in 1931, in which, in addition to the ordinary elementary school curriculum, training was given, in plots attached to the school, to enable the pupils to grow crops suitable for the country in which they live.

## TANGANYIKA.

Area: 374,085 sq. miles.

Population (1931).

Europeans	...	8,200
Asiatics	...	32,000
Natives	...	5,022,640

Total	...	5,062,840
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Birth Rate:	} No reliable statistics available.
Infant Mortality:	
Death Rate:	

1. *General*.—A specially appointed local Committee has submitted a report of 16 pp., dealing chiefly with the practical measures towards securing improved nutrition and to a less extent with the scientific and medical research aspects. [For additional information reference may be made to "The Tribes of Tanganyika—Their Districts, usual Dietary and Pursuits," by R. C. Jerrard, and to Imperial Bureau of Animal Nutrition, Technical Communication No. 8, pp. 17-18.]

2. *Composition and Nutritive Value of Dietary*.—The report refers to the work of Jerrard in recording the customary foods of each tribe in the eight provinces (54 separate districts) of the Territory. These include millet, mtama, maize, rice, groundnuts, beans, cassava, sweet potatoes, native vegetables, fish, meat, mutton, goat flesh, milk, blood, etc., and are used in different proportions and with widely varying preferences by different tribes. For example, some tribes prefer root crops (cassava) while others do not; millet is the staple in some districts, rice in others; blood, meat and milk form the main food of certain nomadic pastoral tribes; and fish is commonly eaten by coast tribes and in the Lake Province but rarely elsewhere. Little is known about the various ingredients used as supplementary relishes ("kitoweo") which constitute a very important part of the dietary. It is generally agreed that the majority of the population does not get enough meat and milk and that there is an annual period of food shortage between harvests. This periodic shortage of food, involving a recurrent annual drain on native resources, is a question even more serious than the occasional outbreaks of famine which have occurred in nearly all provinces during the past ten years, and which cost considerable sums in relief measures. Taboos and tradition are also important factors and are sometimes the cause of protein and vitamin shortage. A taboo on eggs and milk, for example, may operate even during a shortage of staples.

3. *Diet and Health (deficiency diseases and other relevant considerations)*.—Although deficiency diseases have been reported in many districts, particularly beriberi and rickets in the Tanga province and scurvy in the Lupa area of the Southern Highlands, information is not available to determine with any accuracy the extent and prevalence of malnutrition throughout the whole territory. While cases of malnutrition are common enough following serious shortage or failure of staple crops, it is impossible to say whether in a prosperous year any tribe suffers as a unit from food deficiency. Nor is there any exact information to indicate how far conditions of malnutrition are complicated by parasitic infection nor how far deficient nutrition causes or increases susceptibility to such infection. It is recognised that natives living in stock rearing areas are more energetic than those from districts where meat and milk are less plentiful. By improving dietary conditions on estates one large employer increased his average daily turn-out of labour to 98 per cent. as compared with a previous normal of 45 to 50 per cent.

4. *Economics of Diet (relation to local agriculture, cost, tariffs, etc.)*.—There is no doubt that improved distribution of available food supplies would lead to improved nutrition. Particularly is this needed in such an area as the Lupa goldfields where malnutrition exists through lack of fresh foodstuffs aggravated by economic difficulties. A major problem is the tsetse fly menace which prevents the people in two-thirds of the territory (one-sixth of the population) from keeping domestic animals for milk and meat production. In other areas, enzootic disease, density of population and seasonal starvation of animals limit the supply; and the fact that so many owners regard their stock as currency (for marriage dowries, etc.) also precludes the slaughter of cattle for ordinary consumption as meat.

Improvement in quality of food must be an ultimate aim, but the immediate need is greater quantity. The preharvest shortage is serious in some districts and is due to the inherent improvidence of the native who plans his agricultural output to allow only a bare sufficiency for himself and then overdraws on this minimum when the store is at its fullest after harvest. While the development of economic crops such as coffee and cotton is essential to the progress of the African and of the territory, the cultivation of food crops is equally essential. It should be a first consideration to ensure that each family in a tribal area cultivates major food crops sufficient for its needs.

5. *Researches and Surveys*.—[See also Note on the work of the Standing Medical Committee for East Africa, p. 10 above.] Existing knowledge is based on the opinions of many observers rather than on scientific enquiry. Little research has hitherto been undertaken. The report stresses the need for obtaining exact knowledge regarding the basal metabolism and energy exchange of the native to ascertain if and to what extent the European standard of nutrition deviates from that of the

Other studies which appear desirable include the chemical examination of foodstuffs; medical surveys of nutritionally poor districts; comparative dental studies regarding the relative immunity to caries found among primitive tribes and the higher incidence of dental disease among town dwellers influenced by advanced civilisation; and the extent to which parasitic infection influences native nutrition.

6. *Practical Measures for Improvement of Nutrition.*—A lack of appreciation of the importance of nutrition is one of the most important barriers to progress. The lines along which it is suggested that action should be taken include: better distribution and utilisation of stock with a view to improving the supply of meat and milk; development of better stock routes from cattle areas; rotational grazing; improvement of pastures; improved production of milk and of good quality ghee by means of creameries; encouragement of the use of skimmed milk and cheese made from locally-produced skimmed milk; encouragement by propaganda and example of the use of palm oil; protection of the public from adulteration of foodstuffs by the introduction of appropriate legislation; encouragement of vegetable growing; extended maternity and child welfare services; establishment of school gardens for the cultivation of tomatoes and green vegetables; instruction in anti-tsetse measures; encouragement of the use of shark oil and cod liver oil at tribal dressing stations; improvement in methods of food storage; and the establishment of communal kitchens by the larger industrial concerns.

The reviewing Committee recommend that in order to bring them within the purchasing power of as many natives as possible, tinned milk, tinned and dried fish, salt and unmilled rice be exempt from Customs duties and that the licence fee imposed on sellers of dried fish be abolished. The Committee also invite attention to the unsatisfactory conditions under which labourers on certain industrial undertakings are fed, and they express the hope that such remedial measures as may be practicable will be progressively enforced.

#### UGANDA.

<i>Area:</i>		<i>Birth Rate:</i> 26.42 per 1,000
	<i>sq. miles.</i>	(1936).
Land ...	80,371	<i>Infant Mortality:</i> 158.64 per
Water ...	13,610	1,000 births (1936).
	<hr/>	<i>Death Rate:</i> 19.60 per 1,000
Total ...	93,981	(1936).
 <i>Population (1935).</i>		
Europeans ...	1,994	
Asiatics ...	14,860	
Natives ...	3,644,245	
	<hr/>	
Total ...	3,661,099	

1. *General.*—No *ad hoc* Committee has been appointed, but a nutrition sub-committee of the permanent Agricultural Survey Committee has surveyed the position and submitted a report. In addition, a memorandum from the Director of Medical Services, and two reports dealing with health and agriculture in Teso have been submitted. These are (1) "An investigation into health and agriculture in Teso, Uganda," Agricultural Survey Committee, Nutrition Report No. 1—Teso, 1937, by De Courcy-Ireland, Hosking and Loewenthal, and (2) Report of an informal Committee appointed to consider certain questions relating to agricultural, forestry and stock conditions in Teso District.

2. *Composition and Nutritive Value of Dietary.*—The native dietary is primarily vegetarian and consists chiefly of bulky carbohydrate foods. Plantains form the staple food in the Buganda Province and in parts of the Eastern, Northern and Western Provinces. In the rest of the country grain is the staple, the small millet (eleusine) being the commonest. Beans and peas are the staples in Kigezi and Ankole. Groundnuts, a commercial crop in the Eastern Province, are eaten freely when available. Wheat and rice are grown in certain areas but maize is not grown to any extent. Sweet potatoes, great millet (sorghum), cassava, simsim, pumpkins, gourds and native spinach are secondary foods used in varying proportions.

All tribes eat meat occasionally but not regularly. In cattle districts milk is consumed, generally curdled and very often mixed with cattle blood. Fish, both fresh and dried, is popular whenever obtainable among tribes living adjacent to lakes and rivers. Locusts, grasshoppers and white ants are universally eaten as delicacies. Fruit does not ordinarily enter into the diet, but figs, tamarinds and the fruits of the shea butter tree and borassus palm are occasionally used to supplement the routine diet. The consumption of sugar is steadily increasing and tea and coffee drinking is gradually becoming habitual with natives. Food taboos are common, e.g., chicken and mutton are not eaten by Baganda women and milk is often barred to male adults.

3. *Diet and Health (deficiency diseases and other relevant considerations).*—The published investigations of Loewenthal, Mitchell, Owen, Hennessey and others indicate that there exists a very considerable amount of ill-health due to lack of first-class protein, fat, vitamins and possibly of minerals in the diet now consumed. Up to four or five years ago considerable trouble was experienced in Uganda prisons owing to malnutrition. Dietary deficiency the chief evidences of which were oedema, pellagra, xerophthalmia, night-blindness and other ocular defects, was reported by the medical and prison dieting organisations. This suggests that vitamin deficiency, particularly of the A-factor, must exist to a considerable extent among the free population. In recent years, however, prison diets have been so much improved that to-day deficiency diseases are rarely

seen in Protectorate prisons. Another important line of inquiry refers to tropical ulcer which is very prevalent and is considered to be of dietetic origin. Ulcers are of less common occurrence where the diet is richer in calcium and fat, and are scarcely ever met with among native chiefs and houseboys whose circumstances permit of their obtaining a regular and adequate diet including meat and milk. An important factor seems to be the quality of dietary protein. This is indicated by the prevalence of ulcers among vegetarian tribes and their absence in meat-eating tribes.

Observations by Loewenthal on vitamin A deficiency in the Teso area revealed that, of 1,112 individuals examined, both children and adults, almost 30 per cent. showed vitamin A deficiency. Other symptoms, such as neuritis, sore mouth, and skin infections suggest that the deficiencies were multiple in nature.

In the investigation into health and agriculture in Teso by De Courcy-Ireland *et al.* referred to in paragraph 1, two small administrative units were compared. In the one with a denser population and a negligible consumption of food of animal origin, the incidence of nutritional disease (eye troubles and ulcers) was markedly higher than in the other where there was less overcrowding and where fish was a regular constituent of the diet.

4. *Economics of Diet (relation to local agriculture, cost, tariffs, etc.)*.—The methods of agriculture adopted by certain tribes are undoubtedly extravagant of land, and in many respects the present tribal system of land tenure is unsatisfactory. It is suggested that a proper appreciation of the value of land and of soil conservation can only follow if some method of land tenure ensuring continuity of ownership to the individual can be evolved. Teso is the agricultural district most affected by desiccation and soil deterioration. Here, natives normally cultivate land continuously until such time as, judging by reduced yields, it is becoming impoverished. To restore fertility this land is then allowed to rest, new plots being opened elsewhere. Owing to increased pressure of population, increased acreage of economic crops and increased cattle population, no adequate resting period is now being allowed, with the result that land fertility is not being maintained. A special Commission examining this problem in Teso in endeavouring to devise measures necessary to meet a situation which unless immediately dealt with may well become so serious that the natives will have difficulty in growing adequate supplies of food.

Water supply is a difficulty in certain areas. Undoubtedly Uganda could carry a very much larger population than at present if the sparsely watered areas could be provided with this necessity.

5. *Researches and Surveys*.—[See also Note on the work of the Standing Medical Research Committee for East Africa, p. 10 above.] Apart from the informative studies by Loewenthal and others referred to above, little research has been undertaken. Studies urgently required are the analyses of local foodstuffs (including the insects eaten), determination of native protein requirements, investigation of methods of cookery suited to native needs and best adapted to preserving the nutritive value of food, and anthropological research into the reasons for food taboos. Further surveys along the lines of that made in Teso (see paragraphs 1 and 3) are in progress and the Government is detailing a medical officer who will give his full time to this special work.

6. *Practical Measures for Improvement of Nutrition*.—On the agricultural side these include improved crop rotation, the introduction of new varieties of food crops and the improvement of cattle and milk supplies. The evolution of marketing systems and the establishment of recognised cattle routes has resulted in the price of meat being reduced to 25-30 cents per lb. as compared with 1s. (100 cents) per lb. 10 years ago. On the medical side, dietary scales have been laid down for prisons, schools, and hospitals. As an example to private employers of labour, Government has recently provided a well balanced diet to labourers employed on road construction. This has resulted in a very much lower incidence of sickness than is usual in such constructional works. Other measures include infant and child welfare work, health shows, and efforts to increase the consumption of milk. An increased consumption of fish is desirable and investigations are required with a view to better organisation of the fishing industry and the preparation and sale of fish.

## ZANZIBAR

(AND PEMBA).

Area:		Birth Rate: 16.3 per 1,000 (1936).
	Sq. miles.	Infant Mortality: No reliable statistics available.
Zanzibar ...	640	Death Rate: 16.8 per 1,000 (1936).
Pemba ...	380	
Population: 242,770 (1936).		
Distribution (1931).		
Europeans ...	278	
Arabs ...	33,401	
Indians ...	15,246	
Africans ...	186,466	
Others ...	37	
Total ...	235,428	

1. *General.*—The local Committee, consisting of the Directors of the Departments of Health, Education and Agriculture, the Provincial Commissioner, and the Curator of the Museum have published Sessional Paper No. 2 of 1937, under the title of "Nutritional Review of the Natives of Zanzibar", which deals mainly with the dietary problems of the rural African and to a less extent with the urban African and the immigrant Indian. Sessional Paper No. 10 of 1937, published under the title, "Nutritional Problems of Zanzibar Protectorate", is chiefly devoted to the progress which has been made in applying the practical measures for improvement suggested by the Committee.

2. *Composition and Nutritive Value of Dietary.*—*Staple foods.*—Rice, coconuts and cassava. *Secondary staples.*—Fish, plantains, sweet potatoes, yams. *Subsidiary foods.*—Maize, millet, Kaffir corn, legumes, vegetables and fruits. Rice, half of which is imported polished, cassava, sweet potatoes, plantains and various flours form the bulk of the dietary; coconut oil is universally eaten and provides almost all the fatty food; while fish, almost the sole food of animal origin, is commonly eaten fresh or dried, but in small quantities as a relish rather than an essential. Green vegetables and legumes are less commonly eaten, and the consumption of meat, eggs and milk is negligible. A list of typical native dishes, with their mode of preparation, is given. Excessive carbohydrate and deficiencies in protein (both animal and vegetable) and animal fat are the outstanding characteristics.

3. *Diet and Health (deficiency diseases and other relevant considerations).*—In common with neighbouring East African territories, vitamin deficiency (leg-weakness, sore eyes, visual defects and xerophthalmia) is frequently found among prisoners in Zanzibar and has necessitated the revision of nutritional dietary scales. Following a medical survey of prisoners in 1935, the introduction of a new prison diet resulted in a decrease of avitaminosis from 53 to 18 per cent. among long-term prisoners, whereas, among subjects imprisoned for less than six months, the incidence rose from 25 to 36 per cent. The conclusion is inevitable that a marked degree of avitaminosis exists among the free population outside the gaol, which, in the case of short-term sentences, cannot be counteracted owing to the insufficient time on the more adequate prison diet. This conclusion is supported by the fact that, as revealed by medical survey, only one-third of the rural African and Arab children can be described as well nourished.

4. *Economics of Diet (relation to local agriculture, cost, tariffs, etc.).*—To provide for clothes, house repairs, fishing tackle and other essential outgoings, the rural native trades all his most valuable foodstuffs in the towns, buying for himself

cheaper food. Eggs are sold not eaten; milk is bartered not drunk. Nearly the whole milk supply of the Island is absorbed into the township, the largest consumers being the Indian community. The only fish eaten is what cannot be absorbed into the available markets. Meat is not eaten owing to high cost, though it is well liked when obtainable. While the qualitative dietary defects considered in paragraphs 2 and 3 are common both to country and town districts, the quantitative factor is more pressing in the town where there is a great deal of poverty. Probably 80 per cent. of the poorer town dwellers spend not more than Shgs.6 per month on food, a sum considerably below the monthly food expenditure of Shgs.10.50 found in the lowest of four distinct groups of more prosperous town dwellers (examined by Smith and Smith) whose diet even at that level showed marked deficiency of vitamins, animal protein and fat. Annually some 330,000 cwts. of rice and 750,000 lb. of ghee are imported. It is, however, the importance and value of the two main export crops—cloves and coconuts—which has hitherto overshadowed food crop cultivation. Indeed, the whole economic status of the native is primarily determined by the degree of prosperity in these two industries.

5. *Researches and Surveys.*—[See also Note on the work of the Standing Medical Research Committee for East Africa, p. 10 above.] Very little laboratory research and only one or two minor dietary and health surveys of limited scope have been undertaken. The reviewing Committee considers it highly desirable that more data be obtained on the precise nutritional quality of local foods both in the raw state and in prepared dishes, and concurrently that metabolism experiments be carried out to determine whether the energy requirements of the native are comparable to those of the European. By these means alone is it possible to say whether a diet, optimal for native energy and health requirements, can be made up from the common and normally available local foodstuffs. If, however, an enquiry of this scope were to be undertaken in the Protectorate itself additional financial provision would have to be made.

6. *Practical Measures for Improvement of Nutrition.*—These come under two heads, agricultural and medical, and involve (a) encouragement of the cattle and dairy industry in order to foster meat eating and milk drinking; extended food crop cultivation including suitable crop rotation, green manuring and soil improvement; the inauguration of a limited and experimental policy to encourage the extension of rice growing in Pemba; the cultivation of yellow maize to replace the local white variety; gradual replacement of the poor local variety of oil palm by a new variety from the Far East having a good oil-yielding pericarp, with a view to providing an edible oil rich in vitamin A;

improvements to the inshore fishing industry by the introduction of motor boats, the development of crayfish capture, methods of fish preservation and a by-products industry; and (b) continued attention towards further improvement of institutional dietaries; the provision of extra meals for school children, the paramount importance of which is specially stressed; the establishment of girls' schools with a bias towards domestic science training; the provision by Government of ante-natal clinics and maternity and child welfare services.

Steps have already been taken to inaugurate some of the above improvements, but, if they are to be effectively expanded, additional financial aid will be required, particularly in respect of maternity and child welfare, school meals, and the suggested encouragement of the fishing industry.

#### NORTHERN RHODESIA.

Area: 290,323 sq. miles.

Population (1934).

European	...	11,464
Native	...	1,366,425

Total	...	<u>1,377,889</u>
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Birth Rate:

Infant Mortality:

Death Rate:

} No  
reliable  
statistics  
available.

1. *General*.—A standing Committee has been appointed and has submitted a report, to which there are several appendices; among them, observations by Mrs. Gore-Brown and Dr. Audrey Richards, and also a note by Miss Ricardo and Miss Owen on the fish of Lake Bangweulu.

In expressing their appreciation of the very interesting records put forward by Miss Richards and Mrs. Gore-Brown, the Committee wish to emphasise the fact that their data must not be taken to apply to all or even to most of the Protectorate. The high north-eastern plateau where their work was done is agriculturally perhaps the most unpromising part of the Territory inhabited by some of the worst farmers of the many tribes of Northern Rhodesia. A less gloomy picture would probably result from similar studies in, for example, the Luangwa valley.

2. *Composition and Nutritive Value of Dietary*.—(a) *Observations by Richards and Gore-Brown*.—The dietary customs, food consumption and cooking practices of the Bemba, a millet-eating tribe are described in great detail. Compared with European standards, the energy value of the diet is little more than half; there is a marked deficiency of fat ( $\frac{1}{3}$ th European standard) and of animal protein, which may even be entirely absent. A noteworthy feature is the high calcium intake (double average European intake) provided by the type of millet used (finger millet). For each of 300 days of the year, it has been

calculated that 0.9 lb. millet, 0. per standard ma

Conditions in in a typical cas tory. Here, ow richer in protein carbohydrate, ca tains five to six phorus as cassar their carbohydra distinct advanta and stamina, th getic and better a tall and muscula knees.

(b) *Other av* mention is made and the native parts, but all of (red variety is su groundnuts, bea honey and drier supply is used f neither hunt nor rats and insects section to the r sava as compar significance in v sava for cereals vulnerable to t spinaches, relish varying quanti knowledge reg extras is empha

Very little me tion. Even pa meat and in ce one time form as to be in dar come signs of to eat more me siderable influe interest in me native is alwa barter for meat pleuro-pneumo of animals in E