FACTORS IN THE DEVELOPMENT OF CENTRAL AFRICA

A study of the Lower Shire Valley and adjacent highlands

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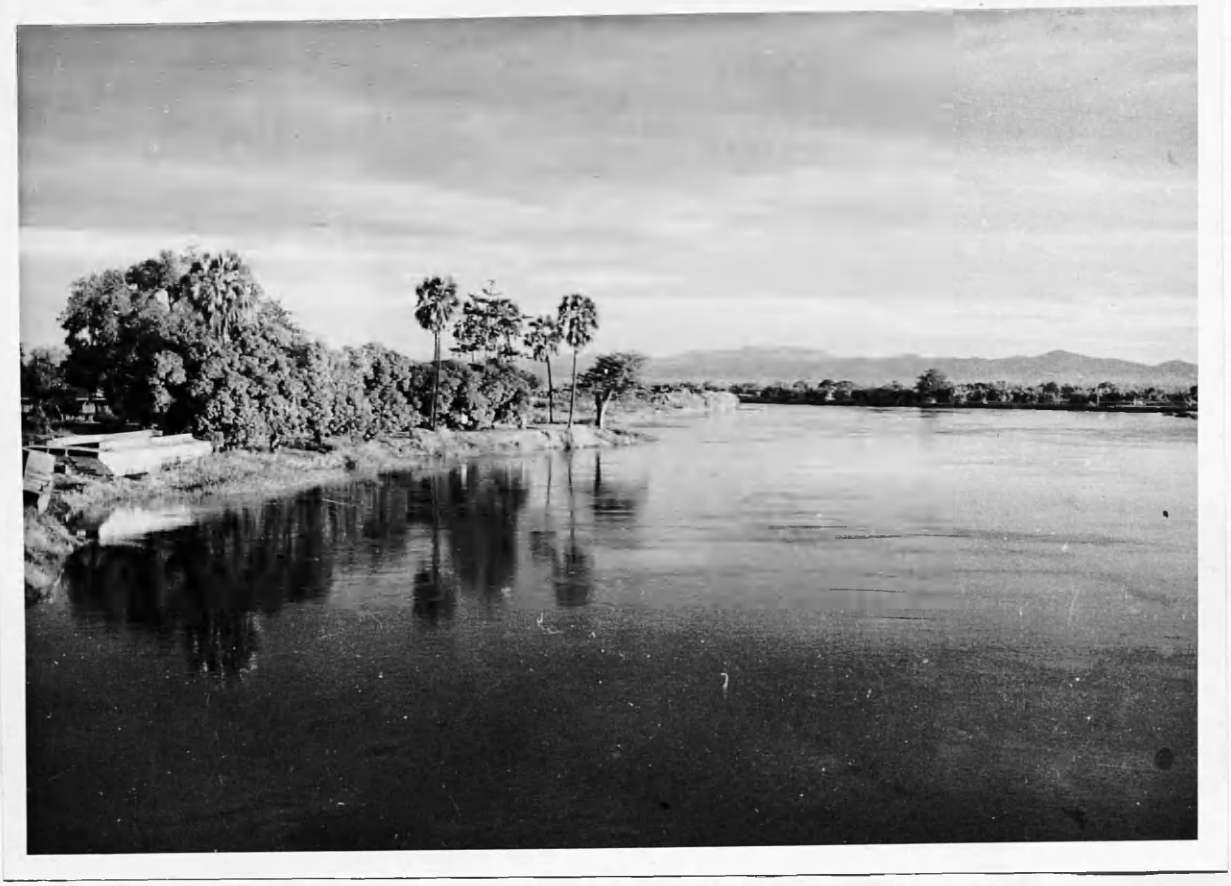
Vol. I

I declare this thesis to be entirely my own composition.

W.B. Morgan.



The Shire near Chiromo - looking south

PREFACE

The following study is the result of research in the southern portions of the Shire Valley of the Nyasaland Protectorate and of Portuguese East Africa during a visit to Africa between April 18th and November 15th, 1951. This work was sponsored by the University of Glasgow and undertaken in company with Mr. T. Price of the Department of African Studies. Much of the information could not have been obtained without Mr. Price's knowledge of the Nyanja and Sena languages, and the expedition itself, involving travel from Capetown to Nairobi would hardly have been possible without his experiences of African travel and conditions. This thesis therefore owes much to his assistance and guidance in the field.

Acknowledgement is due to the kindness and assistance of the British and Portuguese civil authorities in Africa, of the officers of the Nyasaland Agricultural, Survey and Geological Departments and of the many friends in Nyasaland and Portuguese East Africa.

Sources of material include the author's own field work, various scientific papers by workers in the service of the Nyasaland Government, Government papers, historical accounts including some secondary matter where original accounts were not available, statistical information, maps and aerial photographs listed in Appendices B and C.

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8th January, 1953.

CHAPTERS

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I. INTRODUCTION.

In discussing the evolution of British colonial Africa one can point to a change in governmental outlook following 1918 which paralleled the emergence of the commonwealth ideal in place of that of empire. The Devonshire White Paper of 1923 claimed that Kenya was primarily an African territory in which native interests must be paramount, whereas hitherto the colony had been regarded as an excellent field for white colonisation. In 1930 the Passfield White Paper stated that dominion status was the ultimate goal for the colonies if and when the native community could participate in the business of self-government. Although the advance along the road to democratic government has been fairly rapid in West Africa, particularly in the Gold Coast, in East and Central Africa outside the "white colony" of Southern Rhodesia comparatively little has been done. The problem of attaining self governing status has been made more difficult not merely by the presence of a body of white settlers and by the influence of the views of the government of the Union of South Africa, but by the lack of economic advance amongst the native peoples. Without economic development it is impossible for a people to support the educational and administrative institutions necessary to satisfy the conditions embodied in the Passfield Report. Accordingly, the problem of development of resources and of methods of production and with it the attendant question of raising

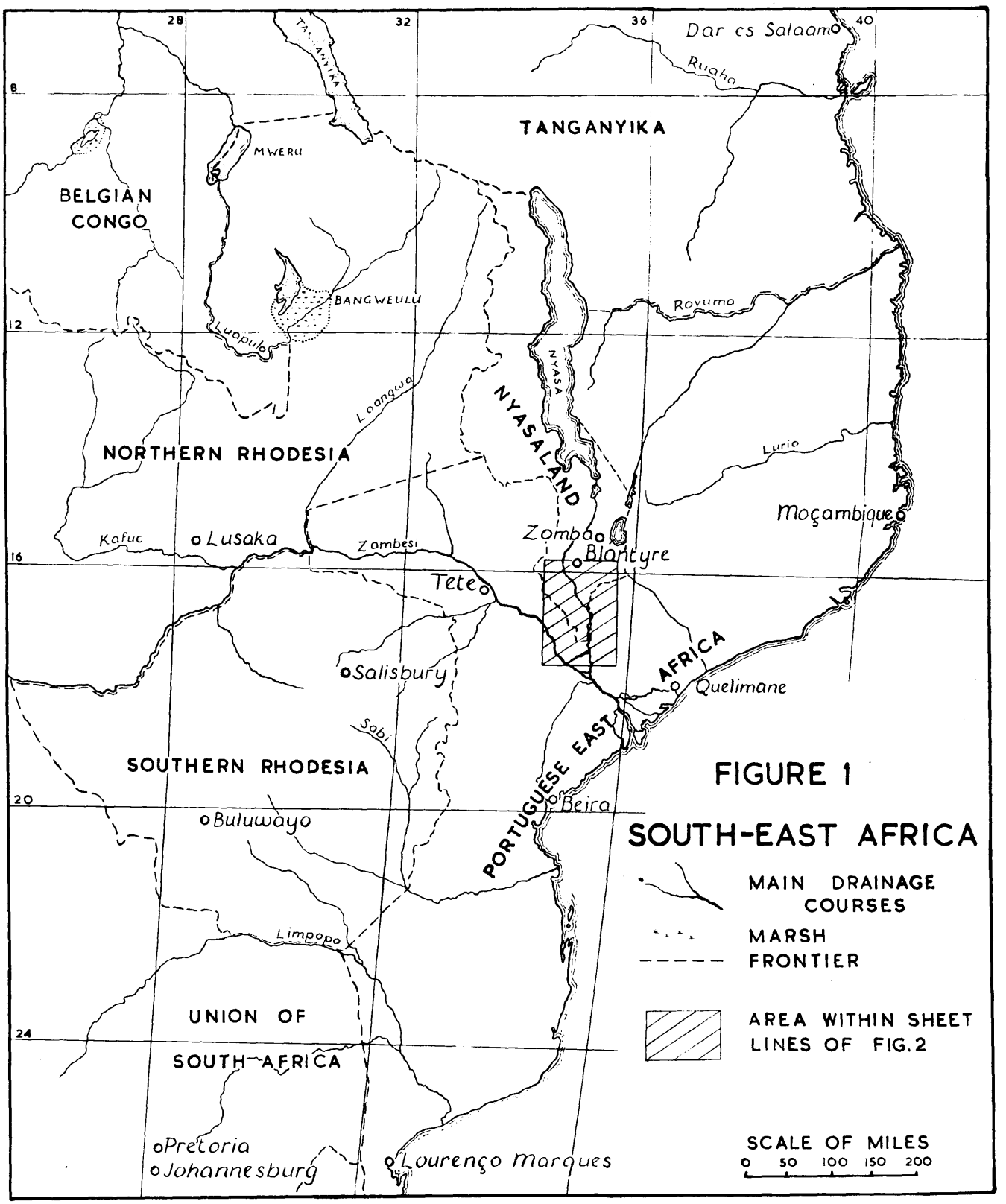
standards/

standards of living may be taken to be a primary consideration in any policy of raising the East and Central African territories from their present colonial status. The issues upon which the call for development is based have been extended since 1945 by the need to increase the dollar earning capacity of the sterling area, by the demand of many Africans that their standard of living should be raised and, complementary to this, by the threat of communism as an attractive alternative to the ideology of Western Europe amongst the peasant peoples of the world. Together with these new factors has come a contraction in the area of the British Empire, making it possible to concentrate more attention on the affairs of the African colonies.

It was in order to study the possibilities for development and the means which have hitherto been employed by both immigrant and native that the author in company with Mr. Price visited the Lower Shire Valley of Nyasaland and Moçambique and the adjacent highlands between the months of May and November 1951. In the time available it was manifestly impossible to attempt the survey of a whole colony, much less that of East or Central Africa. Accordingly, whilst bearing in mind that conditions and techniques vary considerably from place to place, it was necessary to restrict work to a region of sufficient size for the time available and sufficiently representative to give an insight into the broad problems of development throughout Britain's Central and East African territories. The study undertaken is therefore a

sample of the African environment, a regional study which as Jean Brunhes has remarked is the crown of geographical research. The area includes the southern tip of Nyasaland and a small portion of the Morrumbala circonscripção of Portuguese East Africa (figure 1). It lies wholly within the basin of the Zambesi, the scene of so much of Livingstone's work, which provides valuable material for comparison with the conditions of a century ago. The Lower Shire Valley consists of a deep trench approximately 100 miles long by 15 miles wide amidst mainly crystalline highlands, a trench whose proportions owe more to tectonic activity of Tertiary times than to fluviatile action. Its regional limits are sharply defined by both physical and human elements. Everywhere along the perimeter excepting at the river's exit there is a sharp change in gradient, or knick-point, between the valley floor and the steep edge of the highlands. This edge, of varying altitude, is broken only by the narrow trenches of tributary streams and contains little if any settlement, thus providing a gap in the distribution of population between contrasting highland and lowland groupings. In the south there is no dividing line between the valleys of the Shire and Zambesi on the firm ground of either bank, although the descent of the Shire itself is broken by the Pinda Rapids just above the confluence with the Ziwe Ziwe which, being for most of the year a distributary of the Zambesi, marks the northern limit of Zambesi alluvium. The surrounding

highlands/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32
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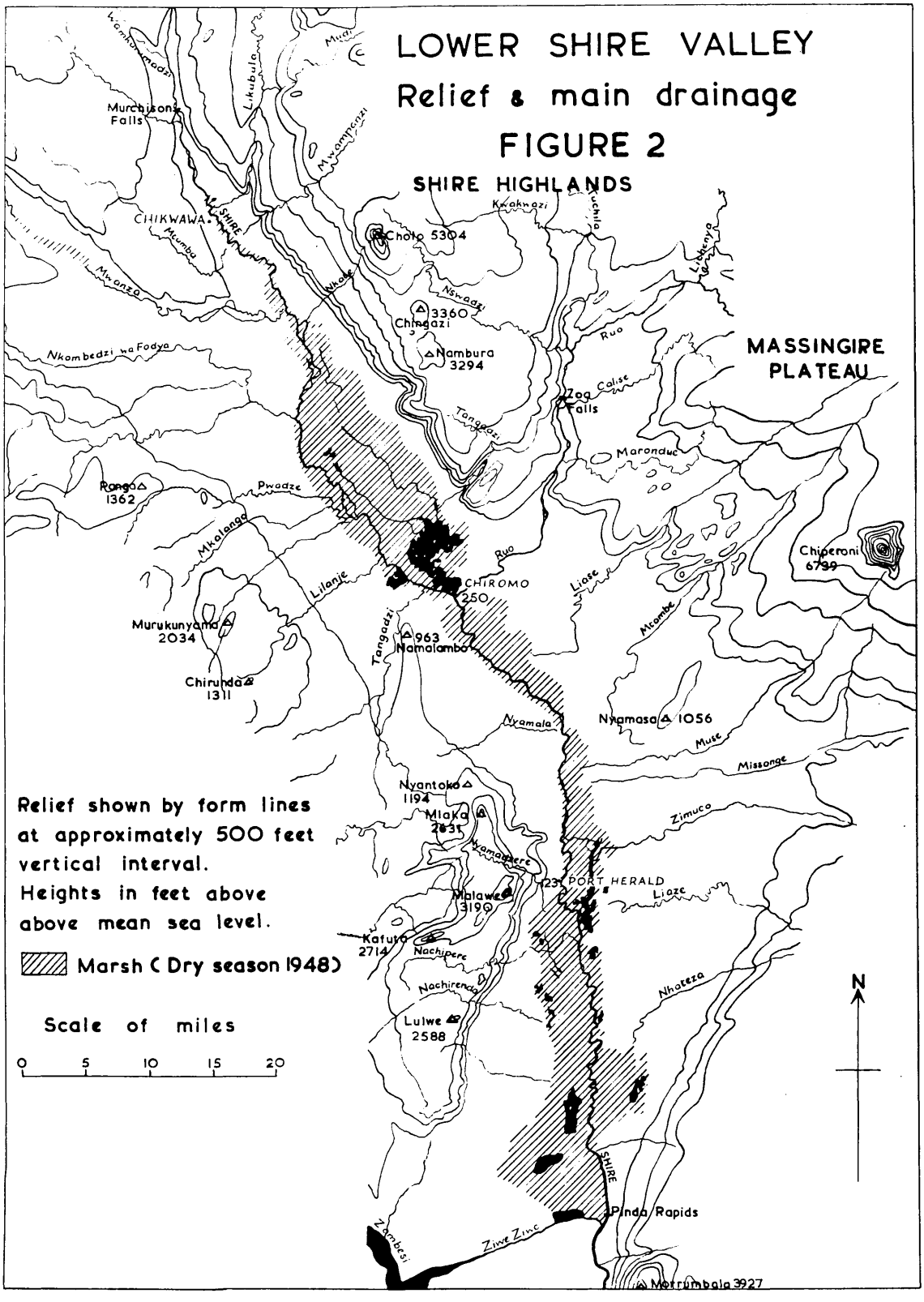
TANGANYIKA
Dar es Salaam
Ruaha
MWERU
BELGIAN CONGO
BANGWEULU
Luapula
Rovuma
NYASA
NYASALAND
Loangwa
NORTHERN RHODESIA
Lurio
Moçambique
Kafue
Lusaka
Zambesi
Zomba
Blantyre
Tete
Salisbury
AFRICA
Quelimane
Sabi
SOUTHERN RHODESIA
PORTUGUESE EAST
Beira
Buluwayo
Limpopo
UNION OF SOUTH AFRICA
Pretoria
Johannesburg
Lourenço Marques
FIGURE 1
SOUTH-EAST AFRICA
MAIN DRAINAGE COURSES
MARSH
FRONTIER
AREA WITHIN SHEET LINES OF FIG. 2
SCALE OF MILES
0 50 100 150 200

highlands consisting of great plateaux rising up to the isolated peaks of Cholo (5304'), Chiperoni (6739') and Morrumbala (3927') in the east, and to the more subdued heights of Murukunyama (2034'), Malawe (3190') and Lulwe (2588') in the west (figure 2). Of these approximately 2000 square miles have been included within the scope of the survey to provide contrast within the study itself and to illustrate both plateau and lowland conditions, i.e. valley shelf and flood plain systems of agriculture in Central Africa. Thus one is presented with two regions, comparison of which will serve to bring out the factors behind development and the problems of effecting the changes necessary to increase productivity. Their combined area contains examples of almost all the physical and cultural problems inhibiting development in the British territories of "plateau Africa". They form a cross-section of colonial structure in inter-tropical conditions, in which the problems of dual society both with and without the plantation agriculturalist may be studied, in which the difficulties due to changing river levels and greatly fluctuating rainfall are most marked, in which onepart may produce a surplus of food whilst another may suffer from famine within the self-same year. One can draw contrasts between areas devoid of settlement and a riverine strip of an agricultural population density as high as any to be found in Africa, but supported by a primitive hoe culture adapted to the physical conditions in terms which are no longer practicable.

And/


LOWER SHIRE VALLEY
Relief & main drainage
FIGURE 2
SHIRE HIGHLANDS
MASSINGIRE PLATEAU
Murchison Falls
Likubula
Mwampagazi
CHIKWAWA
Mtumba
SHIRE
Mwanza
Nkombedzi wa Fodya
Wkale
Nswadzi
Chingazi 3360
Nambura 3294
Cholo 5304
Kwakhazi
Luchila
Liwonya
Ruo
Zog Falls
Calise
Tangadzi
Marondue
Rongo 1362
Pwadze
Mkolanga
Lilanje
CHIROMO 250
Liose
Mtambe
Chiperoni 6739
Murukunyama 2034
Chirunda 1311
Namalambo 963
Nyamala
Nyamasa 1056
Muse
Missonge
Nyantoko 1194
Mlaka 2631
Zimuco
Nyamazere
PORT HERALD
Malawe 3190
Lioze
Katuta 2714
Nachipere
Nachirenda
Nhateza
Lulwe 2588
Pinda Rapids
Ziwe Ziwe
Zambesi
Morrumbala 3927
Relief shown by form lines at approximately 500 feet vertical interval.
Heights in feet above above mean sea level.
Marsh (Dry season 1948)
Scale of miles
0 5 10 15 20
N

And finally there are the contrasting effects of the British and Portuguese administrations upon the same people in similar environments. The choice of Nyasaland was particularly fortunate for the purpose of taking a cross-section, since Nyasaland is the least developed of all the British African colonies. It is advanced enough to present the problems of development in embryo without the complication of so extensive white settlement as that of Southern Rhodesia or Kenya, or over-emphasis on mineral exploitation as in Northern Rhodesia. Nor, on the other hand, are its people confined to reserves, restricted by what was once described as the "zoological gardens policy". Nyasaland is still the Cinderella of African territories as Sir Harry Johnston dubbed her, but a Cinderella on the eve of going to the "ball".

Sufficient attention has been paid to the area as a representative of East and Central African conditions. The content of the study needs now to be outlined. Firstly, the work concentrates on native affairs since it may be assumed that the numerical preponderance of the natives or Africans as they are sometimes now termed makes them the inheritors of the future, whilst governmental policy has on the whole tended to regard colonial Europeans as guardians of the interests of the natives until the latter are deemed capable of self-government. Furthermore, the natives have a far longer tradition of adjustment to inter-tropical conditions, i.e. their economic development will be much

more/

more likely to show the forms of adaptation needed in the inter-tropics than that of the European. European methods indeed are based on the altogether different physical and social conditions of Western Europe with some modifications in the light of experience over the last hundred years. The power of the machines which made possible the conquest of Nyasaland gave the European the right to decide what was best for African development, or basically in Nyasaland what crops should be grown and what methods be used to cultivate them. Not merely have plantation techniques been introduced - a complete departure from previous agricultural practice - but the native agriculturalist himself has been advised to change his methods of crop raising, although such advice is based on little knowledge or experiment. It is contended that in the agricultural practice of the region under view one has an example of a technique which, by adapting itself to local conditions, is expressive of them. Further in the additional practices of gathering, hunting and fishing, and in the local handicrafts one can build a complete picture of the use made of the local environment, whilst in the forms and pattern of settlement resultant upon all these practices one has a summary of present economic development. The aim has been to make such a picture and to analyse the relationship of its components to the physical conditions. It has been fortunate that the study was made at this particular

time/

time since plans are now in hand to modify the agricultural practices to a much greater extent than hitherto and even to alter the physical conditions of the valley itself. Numerous difficulties, chiefly the question of time, allowed only a limited study of organisation and conditions in the highlands. The main theme of this first viewpoint is the valley with reference to the highlands in comparative contexts. An assessment of the present stage of economic development will hardly be sufficient by itself as a guide to future possibilities since development is not static but changing, and the rate of change is increasing with every year. Accordingly, a second viewpoint has been taken, that of the history of the area, with, in particular, an examination of Europeanisation and its effects upon the techniques and environmental conditions existing prior to the European entry. This viewpoint will be related to the first in that it will also be primarily a study of distribution, that is of place, and it is hoped that it will show the impact of alien culture on a particular form of production. In this second section since the Shire Highlands became the nucleus of white colonisation in the area more attention will be correspondingly devoted to them. Finally, as a corollary, a critical examination will be made of proposals for future development and of the suggested advantages of incorporating Nyasaland within a Central African Federation.

Throughout the thesis it should be borne in mind that

the social and physical environments of Central Africa are totally different from anything found in Western Europe and that the English terms one is forced to use are not always appropriate. The African who works on the land plays a rôle comparable with that of the farmer in Western Europe. Nevertheless, the connotation of the word "farmer" is most unsuited for application to that African. Similarly, the word village means a very different form of social organisation from that existing in the Shire Valley and is only used for lack of a better term. In the physical sphere the words "range", "mountain" and "escarpment" are in general inadequate to the purpose of description, but must be used to conform with existing terminology. "Escarpment" here has been applied to any steep edge of tableland and has not necessarily anything more in common with the use of that word by geomorphologists. Occasional use has been made of African terms in cases where English wholly fails or where such terms already have general acceptance. Those employed are all of the Nyanja language of which the chief differences from English practice are: that all vowels are pronounced, that "c" is pronounced as "ch" in "change", that "ng'" is pronounced as "ng" in "singing", and that "l" stands for both "l" and "r" and is pronounced as a single tap "r". Occasional concessions to older practice have been made in the spelling of certain African crop and place names, e.g. Chiromo.

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With regard to the methods of analysis, in drawing conclusions from mapped and statistical material it has been realised that there is a danger of being, as Bertrand Russell remarked in a recent broadcast talk, "precise and dogmatic" about human institutions. The attempt has been made to obviate that danger by observations made on the spot and by the use of material derived from numerous interviews with both Africans and Europeans. Without visiting the area it would have been impossible to assess the true value of the material collected, impossible in fact to have used the greater part of it. In addition, of course, the visit in itself provided large quantities of material otherwise unobtainable and an insight into the African environment which could not possibly have been derived without local experience.

II. SETTLEMENT - the level of development.

The basic unit of settlement throughout intertropical Africa is the village. This is not fundamentally a centre of exchange, but an organisation for mutual assistance composed often of kinsfolk. It is in other words the social expression of African agricultural practice, equivalent to the farm of Western Europe. A village in the Lower Shire Valley may consist of anything between 5 and 500 huts, the commonest size being approximately 20, grouped usually around a central square forming a meeting place. The huts are all one-roomed affairs, rectangular, constructed of wooden lattice work plastered with mud and roofed with thatch. They are essentially temporary dwellings of a nomadic people, the agricultural equivalent of such pastoral nomadism as occurs amongst the Masai of Kenya or the Matabele of Southern Rhodesia. However, whereas the pastoralist moves seasonally, the agriculturalist moves or has moved by units of a year or more according to the fertility of the soils. Before the coming of the European all Africans south of the Sahara were on the move, and the hut is the result of that movement and of the poverty of return from the methods of production employed. In Africa one will look for great architectural achievement in vain. The hut of the Lower Shire Valley also reflects the climatic conditions, for long periods of hot sun are needed to bake mud walls. The thick thatch roof depends on adequate supplies of a particular type of grass known as tsekela which is

capable/

Lay-out of the African dwelling - reed wind shelter, grain store on stilts. Ant-hill to right. Remains of millet garden to left & foreground. June. At 1 mile N.E. of Chiromo.

Typical hut with fenced yard. Note shelter of trees. Mlolo village near Chiromo.

capable of keeping out the heavy downpours of rain characteristic of these latitudes. Recently a more permanent type of hut has been evolved. This usually has a verandah for a shaded outdoor sitting place, part of which is often covered with reeds for protection on the windward side. Sometimes it possesses a thick fence on one side enclosing a private yard together with grain stores either of woven basket-work or hut-like on stilts, a fowl pen, a patch for spreading grain and a "pestle and mortar" arrangement for pounding the grain into flour. Amongst a few of the inhabitants of the valley the form of agricultural practice is seasonal and for a part of the year at least the hut occupied is of an even more temporary nature than that already described, being smaller, of lighter lattice-work and thatch and walled with grass or reeds.

According to Duly the whole of this Lower Valley was uninhabited 150 years ago with the exception of a few settlements of people who had immigrated from the Mount Morrumbala area to the south,(1) and possibly excepting the hippopotamus-hunting Aphodzo of the delta area at the confluence of the Shire and the Zambesi. The total claimed by the 1945 census (see Appendix C) for the two districts comprising the British portion of the area of 126,410 is undoubtedly largely the product of immigration, the settlement of peoples who previously had been continally moving or who had been uprooted from lands previously occupied by superior invading forces. The first to arrive were the

Thatching at Sabao south of Port Herald. Mud still to be applied. July.

Grain stores at Chapanga, Mwanza basin.

Amang'anja who appear to be closely related to the Anyanja of the Shire Highlands overlooking the upper section of the valley from the Ruo to the Murchison Falls. They were followed within the period of the European occupation by the Asena who moved northwards from the Zambesi valley, partly because of what Duly describes as the harsh administration of the Portuguese with a continuance of slavery after its suppression in British territory and a system of labour conscription after slavery had been abolished. However, the movement was also due to the fact that the Asena, like the Amang'anja, were used to moving, were equipped for it, and were prepared to migrate for much slighter reasons than would operate in Western Europe. Moreover, Young records the entry of the Asena as early as 1875 due, he claimed, to the attacks of the "Caffres" (2). The last large scale movement from Portuguese East Africa was in 1917 after the suppression of the Barwe Province rising. Many of the valley's inhabitants claimed that this was the chief cause of pppulation increase in the district. Referehces in Young (3), Coupland's account of the Zambesi expedition (4), Moir (5), and O'Neill (6) show that between 1858 and 1862 chief Chibisa moved with his people from the Shire near Murchison Falls to the Zambesi near Tete and thence back to the Shire; Ramakukan or Kasisi and his descendants have had head villages at Murchison Falls, at a point two miles south of the Falls and at Chiromo at the confluence of the Shire and the Ruo; the descendants of Mlolo have

moved/

moved their head village from its pre-1885 hill top site down into the plains; whilst the succession of chiefs entitled Katunga has occupied sites on both banks of the Shire. Abandoned village sites are not an uncommon feature especially in the northern half of the valley. The result of such movements is clearly to prevent attachment to the land. The chief rules not over a land but over a people - the village name is not that of a place but that of the chief - and there is no land ownership in the European sense, a matter which has produced many complications throughout colonial Africa with the enforcement of European laws. In the Shire Highlands there is still a clash between European plantation owners and migratory "squatters". As far afield as the Rhodesias and Kenya provision has had to be made for the rights of squatters, whilst in Uganda the recognition of the Kabaka's title to much of the land has created grave problems for building expansion in Kampala. Contemporaneous with the Asena immigration into the Lower Shire Valley came a southward movement of Yao peoples into the Shire Highlands, of Akokola to the district around Mount Chiperoni and of Aldo on to the plateau to the south. The Angoni, a branch of the Zulu of Natal, at one time held in subjection the upper part of the valley below Murchison Falls and attacked settlements in the Shire Highlands, but are now confined to the high plateaux north of the river Mwanza. A recent spectacular movement has been that of a group of Mashona from eastern Southern Rhodesia to the district around the

post/

Brick making at Mlolo. The mud bricks form their own kiln.

A brick built chief's hut - Mlolo.

post of Morrumbala in the Portuguese Massingire Highlands. Clearly the British policy of creating native reserves in the Rhodesias, Kenya and Tanganyika has made a situation incompatible with native practice. One has, as a result of these movements, the concept of communities associated with particular places at the present day and growing by immigration. Thus the plains of the Lower Shire Valley are occupied predominantly by Amang'anja - Asena, the Shire Highlands by Anyanja - Yao and the Massingire Plateau by Akokola - Alolo. The modern political divisions have tended to split these communities in so far as the borders are effectively controlled. Thus Amang'anja and Asena dwell on both banks of the Shire and Ruo, separated by the Anglo-Portuguese border, and two Tengani and two Mlolo chiefs face each other across the water (for the present distribution of native authorities see figure 33 in Chapter VIII). Similarly, the Yao have kinsfolk in Portuguese Nyasaland, whilst, to cite a more famous case further afield, the Masai are virtually bisected by the border between Kenya and Tanganyika.

The social changes created by colonisation have resulted in the slowing down and often the complete stoppage of migration. The fixed village has emerged with a brick chief's hut. The old moving village had no problems of sewage disposal or of excessive soil erosion. Its modern counterpart has to take far greater care over the design and distribution of its cess-pits, whilst the hard surface

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Gully erosion in a well-trodden village "square", Chapananga village, Mwanza basin.

Gully erosion in mphala gardens, Chapananga.

of stamped earth forming its central square and the foot-paths to its agricultural lands and to market form ideal grounds for rapid run-off of heavy showers, and incipient gully erosion is a common feature. More gully erosion, in fact, was seen along paths and roadways and on the edges of village squares in the Lower Shire Valley than out on the land, overworked though much of that undoubtedly is. The fixed village site is thus a menace to the lands on which the inhabitants of the village depend for their living.

Having discussed the role of the village in the native economy and some of the implications of that role, attention must now be paid to the various types of village before describing distribution. There is firstly the common agricultural unit normally of 15-20 huts in the valley plain and of 5-10 huts in the hills. The differences in size may be a question of tribal custom or of the need for larger units for defence purposes in the plains until as recently as 1891. The most likely explanation, however, depends on degree of slope. The hill districts all bear the evidence of recent and rapid uplift with deep valley incisions into old erosion surfaces and resulting steep convex slopes. With all the difficulties of cultivation on steep slopes besides greater loss of fertility with more rapid run-off there will be on the hills within a given distance from a given central point, other things being equal, less land of a particular quality available.

School in a head village - Ndamera south of Port Herald.

School in a sub-village - Kupira in the Ndindi Marsh.

The pattern of hill cultivation is in fact broken as opposed to ~~that of~~ the general continuity of that of the plains. Accordingly, within the limit of the distance a man is willing to walk to his fields there will be less land available in the hills to support a village and consequently fewer huts. In the plains this distance is generally 4 miles, and in the hills slightly less since the business of walking up and down steep gradients is obviously more tiring. A point of interest here is that the introduction of the bicycle has made many cultivators willing to travel up to 10 miles to their cropped lands, thus making larger village units possible. Since the cyclist is even more sensitive than the walker to steepenings of gradient the effect should eventually be to increase the disproportion in size between the normal village of the plains and that of the hills. Thus the introduction of modern techniques should produce the same centripetal movement of population as already exists in Western Europe, as opposed to the break up of large, formerly fortified, units in areas previously plagued by war, e.g. in Kikuyland and Usumbara on the fringes of the Masai country of Kenya and Tanganyika. Legislation has also assisted, for the greater centralisation of population was laid down as Nyasaland Government policy by an Order-in-Council of 1912. Besides the normal village there are the large units of native administration usually containing a court-house, post Office, Indian stores, a market and better schooling facilities. These may consist of anything

between/

between 100 and 500 huts and again are generally smaller in hill country. Occasionally the large type is composed of an agglomeration of the smaller 5-20 size hut groups having their own local headman plus the social convenience of belonging to a large unit. Finally there are settlements of less than 5 huts, either temporary, or in the "pioneer fringe", i.e. on the margins of the best agricultural land or dependent on uncertain water supplies. The latter are often of a temporary nature since dependent usually on years of better than normal rainfall.

In plan form there are two types of village: the normal circular or nearly circular pattern forming a collection of huts around a central square and the long ribbon type comparable with the "strassendorf" of Western Europe. The latter is only found in the valley plain and is in most cases associated with siting on a natural levee. The levee has the advantage of being of comparatively coarse material offering good drainage except in the extremely damp Ndindi Marsh south of Port Herald where many huts have had to be erected on stilts. The other cases of its occurrence are along the line of junction of two different types of agricultural land parallel with a river forming the water supply and along an important route. An example combining these factors together with siting on a levee is in the long line of villages on the right bank of the Shire north of Port Herald (figure 3). With regard to siting along a route an interesting contrast is offered in the Portuguese province

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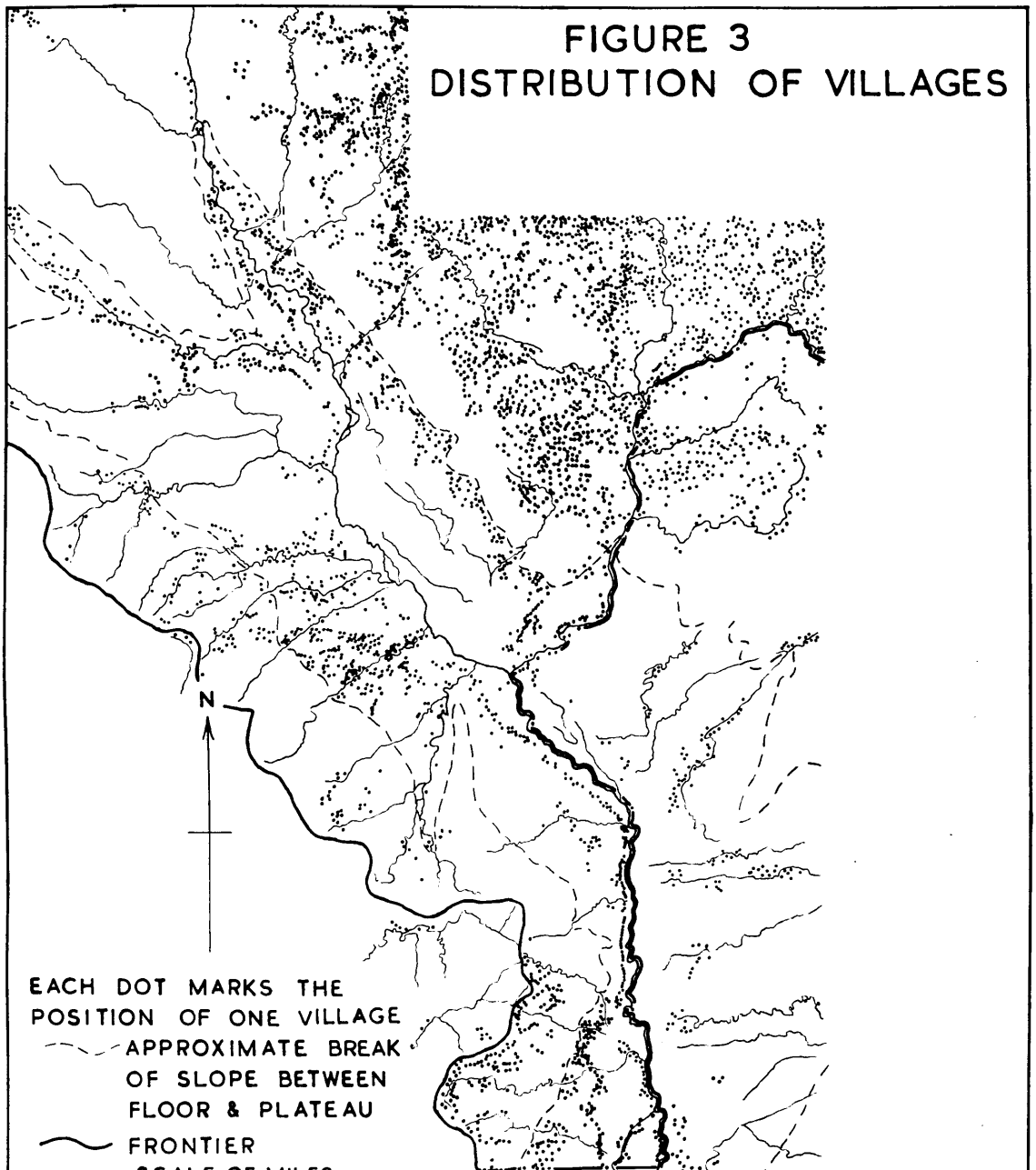
FIGURE 3
DISTRIBUTION OF VILLAGES



of Zambezia where hardly any villages are to be found along the main roads since the villagers choose as inaccessible a location as possible - a relic of the days of forced labour drives.

The distribution of villages in the Lower Shire Valley and in the adjacent highlands is shown in figure 3. The break of slope between the valley floor and the hills is indicated approximately, together with the Anglo-Portuguese border. It is important to stress the fact that the map does not show the distribution of population, since the village sites marked comprise different totals of huts. The impression of greater density in the Shire Highlands is offset by the generally smaller size of the hill village, although the population returns do show greater densities for the districts of the Shire Highlands compared with those of the Lower River, e.g. 1945:Blantyre District 121 persons per square mile, Cholo 193, Chikwawa 32, Port Herald 90. These higher upland densities are, however, of recent occurrence and do not necessarily reflect higher agricultural capacity in the hills. They will be discussed with reference to the effect of European developments. For comparison, the density of the neighbouring Portuguese circonscripção of Morrumbala, consisting mostly of platèau but with "shifting agriculture", was only 15 per square mile by the 1940 Census. The distribution of agricultural land is of prime importance in settlement siting. There are, however, other factors which are related to the nature of the settlement as such

and/

The lower course of the Tangadzi in June.

and which may properly be discussed here.

The essential factor in the siting of a village is the availability of a supply of domestic water. Villages are sited as closely as possible to a source of water and normally not more than 2½ miles away. One exception was found – a village in the recently settled native authority of Ngabu at a distance of 4 miles from its nearest supply, although in this case water was conveyed by cycle. The most common source is the perennial stream. With the long dry season there is a considerable diminution in the flow of all water-courses, most marked in the lower sections of the tributaries of the Lower Shire where these have to cross the porous alluvium of which the valley floor is composed. Below the break of slope between the plain and the hills there are in fact only two perennial streams – the Shire and the Ruo. These like the lakes are distinguished by the term "nyanja" (or "nyasa" in Ciyao), meaning a normally unfordable water. The remaining water-courses, termed "mtsinje" or fordable stream, are of varying permanence according to the fluctuations in yearly rainfall total, and are most nearly perennial in the north-east with the higher rainfall of the Shire Highlands source and only a short width of alluvium to cross. Accordingly one finds a fringe of settlement around the Shire marshes and on islands in the marsh, with the remarkable "strassendorf" pattern of almost continuous settlement on the right bank below the junction with the Ruo. In the north-east between the Ruo and the Likubula there is a high density of villages with a tendency to close grouping

along/

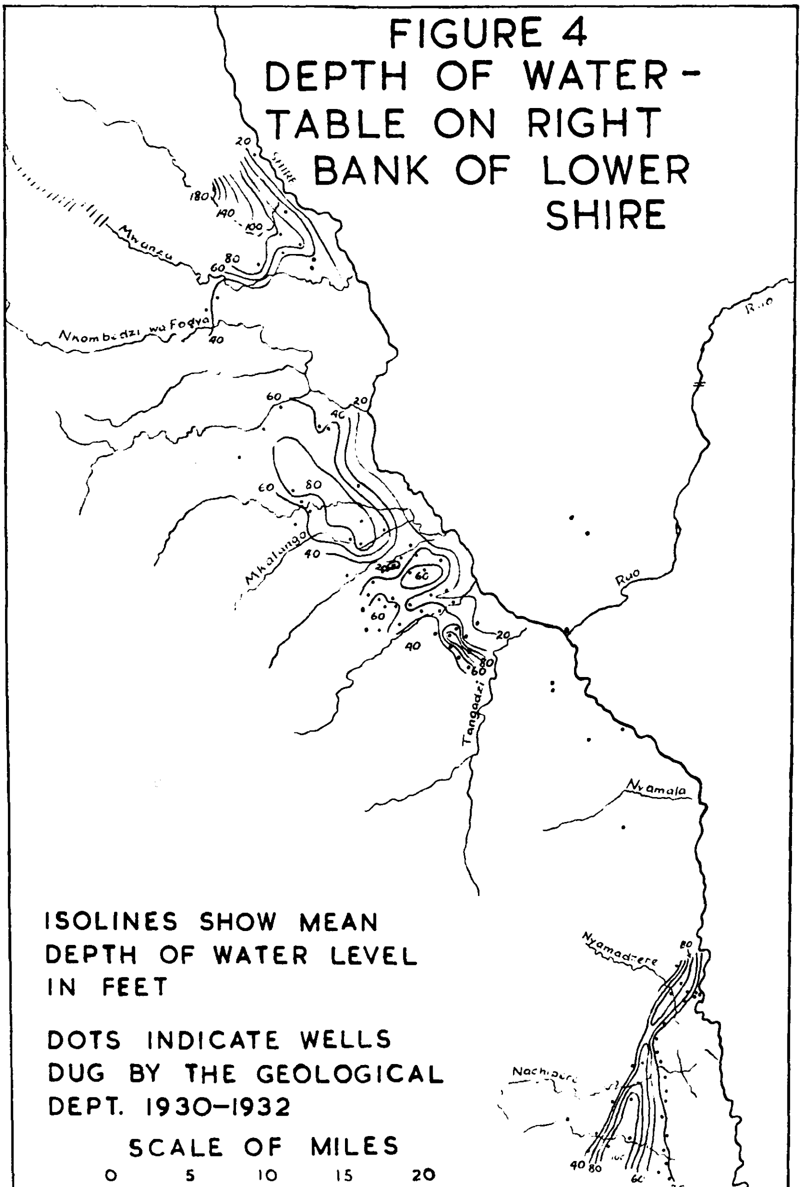


FIGURE 4
DEPTH OF WATER-TABLE ON RIGHT BANK OF LOWER SHIRE

along the banks of the tributary streams. The Mwanza, which is the most nearly permanent of the right bank tributaries, even including some marshes in its course, likewise has its accompanying ribbon of villages, although even the Mwanza which can be a mile wide in the wet season is reduced to barely 10 feet in width throughout most of its lower course by August and in places disappears altogether. The case is similar with village groupings near the Liase, Mtambe, Muse and Missonge in Portuguese territory.

There are, however, marked exceptions to the expected pattern. The villages of the hill areas show little if any tendency to congregate along stream banks; there are two marked breaks in the fringe bordering the Shire marshes, one on the right bank between the Muranza and the Tangadzi and the other on theleft bank below the Ruo; there are marked foothill groupings on the right bank below the Tangadzi; and finally, there is the large grouping north of the Tangadzi in the area known as the Mbengo plain of Ngabu district. The patterns developed on the right bank of the Shire are almost entirely responses to the dry season condition of the water-table. In that season the level of water is lowest in the central portion of the right bank plains. Figure 4 although unfortunately based on the mean depth of wells makes the position sufficiently clear. The hill foot villages are therefore the complement of the levee villages, i.e. they are sited on the only other most nearly permanent surface water supply in the plains. The greater the width of the alluvium the greater the width of the

dry/

dry season waterless area - the Ngabu district containing the greater area with a level of 40 feet or more in depth, and the district immediately around Port Herald the least. A few villages are able to exist in this central belt by siting on the upper terraces of the larger tributaries, above flood level in the wet season and near enough in the dry season to obtain water by digging holes in the stream beds. This means of obtaining water is developed most noticeably along the Tangadzi. The large cluster of villages in the Ngabu area, however, is mostly dependent on wells provided by the Government, and much of the settlement here is due to immigration chiefly within thelast 15 years. It will be noticed that this cluster still has the marked central "gap" and tends to be thickest along the stream banks and towards the hills, wherever in fact the water table is comparatively high. The wells shown in the map, dug in 1930 - 1932, were intended to make settlement possible in the central area and to provide a supplementary supply for the levee and hill foot villages at a time when the streams, particularly the Shire, were remarkably low. In the latter object they succeeded, but in the former many of the wells failed, found only brine or were too deep. In spite of well-digging policy the central "gap" still remains and must be exploited agriculturally from the margins. It is worth noting here that even near rivers or marshes wells are often useful to avoid the danger of attack by crocodiles or the difficulties of walking through a thick mass of water fringing reeds. The gap in the levee fringe, most marked

immediately/

The 90 feet high terrace at Chikwawa looking south.
Maize dimba with plantains in the floodplain.

immediately south of the confluence of the Shire and the Nkombedzi wa Fodya is almost certainly the product of a low dry season water-table consequent on the great width of the plain combined with the existence of a high terrace. This terrace is a cliff-like feature confined to the right bank of the Shire and extending from the Murchison Falls through Chikwawa, where it is 90 feet in height, southwards almost to the Tangadzi, where it is barely visible. The steep face of the terrace is precipitous enough to preclude carrying water from the river except at the few points where ravines occur. Settlement on the recent alluvium at the foot is impossible in the wet season owing to the danger of flooding. Therefore, excepting where the water-table is high, as north of the Nkombedzi wa Fodya, or where the terrace is low, as south of the Pwadze, settlement on this terrace faces the problem of dry season shortage of water, and the stretch between the Pwadze and the Nkombedzi is known locally as the "arid belt". There is the additional problem that in many places the terrace front is retreating quite rapidly threatening to remove any settlement close to its edge. The District Commissioner's house at Chikwawa is at present so threatened. The associated "gap" in the lower course of the Nkombedzi is the Lengwe Game Reserve. Another smaller game reserve on the right bank of the lower Tangadzi produces a similar break in settlement pattern. The distribution of villages in Portuguese East Africa south of the Ruo is a response to a much smaller population able to choose only the

best/

best sites combined with an absence of good natural levees on the edge of the Shire marshes and the occurrence of more nearly permanent tributaries.

The position in the hills is very different from that in the plains and reflects the differing physical conditions. Above the great emptiness of the escarpment edges separating the communities of hill and plain and so well illustrated by the flanks of the Shire Highlands and the Port Herald Hills there is a much more even distribution of villages, but although more even, still forming patterns of higher and lesser density, part of whose explanation lies in questions of slope as in the case of the escarpments. Sincethe builders of hill villages naturally looked for flatter land as a convenience in the site itself, in access and egress and in the business of agriculture, except in so far as the problem of defence needed consideration, the distribution of more level land becomes a problem of immediate significance. And since level land in the plateaux of Africa is the product of the formation of the valley, it will be apposite at this point to discuss valley forms before dealing with actual examples of village siting.

There are four outstanding types of valley in plateau or Gondwana Africa. There are firstly the big troughs, or trenches of the Shire Valley as a whole, of the valleys of the Zambesi and of the Sabi in the Rhodesias, and of the "Great Rift" system of East Africa of which the Shire Valley

is/

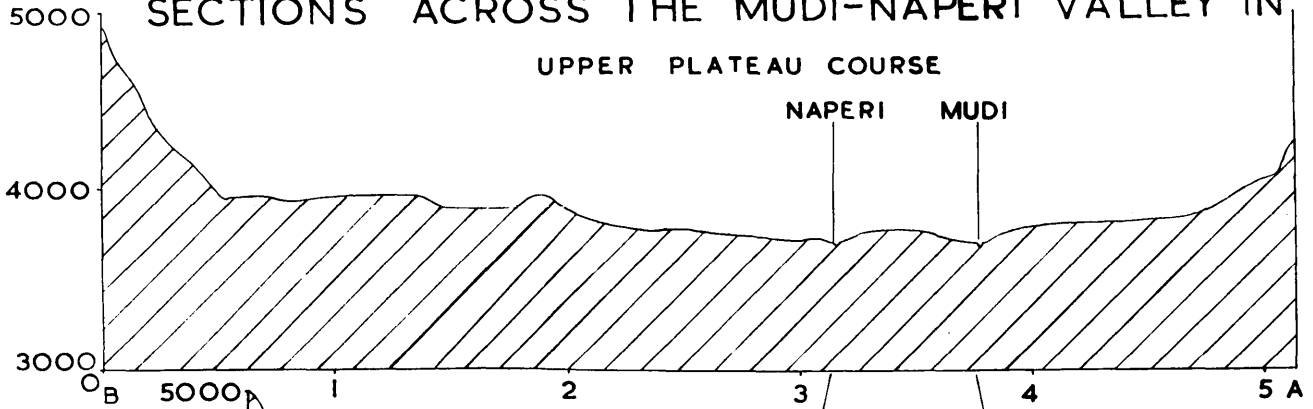
Malawe in the Port Herald Hills from the Shire plain showing triangularly walled valleys. July stubble of millet garden in the foreground.

is supposedly a southern continuation.(7) These troughs are depressions in the plateau surface, the products primarily of tectonic action. The Lower Shire Valley forms the lowest step of its particular trough, being separated from the higher steps by the knickpoint of the Murchison Falls. The Ruo Valley provides in its lower section another smaller trough, and again with a knickpoint - Zoa Falls. Tectonic action is still continuing, for slight earth movements are a regular feature of the region, whilst hot sulphureous springs occur at the base of the plateau escarpment at Sirinya on the Mtambe and in the extreme south at Aguas Quentes near Vila Bocage. These valleys generally include flat floored stretches providing the conditions peculiar to settlement of which examples have already been given. Consequent upon the formation of the steep escarpment slopes are precipitous valleys, presenting a series of triangularly walled steps, too steep for any form of cultivation and clothed with the only forest which may be primeval. These features are of common occurrence along the edges of the Shire Highlands, the Port Herald Hills and Morrumbala Mountain, and may well mark the existence of fault escarpments. Thirdly, there are the main plateau valleys of what is generally regarded as the Miocene erosion surface level.(8) These consist of deep entrenchments consequent upon the uplift of the Miocene surface, and commonly present a series of convex surfaces arranged in step or terrace formation. The water-courses are incised in deep furrows within the main valley. In plan form the valleys

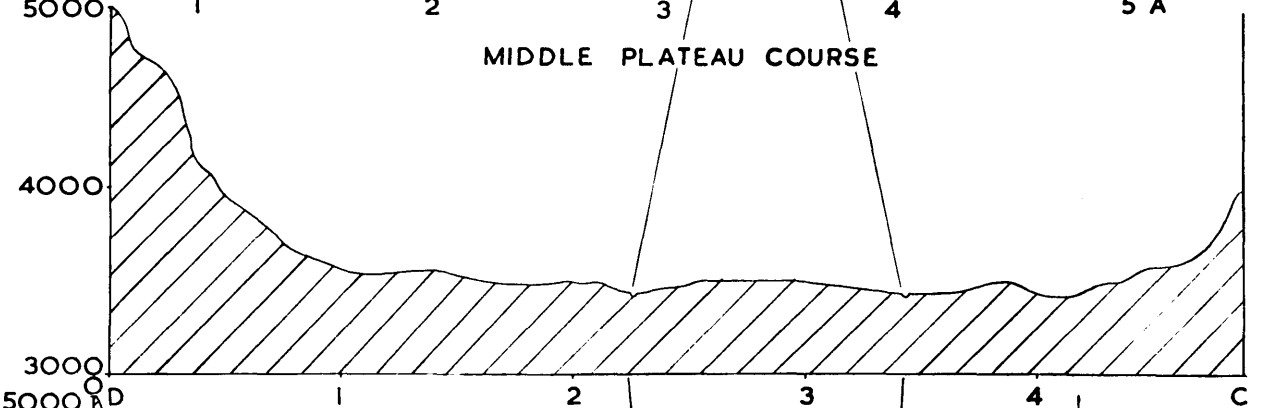
narrow/

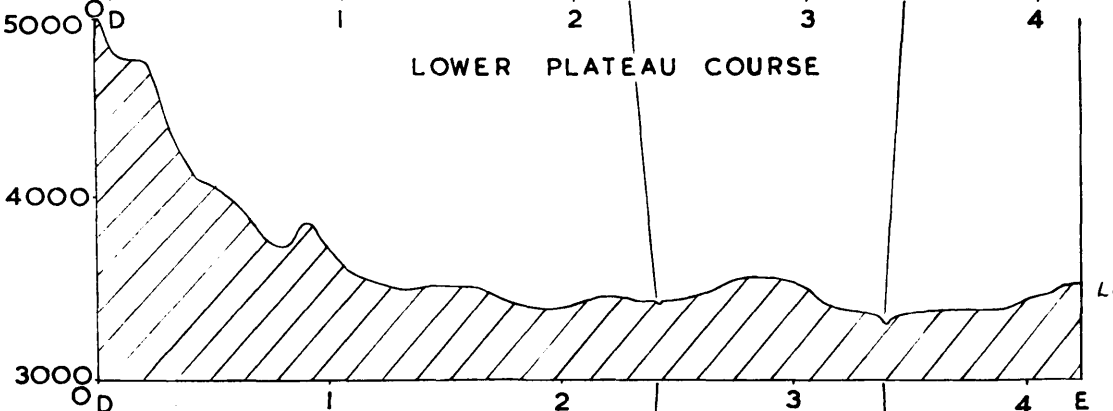
FIGURE 5

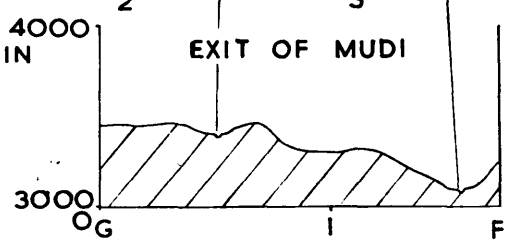
SECTIONS ACROSS THE MUDI-NAPERI VALLEY IN THE SHIRE HIGHLANDS



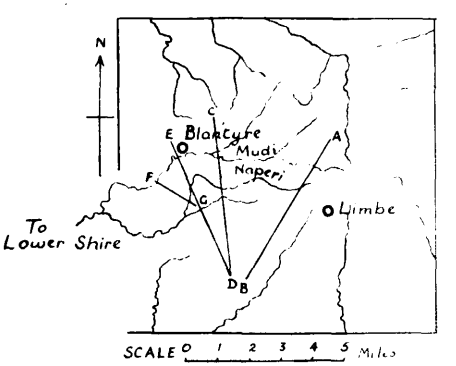
VERTICAL EXAGGERATION APPROXIMATELY 4 TIMES







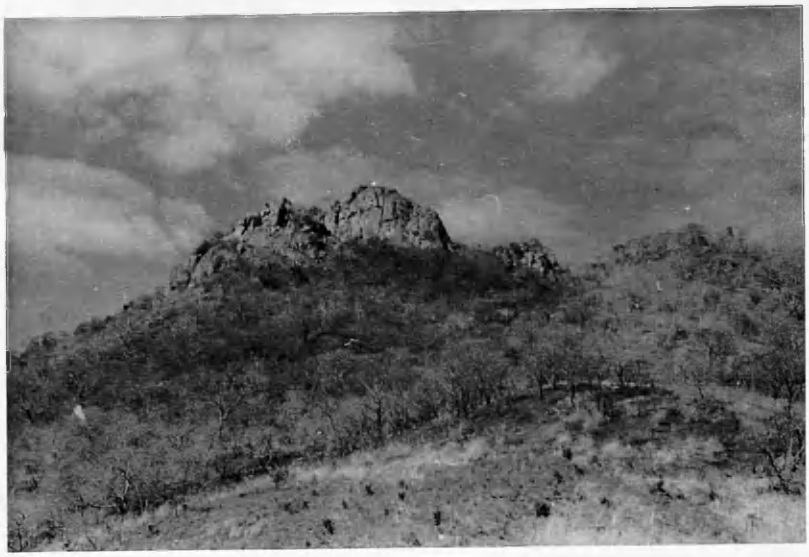
HORIZONTAL SCALES IN MILES & VERTICAL SCALES IN FEET



SKETCH-MAP INDICATING POSITION OF SECTIONS

narrow downstream with a "bottleneck" at their plateau exits. The platforms of the various steps, which mark different stages in the process of uplift, are broadest in the middle portions of the valley track and at the heads of the streams where the gorge-like incisions are replaced by open, gentler slopes. Figure 5 illustrates the shelves and gentler slopes of the upper and middle sections and the deep incision of the river in the lower section and at its exit from the general plateau level. The tributaries consequent upon the formation of the main valleys likewise have open valley sections on the platforms and deep bottlenecks where they cross the steep convex edges. Settlement siting in such terrain is conditioned by the ease with which surface water may be obtained and the availability of level land. It tends therefore to concentrate on the platforms and around the valley heads. The settlement map shows a number of suggestive arcs in the Port Herald Hills where the bulk of the villages is concentrated round the heads of streams, and subsidiary settlements are sited along platforms from which the villagers have the unenviable task of descending into the deep, gorge-like, lowest valleys for water- a task not made any easier by the occurrence of a thick tangle of galeria forest on the stream banks. Whilst many of the small "gaps" in the settlement pattern of the Shire Highlands (figure 3) are due to the occurrence of plantations or forest reserves, the great "gaps" in the courses of the Mswadzi, Tuchila and Ruo are chiefly due to the existence of slopes too steep for cultivation or convenient access. Other gaps occur

north-east/

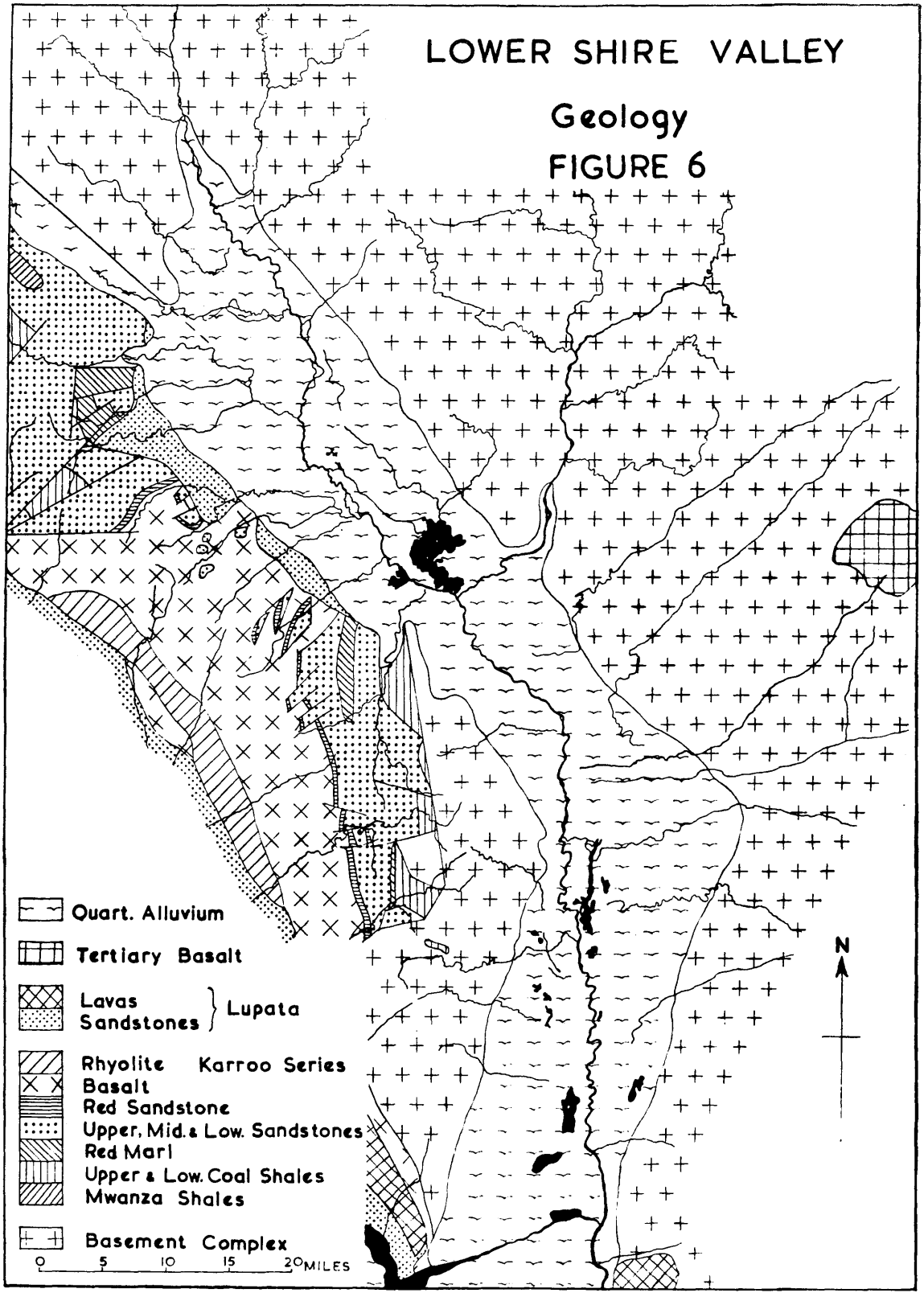


Bornhardt - koppie type. Lulwe in the Port Herald Hills.

Bornhardt - sugar loaf type in the Mwanza basin.

north-east of the main escarpment and in a line parallel to it. Here there is a second escarpment formation above the fault step marking the upper limit of the first (9), and once more conditions are too steep. The result of the pattern of tributary streams to the incised main water-courses of the plateaux is often the cutting up of the terrace lands into numerous isolated hillocks and ridges. This is particularly so in the middle courses of the main streams, and especially amongst the southern tributaries of the Nswadzi in the area known as Cholo District. Here are countless hill-top villages whose siting is in effect analogous to that of terrace settlement in the Port Herald Hills or along the course of the Mudi stream in Blantyre District, the difference being that here erosion has proceeded at a faster pace with a denser stream network resulting from a heavier rainfall total. The valley form just discussed occurs in Central Africa on plateaux with a top erosion surface level of 3000 - 4000 feet above mean sea level. A fourth valley form is that associated with high plateaux at over 5000 feet. This open valley form of concave profile is not, however, of significance here as its only occurrence is on the fringe of the area under discussion in the Zomba Plateau of the Shire Highlands, where it is devoid of native settlement barring one small village of servants for the summer bungalows of the white population of Zomba.

The Nassingire Plateau is remarkable for the large number of bornhardts, tall steep-sided and round-topped hills of syenite, which break the general level of its surface. These,


LOWER SHIRE VALLEY
Geology
FIGURE 6
Quart. Alluvium
Tertiary Basalt
Lavas
Sandstones
Lupata
Rhyolite
Basalt
Red Sandstone
Upper, Mid. & Low. Sandstones
Red Marl
Upper & Low. Coal Shales
Mwanza Shales
Karroo Series
Basement Complex
0 5 10 15 20 MILES
N

being impervious, are usually surrounded by a circle of small springs and therefore afford excellent sites for villages around their base. Thus the settlement pattern of this area is associated with yet another physical phenomenon. Lack of mapped information unfortunately made it impossible to show the distribution of villages on this plateau in the settlement map.

Examination of the settlement map discloses that the hill formations of the right bank of the Shire north of the Port Herald Hills are only sparsely populated. The few villages are confined entirely to stream banks. The geology map (figure 6) shows that the Matunda Range between the Mwanza River and the Port Herald Hills is geologically distinct. Whereas all hill groups previously discussed consist of crystalline materials, this group is composed mainly of recent basalts and sandstones. The porosity of the sandstones has resulted in remarkably dry conditions wherever these occur, whilst the resistance of both basalts and sandstones has produced a system of gorge-like valley profiles, "bottle-neck" in plan form. The result has been a lack of adequate surface water supply combined with great difficulty of access to the streams from comparatively level ground and difficulty of access to the main populated centres. In view of the terms of African settlement one may describe this as a comparatively undesirable area. North of the Mwanza the country is crystalline, though again sparsely populated. This is the area of Dixey's "old valley plain"(9), a remnant of a former valley of the

Shire/

Shire standing about 200 feet above the present level, covered with infertile gravels, and with a water-table at great depth (figure 4). Again an area of only limited possibility for settlement unless water be obtained by some means other than those at present in use.

A few other factors have been of direct significance in village siting. Tengani's village lies just at the great bend of the Shire about 12 miles south-east of Chiromo and at the confluence with the Nyamala. Figure 2 shows that at this point marsh is absent from both banks and indeed this has always been an important crossing point, the first below Chiromo - thus presumably the explanation for the existence of the two Tengani chiefs on each side of the border. Such a crossing point on the Ruo may explain the existence of two Mlolo chiefs although migration has since widely separated them. The importance of Tengani's position is emphasised by the fact that almost alone of the valley chiefs he and his predecessors have never moved in recorded history, i.e. approximately 100 years. It may be more than coincidence that Tengani became closely associated with the chief cult of the valley, the worship of the rain-god Mbona, and that today he is regarded as one of the most important of headmen. The significance of this crossing point had comment from Livingstone:

...."Tingane was notorious for being the barrier to all intercourse between the Portuguese black traders and the natives of further inland; none were allowed to pass him

either way".(10)

Evidently even migratory agriculturalists had fixed defence centres. Chiromo similarly occupies a nodal site and was the scene of many struggles for local ascendancy. The settlement had firm ground on both banks of the Shire and ~~lies~~ lay opposite the great Ruo break in the Highland edge. It is hardly surprising that it was chosen for the construction of the railway bridge across the river in order to connect Blantyre with Port Herald. The Anglo-Portuguese border has had a marked effect. The sudden decrease in density of villages on crossing from British to Portuguese territory is apparent throughout the region. The remarkable ending of settlement at the southern limit of Nyasaland must be one of the most outstanding features of the political geography of Central Africa. On both sides of the border are the same physical conditions, yet on the one side there is only scrub and forest and on the other only cultivated land and villages. The majority of the people who settled here wished to escape Portuguese authority. This is made clear by the fact that before the turn of the century the border lay 5 miles further south, and cultivation then took place on land now abandoned. In the Port Herald Hills the border, where water conditions allow, has often been chosen as a settlement site in order to evade the effect of British or Portuguese regulations. The appearance of a law enforcement officer is the signal for the immediate migration of the villagers across the border. Some mention has already been made of forest reserves. Occasionally those do occupy land

which would serve for settlement, notably in the Port Herald Hills, and therefore prevent the spread of villages into all areas physically suitable.

Some idea of the level of development and of the physical background has been given by means of this discussion on settlement in its various aspects. Now attention must be paid to the means by which development has been effected by Africans - agriculture. Although many authors have focussed so much of their attention on mining, industrial progress or on plantation farming, very little has been paid to the means by which most people live in Africa. Natives work in the mines and on plantations or act as servants for Europeans, and mention will be made of such activity in due course. Here it must be emphasised that these native proletarians are a minority, and that even they are at least partly dependent on the results of the agricultural labour on which their brethren are virtually wholly dependent. The value of all Africa's produce must be immense. It has never been calculated, for so little of it enters public sale. Thus many of the crops are for subsistence and the cropped area bears an immediate relationship to the food requirements of the people living in that area. Thus settlement siting and the distribution of agricultural land are closely linked, and through agriculture one must enter into discussion on the indirect factors in the placing of villages on their present sites. Native agriculture is the key to the whole problem of raising the level of native development in Africa, for upon it has almost all native progress hitherto depended, and as yet

it/

it has no substitute.

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(1) A.W.R. Duly, The Lower Shire District, Nyasaland Journal, Vol. I, 2, July 1948, pp. 11 - 44.

(2) E.D. Young, Nyassa: a journal of adventures (1877)p. 31.

(3) ibid. p. 46.

(4) R. Coupland, Kirk on the Zambesi (1928), pp. 237 - 38.

(5) F.L.M. Moir, Eastern route to Central Africa, p. 101, S.G.M., Vol. I, (1885), pp. 95 - 112.

(6) H.E. O'Neill, Observations in Nyasaland, S.G.M., Vol. I (1885) pp. 428 - 446.

(7) J.W. Gregory, The Rift Valleys and Geology of East Africa, (1921) Chapter XXVI.

(8) F. Dixey, Geomorphic Development of the Shire Valley, Nyasaland, Journal of Geomorphology, Vol. IV, (1941), pp. 97 - 116.

(9) F. Dixey, The Physiography of the Shire Valley, Nyasaland, Geological Survey Department, Nyasaland Government (1925), p. 20.

(10) David and Charles Livingstone, Narrative of an expedition to the Zambesi and its tributaries, 1858 - 64 (1865) p.76

III. AGRICULTURE - the means of development.

The cultivator of Central Africa is not a farmer but a a gardener. The scale of his operations is quite different from that used for the bulk of agricultural production in Western Europe. His system is essentially one of attention to individual plants on "pocket-handkerchief" size lots, a system which precludes at present the use of mechanical appliances or even the assistance of animals. His sole implement, excepting the axe and knife used for bush clearance, is the short-handled hoe, approximately three feet long with a blade 9 inches by 6 inches set at right angles to the handle. The hoe is used to break up the soil surface preparatory to planting, to mix burnt refuse with the soil, to assist in the removal of weeds, and, in British territory, to scoop up the earth into anti-erosion ridges or bunds as prescribed by law. There is no attempt to disturb more than about the top 9 inches of soil - usually less. The sub-soil is never turned over to mix with the upper layer as in British ploughing. This "scratching" of the surface means that the upper horizon of the soil is never renewed by mixing with the lower horizons and is therefore more heavily taxed. It also means that soils which are ill-drained because of a hardpan at a foot or more below the surface may never be brought into cultivation. Ploughs have been used on native lands, notably in Portuguese territory on the Massingire Plateau and around Negaza just south of Port Herald. No

estimate/

estimate of the extent of the resultant sheet erosion has been made, but on no ploughed land was gullying to be seen, a not uncommon feature on the hoed lands in the south of British territory. However, the whole problem of the relative merits of the plough and the hoe has yet to be studied scientifically under inter-tropical conditions, and there is ample room for experiment. A former director of agriculture in Nyasaland, J.S.J. McColl. maintained that agreat deal of the surface wash during heavy rain is due to the shallowness of soils with an impervious sub-layer (1) - a condition which ploughing would help to mitigate besides bringing up more food from the sub-soil. Against this one has the fact that ploughing means the wholesale clearance of land, a process unnecessary for hoeing which can where necessary leave soil-binding tree stumps and other long rooted vegetable matter intact.

The basic system of native agriculture is known as "shifting cultivation" or "rotational bush fallow". This has been described in "An African Survey" as "less a device of barbarism than a concession to the character of a soil which needs long periods for recovery and regeneration". (2) It is in fact a concession to the character of any soil which is not renewed by periodic flooding, for the system does not replace what it removes from the soil either by animal manures or by artificial fertilisers. In the region studied it is practised in Portuguese territory where the population densities are evidently much lower than on the British side of the border, and in the Port Herald Hills, likewise of comparatively low

Shifting cultivation - garden cleared ready for burning. July near Morrumbala Post.

European cultivation - clearing a tsetse barrier in October at Urambo, Tanganyika.

population density. On the floor of the Lower Shire Valley and in the Shire Highlands the competition for cultivable land is too great to admit the use of a method needing so large an acreage per family. Here the system may be best described as one of soil selection according to crop requirements, but a system doomed to fail in its present form due to the possibility of declining returns with lowering fertility.

In the Massingire Plateau and in the lowlands from Chilomo to Vila Bocage, south of Mount Morrumbala, the method is to cultivate a patch or patches of land until the crop returns are too low to justify continuation. A move is thereupon made to new areas, if possible near the hut. If land is not available locally then the hut too is abandoned and a new hut erected elsewhere. The new area is cleared by girdling the trees in order to kill them. Usually mombo or mtwana forest composed of trees of the Brachystegia variety is chosen because of the ease with which this may be destroyed. The dead trunks of the larger trees are occasionally left standing and in some cases serve the useful purpose of boundary marks. The rest are removed by chopping or burning to within 3 or 4 feet of the ground and the remains may serve construction purposes, be chopped up for firewood, or more usually burned to provide an ash easily assimilated by the soil and thereby adding to its mineral content. The undergrowth of medium height grass (5 to 8 feet) and thorn scrub is likewise set on fire to provide nutriment for the soil. The burning destroyed some of the humus content of the surface horizon and kills

both/

Removal of Mombo forest on the slopes of the Port Herald Hills by shifting cultivation. July.

Secondary growth on abandoned gardens in the Shire plain near Megaza, Morrumbala district. July.

both useful and harmful bacteria besides weeds and insect-larvae. However, it is claimed that the result is to produce an immediate increase in useful bacteria with an acceleration of nitrate production.(3) The wood requirement of an effective burning has been estimated at 17¼ pounds per 10 square yards or approximately 3.7 tons per acre.(4) The agricultural year is divided into only two seasons - maenza or rainy and cilimwe or dry - and all this work of clearing and burning has to be performed within one dry season, approximately from May to October, and the land hoed ready for planting at the onset of the first rains - the kokalupsya, literally "which sweeps away the burnt stuff". In addition wherever possible during the dry season crops are grown on the tiny patches of floodland to be found in the valley sections of gentler gradient. These crops are invaluable as fresh foods during a period of dependence on stored supplies. After the rains have commenced the main crop needs constant attention to remove weeds, which are especially injurious to maize, the chief cereal of the whole region. Finally, there is the harvest and, if the land is to be used again the following year, the piling of crop refuse into heaps for burning. When the gardens approach exhaustion they are abandoned to weeds and a secondary vegetation cover consisting chiefly of medium height grass and thorns. Removal of the top soil is thus decelerated and the land allowed to recuperate before perhaps being cultivated again. Throughout plateau and plain on the Portuguese side of the Shire dead trees amidst cultivated patches and abandoned gardens covered with grass

and/

and thorns are outstanding features of the landscape. Bush fires are a common sight throughout the dry season and occasionally spread to engulf villages. The urge to destroy the natural vegetative covering manifested itself everywhere in much purposeless firing of trees and bushes. The result in the red loam area around Morrumbala post was estimated very roughly to be a division of the land surface into forest, secondary vegetation cover and clearance in approximately equal proportions. Of the cleared land well under half is actually cultivated so that destruction is far greater than need demanded. Thus the system is taking for immediate use less than a sixth of the total area available. If one assumes that all the area is necessary to the system then a return must be made to the old gardens every 6 to 8 years if new land is cleared every year. Moreover, with a cultivated area of approximately 5 acres per family, a total area of about 30 acres would be needed for adequate rotation. This appears to be rather low compared with estimates in a similar red loam region just south of the Copperbelt where the total requirement of the cases cited varied between 6 and 12 acres per head or 30 to 60 acres per family.(5) Knowledge of land needs and period of rotation was, however, unusually difficult to obtain in the Morrumbala district mainly due to the language difficulties. The maximum time spent on any one site appears to be 5 years, and that was the limit of the information. Conversation was much easier and therefore study more detailed amongst the Asena and Amang'anja of the valley, with whose language Mr. Price was thoroughly acquainted, Linguistic study and accurate surveying /

surveying are needed for a true analysis of the land situation although even with such surveying it would be extremely difficult to form an accurate estimate since the boundaries of these amorphous gardens are as indeterminate as the dividing line between different vegetation associations. No attempt is made to define the boundaries of holdings except where these are contiguous. The shape of the gardens depends on the ease with which the cultivator may clear the various sorts of ground at his disposal. The hoe makes for digging by very short straight lines unlike the action of the plough. The result is a tendency to work outwards from a central point, so that the nearest approximation to a geometrical figure would possibly be a circle, were other things equal. Only contiguity produces a rectangular garden. The cultivated area and the cleared area on land with non-contiguous gardens may not necessarily correspond, so that the result is often a fringe of secondary vegetation on land cleared but unplanted. In the Port Herald Hills, with the exception of Forest Reserve, all but impossibly steep surfaces have been put under cultivation at least once, for the "uncontrolled land" is virtually stripped of its tree cover. Grass and thorns make up over half the land surface. For a considerable distance the Anglo-Portuguese border coincides with the boundary of the Forest Reserve, and the frontier is thereby clearly marked as a line of vegetation change - on one side a dense stand of trees, on the other a tangle of grass, small bushes and gardens.

Throughout the area under shifting agriculture three

methods of preparing the land for planting were found. Around Chilomo and Megasa, on the slopes of the plateau edge, in the Portuguese section of the Port Herald Hills, and on all land flooded annually, the garden is simply hoed over. In the non-flooded alluvial areas of the left bank near Tengani ridging is practised, although not always along the contour, and presumably for drainage. In the British portion of the Port Herald Hills, except for isolated cases near the border, ridging is again practised, but under compulsion and along the contour as an anti-erosion measure. On very steep slopes bunding is enforced. In the district around Morrumbala post the method is to heap up the earth into small hillocks, approximately 1 foot high by 4 feet long and 1 foot in breadth, and unaligned with the contour. Again as in ridging the result is to provide draining, although why ridging is employed in some parts of Portuguese territory and hillocks in others it was impossible to ascertain. The only answer given to questions was to the effect that the par icular method employed had been practised by forefathers. It was noted that there was a general cropping contrast between the various forms. Hillocks in almost every case are devoted to mixed stands of 4 plants composed of 2 of cassava, maize, beans or pidgeon peas. The commonest combination is maize and cassava. Ridged land supports all these crops, but in combination with millets, whilst land which had merely been hoed is rarely under more than cotton, millets or beans. Cotton is the only crop sown alone by the agriculturalists of Portuguese territory and that

is due to a Government regulation forcing each hut owner to plant one hectare of cotton in pure stand, or undertake 4 months' paid road work a year in addition to the compulsory unpaid week at road repairs. Forced cultivation may explain in this case the comparative lack of effort implied by only the minimum preparation of the land. In some cases the practice is to combine all the hectares of one village, whereupon free ploughing is provided by the purchaser of the crop. Millets are generally found on drier ground already possessed of adequate drainage, or mixed with other crops as a reserve against a failure of the rains. The need of maize and cassava for more water carried with it in this area a need also to prevent water-logging of the roots by raising the plants above the general level of the surface. Beans and peas appear to be better able to withstand badly drained conditions and are grown everywhere possible to increase the variety of the diet. Batatas or sweet potatoes and rice are rarely found outside areas annually flooded where they are commonly combined with maize for a dry season food supply. Plantains, papayas, mangoes and pineapples are universal and generally grown in the immediate vicinity of the villages, although on the whole plantains show a preference for well-watered but well-drained situations on the immediate edge of floodlands.

In the British portion of the valley plain and in the adjacent section of the Shire Highlands, notably in Cholo District, the agricultural system differs from that already described. Whereas under shifting agriculture the emphasis is

on/

on the ease with which land may be cleared, in this region t that land which is at all suitable has already been cleared and is in constant use. The emphasis here is on making the best use of the available resources, i.e. chiefly on soil selection. The cause of this difference was taken to be the contrast in population densities apparent to some little extent from the map of settlement (figure 3). The occupants of the region were originally shifting agriculturalists as their brethren of the areas already described. Increase in density of population under the British administration, to which attention has already been drawn (p. 11) has resulted in the virtual elimination within recent years of "fallow" land except for a little in the Mbengo plain of Ngabu district and along the course of the Mwanza, - unfortunately impossible to estimate even from aerial photographs for areas of secondary vegetation cover on these will also include areas cleared for wood or grass and not necessarily cultivated. The contrast in the densities on agricultural land may be estimated approximately by assuming that under shifting agriculture in Portuguese territory a minimum of 30 acres is needed to support 5 persons. Then the resultant density is a maximum of 105 persons per square mile of cultivable land in regular use. In the Lower River area, or Chikwawa and Port Herald Districts, the density on cultivable land in regular use is estimated as 334. Physical conditions are not so dissimilar - in the valley the poorer returns of the mainly lighter soils are to some extent offset by the higher returns of a larger proport-

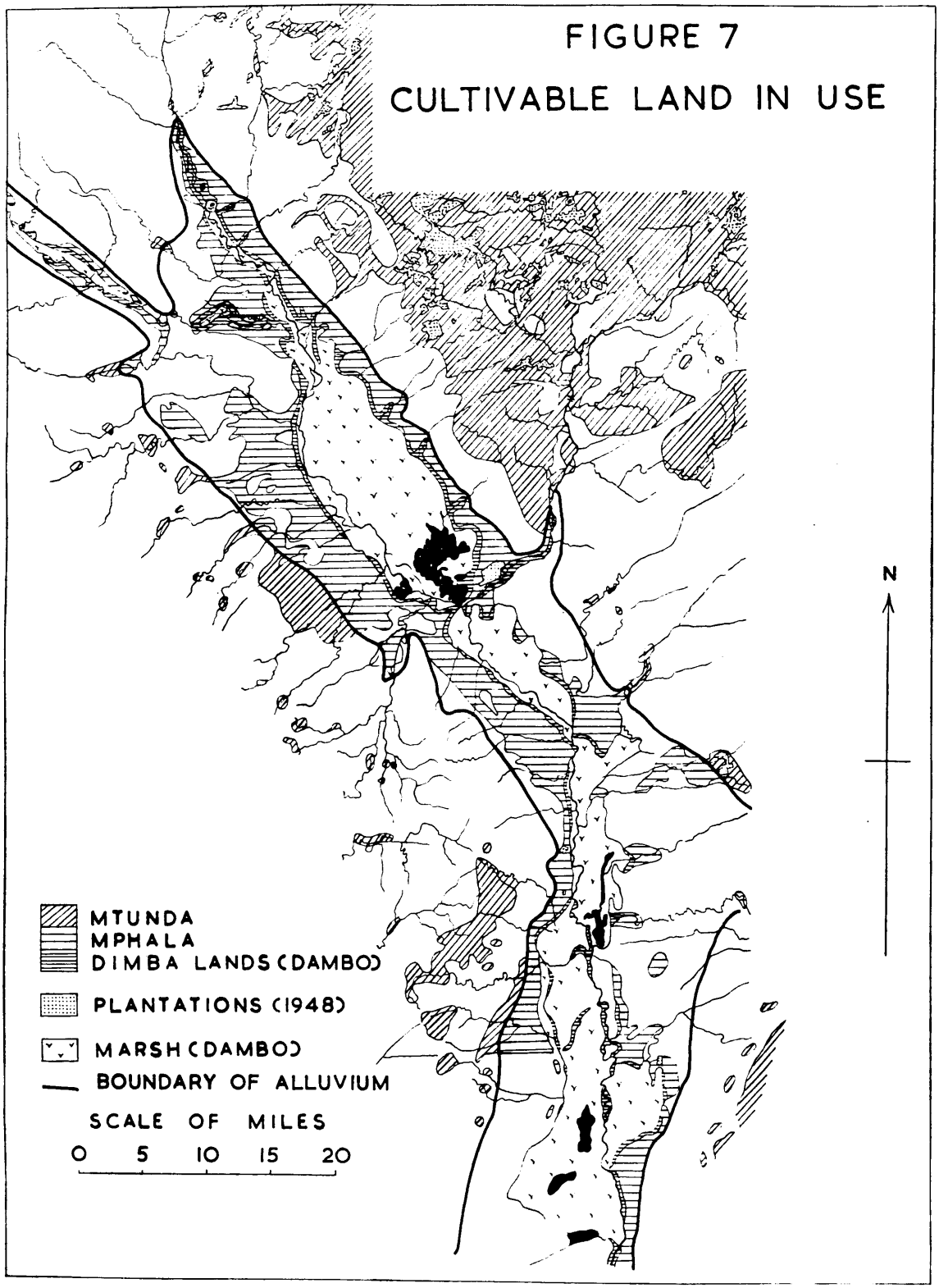
-ion of/

of floodland - that one may not claim that there is a good indication here of overcrowding under the present technique. Barring a few patches in the plains lacking good domestic water supplies, the cultivable area and the area in regular use appear to coincide for there is no indication of any attempt having been made to raise crops outside this area except on steep slopes and stream banks, now proscribed by law. With the greater density of population there is insufficient fallow for the practice of shifting cultivation. Patches of land under a scrub or secondary vegetation cover are indeed rare south of Port Herald and absent over many large areas to the north. Fallow is therefore more lacking in Port Herald District with a density of 400 per square mile of cultivable land in use compared with Chikwawa's 278. On the hill fringes these scrub patches are not uncommon, but there they represent not fallow but the gathering of wood or grass for heating or construction purposes. In addition to the spreading of hearth ashes a little scrub grass and wood is gathered for burning on the land to replace nutriment lost in the soil - a survival of shifting agricultural practice. But this is becoming more and more limited in extent by the increasing shortage of woodland even in areas unsuited to cultivation and by the creation of forest reserves to preserve some woodland from destruction and protect catchment areas. The shortage of fallow land implies a threat of soil deterioration with the continuance of methods employed in shifting agriculture. The value of manure is not appreciated and there are in any case only a few animals

in/

FIGURE 7

CULTIVABLE LAND IN USE



in the soil selection area to provide the material. To the native of this region land is divided into three classes:

(1) dambo or riverine land subject to annual flooding, although not necessarily to the same extent each year.

(2) mphala or alluvial land not subject to annual flooding, but not outside the possibility of flooding in exceptional circumstances. Flooding of mphala was recorded in 1938 and again in 1952 bringing some renewal of soils.

(3) mtunda or hill land.

Figure 7 shows the distribution of cultivable land in regular use in the region, excluding well developed secondary growth (i.e. including cultivated land, fallow under weeds or scrub, occasional patches of useless land or worn-out land too small for demarcation on the map, grave yards, wood lots, roads, paths and village sites), and divided into the three classes. Dambo land has not been shown in the hills since the areas are too small for the scale of the map, as in the case of several small patches of uncultivable land in the plains, besides the virtual impossibility of checking all areas in the field or even from aerial photographs. (See Appendix B). The contrast between the systems of shifting agriculture and of soil selection will readily be appreciated from the map. The hills to the west and the alluvium and hills of the south-east show the patch-work effect to be expected from the shifting system with its large areas of forest still remaining as opposed to the broad continuity of cultivated land in the remainder of the region. Throughout, agriculture functions by the use of two types of land: either mtunda or mphala, giving a wet season crop/

Village on saline wasteland - Kalumbu 10 miles south of Port Herald, looking north towards the Port Herald Hills.

crop in combination with dambo providing food in the dry season. The dambo area consists mainly of land permanently under water and only a small proportion is left for the vitally important dry season gardens or dimba. Calculation of the areas involved for the two administrative divisions of Chikwawa and Port Herald which make up the Lower River District of Nyasaland show that of an estimated total under native cultivation of 242,645 acres, mphala takes 152,137, mtunda (small hill patches included for administrative convenience) 65,221 and dimba lands 25,287 or only 10.4% of the whole. The area cultivated as a percentage of the total area of Lower River District is 14.4%. When one considers that in this district the demand for land has become so great that bush fallowing has practically ceased, whilst in places, notably the extreme south, settlement is confined to waste land in order to ensure a maximum use of the cultivable area, one must realise how small is the proportion of land available suited to agriculture, and this, moreover, appears to be true generally throughout Central Africa. Further the importance of dimba land is out of all proportion to its size and the return from it. Calculation of the returns from the different sorts of land still needs to be done. All that can be stated at present is that dimba land gives a greater return per acre than either mphala or mtunda, a condition which one would expect since the dambo soils are renewed annually. However, it is also evident that the bulk of the crops comes from non-flooded land and it is mainly on that land that the future

Cotton Mphala garden in June at Mlolo village near Chiromo.

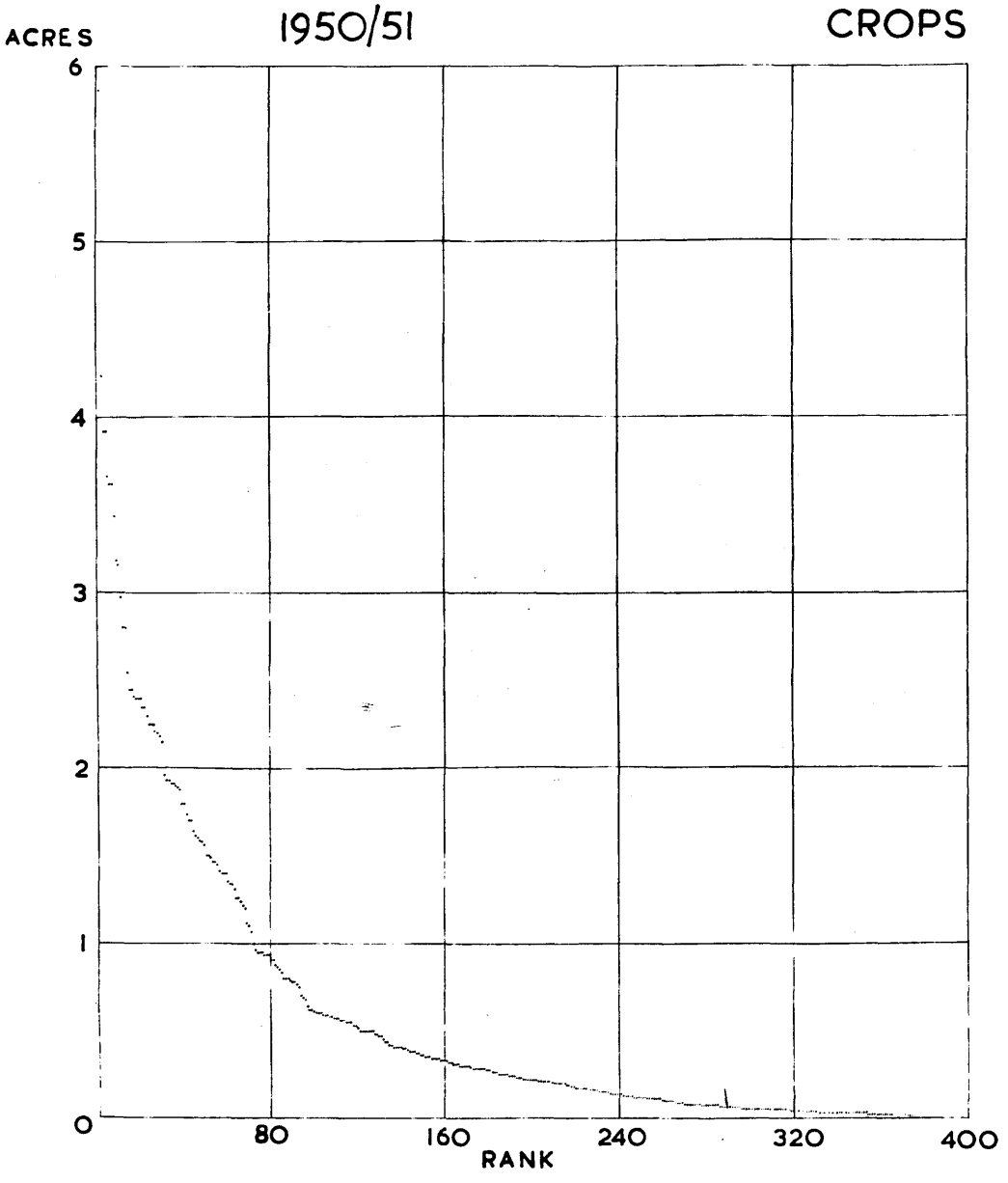
Dimba with maize & batata at Ndamera village south of Port Herald, - July

prosperity of the African depends. Thus in the choice of settlement siting the availability of non-flooded land must be the first agricultural consideration. Where, however, non-flooded land exists in large continuous areas, as in the valley plains, then the distribution of floodland becomes a decisive factor in settlement siting, resulting in the concentration of people around the marshes, on levees or even on islands. The majority of agriculturalists possesses a garden or gardens on mphala or mtunda and gardens in the dambo. Measurements of garden sizes in the district of native authority Ndamera in the extreme south of Nyasaland showed that there mphala gardens varied between 1 and 4 acres in size whilst dimba varied between 0.02 and 0.05 acres. Mphala gardens therefore may be anything between 20 and 200 times the size of dimba. At Bitrinya village in N.A. Ndamera it was possible to calculate the area tilled. The result was approximately 250 acres of mphala and 9 acres of dimba, i.e. approximately 28 times as much mphala as dimba. However, this was not the total area of dimba since increase would occur with the retreat of flood waters as the dry season advanced, so that this does not indicate the possibility of over-estimation in the dimba land proportion of 10.4% already suggested. The total number of occupied huts in the village was 51 providing a mean holding per hut at the time of the visit of 4.9 acres mphala and 0.18 acres of dimba, or 1 to 5 mphala gardens and 4 to 9 dimba per family.

The above material has served to give some picture of agricultural/

FIGURE 8

RANKED MEAN GARDEN SIZES BY CROPS 1950/51



agricultural conditions in the soil selection area and of garden organisation. The figures given for the latter, however, are only true for one small portion of the area and a more comprehensive approach is needed to assess garden organisation of the whole area. The question of garden sizes is one which offers a clue to the whole system. Observation tended to show that there was a relationship between garden sizes and the types of crop, although these are grown in mixed stands. The diet of the people is fairly uniform throughout the area and since theelements in it should bear some proportional relationship to each other, and since these elements are all grown locally on a subsistence basis, therefore it was felt that the numbers of gardens of various sizes should also bear a relationship to each other. To show that these relationships exist and that garden sizes tend to form groups, a graph has been prepared (figure 8) ranking mean sizes of gardens for each crop, both food and cash, by administrative divisions. The figures for Port Herald District were provided by the local agricultural officer and those for Chikwawa by the Agricultural Department. In spite of the fact that the crops and therefore the garden sizes overlap owing to the prevalence of mixed cropping and that not all crops were included besides considerable doubt as to the accuracy of the returns (See Appendix C), it will be seen that the result is practically a uniform curve with the greatest deviation in the upper storey, i.e. amongst garden groups averaging more than 2.45 acres. The small scale nature of agricultural enterprise

is/

FIGURE 9

Crops by garden groups

1	2	3	4	5
maize	maize	maize	maize	maize
mapira	mapira	mapira	mapira	cotton
machewere	machewere	machewere	machewere	
cotton	cotton	cotton	cotton	
mayere	mayere[x]	cassava[x]		
rice	rice[x]	Canadian		
cassava	Canadian	wonder bean[x]		
Canadian	wonder bean[x]			
Wonder bean	pulses[x]			
batatas				
pulses				

Where the cases of occurrence are exceptional, i.e. only 1 or 2 an asterisk (x) is placed beside the name of the crop.

Explanation of local names:

mapira	-	sorghum	-	sorghum vulgare
machewere	-	bulrush millet	-	pennisetum typhoideum
mayere	-	finger millet	-	eleusine coracana
batatas	-	sweet potatos		

Groups 2, 3 and 4 are distributed areally as follows:

In Native Authorities south of the Nyamala out of 29 cases of their occurrence 14 are of 2 and 13 of 3.

In Native Authorities between Ngabu and the Nyamala out of 15 cases 10 are of 3.

In northern Native Authorities excluding Ngabu out of 16 cases 7 are of 3 and 8 of 4. There are in addition 3 cases of 1.

Note: a "case" consists of 1 mean size of garden per crop for one Native Authority or subdivision of Native Authority according to the composition of the statistical tables available.

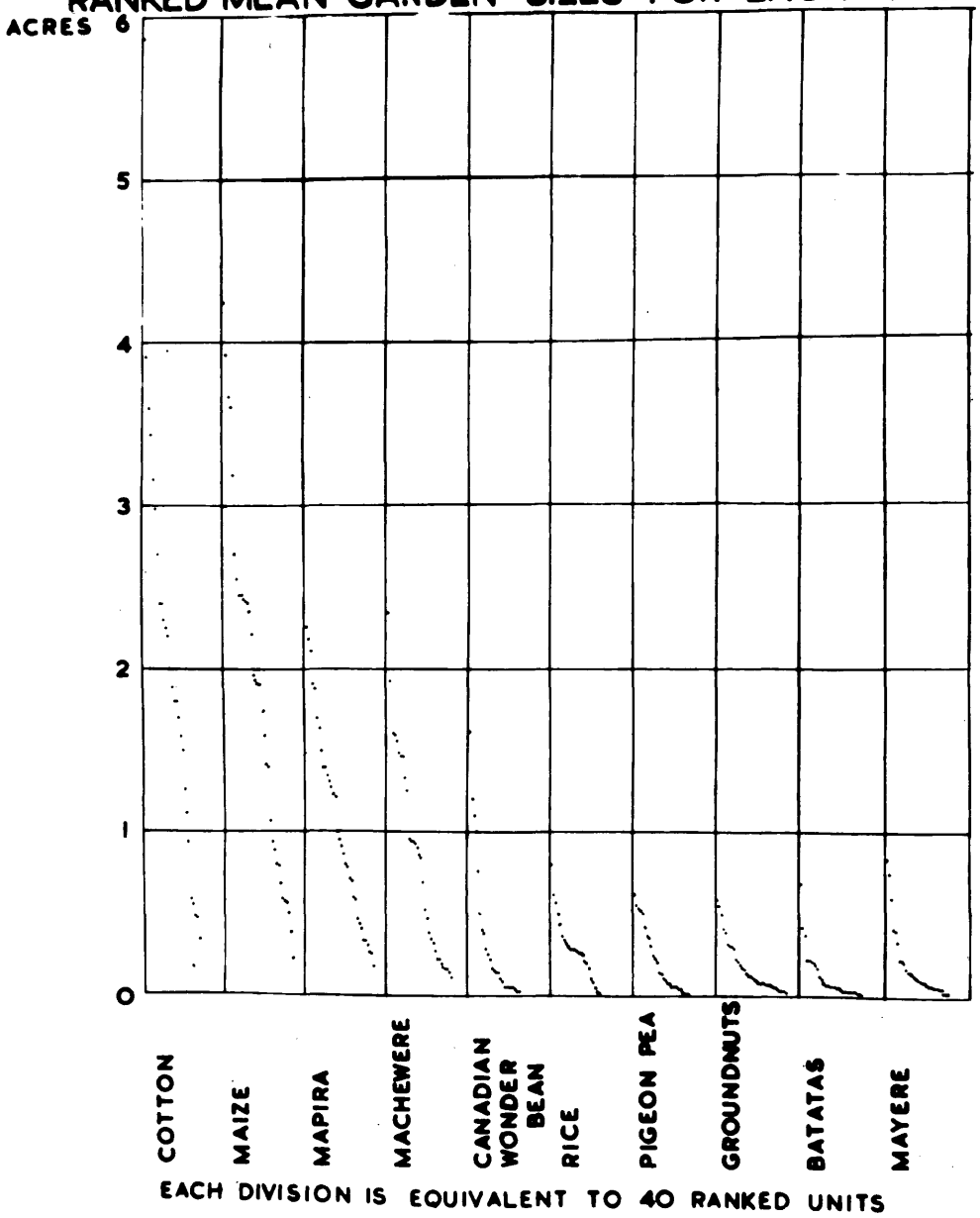
is amply illustrated. The mean maximum size is 5.68 acres and the mean minimum 0.01, with 288 of the 375 items lying below 0.65. The figures were compiled during the wet season of 1950-51 and it was claimed were solely for mphala and mtunda land. It was felt, however, that the census enumerators had included some dimbas, and in the graph a "tailing-off" will be noticed which almost certainly represents the inclusion of some of these gardens. The curve includes some marked vertical breaks dividing off the mean garden sizes into groups. Five groups were determined from the graph as follows:

	Acres	Mean
(1)	0.01 - 0.65	0.19
(2)	0.75 - 1.00	0.90
(3)	1.15 - 2.00	1.60
(4)	2.15 - 2.45	2.33
(5)	2.55 - 5.86	3.54

The graph has therefore supported the notion that the pattern expected in African agriculture from the relationships between diet and methods and gardening actually exists, although the content of those relationships cannot at present be fully established. It also supports the idea of normal groups of garden sizes, of which in this area there are five requiring explanation.

Figure 9 contains a list of the chief crops grown in the area arranged by garden groups. It will be seen that in effect group 1 is a "kitchen garden" producing all manner of crops, although concentrating chiefly on mayere, cassava, beans and pulses. Batatas and rice are confined almost entirely to dimba gardens/

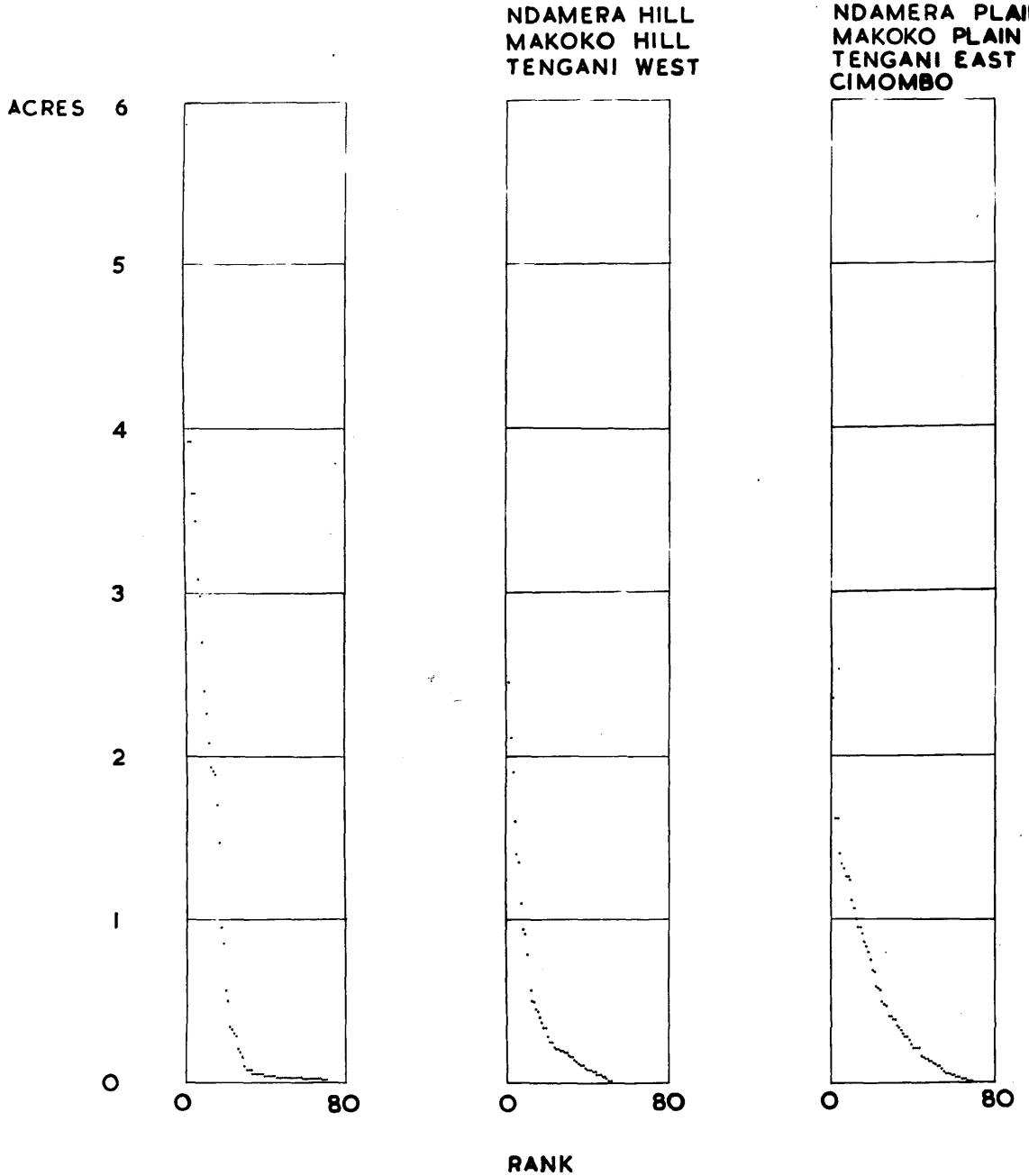
FIGURE 10
RANKED MEAN GARDEN SIZES FOR EACH CROP 1950/51



gardens. Mayere is a hardy crop grown chiefly as a stand-by in case of a failure of the rains and therefore planted in only small quantities for its yield per acre is extremely low even under the best conditions. Cassava is a hill crop and occurs in the plains only in exceptional circumstances, i.e. it is grown by the minority of recent immigrants from the hills who insist on cassava as part of their diet. Groups 2, 3 and 4 are evidently the same crop group producing maize, mapira, machewere and cotton in various combinations. The other crops are all of excpetional occurrence. Group 5 is confined entirely to maize and cotton which are the chief cash crops of the Lower River District. The circumstance is suggestive and shows in effect that the deviating top-storey of the curve is the result of cash-cropping, i.e. of the influence of European trading upon an agricultural system otherwise well balanced. Figure 10 adds point to the above remarks by comparing the curves of garden sizes for each crop - a comparison made possible by the fact that the number of terms in each case is approximately the same. Maize and cotton group together followed by mapira and machewere. The remaining crops all show similar curves with deviations in the case of rice and batatas probably due to the fact that some dimba statistics have been included with the cases of the occurrence of these crops in non-flooded gardens. The fact that the crops group so well, incidentally, emphasises the soundness of this method of analysis of the agricultural system and lendssupport to the idea of balance in African agriculture. It seems clear that the agricultural

pattern/

FIGURE 11
RANKED MEAN GARDEN SIZES FOR SELECTED AREAS 1950/51

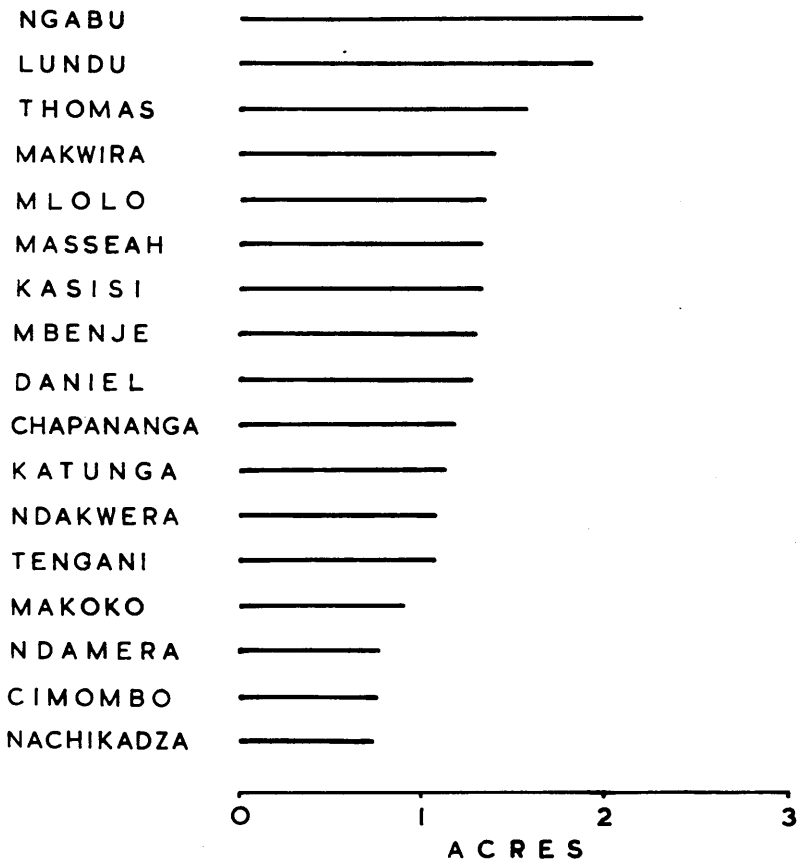


pattern employs 3 sorts of garden - (1) large food producing or still larger cash crop units, (2) small kitchen gardens, (3) dimbas. In the idea of local kitchen gardens plus more distant food or income producing units one is presented with the conception of inner and outer crop units respectively, each serving a specific purpose. Whilst the inner units are commonly attached closely to the cultivator's hut, the outer are usually scattered. A point worth noting here is that the large garden concentrates chiefly on cereals whereas the kitchen garden has a great variety of crops providing a better balanced use of soils. It is the large food or cash crop producing garden which is taking most from the soils with resultant deterioration. The existence of three groups - 2, 3 and 4 - for the same crop combination suggests the possibility of areal differentiation of garden sizes. Analysis of the material (Fig.9) shows that the southern districts, i.e. south of the Nyamala, grow their maize, mapira, machewere and cotton almost exclusively in groups 2 and 3; the central districts, south of Ngabu and on the left bank around Chiromo, concentrate almost entirely on group 3 for these crops; whilst northern districts excluding Ngabu raise maize and cotton in groups 3 and 4 and leave mapira and machewere to group 1. Ngabu is a special case and to illustrate this graphs have been drawn (figure 11) comparing its position with that of two district groups south of the Nyamala, (each group having approximately the same number of terms), the one consisting entirely of hill country, the other of plain. In spite of the physical

differences/

FIGURE 12

APPROXIMATE MEAN SIZES OF GARDENS BY NATIVE AUTHORITIES 1950/51



ONLY 'APPROXIMATE' SINCE GARDEN SIZES OVERLAP DUE TO MIXED CROPPING

differences the two southern districts show very similar curves which contrast sharply with the effect produced by cash cropping in Ngabu, where two sharply divided components appear in the graph. Evidently the basic local food-producing garden size 2, 3 and 4 is well represented in these southern districts whilst the only group strongly marked in Ngabu is 1 - the kitchen garden. The result in the case of Ngabu is remarkably similar to the graphs of cotton and maize, and gives away the European planning and control in this area for the production of marketable crops. A comparison of the average sizes of all gardens by administrative divisions shows the effect of the European preoccupation with large units in native agriculture (figure 12). Ngabu has the largest average size of garden followed by that of the neighbouring N.A. of Lundu, also affected by European "improvements". At the other end of the scale are the four southern districts where virtually no fallow land remains. Here it appears that possibly reduction in size of holdings with overcrowding has resulted in reduction of size of gardens. In the remaining areas cash cropping has not been encouraged to so great an extent as in Ngabu or Lundu and there is still a little fallow land left. Therefore, it may perhaps be taken that garden sizes here represent a norm for stable African agriculture in the Lower Shire Valley, giving a figure of approximately 1.25 acres. If the above remarks hold true it would appear that the pattern of change in native agriculture due to the cessation of nomadism and increasing population density is firstly one of the

reduction/

Dividing line between maize dimba with plantains & mphala.
Mphala grass burned before hoeing in the foreground - September.
View from terrace at Chikwawa. Shire in background.

Contour bunding in the Port Herald Hills near Chididi - August.

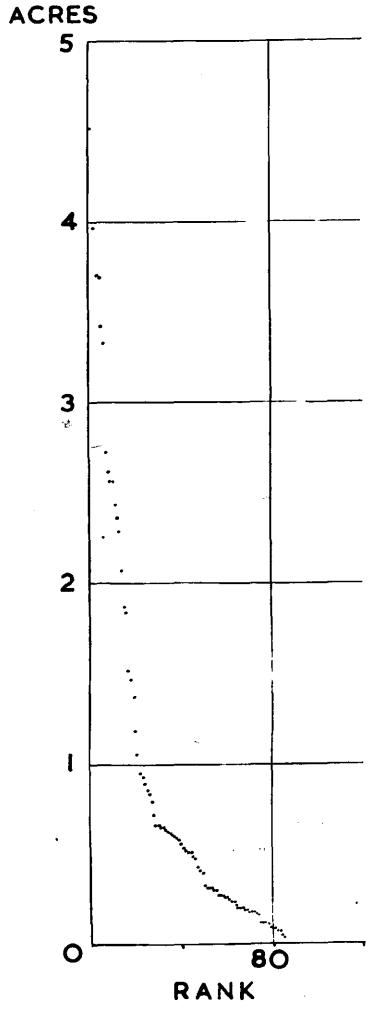
reduction of the area of fallow land followed by reduction of the size of holdings by diminution of garden sizes. The scale of the agricultural development as shown by garden sizes is an interesting question in itself. It is the result of a long period of adaptation to African physical conditions. One must remember that although the African technique is often described as primitive, nevertheless that technique has been subjected to a far longer test in the African environment than has the technique of the European. It may well be that large garden or field units do not give the best results under African conditions. Against this view one has the argument that it may be possible to produce different techniques suited to the environment and which will demand different sizes of garden or field "unit. The European plantations and such schemes as that for groundnut production in Tanganyika are an attempt to do this. Evidently these new systems can produce more per man, but there is a need to show whether or not they produce more per acre. As early as 1909 the Director of Agriculture in Nyasaland had to issue a warning against the large size of cotton fields prevalent and suggested that a single ~~garden~~ field should never be more than 200 acres.(6) Six years later he made a remark of significance today to the schemes of the Overseas Food Corporation:

"The natives of Nyasaland seem to recognise the necessity for this special cultivation and always give more attention to the preparation of the seed-bed for ground-nuts than any other

food/

FIGURE 13

RANKED MEAN GARDEN SIZES BY CROPS 1949/50 PORT HERALD DISTRICT & NGABU N.A. ONLY



food crop and, for this reason alone, the average results under native garden cultivation are frequently better than in the case of European estates where larger areas are planted under ordinary field conditions especially where the soils are inclined to be heavy".(7)

Figures of mean garden sizes by crops for the native authorities of Port Herald District and Ngabu only for the 1949-50 growing season were obtained and havebeen presented graphically (figure 13) as a check of the method of analysis employed. The omission of most of Chikwawa District with its large garden sizes means that the cash cropping group of big gardens fails to make its mark in the graph; but the division between groups 1 and 2 at 0.65 shows up well as does the division between 2 and 3 at 0.95, and this in spite of several differences in the administrative divisions used and in spite also of employing only 88 items in this check demonstration.

With regard to size of holdings, the average from observations appears to lie between 5 and 9 acres per family - but unfortunately statistical information on this point is completely lacking. Of cultivable land in use there is an average of 1.9 acres per head or approximately 9.5 acres per family. In Chikwawa District the figure is 11.5 acres per family and in Port Herald District 8.0. It was unfortunate that between 1945, the date of the census, and 1951, the year of the visit and of the issue of the first accurate maps, there was an alteration of most native authority boundaries and that information on the 1945 situation was insufficient to be able to demarcate

them/

them and thus relate population returns to the land. In Port Herald District only Ndamera N.A. remains unchanged and there calculation reveals the same figure of 8.0 acres per family as for the whole district. With a minimum size of holding at about 5 acres that leaves only 3 acres for fallow, hut and compound space, burial, wood lots, paths and roads - very different from the proportion under shifting agriculture of 5 acres tilled to 25 fallow. Holdings in Chikwawa District tend to be larger. Taking the same proportions as for Port Herald District a guessed estimate gives approximately 7.2 acres cultiv ated to 4.3 acres under fallow and other uses. In any case, the figures of 11.5 and 8.0 acres restrict the size of holdings to something below these figures, and as no rotational fallowing practice was observed outside the area defined as cultivable in use the amount of fallow is clearly insufficient for shifting practice. The limitations to the size of holding are firstly that of the area a man or woman will cultivate with a hoe, and secondly the area available to be divided amongst the several families composing a village. One writes "will cultivate" and not "can cultivate" for certain enterprising individuals were found who were willing to work longer hours than their fellows in order to raise crops on up to 20 acres which appears to be the limit of hoe cultivation for a family unit. However, the smaller holdings make possible a much greater attention to the business of we ding and keeping plants healthy. The introduction of new techniques such as ploughing will make possible the cultivation of greater areas with the same physical effort

but/

but may also result in less attention to the plants during growth and therefore less return per acre. New schemes need very careful review before their adoption in a land where the cultivable area is not great and where the possibility of population increase may well make the question of production per acre a vital issue. Unless plantation agriculture can show adequate returns per acre, and the matter needs considerable research, there is a strong case for increasing attention to peasant agriculture which at least evidences the possibility of greater care in the growth of individual plants.

Having examinaed the size of cropping units it is now possible to focus attention on the actual question of cultivation. The system under review has been described as one of "soil selection" and in this it has been said that it goes further than shifting agriculture where the emphasis is on the ease of clearing and not necessarily on the suitability of the area cleared to the crop. In addition to distinguishing between mtunda, mphala and dambo the people of the Lower Shire Valley also distinguish at least 5 types of soil:

Ndlongo, a black soil suited to cotton,

Mphumbu, a brown earth suited to mapira and machewere,

Nsangalabwe, a sandy earth suited to mayere,

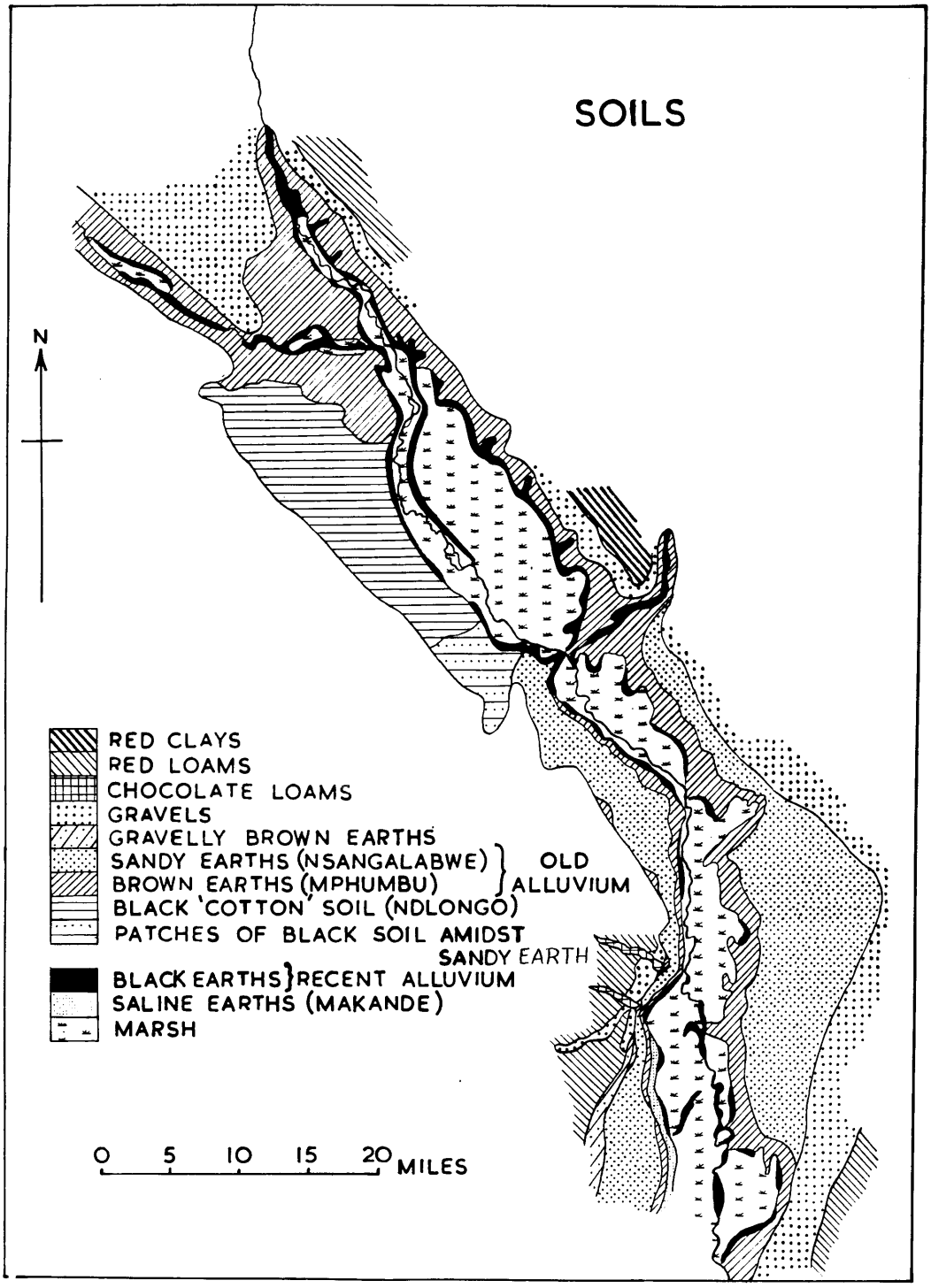
Nkeca, a very light sandy earth suited to groundnuts,

Makande, a saline alluvium useless to agriculture unless drained and baking into a hard polygonally cracked surface in the dry season.

Grasses are also distinguished as indicators of soil types,

but/

FIGURE 14


SOILS
N
RED CLAYS
RED LOAMS
CHOCOLATE LOAMS
GRAVELS
GRAVELLY BROWN EARTHS
SANDY EARTHS (NSANGALABWE)
BROWN EARTHS (MPHUMBU)
OLD ALLUVIUM
BLACK 'COTTON' SOIL (NDLONGO)
PATCHES OF BLACK SOIL AMIDST SANDY EARTH
BLACK EARTHS
RECENT ALLUVIUM
SALINE EARTHS (MAKANDE)
MARSH
0 5 10 15 20 MILES

(8)

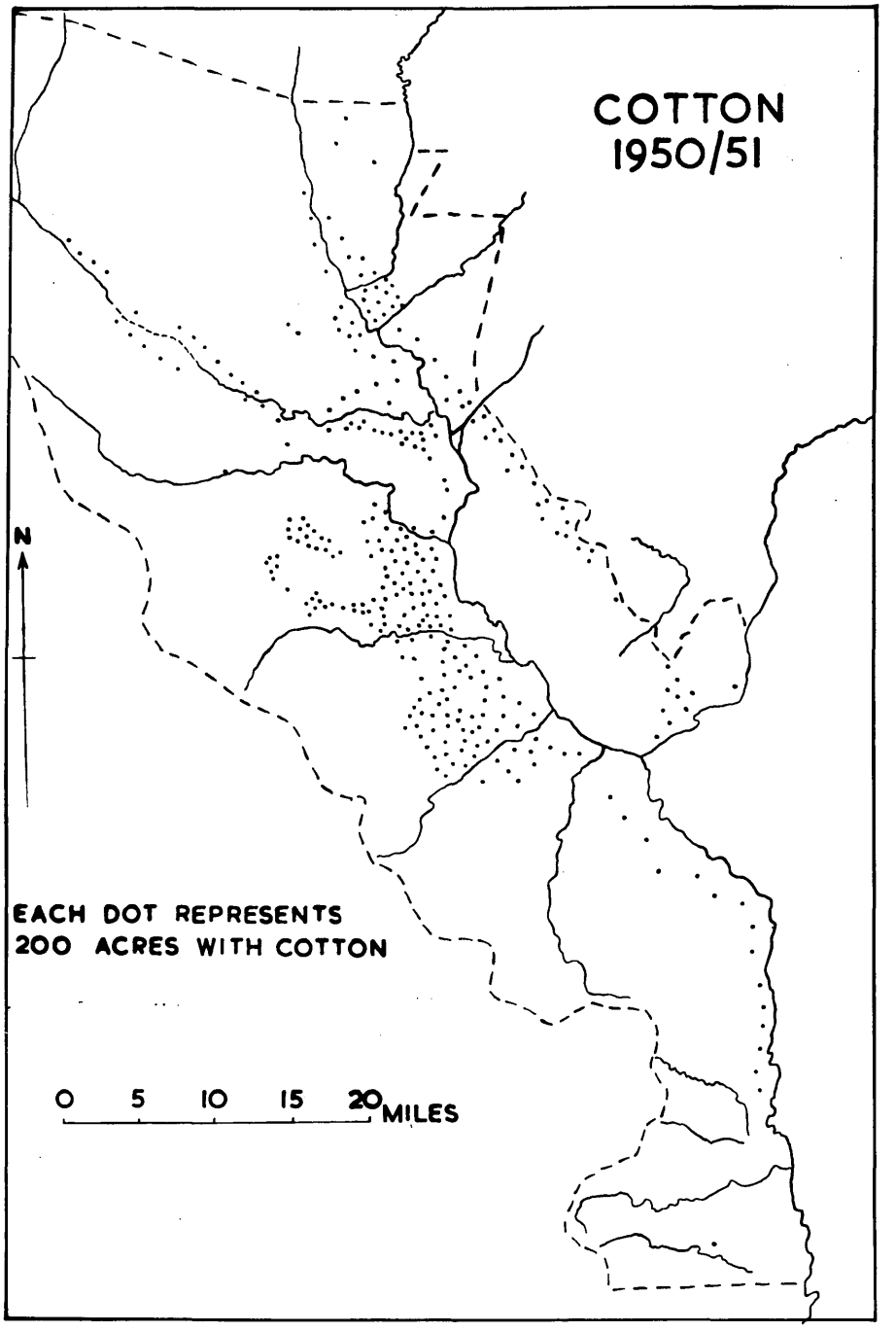
but tree associations are all classed under one name - tengo. The soils mentioned above, with the exception of Mkeca which only occurs in small isolated patches, have all been mapped together with other soils from observations in the field (see figure 14). The map should be regarded as a preliminary statement. The work of accurate survey and the testing of soil samples has still to be done. It will be seen that the soils of the valley fall into three main groups. Firstly there are the brown earths from which the bulk ofmphala cropping is derived. These, the product of alluvium from crystalline sources, provide at their best a foot or more of brown top-soil underlain by a sandy stratum. In the central belt between the Shire and the hills they deteriorate to the sandy Nsangalabure earths. Here the water-table is lower and capillary action during the dry season often makes for the formation of a hard-pan. On sandy earths round Port Herald brick hardness was encountered at depths of no more than 2 feet 6 inches. The distributions of low water table and sandy soils seem to correspond for wherever streams cross the area the belt of light soil is at its narrowest. Cropping without replacing the humus extracted has almost certainly increased the area of sands in the Port Herald District and has led to the worst conditions being found in areas marginal to agriculture, i.e. in the central belt where soil erosion is most highly developed. Towards the hills are the patches of very light sands used for groundnut cultivation, whilst at the foot of the hills the brown earths reappear together with coarse gravels at the

heads/

heads of alluvial fans. Such gravels, left to tango, are to be expected since a river naturally drops its heaviest material first on encountering a sudden decrease in slope. The black or dark-brown soils of Ngabu make a remarkable exception in the general pattern. A glance at figure 7 will show thay they coincide with a geological excpetion, for they consist of material derived not from the crystallines but from the recent Karroo rocks. Vageler points out that dark basic volcanic glasses have a rapid decomposition and provide fertile dark soils.(9) It may well be that the dark element in the soils of Ngabu is derived from the Karroo basalt from which so many of the streams entering the area drain. Dambo soils outside the marshes have been divided into two groups - the highly fertile black earths of the dimba, and the saline makande formed under conditions similar to those affecting the black earths but without adequate drainage resulting in dry season waterlogging and the accumulation of salts by capillary action. With regard to this last question highly saline soils in all cases are found alongside marshy areas which are cut off from the main drainage system except in periods of very high flood. These soils give rise to a vegetation cover of short grass or poor scrubs which, however, appears to afford feed for cattle, notably in the south-west in Ndamera N.A. Wherever the alkaline areas are crossed by tributary streams cultivable conditions once more prevail right down to the Shire marshes. For the rest, the region has the infertile gravels of the old

valley/

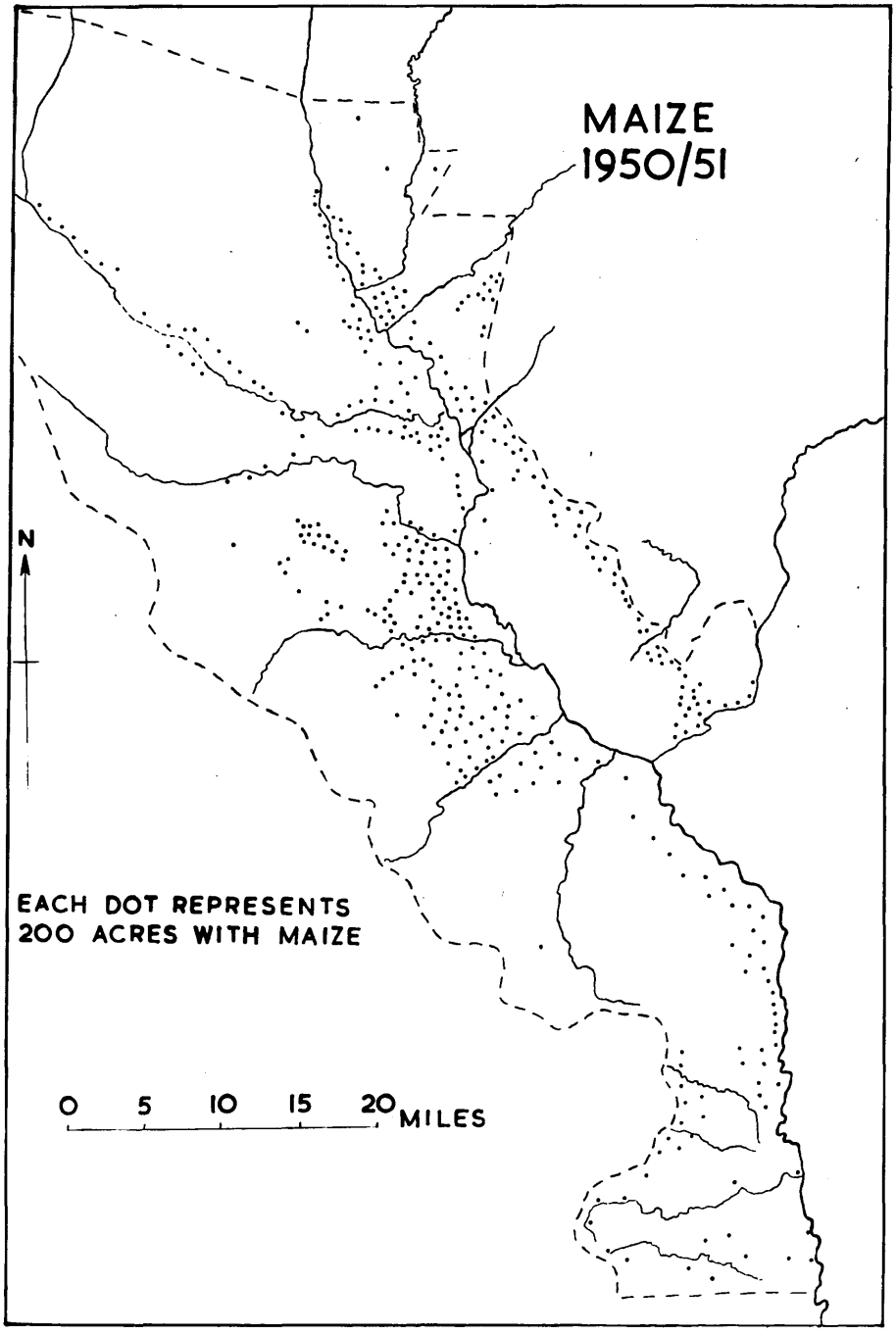
FIGURE 15


COTTON
1950/51
N
EACH DOT REPRESENTS
200 ACRES WITH COTTON
0 5 10 15 20 MILES

valley plain and of the steep escarpment faces with soil depths of less than 6 inches accompanied by outcroppings of bare rock and boulders, the fertile red loams, so characteristic of the inter-tropics, in the hill districts commonly with a dark brown top horizon of about 6 inches in depth and accompanied by chocolate loams in the valley bottoms, and finally the acid red clays of Cholo District which may be regarded as the complement of red loams but formed under conditions of higher rainfall. The question of soils cannot be left without a word on termite hills. The termite or "white ant" is the great scavenger of the inter-tropics and builds hills composed of extremely fine particles and containing fungus gardens.(10) The native agriculturalist keeps the hills or termitaria low by spreading the material of which they are composed upon his land in order to enrich the soil or by using the fine clay of the termitaria as a mud plaster on hut walls. At the same time the work of the termites opens the soil to aeration and removes any unwanted vegetable refuse. In addition the native prizes the termite as a valuable addition to his diet. The examination of the distribution of crops in relation to the distribution of soils shows the principle of soil selection. The case of ground-nuts has already been cited. Dry rice, beans, non-flooded batatas, pumpkins and the little tobacco grown are confined almost entirely to the brown loams. The Canadian Wonder bean, cow peas, pidgeon pea, simsim and dolichos similarly are brown loam crops, whilst cassava appears to do best on red earths, Wet rice, the bulk of the batata crop and some sugar cane are raised on dambo soils.

Cotton/

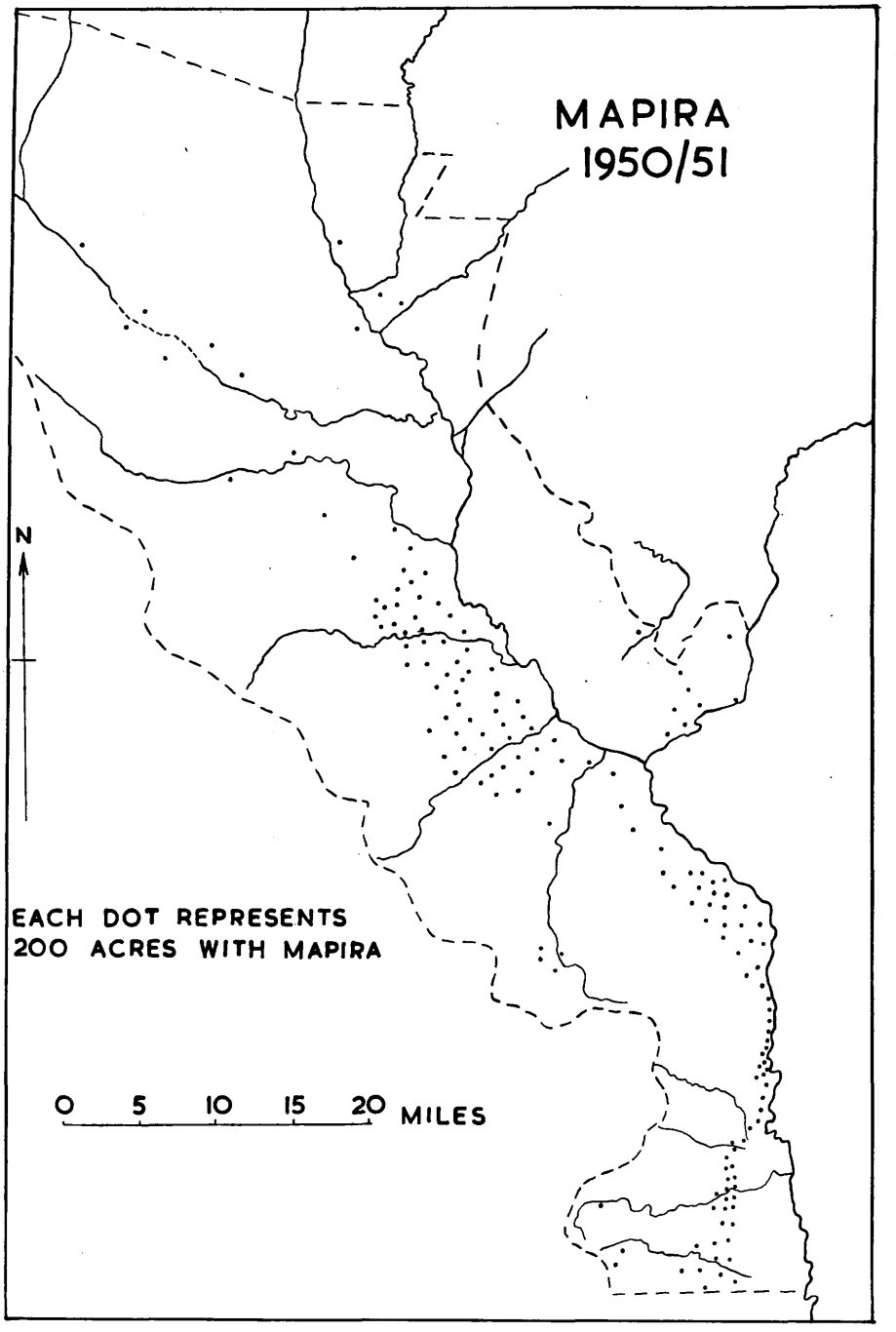
FIGURE 16


MAIZE
1950/51
N
EACH DOT REPRESENTS
200 ACRES WITH MAIZE
0 5 10 15 20 MILES

Cotton - the chief variety now grown is U4 of Uganda - flourishes on soils rich but well drained. Figure 15 shows its distribution. The preponderance of Ngabu N.A. with its black soils is overwhelming. In 1950 Ngabu produced six times the quantity of seed cotton produced by Port Herald District, with an average seed cotton production per grower of 900 pounds compared with 200 pounds average for both Lower River Districts excluding Ngabu. Outside Ngabu, the brown loams of the northern district and of the left bank are seen to have a good distribution of cotton, but southwards the cotton area thins until south of Port Herald where the crop is almost entirely absent from soils badly overworked. Before the great floods of 1936 and later years Port Herald was the chief cotton producing district (with Egyptian varieties until 1914 followed by Nyasaland Upland) on dambo soils. The move to Ngabu was the result of the well digging policy to open up new lands and of knowledge based on Indian experience, for the similar appearance of the soils of Ngabu to the so-called "Trap" soils of the Deccan led to the transference of the term "black cotton soil" from the latter area to the former. Furthermore, the shortage of land in the Port Herald District has led the inhabitants to concentrate on food crops rather than gamble on the less certain results of cotton with fluctuating prices and the danger of total loss from disease or failure of the rains. Maize (figure 16) is a sturdier crop than cotton and shows a more even distribution, being better represented in the southern plains and in the hills. For the rest its distribution shows

the/

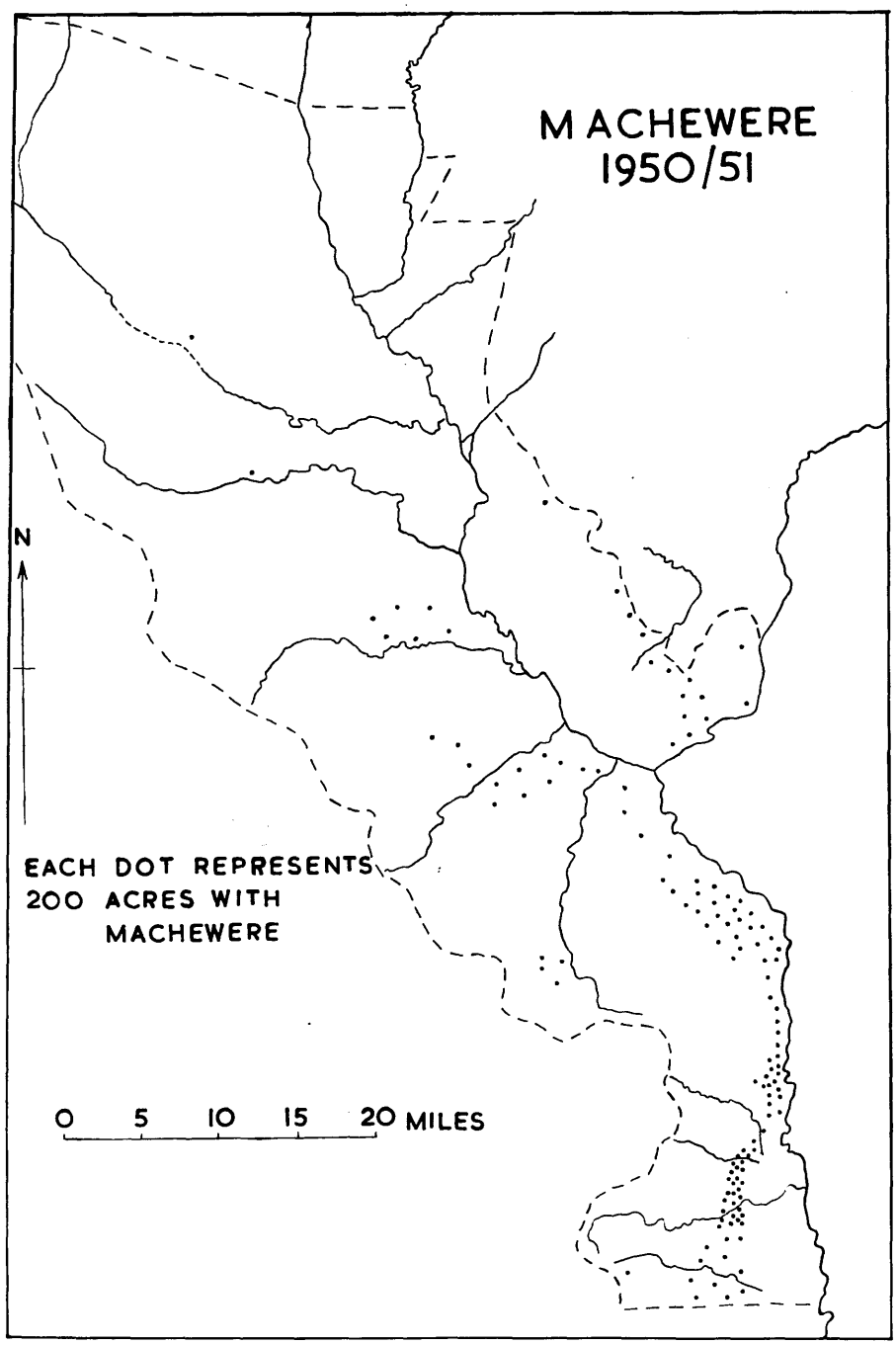
FIGURE 17


MAPIRA
1950/51
N
EACH DOT REPRESENTS
200 ACRES WITH MAPIRA
0 5 10 15 20 MILES

the similarity to be expected from the evidence of the discussion on garden sizes since maize is both a cash crop and a useful inter-crop with cotton. The maps of mapira (figure 17) and machewere (figure 18) provide a contrast both to the two preceding diagrams and to one another. Both crops will produce results on soils too light for either maize or cotton, machewere being in this respect somewhat better than mapira. Both crops are more likely to give some result with the vagaries of local climate. Both, however, give less return per acre in weight of grain or in cash on the better soils. Estimates of returns per acre in the Lower River Districts for 1948 are maize 150-1500 lbs. (average 600), mapira 280-1300 lbs. (average 750) and machewere 187-796 lbs. (average 500), i.e. maize has the highest upper limit. It will be appreciated that mapira and machewere are pre-eminently the cereals of the southern districts and of the dry Tangadsi basin. Their representation in the Port Herald District is very strong where they take the place of maize as the chief cereal. It is also almost identical illustrating their inter-cropping. In the northern districts where the brown loams have been less taxed maize replaces them as a cereal crop. The contrast between mapira and machewere illustrates well the principle of soil selection, for in spite of the prevalence of the practice of growing these crops together, the two maps do show some differences. Mapira, which gives better results on heavier soils, has much higher densities in Ngabu, in the northern districts and in the Port Herald Hills, whilst

machewere/

FIGURE 18


MACHEWERE
1950/51
N
EACH DOT REPRESENTS
200 ACRES WITH
MACHEWERE
0 5 10 15 20 MILES

machewere reaches a higher density in the sandy plain south of Port Herald. In this last area there exists a contrast which unfortunately it was impossible to map. The brown loam fringe to the floodlands wherever mapira or machewere are mixed with some other crop and not with one another supports mapira rather than machewere, whilst in the central light soil belt the reverse tendency is the case. Mayere wherever it is not cultivated as a kitchen-garden reserve crop is found chiefly on the light sands - in fact in areas where no other cereal could possibly give a result. A point that emerges from this question of selecting soils is that with the progressive degradation of soils in the southern districts unless some new effective policy is found machewere will increase at the expense of mapira and mayere at the expense of both. Further both mapira and machewere may be expected to advance into lands at present under maize. Thus soil deterioration will tend to produce a crop adjustment with, however, in any case lowered returns, although better returns than from continued cultivation of the same crop. One factor which will retard this tendency and which is also a factor in the distributions shown is that of crop conservatism. Certain tribes specialise in the growth of particular crops. The Asena who occupy mainly the southern half of the region are extremely fond of mapira whilst the Amang'anja whose influence is greatest in the northern half prefer maize. In this connection a local agricultural officer has remarked that much of the land was kept under maize only because of the conservatism of the growers/

growers and would be better planted to millets.(11) The example of the liking of the hill peoples for cassava has already been given. This conservatism also expresses itself in a reluctance to change from a conventional diet, and cases have been found during a food shortage of even evincing a preference for flour milled from white seeded rather than from yellow seeded maize.(12) A further possible result of soil deterioration will be to lengthen the period necessary for growth since it is the general experience of local agricultural officers that maize and millets on lighter soils take longer to ripen than on neighbouring brown earths.

The tendency to combine crops is a point which may be of great significance in African agriculture and as yet less attention has been paid to it than it deserves. Intercropping in Africa may be the result of a long period of experiment by which the need to associate one crop with another has been recognised. Tropical soils present different structures from those found in Western Europe. There is not only the question of different climatic conditions, there is the contrast in the organisms at work, as for example between the earth-worm and the termite. The yearly rest period, where it exists, is one lacking in precipitation in the inter-tropics and providing great diurnal ranges of temperature. In Western Europe it is a period when frost occurs, helping to break up the soil and expose it to the air. With regard to this question one example of plant combination which has been proved successful by Europeans is that of combining trees commonly of the Albizzia

variety with tea. These trees not only provide shade and add nitrogen to the soil, but also help to break up the soil with their larger root systems assisting the process of aeration.(13) Unfortunately so little has been done to examine the effects of native systems of intercropping. An experiment undertaken in the Lower River District was reported in 1931.(14) Two half-acre plots of machewere and mapira were planted, the one native style with a plant spacing of 3 feet by 3 feet, the seed mixed before sowing and no subsequent thinning, the other with the crops alternating in lines 2 feet apart, and the machewere and mapila subsequently thinned to 6 inches and 1 foot between each plant respectively. The result was that the native style plot had over double the machewere yield of the other whilst mapira yields were about the same. Unfortunately the scale of the experiment was so small and the case so isolated. Many more experiments need to be done, and done on a sound basis. Some idea of the difficulties and of the somewhat haphazard nature of some of the ~~following~~ experiments undertaken may be gathered from the following reference to the Nkadana Demonstration Plot, Port Herald District:

"....was opened during 1937 and the first crops were taken off this year (1938). The highest yields of cotton (920 lbs. per acre) came off the plot of mixed machewere (Pennisetum typhoideum) and cotton, the lowest (384 and 392 lbs. per acre) from another plot of cotton interplanted with machewere and from maize and cotton interplanted. Plots of pure stand cotton gave 756 and 582 lbs. of seed cotton per acre./

FIGURE 19.

Times of planting and harvesting

MPHALA

	Plant	Harvest
Machewere	November - December	March - April
Mapira	November - December	May - July
Maize	November - December	April - May
Cotton	January - February	July - October
Groundnuts	December - January	April - June
Mayere	November - December	April - June
Cassava	November - December	July
Beans	November - December	March - April

DIMBA

Rice	February - March	June - July
Batata, Maize, Sugar	June - August	October - December

Occasionally sand is mixed with dambo soils for the planting of maize.

Variation occurs within the months given from year to year and also areally, e.g. mphala harvests are later at Port Herald than at Chiromo although planting occurs at the same time.

acre. Unfortunately all grain yields were hopelessly muddled by the capitaos (native assistants) in charge. The figures in any case mean very little, but show that very much higher yields are obtained on the plot than on surrounding gardens". (15)

The question of intercropping is related not only to yield, but to the matter of times of planting and harvesting. A table of times of planting and harvesting in the Lower River District is appended (figure 19). For its appreciation it should be realised that the rainy season is divided into two portions - the early rains or kokalupoya beginning in November or December and the late rains in January or February finishing usually about April. Machewere and mapira by being planted together produce a protracted harvest season from the same land by their ripening at different times. The two crops, since differing in height at the time of the first harvest, may be gathered separately, the work of pounding the grain into flour is extended and therefore not so intensified as would otherwise have been the case, and the period needing grain storage is shortened. Beans or Cassava may be imterplanted with mayere and again the result is harvesting at different periods, besides, as in the case of mapira and machewere, different reactions on the part of each type of plant to different rainfall totals, and therefore some safeguard against the variations in rainfall experienced - a problem which will be discussed in the next chapter. In spite of efforts to encourage the planting of cotton alone on the part of the Department of Agriculture, it is usually intercropped as a safeguard against the dangers of

monoculture./

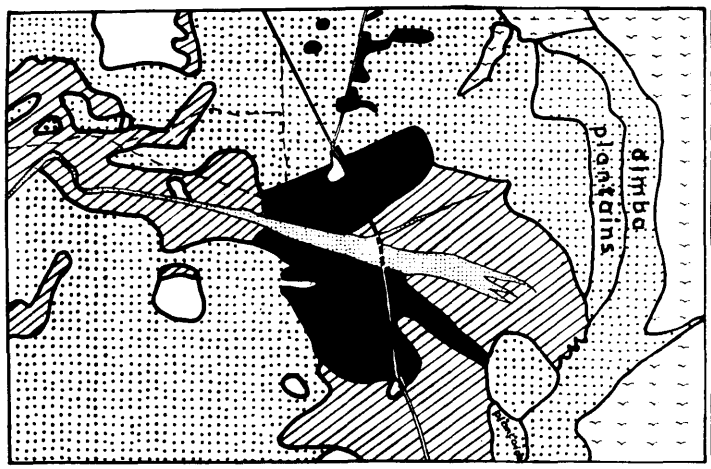
monoculture and in order to reduce effort by combining the weeding of a cash crop with that of food plants. Cotton is occasionally interplanted with short term pulses or groundnuts, but more usually with millets, particularly mapira, and above all with maize. Investigation between 1940 and 1944 showed that 37.7% of maize gardens and 14.7% of millet gardens were intercropped with cotton.(16) As the average size of a maize garden is approximately 2.4 times that of a mapira garden and 1.6 times that of a machewere garden, the area of maize combined with cotton was approximately 6 times that of millets and cotton combined. The statistical survey of intercropping therefore supports the deductions already drawn from the examination of field sizes. Figure 19 shows that maize is usually planted with the first rains in November. The rows of maize are approximately 3 feet apart and cotton is planted in between with the second rains in February or late January. The preparation of the ground for cotton weeds the maize crop, and weeding then follows for the combined crops until April or May when the maize is harvested and the stalks laid down between the cotton rows to form a mulch. Cotton is then picked over a period lasting generally from July to October, but varying in length and incidence according to the weather conditions of the season and the attacks of pests. In a number of field experiments it has been shown that maize affects cotton adversely when interplanted by robbing the latter of essential moisture supplies.(17) Unfortunately no attempt was made to show the comparative value per acre of the two crops - pure stand cotton and mixed maize

../

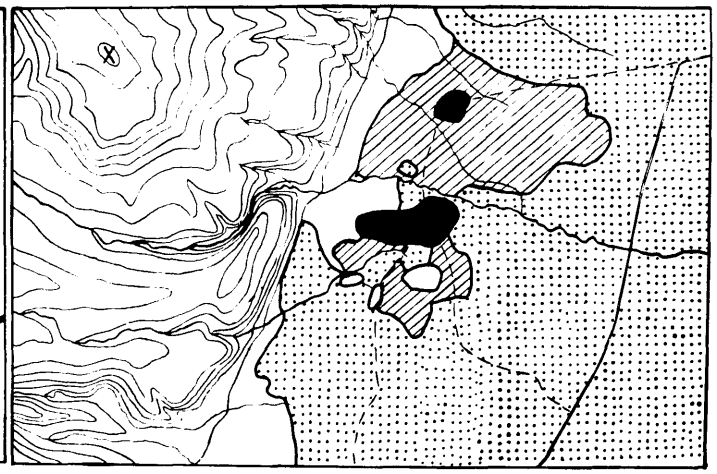
and cotton - and that must be the most important assessment from the viewpoint of the agriculturalist. The experiments showed, incidentally, a relationship between planting dates and returns significant for a mixed crop, for the earlier maize was planted, the higher was the yield of cotton. It is important to note that mphala land under cotton has a much shorter dry season rest period than under any other way crop. On occasions it has virtually no rest at all. This question deserves attention from agricultural research workers. So far it has had no investigation. In connection with dry season fallowing it may be noted that it is a common practice to leave the stubble on the ground for some time after the harvest before burning. The effect is to reduce the rate of erosion by wind and by dry season showers and possibly to reduce the rate of evaporation from the soil, although again as in so many other cases data are lacking. What burning there is under this fixed system is on nothing like to scale of that under shifting cultivation and therefore cannot obtain such beneficial effects. Local supplies of brushwood to add to the process are insufficient for a comparable result. With regard to flood land cropping rice is planted earliest since requiring standing water - there is no bunding of gardens to make small flooded basins as in Oriental practice. As the water retreats so the gardening follows. Maize and batatas take the place of rice in June and are planted at progressively lower levels as the water recedes until about the end of August. Harvesting of these crops lasts until about December. Thus a typical

year/

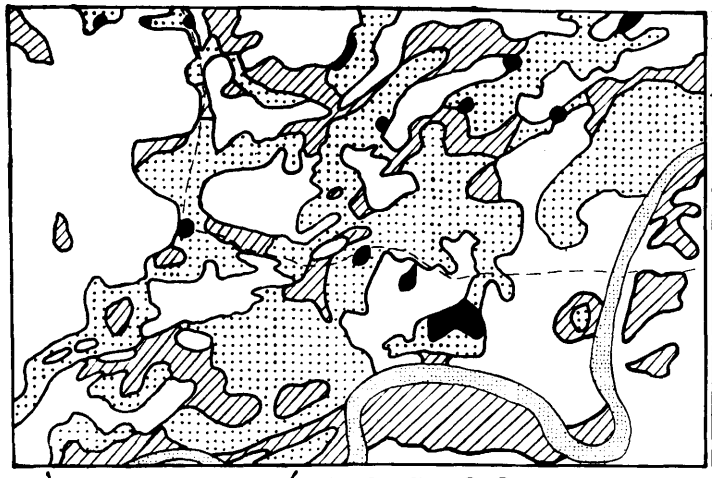
FIGURE 20
SAMPLES OF AGRICULTURAL PATTERN



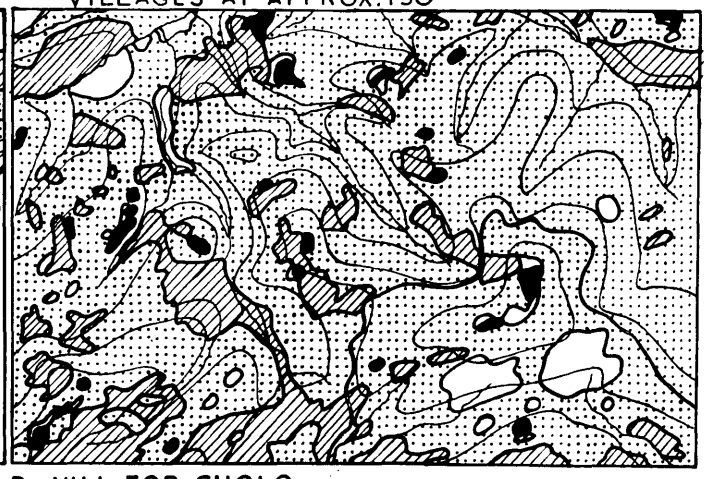
A. MPHALA-DIMBA, NDAMERA



B. HILL FOOT, NEAR PORT HERALD
HIGHEST POINT X AT APPROX. 1550′
VILLAGES AT APPROX. 150′



C. 'PIONEER FRINGE', LOWER TANGADSI



D. HILL TOP, CHOLO

CULTIVATED LAND
SCRUB
WOODLAND
SALINE GRASSLAND
MARSH
RIVER SANDS (DRY SEASON)

FORM LINES AT 100′ INTERVALS

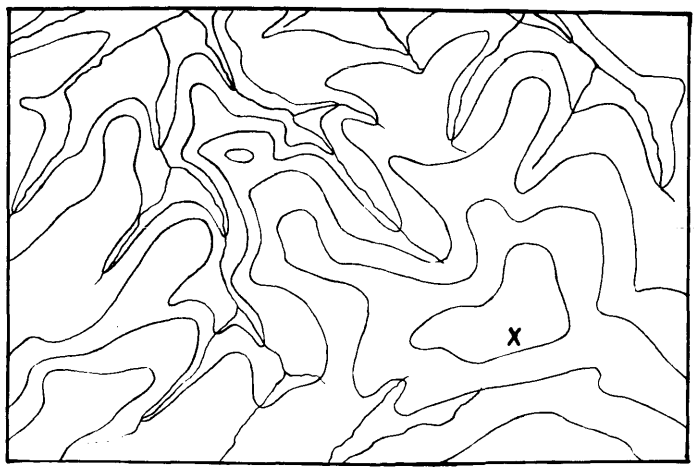
VILLAGE AREA

EARTH ROAD — CHIEF PATHS (OMITTED FROM D)

SCALE OF MILES

0 1/4 1/2 3/4 1

N



RELIEF & DRAINAGE OF FIG. D
HIGHEST POINT X AT APPROX. 3500′

year for a valley cultivator might be as follows:

November: First rains; plant machewere/mapira gardens and harvest last maize and batata crops from dimbas.

December: Plant maize and weed gardens planted. Plant pulse and mayere garden.

January: Second rains. Interplant cotton with maize.

February) March) Weeding. Period of shortage of fresh foods. Plant rice in dimba.

April: End of rains. Harvest machewere and pulses.

May: Harvest mapira, maize and mayere.

June: Harvest rice and plant maize and batata in dimba.

July: Cut down crop remains in mphala gardens and heap in rows. Pick plantains and papayas.

August: First cotton picking. Burn stubble of machewere/mapira gardens. Pick plantains and papayas.

September: Hoe machewere/mapira gardens.

October: Possibly second cotton picking. Clear cotton gardens and burn. Hoe before rains. Gather dimba crops.

It will be seen that there are two periods without harvest excluding fruit. That from July to September is the shorter, and follows the mphala or main harvest. It is not therefore a period of so great scarcity as February and March.

The adaptation of the soil seclection system to local variations in the environment has resulted in the development of 7 types of agricultural system. A diagram of 4 of these has been prepared (figure 20) from aerial photographs of areas visited by the author. The figures are not claimed to be any more than an approximation to the truth. The photographs were taken in June, July and August - the middle of the dry season - when the condition of mphala gardens includes:

bare/

bare earth on land hoed by those making an early start on dry season work, ash covered earth on land burned but not hoed, earth covered with the litter of the previous crop, earth covered not only with litter but with weeds which can grow profusely in the dry season with the support of light showers, making such gardens difficult and in many cases impossible to distinguish from land under fallow the previous wet season, earth still under cotton. The systems include the mphala - dimba type (A) on the fringe of the Shire marshes with the village sited on the highest ground locally, e.g. alluvial fan, levée or terrace and with both mphala gardens and dimba lying close at hand occasionally supplemented by dimba patches on islands in the marsh. In the figure it is to be noted how the scrubland, consisting of a secondary cover of medium height grass, thorns and small bushes, follows the banks of the tributary stream, the Nyamadzere, being confined mainly to coarse gravels. In most cases this scrub does not mark fallow, but land regularly cut over for wood, lashings or thatch. The strip of saline grassland lying adjacent to the marshes is here broken by an alluvial fan with dimba at its lower extremity, followed by a mixture of mphala gardens and plantains at the "normal" flood limit and finally with scrub and village on the higher gravels. The village itself is very large, being the centre of a Native Authority. Associated with the mphala-dimba form is the purely dimba type, a seasonal practice in temporary huts on dry season islands in the marshes, particularly in the

Elephant/

Elephant Marsh near Chiromo. This appears to be due to local overcrowding on mphala land relieved by the extra work involved in yearly movements and house construction in order to make the maximum use of available land. These dimba agriculturalists crop higher floodland acreages than normal in order to provide a dry season surplus exchangeable for a share of a relative's mphala crop. During the wet season they have the advantage of being able to offer their labour to Europeans at a time of labour scarcity. A development of the mphala-dimba type is found on islands in the Ndindi Marsh, south of Port Herald, and in a few places in the Elephant Marsh where only minute quantities of mphala land are available - too small to be marked on figure 8 - and where the main support is derived from dimba gardening plus fishing. A further variation lies in the hill foot village type (B) where mphala land lies adjacent to the village sited close to water on well drained fan gravels, but without local dimba. Again scrub and forest reach their greatest extent on the uncultivable gravels - the portion of the Port Herald Hills depicted is a forest reserve. The hill foot villagers are kin to people living adjacent to the marshes and have dimba amongst those of the latter. Such settlement may possibly be a development subsequent to the mphala - dimba type due to the need to use all possible land. The type in Ngabu N.A. is similar in that the villages are situated at some distance from their nearest dambo, although since there is a lesser density here of marsh fringing settlement practically all dimba belong to

Ngabu. In the Tangadzi Basin a few villages are without dimba and eke out a poor existence on extremely light soils (C). Such settlements as these and other small villages on badly watered and well wooded land south of the Mwanza constitute a "pioneer fringe", forced back to the assistance of their relatives in better situations during times of scarcity. Immediately south of the Tangadzi some of the land is so poor that a supplement has to be provided by cultivating land 7 miles to the north. A point to note in the figure is the manner in which many of the villages are closely surrounded by forest to screen them from the view of passers-by. In the hills the pattern of settlement on shelves and round valley heads has already had comment (pp. 24-25). The arrangement of cultivated land in the shelf type is linear being limited by the steepness of the gradient immediately above and below it. The hill top type of Cholo District (D) generally has mphala land limited to summits or gentler slopes with dimba in the valley bottoms - the latter on too small a scale for separate distinction. The pattern of small villages with a patch work of scrub, woodland and cultivated land resembles that of the"pioneer fringe" type being limited in both cases by the patchy distribution of better land and unable to cultivate over a continuous area.

Thus discussion of agricultural method has returned to the question of settlement pattern with which it is inevitably linked. Now that both matters have been examined it is possible to review their basis - the physical resources of the region - and in this review to examine the limitations of these

resources on development under the present technique.

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(1) J.S.J. McColl, Ploughing and soil cultivation in Nyasaland, Report of the Department of Agriculture, No. 3, Nyasaland Government (1912).

(2) Lord Hailey, An African Survey, second edition (1945)p.1.

(3) Soil and tobacco survey of Nyasaland, Report of the Department of Agriculture, No. 5, Nyasaland Gov. (1923).

(4) ibid.

(5) W. Allan, Studies in African Land Usage in Northern Rhodesia, Rhodes-Livingstone Papers, No, 15 (1949) p. 15.

(6) J.S.J. McColl, Notes on cotton cultivation in Nyasaland, Report of the Agriculture and Forestry Department, No.4, Nyasaland Government (1909).

(7) J.S.J. McColl, The ground-nut, Report of the Department of Agriculture, No. 4, Nyasaland Government (1915).

(8) For further information on soil and grass names see A.W. R. Duly, The Lower Shire District, Nyasaland Journal, Vol. I, 2, July 1948, pp. 11 - 44.

(9) Dr. P. Vageler, An introduction to tropical soils, translated by Dr. H. Greene (1933) p. 30.

(10) See An Introduction to tropical soils, pp. 129-32.

(11) Annual Report of the Department of Agriculture for 1938, Nyasaland Government, p. 52.

(12) Colonial Reports, Nyasaland (1949) p. 30.

(13) For discussion on this subject see H.H. Mann, Report on tea cultivation and its development in Nyasaland, Nyasaland Government (1933) pp. 4 and 10.

(14) Annual report of the Department of Agriculture for 1931, Nyasaland Government, p. 25.

(15) Annual report of the Department of Agriculture for 1938, p. 60.

(16) E.O. Pearson and B.L. Mitchell, A report on the status and control of insect-pests of cotton in the Lower River Districts of Nyasaland, Nyasaland Government (1945) pp. 38 - 39.

(17) ibid. p, 39.

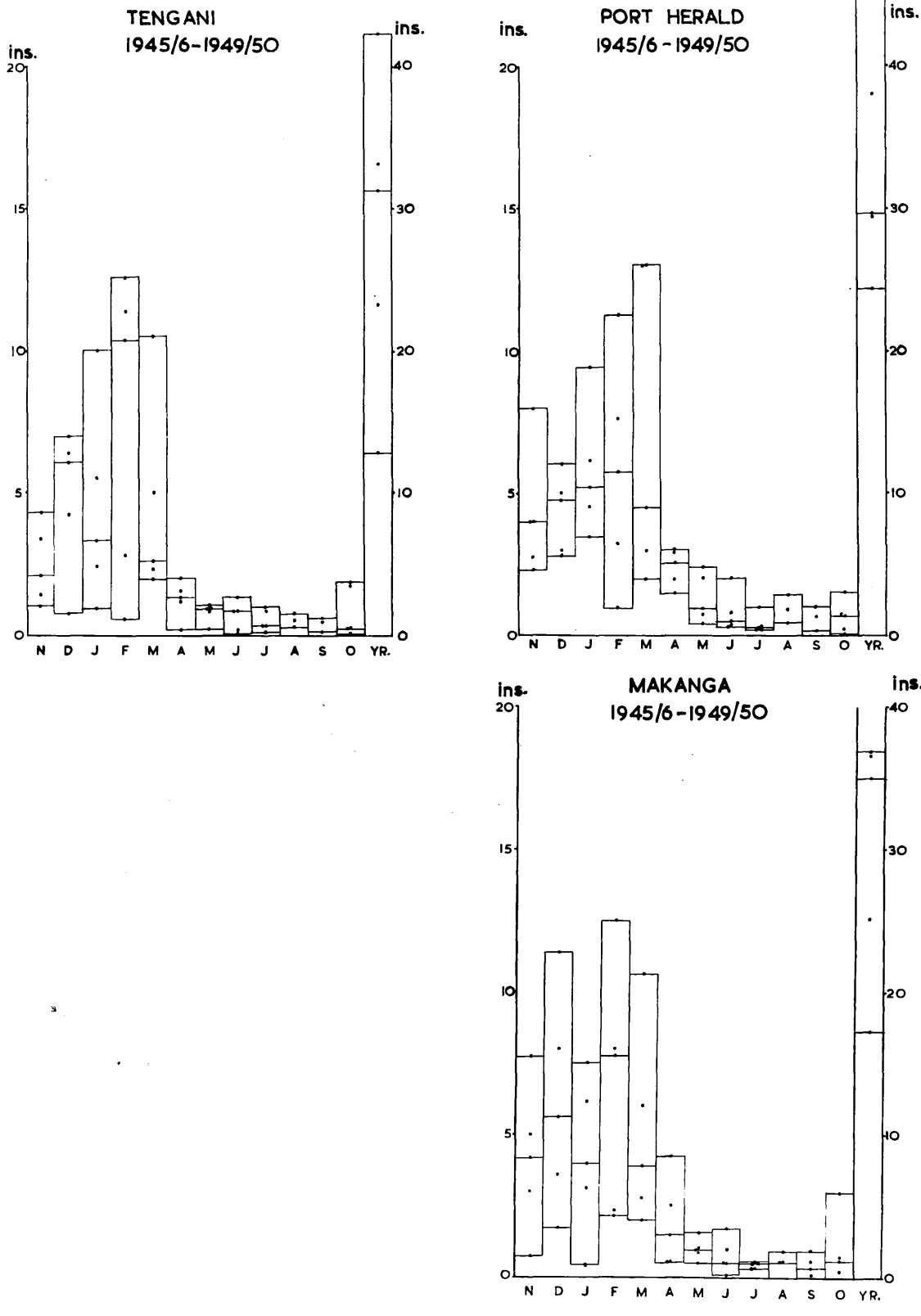
IV. PHYSICAL RESOURCES - THE BASIS AND LIMITS OF DEVELOPMENT.

It would be unwise to describe the physical resources of Central Africa as poor, for all appreciation of such resources must be related to the techniques available, and a revolution in technique may well produce a revolution ~~with~~ in appreciation. At present the results are poor enough when compared with those of Western Europe. The African hut is a miserable structure. The diet is monotonous and with too high a proportion of carbohydrates due to the emphasis on maize and millets. Yet even this present standard of living is insecure and threatened not only by the agricultural difficulties to which attention has already been drawn, but by the fact that certain elements of the physical environment are not static but constantly changing and with rates of change difficnlt to estimate. Of these perhaps rainfall is the most vital. Its necessity for raising mphala or mtunda crops combined with its varying quantity underlines the importance in native society of thw witch-doctor as the rain-maker or prophet of rains, and in the Lower Shire Valley gives point to the worship of Mbona, the rain spirit.

Monthly totals of precipitation in the Lower Shire Valley for the three stations of Makanga, Tengani and Port Herald are available on a comparative basis only for the period 1944/45 - 1949/50 (See Appendix C). These figures have been shown by means of a dispersion diagram (figure 21). The plotting of inter-quartile ranges was clearly impossible and instead the absolute ranges for the period have been indicated. The

FIGURE 21

MONTHLY PRECIPITATION FOR 5 YEARS



medians for Tengani and Makanga show well the first and second rains and the comparative dryness of the "dry" season. At Port Herald the tendency to a divided rainy season is not apparent, although the dry season is well marked. What is apparent at all three stations is the great range over the five year period of monthly and yearly rainfall totals. With only five years of annual totals available relative variability has been calculated by the formula:

$$V_r = 100\frac{(AV)}{\bar{p}}$$

$$\text{where} \quad (AV) = \frac{1}{n} \sum (p_i - \bar{p})$$

when p_i is the annual precipitation for a given year and $\bar{p}$ is the average annual precipitation.(1) The results are Makanga 23.9%, Tengani 29.3% and Port Herald 20.8% with ranges of 17.29 - 36.89 inches, 12.88 - 42.38 inches and 24.39 - 46.74 inches respectively. The means of 30.21, 28.60 and 33.66 inches respectively are all over the critical figure of 28 inches below which V_r is practically a constant making conclusions inaccurate and misleading(2). Thus over the five year period there has been a considerable fluctuation around very low means for agricultural purposes when one considers the high temperatures involved (figure 22). The resultant rates of evaporation cause serious loss which in years of low rainfall is commonly disastrous. Comparison with 23 years of rainfall figures ~~from~~ from the Réseau Mondial for Zomba in the Shire Highlands and for Salisbury on the neighbouring plateau of Southern Rhodesia suggests that the above relative variabilities are/

are high, for Zomba has only 18% and Salisbury 16.4%. However, rainfall conditions at both may well be different for neither show a tendency to double precipitation maxima, recording usually a single maximum in January. The mean precipitation of Zomba, the nearer of the two stations, is also much higher, being 52.5 inches. The problem of variability may be approached more satisfactorily by means of drought records. As early as 1859 the destruction of crops by drought in the Lower Shire Valley was noted - the advent of Livingstone's ship, the Ma Robert, being blamed by the Amang'anja.(3) In 1903, 1907 and 1911 drought brought a partial failure of crops in the Lower Shire (Port Herald) District, necessitating Government relief.(4) In the last instance it was commented at the time that in no other district of Nyasaland had the crops failed so completely as in the Lower Shire. In 1913 drought caused almost a total failure forcing the Government to import grain from Northern Nyasaland and German East Africa for distribution at Port Herald.(5) In this connection it should be noted that Northern Nyasaland has constantly produced a food surplus, even supplying the Moçambique Company's territories when they were suffering from drought in 1908.(6) In 1920 drought destroyed the European cotton crop in the Ndindi Marsh.(7) In 1932 a poor cotton crop in the valley was blamed on poor rains,(8) and five years later a shortage of rain was blamed for a shortage of food.(9) In 1945 75 tons of relief maize had to be imported into the district due to the partial failure of the crop.(10) Famine occurred again in April 1949 and relief maize had to be distributed in N.A. Tengani, in the country of the right bank/

bank opposite Chiromo (the "pioneer fringe" region), and in a few places south of Port Herald.[11] In 1951 Chief Tengani had to forbid the dry season sale of food due to the poverty of stocks after a poor growing season. Tengani's area appears to be the most badly affected by food shortages according to local agricultural officers.

Comment on areal contrast leads one to the differences between plain and hill conditions. Rainfall in Central Africa is mainly an orographic phenomenon as will be appreciated from the following normals (published by the Department of Agriculture in 1940):[12]

	Inches	
	Nov.1 - Apr.30	May 1 - Oct.31
Plain	6 wet months	6 dry months
Port Herald Experimental Station	28.8	3.2
Chikwawa	29.7	2.3
Cholo District (Southern Highlands)		
Cholo	48.8	8.1
Makwasa	46.8	4.4
Shire Highlands		
Blantyre	39.9	3.3
Zomba Experimental Station	46.8	4.6

The dry season differendes are not appreciable, but in the wet season the hills receive at least half as much rainfall again as the plains. The result agriculturally is that maize is even more important a cereal crop in the hills than it is on the plains, whilst millets are very little grown, their

place/

place being taken largely by cassava. The dry season precipitation is mostly insignificant for the mphala agriculturalist, except in so far as it softens the ground, making hoeing possible before the onset of the rains. It comes with the onset of the south-east airstream, usually in the form of a light drizzle which may last for periods of three days and is known in the Shire Highlands as a "Chiperoni", after Mount Chiperoni lying to the south-east. In the valley plain, short heavy downpours are occasionally produced as the result probably of overheating. The hot period towards the end of the dry season commonly produces cloudy conditions about mid-afternoon which serve in their turn to lessen the heat. The author himself has seen cloud forming over bush fires. The cloudiness resulting from the Chiperoni is valuable in Cholo District with its exceptional dry season rainfall of 8 inches, for cloudiness diminishes not only heat by day but cold by night and thus makes possible the growth of plantation tea in this district and neighbouring Mlanje alone in Nyasaland, although it must be admitted that there is an additional limitation of an international tea-growing restriction policy in force since 1934. A point of interest here is that dry season rainfall was significant for the growth of cotton during the dry season on the floodlands of the Ndindi Marsh. An increase in the total rainfall of the period May to August from 1.5 inches to 4 inches was found to be capable of doubling the yield.(13) Generally, therefore, one may draw a contrast in the wet season between the valley with less than

thirty/

Severe gullying in Chapananga N.A., Mwanza basin.

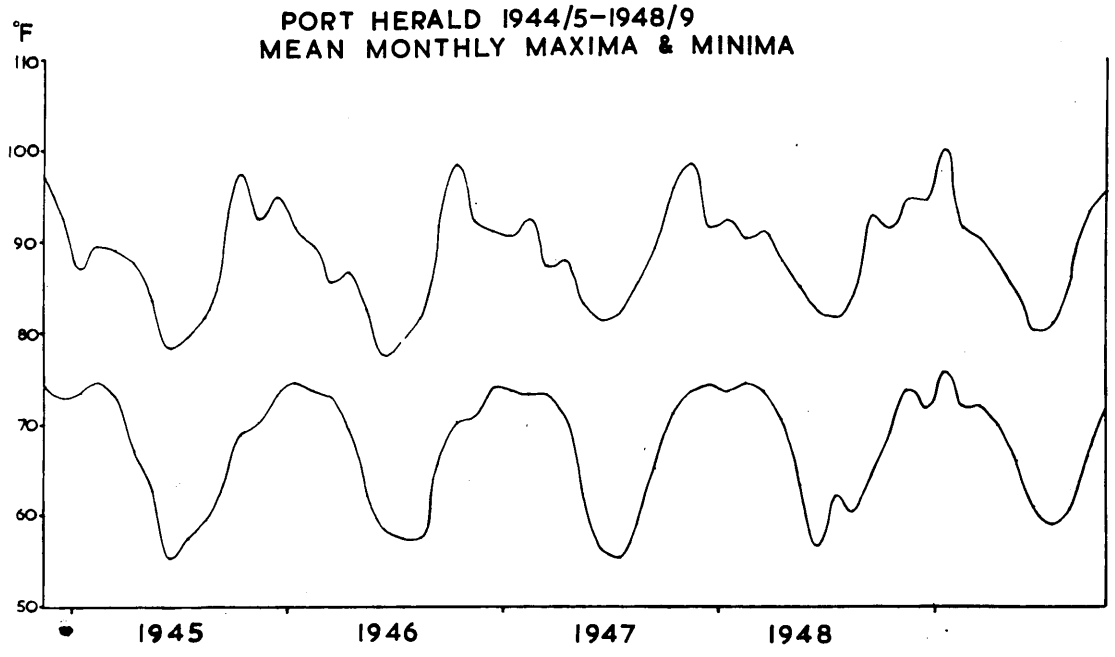
thirty inches, and lessening slightly downstream, and the hills with over 40 inches, and in the dry season of less than 2.5 inches round Chikwawa, increasing slightly downstream, and over 4 inches in the hills.

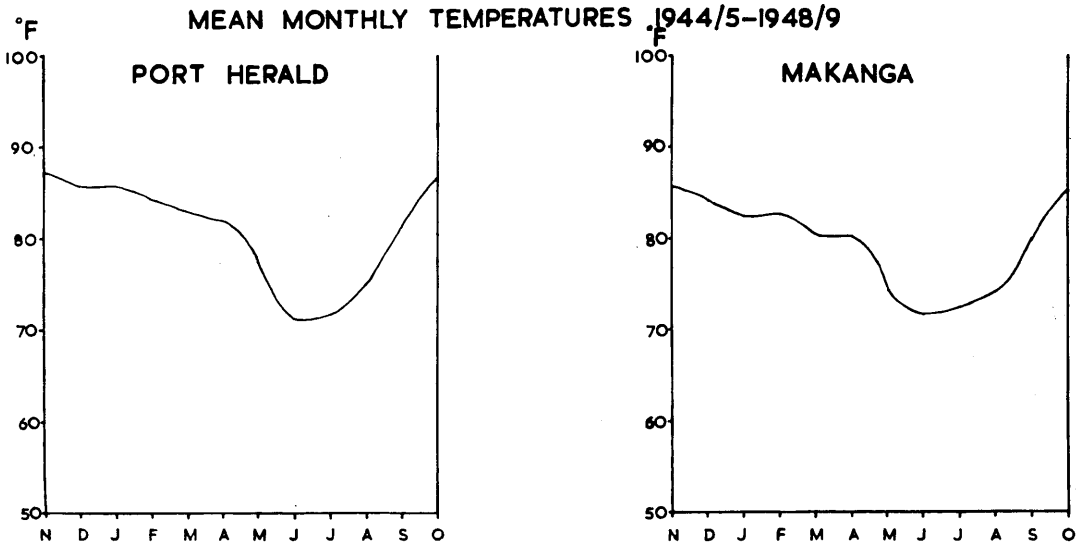
The intensity of precipitation is significant in the problem of soil erosion. Comparing normals of amounts per rainy day Zomba receives 40% between 0.5 and 1.0 inch and 26.6% at over 1.0 inch, whilst Greenwich for comparison has only 20% and 5% respectively.(14) On the 13th December, 1946, Zomba received 7.97 inches and 20.04 inches on the following day during exceptional meteorological conditions.(15) At Chididi Mission in the Port Herald Hills 7 inches once fell in 3 hours, whilst 0.53 inches fell at Port Herald. At Morrumbala Post in 1947, 36.5 inches fell on 113 rainy days with a maximum for one day of 1.94 inches on March 9th. For the period 1945-50 the mean of the maximum months as a percentage of the mean annual total gives Makanga 31.1%, Tengani 28.2%, and Port Herald 24.8% - a high concentration and increasing upstream. This concentration means that quite often livelihood depends on the precipitation of one or at most two months in the year, whilst mud structures and gutters are subjected to the severest tests in the clearance of storm waters. The Nyamadzere stream at Port Herald has been known quite often to change in less than 6 hours from a dry bed to a raging torrent of at least 4 feet in depth, whilst the Ruo has been known to rise 24 feet in a day, ponding back the Shire above Chiromo. Hence the significance

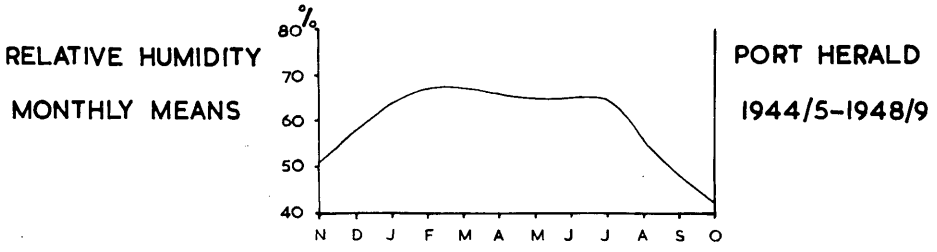
of/

FIGURE 22

AIR TEMPERATURE & RELATIVE HUMIDITY







of the hard, well-trodden native paths and squares, and of roadways in the formation of gullies. Hoed land is much more capable of absorbing the downpour though even here the loss of soil during heavy storms must be considerable, occurring in the valley plains chiefly by sheet wash from the hills. The policy of ridging is undoubtedly a great help in blocking the flow of storm waters, although one wonders whether it is sufficient during the heaviest, and therefore the most damaging, storms. Research into this problem also awaits attention.

With regard to temperatures it will be seen from figure 22 that there has been a fair regularity over the period 1944-49 at Port Herald, with the exception of some curious bends in the curves of maxima and minima in the 1948-49 period, probably due to greater incidence of cloudiness as evidenced by unusually high rainfall totals towards the end of the 1948 dry season. The range is least in the wet season and greatest at the commencement of the dry season when diurnal variations of over 30° are common. The rapid increase of temperature at Port Herald and Makanga at the end of the dry season should be noted. At this period over 100° at midday is the common experience in the valley plains whereas it is excpetional in the hills. It is this that makes it extremely difficult to persuade hill peoples to come down into the Lower Shire Valley even for only a short journey. Comparison of yearly means shows that Port Herald is 7.5°F. hotter than Zomba. On the other hand, the humidity is not excessive outside the marshes and quite a number of Europeans

in/

in the valley are content to stay there all the year round, although it must be admitted that most Europeans find the conditions at the end of the dry season and the beginning of the wet too uncomfortable to be tolerated. Brunt has analysed the effect of air temperatures and relative humidity on the human body.(16) Employing his graph of curves limiting the range of tolerable air conditions for various degrees of activity for the figures provided at Port Herald for the period 1944/45 - 1948/49 and assessing monthly mean temperatures against monthly means of relative humidity there is, if the wind is light, a strong risk of heat stroke for Europeans working out of doors from September to May, and for those merely resting outdoors from November to March. June, July and August are the only months without any risk by means. Taking monthly mean maxima as the temperature basis instead of monthly means there is some risk of heat stroke for Europeans working outdoors at all times of the year and for those merely resting outdoors from the period September to May. January is the worst month with conditions approaching closest to the bodily limits of loss of heat by evaporation when resting indoors. In the hills one comparatively adverse effect of the lower temperatures is that they retard the establishment of a secondary vegetation cover on abandoned land, leaving the gardens more open to heavy soil erosion than those of lower altitudes.(17) Frost has only been known once in the Lower Shire Valley within living memory, and on that occasion resulted in the destruction of the cotton crop. One myth that

deserves/

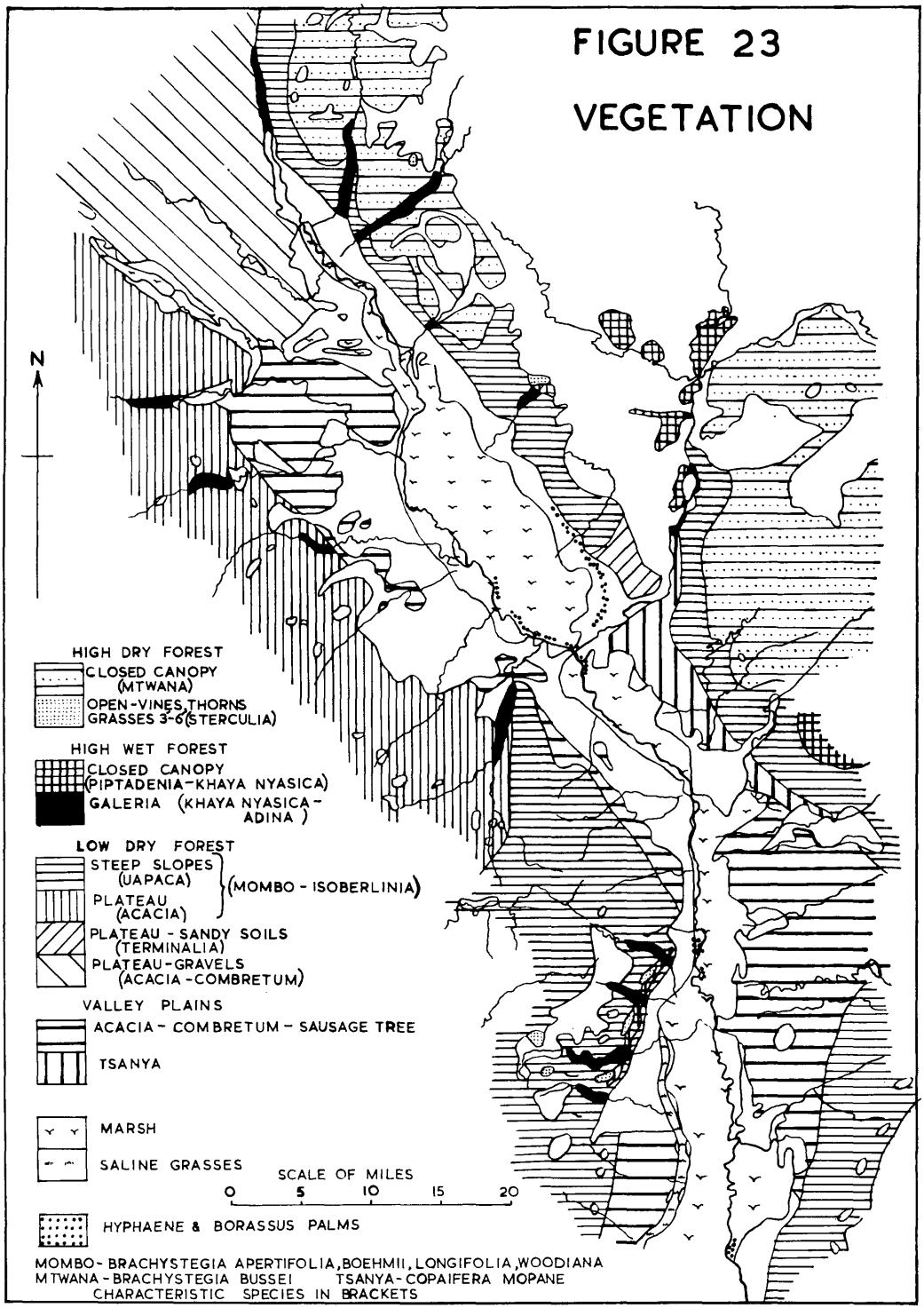


FIGURE 23
VEGETATION
N
HIGH DRY FOREST
CLOSED CANOPY (MTWANA)
OPEN-VINES, THORNS GRASSES 3-6 (STERCULIA)
HIGH WET FOREST
CLOSED CANOPY (PIPTADENIA-KHAYA NYASICA)
GALERIA (KHAYA NYASICA-ADINA)
LOW DRY FOREST
STEEP SLOPES (UAPACA)
PLATEAU (ACACIA)
(MOMBO - ISOBERLINIA)
PLATEAU - SANDY SOILS (TERMINALIA)
PLATEAU - GRAVELS (ACACIA - COMBRETUM)
VALLEY PLAINS
ACACIA - COMBRETUM - SAUSAGE TREE
TSANYA
MARSH
SALINE GRASSES
SCALE OF MILES
0 5 10 15 20
HYPHAENE & BORASSUS PALMS
MOMBO - BRACHYSTEGIA APERTIFOLIA, BOEHMII, LONGIFOLIA, WOODIANA
MTWANA - BRACHYSTEGIA BUSSEI TSANYA - COPAIFERA MOPANE
CHARACTERISTIC SPECIES IN BRACKETS

deserves squashing here is that Africans do not work in the heat of the mid-day sun. The author has seen both men and women hoeing their gardens throughout the mid-day period, which removes a second myth - that only the women work in the gardens.

From discussion of climatic conditions one may pass to the distribution of vegetation as an indicator of those conditions combined with factors of soil and drainage, and an important limiting element in the spread of agriculture. Figure 23 indicates the chief vegetation associations observed, based mainly on the classification system of Davy and Hoyle.(18) It will be seen that the region is dominated by two types of forest: (1) that of the plains, rich in species including the baobab, sterculia africana, acacias, borassus and hyphaene palms and kigelia aethiopica or sausage tree, (2) the dry hill type of the brachystegia (mombo or mtwana varieties) - uapaca (msuku) - isoberlinia (ntondo) association, including grass and thorns in the lower storey and subdivided into two types, one a poor thin forest (mombo) characteristic of gravels or highly leached soils, and the other a closed canopy forest (mtwana) with trees about 50 feet high on soils adequate for agriculture. The question of canopy is interesting with regard to interpretation of aerial photographs. The 1:50,000 maps based on aerial photography distinguish "thick forest" when they mean closed canopy - the point being that the density of trees in such forest is often no greater than in "medium and light forest" and often too the closed canopy type is easier to pass through owing to the suppression of undergrowth/

Well developed brachystegia (Mtwana) forest on the Massingire plateau near Morrumbala Post - July.

Poorly developed brachystegia (Mombo) forest on the Port Herald Hills near Lulwe - July.

undergrowth ~~of~~ in the lower storey. The second type of hill forest and the plains type except where it degenerates with very dry conditions have both been heavily attacked by the agriculturalists. It may be assumed that their existence is indicative to the native of land suitable for cultivation, and the same may be said of the piptadenia forest of Cholo district and of the valley bottoms, although this requires a greater effort in the clearing. In Nyasaland the land once under these types of forest now provides the basis of the soil selection system of agriculture whilst more impoverished forms, wherever agriculturally possible, are under the rotational bush fallow system. It is quite evident that if the native selection of forest types means anything then there is very little land suitable for peasant cultivation left in the British portion of the Lower Shire Valley. Those parts on the map which appear to be still available are in most cases ignored because of local difficulties in obtaining domestic supplies of water. It is noteworthy that timber on cultivated land has least density south of Port Herald where demand for land is greatest. In Morrumbala district of Portuguese Africa the rotational bush fallow system is seen to be practised in conditions similar to those of the soil selection area of Nyasaland. There is, therefore, in this area a reserve of the best quality land available in terms of the Nyasaland system, although it should be noticed that in the north a good inroad into this land has already been made. True jungle is impossible or extremely difficult to

clear/

Evergreen rainforest on the slopes of Morrumbala Mountain at about 1000 feet above sea-level. The pipe supplies fresh water to a plantation below the forest. July.

Galeria forest in the Domasi Valley near Zomba, at about 4000 feet above sea-level - September.

clear and is found only in the extreme south, on the western slopes of Morrumbala Mountain where it seems likely that unusually heavy rainfall is experienced. Throughout the lands under forest there is a considerable amount of scrub, consisting of thorns, medium height grass (3 feet to 6 feet) and small bushes; generally a secondary cover and marking either fallow or areas cut over for wood supply. The scattered and generally small scale nature of many of these patches rendered them impossible to include them in the general map. Their association with the system of fixed agriculture is illustrated in figure 20. With regard to the use made of trees, the brachystegia varieties are valued for their bark formerly used to make bark cloth and still employed for lashings in hut construction. The demand for the latter in forest composed of a mixture of uapaca and brachystegia species has tended to result in an increase of the uapaca at the expense of the associated tree.(19) Two species known in the Lower River District as mpondo and mtandu but otherwise unidentified(20) plus a third, njale or fever tree, are used for canoe construction. Mbawa (mahogany) and mangale (a variety of combretum) are valuable hardwoods used to make ornaments for sale to Europeans. The mwabvi tree which grows along stream banks provides a poison for ritual. Other hardwoods confined chiefly to stream banks include mbila (a variety of pterocarpus), mpingo or ebony (dalbergia melanoxylon), and napine (terminalia sericea). Of the exotics, the cassia is commonly planted round villages to form a windbreak and provide

firewood/

firewood, the eucalyptus has been planted in the highlands chiefly for the manufacture of tobacco hogsheads, the blue gum has also been planted in the hills to give a quick growing construction timber, and the kapok or wild cotton tree grows well in the valley, but has little commercial value. The blue gum, unfortunately, has a heavy transpiration rate which may assist in lowering the water table. A point of interest is that the tendency to form permanent villages, encouraging the use of brick for building purposes is leading to a heavy destruction of timber in order to provide fuel for brick manufacture. Forest has an additional value as a protection of head water areas from the affects of accelerated soil erosion resulting if man is allowed to destroy the natural vegetation cover. Clements has demonstrated that evaporation is lower in forests than in the open due to lower temperatures with shade, greater humidity of the air, and comparative lack of air flow - thus conserving moisture. (21) Experiments in the Shire Highlands over a period of 5 years showed:

> Allow the evaporation of water from soil in the open at 100 parts.
>
> Then the evaporation from forest soil without humus is 47 parts,
>
> And the evaporation from forest soil with humus is 22 parts.

Against this some allowance must be made for an estimated interception of 23% of precipitation by the canopy from which a

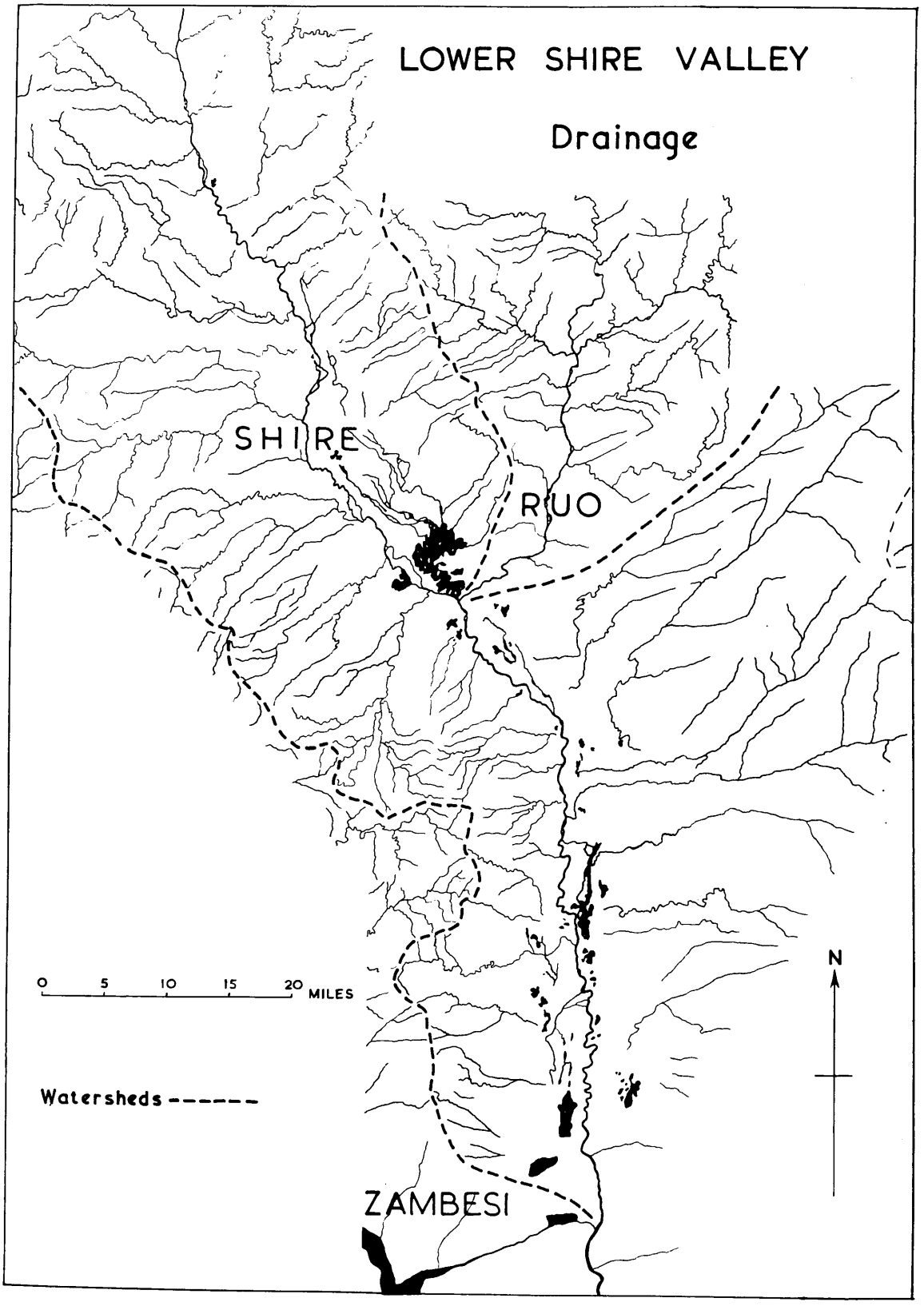
"considerable"/

"considerable" part evaporates. Accordingly, hill forests preserve moisture and with the "sponge effect" of their root systems help to even the flow of water, thus minimising both floods and droughts. The forest reserve of the Port Herald Hills, therefore, is valuable as a factor against erosion, both on the hills and in the plains since it controls the headwaters of streams tributary to the Shire and the general downhill flow of moisture. A point to note is that only in closed canopy forest is grass suppressed, but that grassland occurs alone only in badly drained or thin soiled areas or in places just recovering from the activities of fire agriculturalists.

The question of drainage and flooding is all important to the African agriculturalist in view of the need for dry season crops raised on floodland. Study of this question in the Lower Shire Valley brings back once more the problem of variation noted already as the most important characteristic of precipitation. Drainage depends largely on rainfall and one might therefore expect the streams of the region to exhibit the variations of the rainfall peculiar to the areas from which the streams are derived. Of the tributaries of the Shire this is certainly true. The left bank streams drawn from areas of higher rainfall than those of the right bank flow more strongly and more constantly. All streams exhibit régimes consisting of peak flows immediately after the heaviest rains. During the dry season from at least part of their course water is absent. The Ruo is an exception,

having/

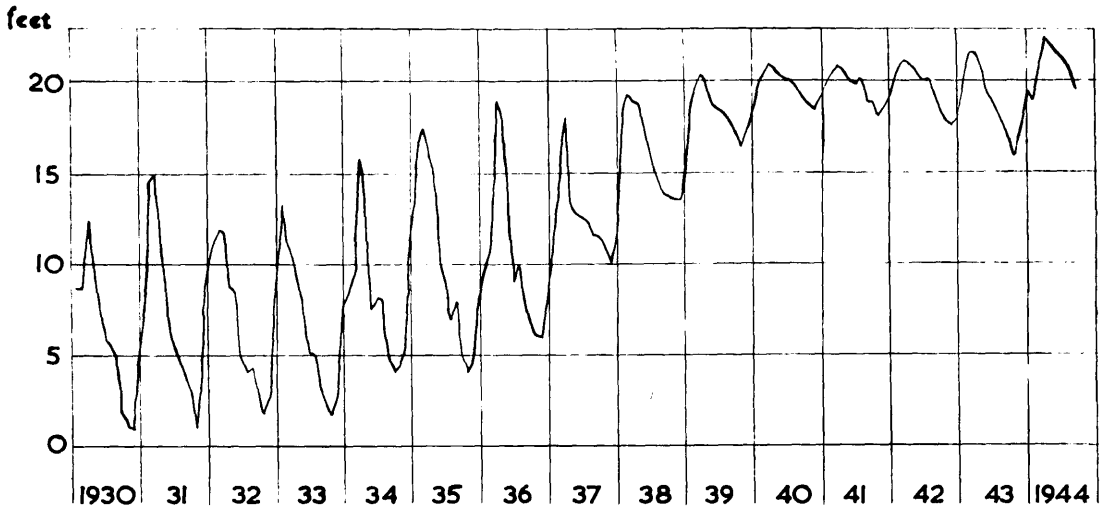
FIGURE 24


LOWER SHIRE VALLEY
Drainage
SHIRE
RUO
ZAMBESI
0 5 10 15 20 MILES
Watersheds ------
N

having a far larger drainage basin than the rest (figure 24) and drawing the bulk of its water from the great mountain mass of Mlanje which has rainfall throughout the year, although the maxima still occur in December and February. The peak of the Ruo's flow is generally in late March or April, although flooding often takes place in the lower reaches in February due to ponding back by a rise in the Shire. Amidst the variety of flows to be expected under so uncertain a rainfall the Shire provides the most variable flow of all. As the District Books of Chiromo record, the river may change from a series of pools a few inches deep, as in the dry season of 1903, to a depth of 10 feet at a speed of 3 knots as in February 1904. The Shire is dependent not only on the régimes of its various tributaries and on the rainfall of its Lake Nyasa source, but on the changing height of a bar composed of sand and of what in the Nile valley would be called sudd (duckweed, reeds and papyrus) at the Fort Johnston outlet of the Lake. Some idea of the thickness of vegetable matter which accumulates at Fort Johnston and in the marshes may be gained from the fact that the commonest reed, mabonda, forms a mass so dense that it is possible to walk on it, thereby crossing creeks of a hundred yards or more in breadth without touching bottom. Every year the bar builds higher and the depth of the lake behind it is increased accordingly until at last - usually in a year of higher than normal rainfall - a heavy flow crosses the bar and removes it by erosion lowering the lake level, whereupon

the/

FIGURE 25
SHIRE RIVER LEVELS AT PORT HERALD
BASED ON MONTHLY MEANS



FROM F.E.KANTHACK, REPORT ON THE MEASURES TO PERMANENTLY STABILIZE THE WATER LEVEL OF LAKE NYASA (1948)

the whole process is repeated.(22) What this means to the régime of the Shire in the Lower Valley is shown by figure 25.(23) It will be seen that the Shire at Port Herald reaches its highest level in February or March and declines to a minimum in October or November before the first rains. This régime is true generally from Chikwawa to Port Herald. South of Port Herald in the Ndindi Marsh there are complications in local water levels with differences in height of the marsh water and of the river according to season so that certain channels, particularly those crossing the broad levée between the marsh and the Shire, flow in either direction, making the marsh lakes act as stabilising reservoirs. A ponding back effective as far as Port Herald is occasionally experienced due to early flooding of the Zambesi. If the Shire floods before the Zambesi the result is that the Ziwe Ziwe, ordinarily a distributary of the Zambesi, reverses its flow and becomes temporarily a distributary of the Shire.(24) The graph is in itself a sufficient indicator of the unreliability of the Shire from the viewpoint of the valley cultivator. Points to note are the increase in both maxima and minima between 1930 and 1944, the contrasts in the range between the maxima and minima, and the curious variations in the descending portions of the curve indicating minor sudden increases in water level - possibly due to local accumulations of sudd. What all these changes of level have meant to the valley's inhabitants may be indicated by a short historical survey. In 1903 the Shire at Chiromo was reduced to a few pools

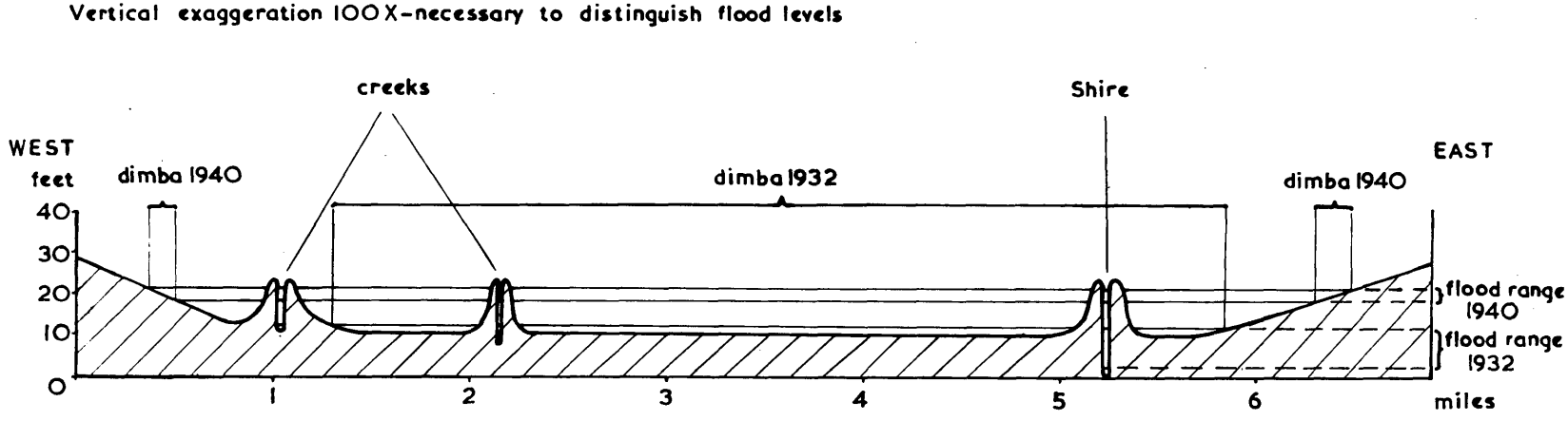
during/

during the dry season and the people were hoeing their gardens far out into the channel of the river.(25) After 1903, however, the river began gradually to rise, bringing a flood in 1914. By 1918 the wet season floods became serious, causing loss of life and crops in the Ndindi Marsh and again in 1920 - increased in severity in both cases by early flooding of the Zambesi.(26) By 1936, with a rise in the minimum levels of the river, an enormous loss of dimba gardens had occurred. The Agricultural Report for 1936 claimed a decline in dimba acreage of 41% compared with the previous year,(27) with a loss of up to 10,000 gardens. In 1937 heavy floods resulted in a 57% diminutionin dimba acreage.(28) The following year the natives of the flooded lands were exchanging fish for machewere from neighbouring areas,(29) and a tributary of the Shire, the Linjisi, burst its banks due to ponding back and destroyed part of the crops of Lundu district just north of Ngabu.(30) By 1939 it was computed that 120,000 acres of the best agricultural land in the Lower River area, formerly the source of the best quality cotton in the Protectorate, were now no longer cultivated due to flooding,(31) and the following year plans were made to encourage the growth of rice in partially flooded portions now unsuited to cotton.(32) Some settlement was forced off levées and islands in the Elephant Marsh to the hill margins. It is important to note that until 1938 the increase in maxima and minima of the Shire levels at Port Herald was due entirely to increase in flow from the catchment area south of Matope, at the point

where the Upper Shire leaves the floodplain south of Lake Nyasa, about 80 miles south of Fort Johnston for the rapids and falls of its middle course above Chikwawa. As Kanthack shows, the height ofthe lake level at Fort Johnston was maintained until 1940 when the bar was reduced and the channel of the Upper Shire cleared of practically all sudd, (33) thus raising the levels at Port Herald still further. Great islands of sudd came downstream causing many blockages with local flooding. The bar had given way slightly in 1938, producing a small drop in the Lake levels and coinciding in figure 25 with a shortening of the range of the Shire levels at Port Herald, accentuated with the complete breakage of the bar in 1940. One statement by Kanthack needs some correction, however, for he erroneously gives the impression that flood land cultivation ceased after 1938, whereas it (34) continued, but on a much reduced scale. He adds that the cropping period on seasonally flooded land coincided with a river guage reading at Port Herald of below 10 feet, and that since 1938 the level has been permanently above 10 feet, thus eliminating flood land cropping. Between the fringe of the marshes at their present dry season water level and the foot of the hills there is a gentle and fairly uniform gradient. Since there is still some considerable range between the highest and lowest levels of the Shire there is therefore still a considerable area of floodland for dimbas - the difference being that the high water mark has tended to move nearer the hills, i.e. dimba land has gained at the

expense/

FIGURE 26
SECTION ACROSS THE NDINDI MARSH LATITUDE OF NDAMERA



expense of mphala land. The loss of floodland acreage is partly the product of reduction in the range between level maxima and minima and partly due to the ending of uniformity of gradient at about the present dry season water level. Below this level is a series of "flats" forming a terrace now covered by marsh just above the bed of the Shire (figure 26), and once the chief site of cotton cultivation in the Lower River District. The upward movement of the levels of the Lower Shire has not yet ceased. In February 1952 the river burst its banks for over 100 miles, forming a lake up to 30 miles in width, rendering thousands homeless and destroying crops.(35) This flood, as those of 1918 and 1920, was rendered worse by ponding back from flooding of the Zambesi, which reaached the highest level ever recorded for the time of the year.(36) However, in spite of the damage caused, exceptionally high floods such as the last must be regarded as reliefs to the deterioration of soils caused by static methods of cultivation.

A final factor to be borne in mind when discussing limitations is that of disease. Malaria is endemic in the Lower Shire Valley, and the possibility of infection there is far greater than in the highlands as the pioneers of the colony and the builders of the railway found to their cost. The District Books of Chikwawa and Port Herald reveal the high mortality rate due to malaria, malarial fever and black-water fever before the introduction of modern forms of prophylactic quinine amongst Europeans entering or leaving the Protectorate by the Shire route. In the period 1906-1907,

of 23 male deaths in the Protectorate, 14 were in the Lower Shire Valley on railway construction and 5 were in the low altitudes of the tributary Luchenza valley. Of the 23, 4 were cases of malaria, 2 of malarial fever, and 5 of blackwater fever.(37) Whilst malarial parasite carrying mosquitoes are only an evening feature of the Shire Highlands, Port Herald Hills and Massingire Plateau and then mainly in the wet season, in the valley they are common throughout both day and evening in wet and dry seasons. The result must inevitably be a greater lowering of the vitality of the people of the valley compared with that of the people of the highlands. Bilharzia, yellow fever, hookworm and yaws are also of common occurrence throughout the area studied, together with a few cases of leprosy. With regard to the first, the native habit of drinking almost any water without preliminary treatment should be noted. Malnutrition, unhealthy living conditions and the poverty of the medical facilities available all mean lower standards of health with lowered energy compared with the standards of Europeans, and a heavy infantile mortality rate. Attempts to improve health and thereby increase the span of life and the chances of survival must face the problem of thereby increasing the population density. Methods of increasing productivity must be a first consideration in order to absorb the greater numbers resulting from such attempts. There is not only the question of disease amongst human beings to consider, but that amongst animals and plants as well. There are several belts of

tsetse fly in the region and in 1929 trypanosomiasis broke out amongst cattle at Chiromo and just north of Port Herald.(38) By 1933 all cattle in the district were infected. The Veterinary Department has succeeded in reducing mortality amongst cattle in recent years by inoculation, but at present the method is not fully understood since some of the cattle treated have died as a result. Cattle are also weakened by the attacks of tick, and it is not an uncommon sight to see the white tick birds accompanying a herd in search of the parasite. Sheep and pigs similarly are usually infested with worms. Plants are beset by such diseases as smut (mapira) and rosette (groundnuts), and pests including borer (maize), long-headed grasshopper (rice and mapira), variegated grass-hopper (cassava), sucking beetles (beans), jassid, stainer and bollworm (cotton), and by the ravages of baboons and to a lesser extent hippopotamuses. The work of Pearson and Mitchell (39) has shown that bollworm infestation is the major limiting factor in cotton production in the Lower River District since it reduces yield by 50% or more. The destruction of gardens by hippopotamuses is not serious since it is confined to river banks, and the animals are so few in number due to their reduction by European sportsmen. The baboon, on the other hand, is a very destructive pest and in the last few years has been increasing in numbers owing to the shootimg of his chief enemy, the leopard, by Government hunters, in order to reduce the latter's attacks on human beings and fowls. The result has been the appoint-

-ment of/

of a government hunter to cut down the number of baboons. Incidentally, a common sight in the gardens is a hut on stilts occupied by small boys attempting to scare away pests. Shooting has likewise reduced crocodiles to only small numbers, although certain of the riverside villagers so fear them that they still prefer to draw their water from wells rather than from the Shire. Snakes are not common, but include the highly dangerous black-necked spitting cobra.

From the above account of the physical limitations of the region it is clear that the expansion of agriculture in its present terms is quite impossible in the British sphere. Indeed the present producing area is itself already beset by problems and difficulties of great variety. The possibility of changing the agricultural terms will be examined in the final chapter. At present the task remains of reviewing activities other than agriculture which may offer means of development.

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(1) V. Conrad & L.W. Pollak, Methods in Climatology, second edition (1950), p. 54.

(2) Ibid, pp. 55-56.

(3) R. Coupland, Kirk on the Zambesi (1928), p. 139.

(4) Report on the trade and general condition of the British Central Africa Protectorate for 1903-04, Cd.2242,

Colonial Annual Report, Nyasaland, 1907-08, No. 574, Cd. 3729 - 28.

C.A.R. Nyasaland, 1911-12, No. 732, Cd. 6007 - 32.

(5) C.A.R. Nyasaland, 1912-13, No. 772, Cd. 7050 - 13.

(6)/

(6) C.A.R. Nyasaland, 1908-09, No. 619, Cd. 448 - 28.

(7) Nyasaland Handbook for 1922, p. 69.

(8) Annual Report of the Department of Agriculture for 1932, Nyasaland Government, p. 16.

(9) Annual Report of the Department of Agriculture for 1937, p. 44.

(10) District Books (unpublished) Port Herald.

(11) Report of the District Agricultural Officer, Port Herald for 1949 - 50 (unpublished).

(12) Annual Report of the Department of Agriculture for 1940.

(13) E.O. Pearson & B.L. Mitchell, a report on the status and control of insect-pests of cotton in the Lower River Districts of Nyasaland, Nyasaland Government (1945) p. 5.

(14) A.J.W. Hornby, Studies on three important soil series of Nyasaland, Department of Agriculture, Nyasaland Government (1930) p. 5.

(15) A.C. Talbot Edwards, The Zomba Flood, December 1946, Nyasaland Journal, Vol. I, 2, July 1948, pp. 53-63.

(16) D. Brunt, Some physical aspects of the heat balance of the human body, Proceedings of the Physical Society, 59, (1949) pp. 713 - 726.

(17) A.J.W. Hornby, The Destruction of vegetation and its relation to climate, water supply and soil fertility, Part III, Bulletin No. 1 of the Department of Agriculture, Nyasaland Government (1924).

(18) J. Burtt Davy & A.C. Hoyle, Check lists of the forest trees and shrubs of the British Empire, No. 2, Nyasaland Protectorate, Imperial Forestry Institute in collaboration with the Forestry Department of Nyasaland (1936).

(19) Ibid. pp. 16 - 17.

(20) District Books (unpublished) Chikwawa.

(21) J.B. Clements, The Destruction of vegetation and its relation to climate, water supply and soil fertility, Department of Agriculture, Nyasaland, Bulletin No. 1, Part II, (1924).

(22)/

(22) For detailed information on the Fort Johnston bar and the process determining the régime of the Shire see:

Sir Alfred Sharpe, Transport on the River Shire, Nyasaland, Geographical Journal, Vol. 87, Jan. - June 1936, p. 142.

F. Debenham, Report on the water-resources of Central Africa, Nyasaland (1948) pp. 55 - 64.

(23) Graph taken from a diagram comparing water levels on Lake Nyasa at Fort Johnston and on the Shire River at Port Herald in F.E. Kanthack, Report on the measures to be taken to permanently stabilize the water level of Lake Nyasa, Nyasaland Government (1948).

(24) Transport on the River Shire, p. 144.

(25) A. Werner, The Native Races of the British Empire, British Central Africa (1906) p. 5.

(26) Handbook of Nyasaland for 1922, pp. 67 - 69.

(27) Report of the Department of Agriculture for 1936, p. 35.

(28) ibid. for 1937.

(29) ibid. for 1938, p. 52.

(30) ibid. p. 53.

(31) ibid. for 1939, p. 5.

(32) ibid. for 1940, p. 12.

(33) Report on the measures to be taken to permanently stabilize the water level of Lake Nyasa, pp. 7 - 10 and graph end-paper.

(34) ibid. p. 22.

(35) The Times, 26th February, 1952.

(36) The Times, 1st March, 1952.

(37) C.A.R. British Central Africa, 1906-07, No. 537, Cd. 3729 - 1, p. 48.

(38) District Books, Port Herald.

(39) A report on the status and control of insect-pests of cotton in the Lower River Districts of Nyasaland.

V. OTHER MEANS OF DEVELOPMENT.

Agriculture is not the sole productive occupation of the area. Almost everyone has some alternative work for at least part of the year and in some cases to the complete exclusion of agriculture, although the latter remains for the majority the staple means of production. These other activities may provide work when there is comparatively little to do on the land, that is, particularly in February and March. When there is difficulty in growing cotton or producing a surplus of maize they may be a source of cash, not only for the purchase of such commodities as cloth or bicycles, but for the payment of taxes. In time of food shortage they may provide cash or commodities for exchange with the food crops of areas which have more than sufficient for their own needs. Finally, certain of these activities are essential for the provision of communally enjoyed services or to provide supplementary foods to break the monotony of the diet.

The keeping of cattle, sheep, pigs and fowl is an occupation of great importance for broadening the diet, and assists total productivity by using otherwise waste vegetable matter and land unsuited to crop raising. This activity is not an integral part of the agricultural system as it is in Western Europe. It bears only an indirect relationship to cultivation and for that reason has been treated separately in order to emphasise the distinction from European methods. Animal keeping in this area in fact is chiefly

Donkey well at Megaza in the Portuguese portion of the Shire plains.

Draught oxen at Megaza.

the result of European or Indian introduction of the beasts even in the cases where these happen to be native to Africa. Cattle-keeping is a very recent activity. Livingstone makes no mention of it in the Shire Valley.(1) Somewhere about 1910, the Zambezia Company was breeding Hereford and zebu crosses at Bompona on the island of Inhangoma, south of the Ziwe Ziwe, where trypanosomiasis did not at that time exist.(2) At about the same period the products of zebu crossed with native stock were introduced by plantation owners into the Lower River Districts from the Shire Highlands for draught purposes as well as milk and meat, and by the Missions into Cholo District and the Port Herald Hills. After 1918 Indian settlement in the region brought with it more zebu stock, whilst zebu crosses were imported by the Portuguese to the left bank of the Shire to act chiefly as draught animals, a function they still perform on the Megaza estate about 10 miles south of Port Herald, in company with the only donkeys in the region, used to draw well-water. European interest in settlement in the Lower River District declined and by 1931 the last cattle owner had left after disastrous losses from trypanosomiasis. Those cattle which were hardy enough to survive disease came into native hands, more cattle were introduced by natives returning from employment on estates in the Shire Highlands, and by 1944 there were 700 in Port Herald District,(3) increased to 1435 by 1951. Of this last increase many have been bought from Indian stock owners by former members of the King's African Rifles with their

Cattle on saline grassland fringing the Ndindi Marsh near Ndamera south of Port Herald. July.

demobilisation pay. The native interest in cattle keeping has been fostered mainly by the increasing consumption of tea in the British fashion with milk, and by Government propaganda to increase the consumption of milk by infants. In addition, a few have seen the advantage of using draught oxen wherever it has been unnecessary to cross a tsetse fly belt. However, the present total of cattle in the Lower River District is only 2761, or 1 to every 46 persons. At present, except for the few educated natives in the district, e.g. clerks and teachers, few of the native inhabitants understand the value of manure which to them is useful only as a fuel when wood is scarce. Attempts to encourage the employment of manure as a fertiliser or for the production of compost when mixed with vegetable refuse have invariably failed, although some manuring must result from the practice of allowing animals to wander amongst the stubble of the mphala gardens during the dry season. A difficulty in the encouragement of cattle keeping is the immense cost of the beasts to a people who find it difficult to amass any capital, coupled with the danger of loss by disease. There is the further factor of the difficulty of finding grazing land with the heavy demands of crop raising on the present acreage. The animals are confined during the wet season to mphala land where there is little fallow or waste ground left south of the Nkombedzi wa Fodya. In the dry season they have the stubble of the mphala gardens, a little mphala grass, drought-resisting but tough eating, and the grass of the saline flats

bordering/

bordering the Ndindi Marsh. The poverty of the grazing means that cattle and all the other animals are thin and scraggy beasts, and with a lack of fencing there is no control of breeding to improve the stock. Their milk yield is as poor as it possibly can be. At present, experiments are being made to discover good pasture grasses suited to local conditions. With the shortage of meat existing in the district, common to all agricultural areas of Central Africa, the slaughter of a cow or a bullock and the exposure of its carcase for sale in Port Herald or Chiromo markets is a major event, attended by all who can possibly get to the scene. The profit to be made by the sale of meat to a meat-hungry people, however, is offset by the smallness of the customer's purse, combined with the expense of employing herd boys in unfenced country, plus, in spite of the latter, continual payment for damage to crops and the cost of renting pasture land wherever such land is available. The sosts of meat production is this area outside possibly the alkaline flats are so high as considerably to restrict the market, i.e. if one excepts sale to Europeans, but this, to be on any large scale, means costly conveyance by rail to Blantyre and Limbe or to the Portuguese settlements on the Zambesi. What grass is available appears to be worsening in quality rather than improving, due to the custom of burning before the first rains in order to obtain young shoots for feeding, scanty after the dry season. Apparently the result is to exterminate the shallow rooting finer herbage leaving the tussock grasses dominant.(4)

Pigs/

Pigs and sheep of the black-haired variety are kept for their meat, and goats for their meat and milk. All these animals are thin and diseased. Indeed, "kept" is hardly the right word, for they have to forage for themselves, hunting around the village for odd scraps of food. Goats exist in greater numbers than any other animal. In 1951 it was estimated that there were 21,130 in the Lower River Districts or one to every 6 persons. (i.e. about one per family), or one to every 12 acres of land in use, which is probably a low enough density to avoid charging the goat with being a cause of accelerated soil erosion. In Chikwawa District pigs and goats are of almost equal importance, numbering 1 to every 7 and 1 to every 5 persons respectively. In Port Herald District there is less land to spare, less surplus of waste matter and the proportions for pigs and goats are 1 to 17 and 1 to 7. In both districts sheep are of very little importance in the economy, numbering 1 to every 39 persons for the combined area - a ratio nearly as low as that of cattle. Of poultry, cocks and hens form the largest number, with a total approximately equal to that of human beings. Eggs are valued as food, although extremely small, as are the birds themselves, averaging about half the size of their British equivalent and forced to depend on scraps for existence. There seems to be a prejudice against eating chicken except on occasions of ceremonial, although this is now breaking down to some extent under European influence. Pigeons are kept by a few and also Muscovy ducks

introduced/

introduced from Brazil by the Portuguese.(5) Finally there are the dogs, small jackal-like creatures without a bark, whose only use seems to be in hunting small game.

Meat is derived not only from domestic animals, but from game, chiefly small buck or birds. The Lower Shire Valley was once famous for its game, now of comparatively little significance, due to the clearance of so much land for agriculture and the immense slaughter by Europeans. Of the larger game hippopotamuses are still hunted by the Aphodzo in the extreme south, but elephant hunting has now ceased, although the marshes north of Chiromo were once famous for it. In 1893 Lugard described the Elephant and the Ndindi or Morrumbala Marshes as the haunt of elephants being shot down by endless parties of natives and hunters.(6) Robertson recorded: "In the early days of the European settlement of the Shire Highlands the attraction of elephant hunting was so great that settlers unfortunately neglected the planting of useful fruit-trees".(7) Eventually the marsh was declared a game reserve, but the demand for agricultural land resulted in the abolition of this order in 1911,(8) although the Lengwe and Tangadzi Reserves were maintained, partly because they were on land of little agricultural value and partly because the Tangadzi Reserve has a small herd of nyala antelope, one of only two herds left in Africa. There are a few lion, zebra and rhinoceros left and buffalo may be found on the fringe of the Matunda Hills and on the flanks of Chiperoni. The most useful game are buck, including kudu, sable antelope, waterbuck, reed buck, bushbuck and hartebeeste. Bushpig and warthog and duck teal, partridge and guinea-fowl are/

are also hunted. The weapons of the chase are chiefly bow and arrow, and spear. Only a few natives are allowed to possess guns, and the 0.303 rifle is outlawed for civilian use, owing to the danger of army ammunition being stolen and the fear of uprising after the John Chilembwe revolt of 1915. The time for hunting is the very beginning of the dry season when food stocks are low, there is comparatively little to do on the land and the intended victims are more restricted in their sources of water. In this activity the weapons mentioned above are supplemented by nets, poisons, pits and spring traps. Domestic animals are killed for meat, usually in the middle or at the end of the dry season which is the meat eating period of the year. The wet six months are the fishing season when for many catching fish becomes the leading occupation.

There are three major sources of fish in Nyasaland - Lake Nyasa, from which 2000 - 3000 tons are taken annually, Lake Shirwa, producing about 1000 tons, and the River Shire, with about 400 tons, most of which is caught south of the Murchison Falls.(9) The river fishermen are also agriculturalists, but they hold less land than their fellows and usually only dimbas since their gardening is mainly a dry season occupation. In some native authorities, the fishermen are organised into guilds, in others the right to fish depends merely on a man's ability to acquire the necessary equipment. Some tribes specialise in fishing. The few Yao who have come into the valley are nearly all so engaged. The tools

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of the trade are dug-out canoe - canoe making is itself a specialised trade - hand made lines, flat and trawl nets, baited baskets and cone traps (in design rather like lobster pots)(10). Occasionally resort is had to spearing or even to hoeing fish out of the mud. On the smaller streams hurdles are often constructed across the main channel or small movable reed dams are used, but permission to use such devices must first be gained from the chief, for the dams are so effective as possibly to interfere with the rights of others. The capital outlay of the fisherman is by native standards quite large, and in addition he has to pay licensing fees. Fishing in the Ruo and the Lower Shire depends on the times of flooding. In general, fish are only found in plenty when the water is high. On the Shire the season begins about December and lasts until April. Some variation occurs with ponding back at the Ruo and Ziwe Ziwe confluences, and at least some fishing takes place in the marshes all the year round. Thus in June and July it is still possible to buy fish at Chiromo and Nachikadza, on the fringes of the Elephant and Ndindi Marshes respectively, whilst at Ngabu and Port Herald at the same period fish may fetch up to three times the Chiromo price or even be unobtainable. Nachikadza is the leading fishing centre. Here people have very little mphala land since the last great rise of the Shire. The chief varieties caught are Mpende (a perch), chambo (tilapia squamipinnis) and mlamba (clarias, a cat-fish living in the muddy waters of the marsh creeks). The ncheni (rhampochronis)

or/

or tiger fish is usually only caught by Europeans for sport. The people of Nachikadza sell a small part of their catch locally. The rest is gutted, and either smoked or put on hut roofs to dry, then sent by rail from Port Herald to market at Blantyre or Limbe. Each year as the level of the river drops the professional fisher-folk follow the fish downstream, building camps wherever convenient. Of recent years there has been a tendency to build these on the Portuguese rather than on the British bank of the river to avoid paying British taxes or licensing fees. In this marsh country it is in any case difficult to enforce laws or to catch offenders. The people on both sides of the border are related and readily assist one another. Some of the fish caught has little commercial value, but could be used for manure. At present, no attempt is being made to develop this possibility. Sea fish only enter into Portuguese territory, being conveyed by rail from Beira to Dona Ana and carried thence by road to Vila Bocage or Morrumbala for consumption by Europeans - a luxury traffic.

The remaining local ~~authorities~~ activities may be divided into two groups - local manufactures and gathering. The latter is chiefly in search of the edible lotus root, nyika, which takes the place of the batata in time of scarcity and grows abundantly in the marshes, of honey and a little wax from the nests of wild bees, and of edible fruits to enliven the staple dish of porridge with a ndiwo or relish. Of these masao (zizyphus jujuba), of widespread distribution, is the chief. Others include the fruit of mkuyu (ficus) and

mtondo/

Hyphaene palms at Port Herald in July.

mtondo (cordyla africana), both of which grow near streams. The bark of a number of trees and certain leaves and woods when steeped in water are used medicine.(11) Masao fruit is the basis of a secondary activity - the manufacture of kacasu or spirits by means of a primitive still, composed of a pot and a gun-barrel. This occupation together with the brewing of mowa (a sort of beer made from millets or maize) were forbidden towards the end of the dry season of 1951 as the work involved, plus the time spent in drinking, had delayed in previous seasons the preparation of gardens and the planting of crops. The result of this regulation was a movement of women brewers and distillers to the border, where alcoholic drinks were prepared just outside the range of British authority. One enterprising chief was found in a temporary village on the Portuguese bank of the Shire, who made a profitable business of smuggling kacasu into Nyasaland. The Hyphaene palm is the basis of palm wine manufacture. The method is to lop off the top of the tree and then catch the juice emanating from the cut. The result is to kill the palm, and with dead trees outnumbering the living by about 4 to 1 the capacity of the industry seems to be somewhat limited. The local manufactures have greatly declined. Livingstone described the Amang'anja as industrious and mentioned their working with iron and cotton and their basket-making(12) and salt manufacture.(13) In 1876 cotton spinning and weaving was a common occupation of the men. By 1885 it had almost gone(14) and now it has totally disappeared due to

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the competition of cheap imported British cloths. The manufacture of bark cloth also became extinct for the same reason. Iron ore (haematite) is present as a red stone termed ng'ama or kundwe, and found commonly in the form of small nodules in the beds of mountain streams.(15) It was smelted for the production of spears, axes, knives and hoe blades by means of charcoal at least up to 1904.(16) Kirk noted: "Every village has its forge and in the forest are the smelting furnaces".(17) Buchanan records the existence of a primitive furnace and a smithy at Blantyre in 1876.(18) Again the import trade has resulted in the extinction of a local industry. Salt manufacture has a like history. Livingstone described the filtering of salt from impregnated earth in the Lower Shire Valley of 1859,(19) and apparently a very important centre of production once existed in the dry country just south of the Mwanza.(20) Thus although agriculture is of major importance amongst the peoples of Central Africa one must not picture them as ever engaged in the occupation to the exclusion of all else. Weaving, metal work and salt manufacture were once extremely important. The introduction of European goods by destroying these trades has destroyed the unity and balance of the previous economic structure by making native society even more dependent on agriculture than had hitherto been the case, except in so far as employment may be obtained with Europeans. The native is steadily increasing his consumption of foreign goods thereby losing his economic independence. Clearly the colony does become a market for the goods of the occupying power and a source of raw materials for its

industries/

Where labour is cheap - shunting at Port Herald.

Wood working with primitive lathe at Tengani north of Port Herald.

industries. All that are left of the old local trades today are pot-making and carpentry. A few people produce excellent hand-carved ornaments for sale to Europeans. New trades, as yet on only a small scale, are brick manufacture and bicycle repairing.

Many have no trade and no cash crop, and in order to buy cloth or small luxuries and to pay taxes must seek employment with the European. Their tendency, however, is still to remain gardeners, and usually they try to find work for a short period of the dry season only - just long enough to earn the particular sum of money required. Others, particularly young men seeking to marry, contract themselves to the service of the European for much longer periods. There is little industrial activity in Nyasaland, only cigarette and pipe tobacco manufacture, plus soap, tea and cotton packing, with the only mining that of road metal from laterite or bog ore deposits. Many men leave the territory and go as far afield as the Copperbelt, Southern Rhodesia or the Witwatersrand. This migration has come to be regarded as a replacement of the old initiation ceremonies weakened by European influences. It may also be regarded as a continuance of the old migratory habit. There is, therefore a seasonal labour force and a comparatively stable regular body of workers. Casual labour finds its way to the plantations, loads railway waggons or barges, builds or repairs roads, and acts as carriers. Regular labour, if educated, fills the ranks of clerks and school teachers and, if not educated, may take up domestic service, long term plantation

work/

work, mining, railway work (the better posts, e.g. driver, or stationmaster, are usually held by Indians) or service in stores and commercial concerns (managerial posts are all held by Indians or Europeans). A few join the King's African Rifles, of which the famous first battalion is recruited in Nyasaland. In 1945, of Chikwawa and Port Herald districts combined, it was estimated that 1947 males and 20 females were absent, having left before September 1939, and 4142 males and 119 females were absent, having left after September 1939. In addition 806 males were in the forces, making a total absentee population of 7034 out of 126,410 or approximately 6%. The proportion amongst males, however, is nearly 11%. The district has therefore about one tenth of its male population away and that tenth is drawn from amongst the most effective of its workers, to the consequence economic loss of the area and with the creation of social problems. The destinations of the migrant labourers are various. A 1946 estimate of native employment in British Central Africa claimed that whilst approximately 70,000 Nyasaland natives found employment in Nyasaland, 82,000 were employed in Southern Rhodesia, 41,500 in the Union of South Africa and 6000 in Northern Rhodesia.(21) The movements of the labourers have resulted in a "shuttle" of labour across Central and Southern Africa. In 1937 it was estimated that every year 4000 Nyasaland natives entered Southern Rhodesia, whilst 8000 natives left Southern Rhodesia for the Union. The chief routes from Nyasaland in 1937 were from Angoniland in the west to Salisbury via Fort Jameson or via Fwaneungo in

Portuguese/

Portuguese Angonia and from Port Herald in the south to Southern Rhodesia via Tete and the Zambesi Valley.(22) It is important to note that although there are Migrant Labour Agreements these have never prevented a native's migrating on his own account. Outside the Union of South Africa there is no prohibition of uncontracted immigrants, and even there it is suggested that uncontracted migrants enter in considerable numbers. An agreement has been concluded between the governments of Nyasaland and Southern Rhodesia whereby the government of the latter country agrees to send back Nyasaland immigrants after a stay of 2 years, but the effectiveness of this agreement is somewhat doubtful. The history of the causes of the migrant labour situation, the product of colonial development and common to all Africa, needs consideration, for in it lies the destruction of tribal society and the production thereby of many problems, if a peaceful continuity to African development is to be obtained. The problem of the absentee male is but one of many questions facing an African where the changes introduced by European society tend to create more problems than they solve. The history of these changes, that is of development, will now be studied in order to assess the background of present-day conditions.

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(1) David & Charles Livingstone, Narrative of an expedition to the Zambesi and its tributaries, 1858-64 (1865)

(2) R.N. Lyne, Mozambique and its agricultural development (1913), p. 143.

(3)/

(3) A.W.R. Duly, The Lower Shire District, Nyasaland Journal, Vol. I, 2, July 1948, pp. 11 - 44.

(4) A.J.W. Hornby, The destruction of vegetation and its relation to climate, water supply amd soil fertility, Part III, Department of Agriculture, Bulletin No. 1, Nyasaland Government (1924).

(5) Major C.B. Vyvyan, Précis of information concerning the British Central Africa Protectorate, Intelligence Division, War Office, (February 1899), p. 42.

(6) Captain F.D. Lugard, The rise of our East African Empire, Vol. I, (1893), pp. 31-32.

(7) P. Robertson, The commercial possibilities of British Central Africa, S.G.M., Vol. XVI (1900), p. 236.

(8) Colonial Annual Report, Nyasaland, for 19 9 - 10, No. 655, Cd. 4964 - 29.

(9) The Central African Territories (June 1951) Cd. 8234, p. 22.

(10) For native terms see The Lower Shire District.

(11) For notes on fruits and medicines see Harry Kambwiri, An essay on the useful trees of British Central Africa, in Sir H.H. Johnston, British Central Africa (1897), pp. 227 - 32.

(12) Narrative of an expedition to the Zambesi, p. 110.

(13) Ibid. p. 101.

(14) J. Buchanan, The Shire Highlands (1885), p. 127.

(15) A. Werner, The native races of the British Empire, British Central Africa, (1906) p. 7.

(16) District Books (unpublished) Port Herald.

(17) R. Coupland, Kirk on the Zambesi (1928) p. 152.

(18) The Shire Highlands, p. 132.

(19) Narrative of an expedition to the Zambesi, pp. 101 - 02.

(20) District Books (unpublished) Chikwawa.

(21) Central African Territories, Cd. 8234 (1951).

(22) J.C. Abraham, Report on Nyasaland Natives in the Union of South Africa and in Southern Rhodesia (1937).

VI. THE SEEDS OF COLONIAL DEVELOPMENT, 1858 - 89: MISSIONARY AND TRADER.

African colonisation began with the Portuguese who occupied a number of points on the coast of south-east Africa as early as the sixteenth century. They took over the trading operations of their predecessors the Arabs, and advanced far enough inland for the territory they occupied to be described as a Portuguese colony. This colony, however, was long neglected for it was regarded merely as a stepping stone to India, and when the Indian interest was lost, attention was focused on the East Indies and Brazil. Slaves, ivory and gold were the exports of Moçambique, a traffic managed by half-castes of Goanese or Portuguese descent and supervised by the few administrators that Portugal could spare. The farthest advance of settlement inland was along the Zambesi valley where the markets of Sena and Tete were founded in the 17th century and a fort built at Mutarara near the confluence with the Shire. Limitation of resources and lack of interest prevented the occupation of the Shire valley although a number of Portuguese explorers succeeded in entering the area. The first recorded entry was in 1616. In 1635 Antonio Bocarro wrote of his kinsman Gaspar Bocarro: ....."he started from Tete in March 1616.. ...and, passing to the other side of the river Zambesi, journeyed on through the lands of Bororo, etc. and twenty-five days later "slept at Morumba....Near the city of Morumbo is the great river or lake Manganje, which has the

semblance/

semblance of a sea, whence flows the river Nhanha (nh in Portuguese is pronounced ny) emptying itself into the Zambesi below Sena, to which they give the name of Chiry... ... and he (Bocarro) proceeded beside this river Nhanha, and slept on its shores....".(1) In 1624 Luiz Mariano wrote a letter from Tete mentioning Lake Hemosura (Nyasa) and describing the river Cherim or Shire. In 1665 Manoel Godinho wrote of "the river Shire which .... flows into the Cuama (Zambesi) below Sena", and thirty years later Francisco de Souza described the valley as a route useful to reach Ethiopia. After this came a gap until 1824 when Maria and Velasques journeyed up the Shire to Lake Nyasa annexing territory, but in name only. Batalha-Reis records that in 1858 Maria was ill and attended by Dr. Kirk of the Livingstone Expedition whom he supplied with "minute information" regarding Lake Nyasa. In 1856 Livingstone himself had been told of Lake Nyasa and the Shire by Cardoso, a resident of Tete, and attempted to check this information by the maps available at this period. In 1853, da Silva visited the Amang'anja living to the west of the Shire, and the following year Silva Porto crossed the river. On the 29th December, 1858 the Livingstone Expedition steered the Ma Robert into the Shire and a new era had begun.

It will be seen that until 1858 the inhabitants of the Lower Shire Valley had owed no allegiance to the Portuguese, who confined their activities merely to trading visits or perhaps occasional slave raids. Indeed at this time it was

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not the inhabitants of the valley who were paying tribute to the Portuguese, but the latter who were forced to pay it to the Landeens, a branch of the Zulu.(2) The valley was at this time inhabited by the Amang'anja, possibly including a few Asena from the banks of the Zambesi, and not over troubled by war except for occasional clashes with the Azimba and Achipeta to the north-west, bow and poisoned arrow using tribes. Livingstone wrote of the valley in 1859:

"Many gardens of maize, pumpkins and tobacco fringed the marshy banks as we went on. They belong to natives of the hills, who come down in the dry season, and raise a crop on parts at other times flooded. While the crops are growing, large quantities of fish are caught ....."(3)

"The cultivated spots are mere dots compared to the broad fields of rich soil, which is never either grazed or tilled".(4)

"The Manganja are an industrious race; and in addition to working in iron, cotton and basket-making, they cultivate the soil extensively. All the people of the village turn out to labour in the fields. It is no uncommon thing to see men, women and children hard at work, with the baby lying close by beneath a shady bush. When a new piece of woodland is to be cleared, they proceed exactly as farmers do in America. The trees are cut down with their little axes of soft native iron; trunks and branches are piled up and burnt, and the ashes spread on the soil. The corn is planted among the standing stumps which are left to rot".(5)

Clearly/

Clearly there was no great population in the Lower Shire Valley in 1859, and shifting agriculture was practised in consequence. One of the purposes of the expedition was to review the possibilities of trade. Livingstone realised that barter for native crops could be the means of removing the odious trade in slaves, at that time Africa's most important commodity. He was accordingly delighted to observe that the valley people grew cotton even on brackish soils which he thought might support crops of long-stapled Sea-Island variety.(6) Kirk shared his enthusiasm and wrote:

"Under proper care this would be a splendid plain far before that of the Nile, with a fine navigable river winding through it".(7) The "fine navigable river" with all its variations of level later became the despair of traders. The trade which Livingstone's expedition made possible destroyed cotton cultivation instead of fostering it. The two varieties grown, tonje kadje or native cotton and tonje manga or long-stapled cotton introduced by the Portuguese, disappeared with the import of British cloth. In 1900 Robertson wrote:

"Of late years the cultivation (cotton) has almost died out, as, owing to the cheapness and superior finish of imported cloths, the native prefers these to his own manufacture".(8)

It was not until 1904 that the Nyasaland Government and the British Cotton-Growing Association attempted to bring Livingstone's idea to fruition. Livingstone had not

visualised/

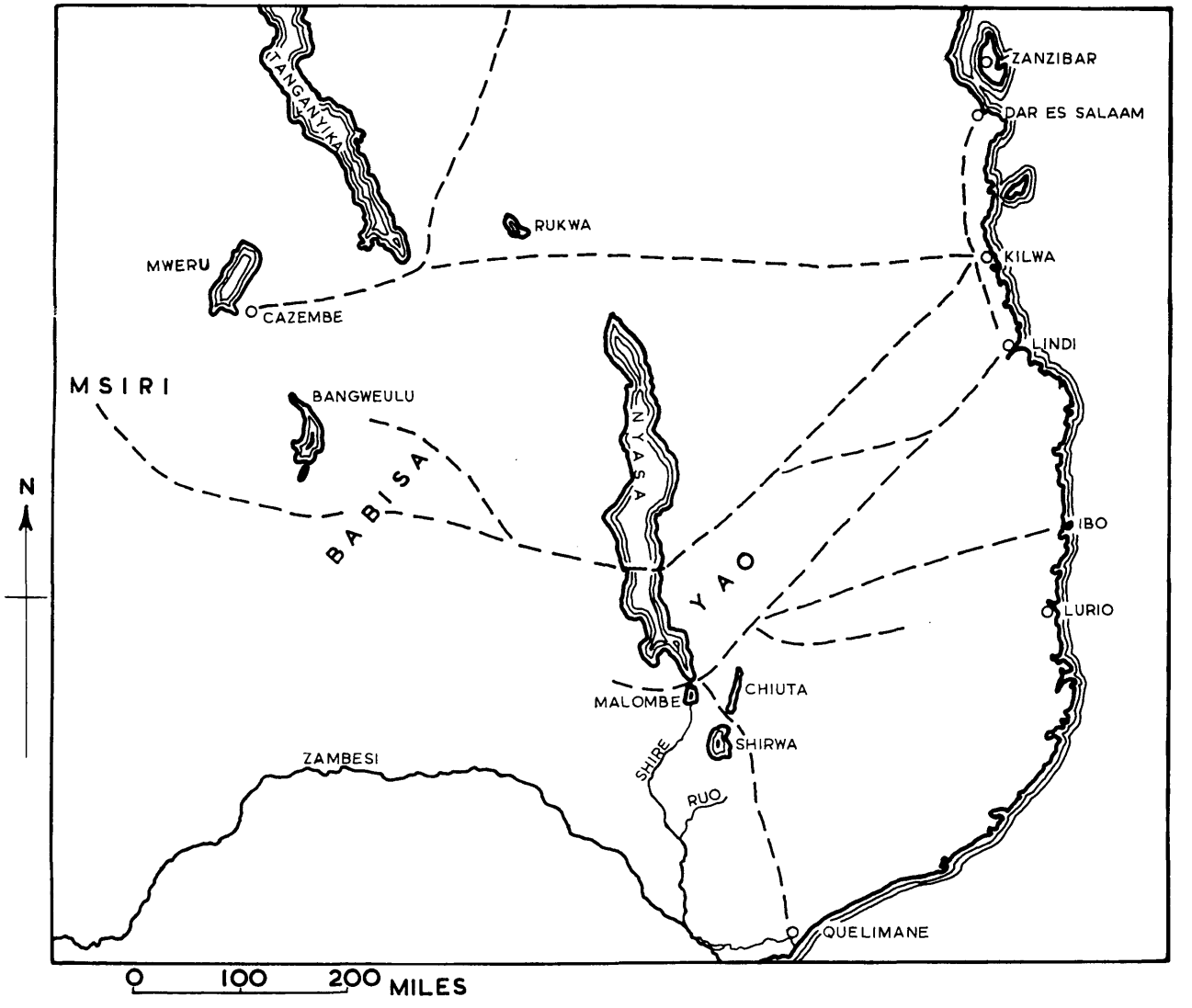
Rapids of the Middle Shire – Mpatamanga Gorge near the crossing of the road between Tete & Blantyre.

visualised a colony in which the development of resources would be undertaken by white plantation owners. He wanted to establish mission stations and trading posts outside the limits of Portuguese authority and along a route which would cut across the paths of the slave traders. Africa in 1359 lacked roads, the product of city peoples. A water route was therefore necessary, and the Shire, accessible from the sea, provided a way into the heart of Central and East Afric by the pattern of lakes and streams associated with the Great Rift system, and revealed by the explorations mainly of Livingstone and Stanley. The first intention had been to join the friendly Makoldo dwelling in the basin of the middle Zambesi, but the way had been barred by the Kebrabasa rapids. The alternative of the Shire eventually proved even more effective than Livingstone had dared hope, for s since it cut across slave trading routes, a clash between rival Arab and British interests developed, forcing the latter to destroy the slavers by warfare. All that Livingstone could foresee was that en route lay the cooler altitudes of the Shire Highlands where the Magomero station of the Universities' Mission to Central Africa was to be established, whilst slave trading at Lake Nyasa might be supplanted by cotton trade, with steamers on the Shire and a portage of only thrity-five miles along the middle rapids section of the river above Murchison Falls. (9)

By means of two journeys in 1859 the Livingstone Expedition ascended the Lower Shire as far as Chibisa's

village/

FIGURE 27
ARAB SLAVE ROUTES ACCORDING TO J. STEVENSON, THE ARABS IN CENTRAL AFRICA & AT LAKE NYASSA (1888)



village at the foot of the Murchison Falls, explored the Shire Highlands and followed the Shire river up to Lake Nyasa. In 1861 the explorers ascended the Shire again, bringing Bishop Mackenzie and the Universities' Mission to Central Africa party. On climbing up to the plateau top of the Shire Highlands, the would be settlers met a slave caravan which they broke up, and also refugees fleeing from Yao invaders. The Yao had been living to the east of Lake Nyasa until about 1855 when the attacks of other tribes drove them southwestwards. The Ajawa sept of the Yao obtained guns from the Arabs with which they raided the country to the south of Lake Nyasa in search of slaves.(10) Guns made a tribe powerful and guns could only be obtained from Arabs or Portuguese in exchange for slaves. The cost of paying for guards to protect the caravans and the feeding of the slaves en route to the coast was paid for by the ivory which the slaves were forced to carry. The Yao slaves had to travel eastwards to Ibo or more usually north-eastwards to Lindi, Kilwa or Dar-es-Salaam from where they were shipped to the great market of Zanzibar which also became a centre of the ivory traffic and of the manufacture of ivory ware (11) (figure 27). Thus in 1861 the two invading groups met, and with the initial victory to the British party, Magomero Mission was founded, soon becoming a crowded refugee camp for the Anyanja who looked to the missionaries for protection. Magomero, although on the plateau, was not a healthy site. It was in heavily wooded country

harbouring/

harbouring malarial mosquitoes. Its imported goods had to be carried an expensive distance from the head of navigation at Chibisa. The surrounding district suffered from famine and disease consequent upon the wars. Finally, by identifying themselves with the Anyanja, the missionaries were opposing forces too strong for them. In 1862 both Mackenzie and an assistant, Burrup, died as a result of an expedition to the Shire in which they lost their medicines. The mission moved to a healthier site overlooking the Shire, but the Ajawa followed and in face of attack the missionaries crossed the Shire to Chibisa's where they found that the chief had fled to the Zambesi before an attack by the Amang'anja now ruled by 5 of Livingstone's original group of Makololo carriers. Chibisa later returned chased by Belchioro, a Portuguese half-caste slave raider. With all these difficulties the mission under Bishop Tozer, sent out to replace Mackenzie, was forced to withdraw altogether and moved to Mount Morrumbala near the confluence of the Shire and Zambesi. Again slave raiding made mission work impossible and the party moved finally to Zanzibar.

From 1863 onwards the Lower Shire region was subject to continual warfare. The Makololo chiefs succeeded in forcing the timid Amang'anja to fight, and a struggle developed between them and the Ajawa to the north-east, the half-caste slave raiders Belchioro and Mariano or Matekenya to the south, and the Azimba and Achipeta to the north-west. These last had been living in the Kirk Range to the west of

the/

the Upper Shire Valley. There they were attacked and driven south-eastwards by the Angoni, like the Landeens a branch of the Zulu, who had fled northwards from the power of Chaka between 1818 and 1828. South of the Ruo on the left bank of the Shire a confederation of tribes was founded known as the Machinjiri or Massingire. These disputed possession of the strategic point of Chiromo with the Makololo. One of the Makololo chiefs, Ramakukan, was himself forced to take up slaving in order to get guns by trading with the Arabs of Ibo. (12)

The U.M.C.A. had failed to propagate the gospel or put down slavery. The result of the Livingstone Expedition was confined to increased knowledge of the Shire and Nyasa regions, a knowledge shared with the Portuguese whose slave raiders followed in Livingstone's track. Perhaps Livingstone's greatest contribution to the development of Africa was that he created an interest in that continent amongst the British, an interest great enough to sponsor an expedition in search of the explorer when rumours of his death reached Britain. This expedition under Lieut. Edward Young went up the Shire in 1867 and collected enough evidence to prove that Livingstone was still alive. (13) In 1874 Dr.Stewart appealed to the Scots to send out a mission to the Nyasa country as a memorial to Livingstone who had died the year before in what is now Northern Rhodesia. The Free Church formed a mission party of which Young was given command, and with him went H. Henderson of the Church of Scotland

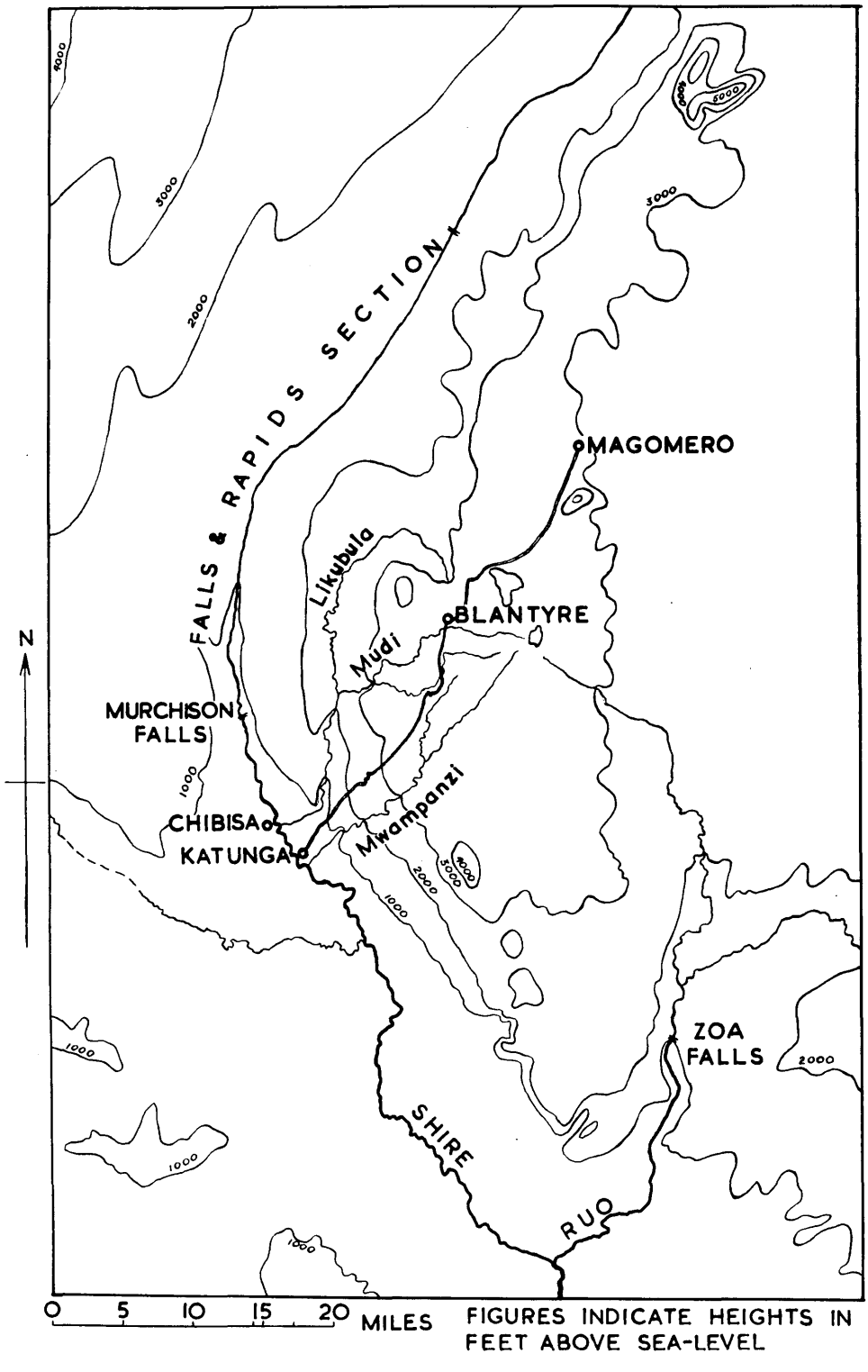
to/

to seek out a suitable site for the missionaries of that church.(14)

The Young Expedition entered a somewhat changed arena. The Makololo were still fighting the Portuguese slave raiders,(15) every principal village being stockaded, although some respite had been gained by recently defeating Belchioro.(16) However, in 1868 the Angoni under Chief Chidiaonga had invaded the Shire Highlands and although armed only with spears and shields defeated the Ajawa.(17) Unlike the Yao the Angoni were not slave raiders. They sought to hold other tribes subject to them for the sake of annual tribute. If tribute failed to appear they attacked at the beginning of the dry season when the crops were ripe and most streams easily fordable. In the country south of Lake Nyasa there was therefore some diminution of the slave trade by the time the missionaries arrived. The expedition sailed in the Ilala to the Murchison Falls, where the steamer was dismantled and 800 men hired to carry the sections, by a portage of 60 miles instead of Livingstone's optimistic 35, to the Upper Shire.(18) From the point of assembly on the Upper Shire the Ilala steamed into Lake Nyasa and a site for a mission settlement under Dr. Robert Laws was chosen at Cape Maclear. Henderson turned his attention to the Shire Highlands and chose a site on the edge of the plateau within easy reach of the Shire. To this point came the Rev. Duff MacDonald and the Church of Scotland Mission party in 1876, disembarking at Katunga's village near Chikwawa.(19) Their

route/

FIGURE 28
SKETCH-MAP TO SHOW THE POSITION OF BLANTYRE



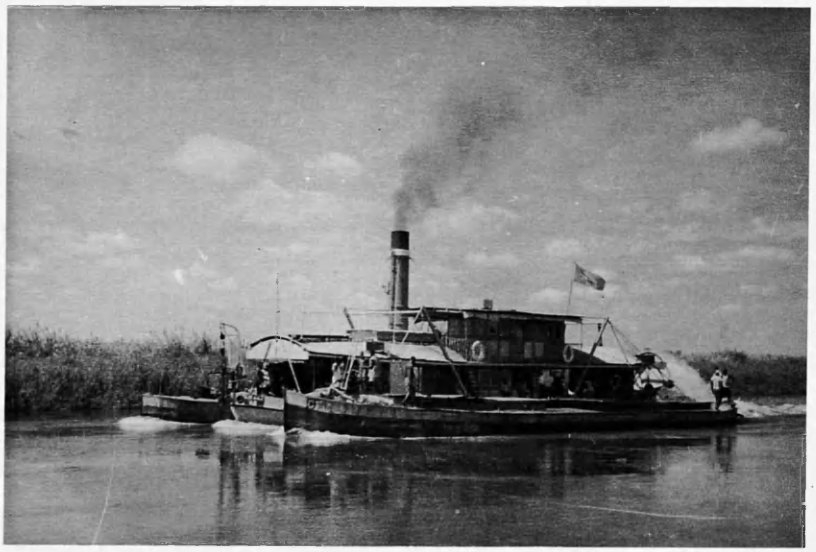
route up the escarpment to the new settlement of Blantyre followed a spur between the Mwampanzi and Likubula rivers (figure 28). The spur was chosen since it offered the quickest and least densely wooded ascent. The valleys here are exceptionally steep-sided with little or no flood plain. A route within them must avoid wash-outs and ravines, must cross many streams, and is always liable to removal by flooding. A fault step along most of the escarpment face provides an intervening stretch of comparatively level ground chosen as a suitable place for a rest camp on this 30 mile walk. Blantyre Mission was built at the crossing of the first large stream, the Mudi, after coming over the lip of the escarpment.(20) The Mudi, although perennial, was not an excellent a source of water as doubtless the first settlers hoped, precisely because of the Mission's need to be in a populous district. Native settlement above Blantyre polluted the water and rendered it unfit for drinking without considerable precaution. There were other difficulties. The Ajawa were no longer a serious trouble, but the Angoni continued their raids although they left the Europeans alone.(21) The journey upstream from the Portuguese port of Quelimane was long and tedious. MacDonald records that his trip took from 9th August to 23rd October with at least some members of the party down with fever every day. The first opportunity for writing home did not occur until April 1877 when Henderson left the Mission. Goods ordered from Britain took a whole year to reach their destination.(22) Other troubles arose due to the entrusting of responsibility to

men/

men unfit for their posts, and the ensuing scandal resulted in almost wholesale replacements of the Mission staff in 1881 when Hetherwick and Scott were sent out to take charge.(22) The site of the Livingstoneia Mission at Cape Maclear proved unhealthy and in the same year, 1881, Laws moved northwards to Bandawe amongst the Atonga on the western shore of Lake Nyasa.(23)

The missionaries of both stations found it difficult to conduct trading operations and maintain their supplies by the Shire route in addition to their normal work. In 1878 the Livingstonia Central Africa Company, later renamed the African Lakes Company, was formed to take over the(24) secular duties and to realize Livingstone's scheme of replacing the slave trade by legitimate commerce. The two Moir brothers were sent out and established their headquarters at a station near the Blantyre Mission and subsequently named Mandala, a name later applied to the whole African Lakes Company. Besides handling the commercial affairs of the missions, the company hoped for an ivory trade with perhaps later an export of grain. The route from Britain to the Shire Highlands at this period began by Currie's Castle Line to Quelimane on the Kwakwa, the northernmost distributary of the Zambesi and for long thought to be the only easily navigable waterway in the delta. Conveyance on this stream was by punt or houseboat to Marendini or Mopea, a journey of 1½ days. From either of these points portage was obtained to Maruru on the main stream of the

Zambesi/



Stern wheeler on the Shire. A barge is fastened to each side of this Portuguese vessel.

Zambesi where the African Lakes Company purchased a frontage in 1882. Maruru was an unfortunate site. Half of the Company's land disappeared into the river in 1883, and the following year most of the remainder followed together with part of the Company's house.(25) From Maruru the Lady Nyasa, a paddle steamer drawing only two feet of water, took passengers and goods to Katunga.(26) Even with only two feet draught the Lady Nyasa experienced difficulties in the dry season. The Pioneer of 1861 had drawn 5 feet and the result as Kirk remarked was:

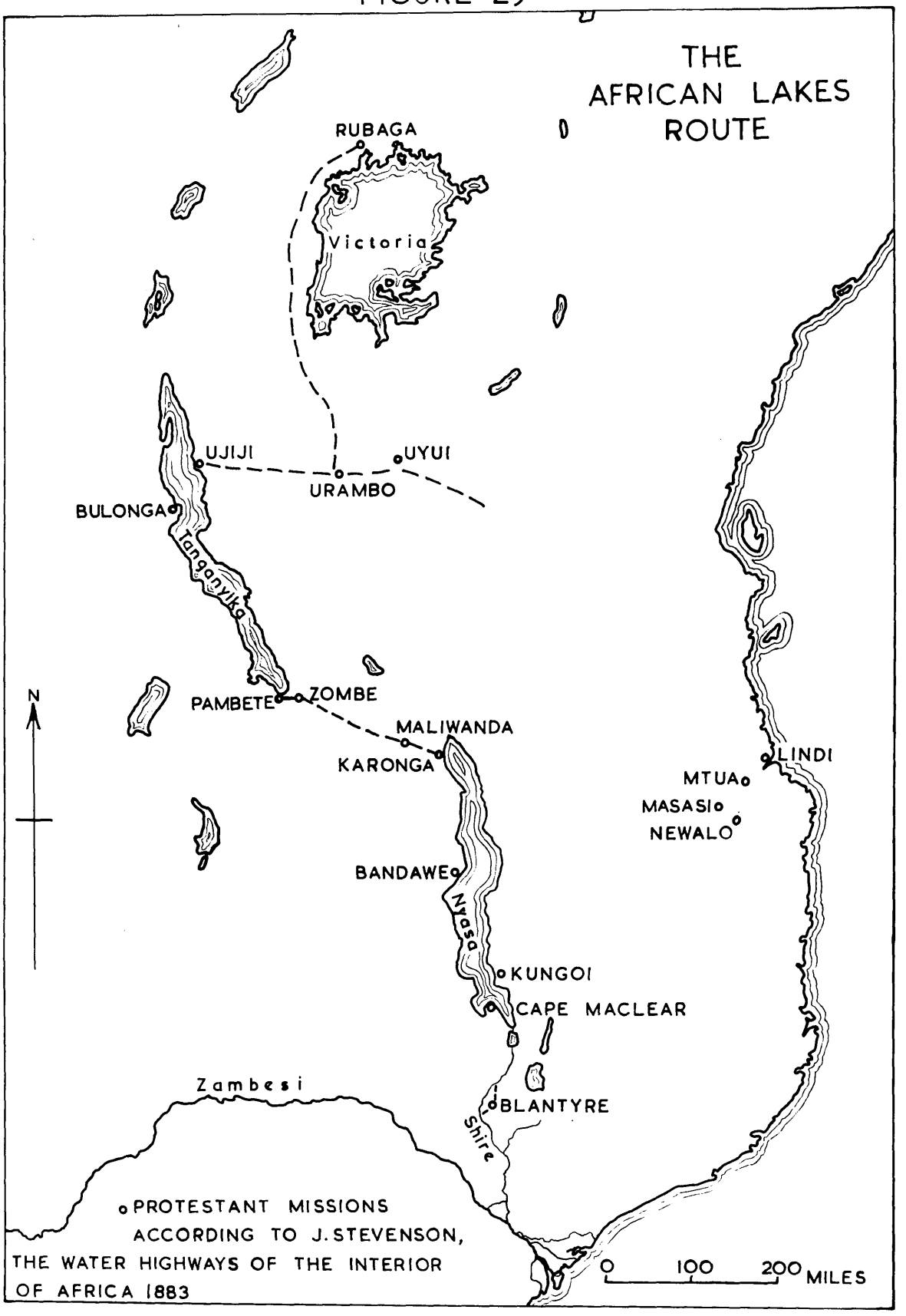
....."we have been aground about as many hours as we have been afloat".(27)

Shallow draught was essential, and so were the paddles, for the abundance of duckweed in time of flood made the use of a screw impossible. The standard type of vessel eventually in use was the stern-wheeler which had the advantage that barges could be attached to its sides thus increasing the load carried on one voyage without reducing manoeuvrability by towing. Since draught increases proportionally to the load per unit area it was important to provide as great an area as could reasonably be manoeuvred. The District Books of Chiromo note that at the turn of the century whilst barges could carry 50 tons when the river was full, only 4 to 8 tons were possible when the river became very low in the dry season. This increase in area was, however, very limited, for when the river is deepest it is also in full flood and vessels proceeding upstream must keep close to the banks to make headway against the currents/

current. From Matunga goods were taken to Blantyre by carriers along a ten feet wide road built by J. Stewart (28) and thence, if destined for the Free Church Mission, to the Upper Shire at Matope. Shipment from this point was by the Ilala and later also by the A.L.C.'s Domira. The Lady Nyasa was supported by the search of Young's first expedition and later by the James Stevenson. Thus the Company opened up a regular route into the heart of Central Africa, and the Lower Shire Valley became of great strategic significante as the entrance to that route. The Company did not promote Livingstone's cherished sotton trade, but helped to destroy all hope of it with imported cloth, its chief item for bargaining. However, it did seek to cut completely across the path of the slave traders, although Lugard accused the A.L.C. and other British and Portuguese interests of assisting (29) the Arabs by selling guns to them. In 1880 Joseph Thompson discovered the way from Nyasa to Tanganyika, and 5 years later the Company conveyed parts of a steamer for the London Missionary Society along the Shire and Nyasa and across (30) the narrow neck of land between the two lakes. James Stevenson, a director of the Company, sponsored the construction of the Stevenson road from Nyasa to Tanganyika in 1881, by giving £4,000 towards the cost on condition that the London Missionary Society and the Free Church Mission of Scotland would establish mission stations on the line of the road, and that the A.L.C. would undertake to maintain regular communication between the ports of Lake Tanganyika and Quelimane. (31) At the northern end of Lake Nyasa the

Company/

FIGURE 29


THE
AFRICAN LAKES
ROUTE
RUBAGA
Victoria
UJIJI
UYUI
URAMBO
BULONGA
Tanganyika
N
PAMBETE
ZOMBE
MALIWANDA
KARONGA
LINDI
MTUA
MASASI
NEWALO
BANDAWE
Nyasa
KUNGOI
CAPE MACLEAR
Zambesi
BLANTYRE
Shire
PROTESTANT MISSIONS
ACCORDING TO J. STEVENSON,
THE WATER HIGHWAYS OF THE INTERIOR
OF AFRICA 1883
0 100 200 MILES

Company built the trading post of Karonga, and another on the shore of Tanganyika at Pambete. In 1885 Stanley was able to announce the result of his and of Livingstone's work at fittingly the first meeting of the Royal Scottish Geographical Society.(32) He showed that the company had provided a route leading right into Uganda - water to Katunga, portage 60 miles to Matope, water to the northern end of Lake Nyasa (420 miles), and thence 210 miles portage to Lake Tanganyika and 360 miles of waterway to the northern end of the lake (figure 29). The cheapness of this waterway brought a large transit trade focussing on Blantyre. The route, involving 1100 - 1200 miles of canotage and 400 - 500 miles of portage, could be operated at a cost for the full journey of £85 per ton, compared with £250 - £300 per ton by the overland route from the head of Tanganyika to Mombasa.(33)

All these activities brought opposition. War broke out with the Arabs starting at Karonga in 1887 and ending at Mlozi's just north of Karonga ten years later. This war finished the slave trade.(34) In the Lower Shire Valley the Portuguese had not been idle once they realised the value of a route which might have been theirs. Recognition had been given to the British claim that the Zambesi was an international waterway, and a customs house had been established at the confluence of the Zambesi and the Shire. Successful campaigns had been conducted against the Landeens.(35) Soon after the establishment of the missions, however, the exclusive right of navigating by steam on the

Zambesi/

Zambesi and Shire was offered to Zagury, a Portuguese subject resident at Liverpool, on the impossible condition that his steamer should ascend the Shire to Lake Nyasa. In accordance with this the A.L.C. steamer was arrested, until the British Government forced the Portuguese to recognise the right of the Company to navigate the Zambesi.(36) In 1883 came the appointment of the first British consul to the Shire Highlands - Captain Foot. The following year the Congo Treaty providing that Portuguese influence in the direction of these highlands should cease at the confluence of the Shire and Ruo rivers was rejected, and the Portuguese "determined once more to revive their scheme of a trans-continental Empire from Angola to Moçambique, including the southern part of what is now Central Africa".(37) Stevenson wrote of the situation:

"Things were settled but for a few years when a Portuguese, who had acted as our consul at Quelimane, having been kindly taken up the rivers on an excursion to Blantyre, the colonials became excited about the fine country occupied by us, and a short time afterwards a half-caste was found making war upon the Makololo chief near the mouth of the Shire. Then the Governor appeared on the scene, and an attempt was made to tax the Machingiri inhabiting the left bank, which resulted in a war with them. In the course of it the custom house arranged for with the British Government was destroyed, and from that time constant excuses have been made for not replacing it, while provincial instead of transit duties have been charged, notwithstanding earnest

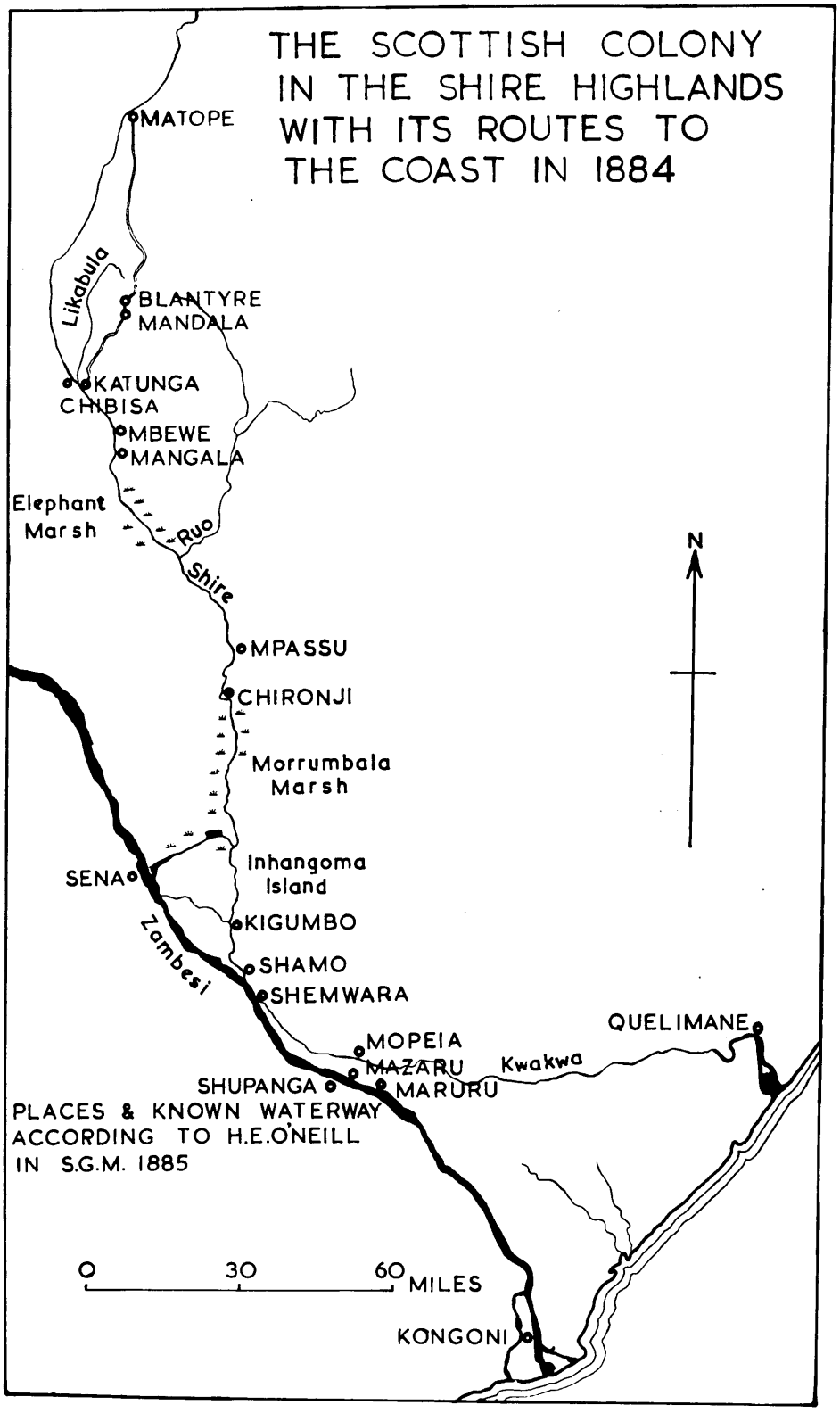
representations/

representations as to such injustice".(38)

The Governor's appearance "on the scene" was in order to lead an attack on the last of the half-caste slave raiders who had been as great a nuisance to the people of Portuguese territory as they had to the inhabitants of the Lower Shire Valley. The result of this attack wwas the occupation of the valley south of the Ruo and the construction of a military settlement at Chironji on the left bank of the Shire about ½ mile below the site of the present Port Herald. From there attempts were made to tax the local inhabitants at the very heavy rate of 7s 6d per head. In 1884 the Machinjiri rose against the taxes and against ill-treatment by the soldiers, and destroyed Chironji together with the customs post. They then advanced down the Zambesi valley destroying a French factory, looting British and Dutch barges and attacking the settlement of Mopea where they surrounded the Opium Company's station.(39) The foreign houses feared that if the Machinjiri were not soon checked the coast natives would rise to join them. A volunteer force was raised whose composition sheds an interesting light on the variety of nationalities then in Portuguese East Africa, for it consisted of 15 Europeans including English, French, Dutch and German under a Scots leader. This force managed to relieve the besieged at the Opium Company's station, consisting of one Scot, 2 Portuguese and 15 "Bombay men",(40) and put the Machinjiri to flight. The war lost the British their customs post, brought a strengthening of the Portuguese forces to prevent any

future/

FIGURE 30


THE SCOTTISH COLONY IN THE SHIRE HIGHLANDS WITH ITS ROUTES TO THE COAST IN 1884
MATOPE
Likabula
BLANTYRE
MANDALA
KATUNGA
CHIBISA
MBEWE
MANGALA
Elephant Marsh
Ruo
Shire
MPASSU
CHIRONJI
Morrumbala Marsh
Inhangoma Island
SENA
KIGUMBO
Zambesi
SHAMO
SHEMWARA
MOPEIA
MAZARU
Kwakwa
QUELIMANE
SHUPANGA
MARURU
PLACES & KNOWN WATERWAY ACCORDING TO H.E.O'NEILL IN S.G.M. 1885
N
0
30
60
MILES
KONGONI

future recurrence, and caused "tremendous losses" to the A.L.C. and the Missions.(40) In the same year traffic on the Lower Shire was further impeded by a revolt of the Makololo chieftains against European authority after the shooting of one of the chiefs by a European trader. This matter was eventually settled by the payments of satisfactory compensation to the paramount chief Ramakukan.(41)

The condition of affairs in 1884 is shown in figure 30, mainly a reproduction of a sketch map by Henry E. O'Neill, consul at Mocambique. British development is confined to the area north of the Ruo. South of that the nearest Portuguese trading station is Mpassu. The state of knowledge of the Zambesi delta is evidently somewhat limited for beside the Kwakwa only the Kongoni mouth is delimited satisfactorily In the accompanying article, O'Neill described Blantyre:(42)

"Goods of almost every description required by the traveller are stored here, and any moderate-sized expedition could be equipped without returning to the coast. Lastly these highlands enjoy so temperate a climate that travellers may benefit more by a short residence upon them than by returning to the more unhealthy settlement of the coast". Goods were conveyed by carriers along the road from Katunga to Blantyre or Matope, the Shire Junction Road, for tsetse fly abounded en route and prevented the use of pack animals.(43) Around the Blantyre Mission people, particularly refugee slaves, were collecting for protection, forming the beginning of the high population density characteristic of the Shire Highlands. Some of these people took up casual employment

with/

with the A.L.C., laying the foundation of the migratory labour problem. There was indeed no shortage of labour around Blantyre, but there was a shortage of carriers at Matunga, partly because the Amang'anja do not like the work since it is considered a woman's occupation amongst them, and partly because of local depopulation, due to Angoni raids. This menace to districts outside European influence was not reduced until after 1889, when the Rev. A.C. Murray and T.C.B. Vlok founded a mission of the Dutch Reformed Church at Mvera in Central Angoniland. (44)

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(1) This quotation together with the other accounts of Portuguese exploration is taken from J. Batalha-Reis, The Portuguese in Nyasaland, Scottish Geographical Magazine, Vol.V (1889), pp. 256 - 268.

(2) David and Charles Livingstone, Narrative of an expedition to the Zambesi and its tributaries, 1858-64, (1865), p. 30.

(3) ibid, pp. 90 - 91.

(4) ibid, pp 92.

(5) ibid. pp. 110 - 11.

(6) ibid, pp. 101 - 02.

(7) R. Coupland, Kirk on the Zambesi, (1928), p. 137.

(8) P. Robertson, The commercial possibilities of British Central Africa, S.G.M., vol.XVI, (1900), p. 239.

(9) Kirk on the Zambesi, pp. 156 - 57.

(10) The best general accounts of the early history of British Central Africa are in:

The Story of Nyasaland, The Central African Archives, Southern Rhodesia (1951), pp. 9 - 34.

Sir H.H. Johnston, British Central Africa (1897), pp. 52 - 159.

(11) /

(11) See David Livingstone, Last Journals, edited by Horace Waller (1874).

J. Stevenson, The Arabs of Central Africa and at Lake Nyasa (1888).

(12) J. Stevenson, The Water highways of the interior of Africa (1883) pp. 11 - 12.

(13) The story of Nyasaland, p. 11.

(14) Ibid, p. 16.

(15) E.D. Young, Nyassa: a journal of adventures (1877) p. 40.

(16) Ibid. pp. 33 - 34.

(17) The story of Nyasaland, p. 14.

(18) Nyassa, pp. 51 - 59.

(19) Rev. Duff MacDonald, Africana, Vol. II (1882) p. 20.

(20) For the development of Blantyre see W.B. Morgan, Blantyre, a Scottish foundation in Nyasaland, S.G.M. December, 1952, pp. 122 - 28.

(21) See F.L.M. Moir, Eastern route to Central Africa, S.G.M. Vol. I (1885) p. 102.

(22) Africana, pp. 20 - 23.

(23) The story of Nyasaland, p. 17.

(24) Ibid. p. 18.

(25) Eastern route to Central Africa, p. 96.

(26) Ibid. pp. 96 - 97.

(27) Kirk on the Zambesi, p. 191.

(28) A. Hetherwick, The Romance of Blantyre, (1931) p. 29.

(29) Capt. F.D. Lugard, The rise of our East African Empire, Vol. I (1893) p. 27.

(30) The story of Nyasaland, p. 19.

(31) L.M. Fotheringham, Adventures in Nyassaland, (1891) p.6.

(32) H.M. Stanley, Central Africa and the Congo Basin, S.G.M., Vol I (1885) p. 10.

(33) J.T.P. Heatley, The port of the Upper Nile in relation to the highways of foreign trade, S.G.M. Vol XI (1895).

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(1895) pp. 573 - 79.

(34) See British Central Africa, pp. 80 - 151.

(35) J. Stevenson, The civilisation of south-eastern Africa (1883?) pp. 14 - 15.

(36) Ibid. pp. 18 and 22.

(37) British Central Africa, p. 80.

(38) J. Stevenson, Great Britain and Portugal in East Africa, S.G.M., Vol.V (1889) p. 372.

(39) Eastern route to Central Africa, pp. 99 - 100.

(40) Note from Dr. Scott, 4th November, 1884, S.G.M., Vol. I (1885) pp. 56 - 57.

(41) Adventures in Nyassaland, pp. 10 - 12.

(42) H.E. O'Neill, Observations in Nyassaland, S.G.M., Vol. I (1885) pp. 428 - 46.

(43) Eastern route to Central Africa, p. 102.

(44) The story of Nyasaland, p. 18.

VII. BUILDING THE COLONIAL PATTERN, 1889 - 1929. - plantation, sternwheeler and railway.

In the year 1889 the whole course of economic and political events in the Shire region was changed. D.J. Rankin announced the discovery of the Chinde mouth of the Zambesi and L. Buchanan proclaimed a Protectorate over the Shire Province, i.e. the country between Lake Shirwa and the Kirk Mountains, the Ruo and Zomba Mountain.

Seven mouths to the Zambesi were already known, but all blocked by difficult bars and some subject to considerable changes of channel or choked by weeds. Of these the Kwakwa was almost exclusively used, and of the rest the Madredane with a Dutch trading post at Conceição, the Mosella or Inhamissengo and the Inhangurue or Kongoni mouth had occasional use. Rankin announced that the Chinde river had a more reliable and less over-grown channel with a bar 7 feet deep at lowest water rising to about 16 feet at highest and nearer the shore line than that of the Kwakwa making navigation easier. Ships could anchor offshore in 4 fathoms for 9 months in the year and unload by means of lighters.(1) This discovery meant that stern wheelers could now operate from Katunga direct to the coast. No longer was the tedious punting of goods along the Kwakwa necessary. No longer need goods be subject to petty annoyances and restrictions at Quelimane, besides an average loss of 60% by value on the Kwakwa due to damage by water or exposure. Somewhat belatedly the Portuguese claimed prior discovery

of/

of the Chinde mouth by G.A. da Silva in 1861,[2] and undoubtedly Rankin was put on the track of his discovery by information from a Portuguese planter working a concession in the delta.[3] Nevertheless to Rankin belongs the credit of making an announcement vital to the future of British Central Africa.

Whilst Rankin was engaged in the delta the Portuguese sent an expedition under Major Serpa Pinto and Lieut. Coutinho up the Lower Shire Valley.[4] The party advanced up the right bank where at Mpatsa just below the Ruo they were attacked by the Amang'anja under Mlauri, one of the Makololo chiefs. These they defeated, then crossed to the left bank and reached the Ruo. Here Lieut. Coutinho led an attack on Chiromo and built a fort there, afterwards advancing to Katunga where preparations were made to attack Blantyre whither the Makololo chiefs had fled. Johnston claims that a"Mr. S..." of German birth (presumably Eugene Sharrer, a naturalised British subject, owner of a plantation and a trading company) had been attempting to conclude treaties with the chiefs by which they were to yield to him their sovereign rights. The combined events precipitated the proclamation of the Protectorate on the 21st September, 1889. The British Government presented an ultimatum to the Portuguese Government and the Serpa Pinto expedition was recalled. In 1890 it was decided to declare a Protectorate over the regions adjacent to Lake Nyasa and the River Shire to be administered by a Commissioner (H.H. Johnston) and to place the rest of the "Sphere of Influence north of

the Zambesi" under the charter of the British South Africa Company with Johnston as Administrator. By the Anglo-Portuguese Convention of 1891 British rights in the above territory were recognised by the Portuguese and a portion of the right bank of the Shire below the Ruo junction was allotted to the British in exchange for a strip of territory to the west of the Shire basin. In addition a British concession was established at Chinde and the post of Port Herald founded on the southernmost firm ground on the British section of the right bank of the Shire. Military forces were strengthened by the arrival of 70 Sikh and Mohammedan volunteers, the commencement of the Indian minority. Sixteen years later, in 1907, came the final measure establishing government in its present-day form, when by Order-in-Council the title of the head of administration was changed to Governor and of the country to Nyasaland.

With the establishment of full governmental authority backed by armed force plus an adequate route to the coast, economic development of the Shire Province began. The native peoples benefited by this combined advance of missionaries and settlers, but not as producers for they were regarded only as a reservoir of labour for the Europeans. The settler came not as a farmer, but as an employer of native labour. Native interests became subordinate to the interest of the European whose aim was to amass enough capital for future retirement in Great Britain. Livingstone's work in Central Africa was now leading to new and unexpected results. In 1878 Jonathan Duncan introduced a

coffee/

coffee plant of the Mocha variety from the Botanical gardens at Edinburgh. This was cared for by John Buchanan who had joined the Blantyre Mission in 1876 as lay member in charge of horticultural work. From this plant 400 seedlings were eventually reared and in 1883 14½ cwts. of coffee were produced.(6) Henry Henderson of the same Mission introduced Liberian coffee seed in 1887 and later the two Moir brothers brought in Jamaican varieties.(6) In 1880 Buchanan left the Mission and began as a coffee planter on the Mlungusi Estate at Zomba, about 40 miles north of Blantyre, and there seven years later he was commissioned by Consul Hawes to build the Government ~~Railway~~ Residency, thus making Zomba the capital.(7) Hawes' motive in moving to Zomba was to be nearer the slave routes and thus "keep an eye on" traffic which he claimed it was his duty to watch.(8) In 1889 Sharrer began planting and he was followed from 1890 onwards by numerous others who grew coffee chiefly round Blantyre, where Buchanan also developed the Michiru Estates, and later to some extent round the base of Mount Mlanje. Coffee boomed, and its success became the foundation of the wealth of the Protectorate. A cattle trade began, for manure was needed to promote the growth of the coffee plants, besides the demand for the "secondary" products, meat and milk. The African was able to obtain plantation work and employment as carrier or road builder on a grand scale. In exchange he lost extensive acreages which were aquired by the

A.L.C./

A.L.C. and other companies by treaties with the chiefs - although the "squatter's" or tenant's position on these lands was recognised and the rights of both tenant and landlord eventually defined by the Private Estates Ordinance, of 1928. As early as 1904 a Lands Ordinance provided for the creation of native locations on private estates in Shire Province and arranged the allotment of garden land at 8 acres per family, the proportion of the allotments made not to exceed one tenth of the whole, and to be rented from the landowner at 4s. per year per family or 6d. per acre.(9) There has never been any segregation policy in the Protectorate. The African was never confined in Reserves, but he was made to pay a hut tax of 6s. and later a poll tax. To collect the hut tax the British Central Africa Protectorate, as it was called in 1893, was divided into districts each under an officer or "resident" and British currency was introduced thereby starting the destruction of the old barter economy. The remainder of the revenue was made up by customs duties, a tax on firearms, and the sale of postage stamps.(10) The Lower Shire Valley was divided into three districts ruled from Port Herald, Chiromo and Chikwawa, whilst the adjacent portions of the Shire Highlands were ruled from Blantyre.(11) In 1912 district organisation was completed by an Ordinance providing for the subdivision of districts into sections each ruled by an appointed Chief and for the greater concentration of families in compact villages. In 1891 1600 acres were cultivated by Europeans and in 1896 5700 acres.(12) By the latter year about 300 Europeans had settled in the

Protectorate/

Protectorate, nearly all of whom had arrived since 1890, and of these 119 were Scots and 123 English and Welsh. In addition, there were 263 Indians of whom 56 were traders, and all except 14 British Indian subjects.(13) The Indians stepped into the rôle of middlemen acting as intermediaries between the Europeans and the Africans in commercial matters Few European companies would undertake the task. Thus the foundations of a caste system were laid.

With the exception of the John Chilembwe revolt in 1915, the sinking of the Herman von Wissman in Lake Nyasa in 1914 and the border incidents of the 1914-18 war, warfare ceased in the Protectorate after 1897 and south of the Lake country after 1891. The southern districts were at peace and in that peace commercial activity thrived. Blantyre became an entrepôt for traffic along the Lakes route and a market for the new coffee crop. Johnston described its appearance in the 1890s:

"It seems hardly correct to speak of it as a town, as the houses are still very scattered, yet it is now constituted as a township and rather well laid out with roads".(14) He referred also to the numerous coffee plantations round the town and to their tendency to move away in order to avoid contact with the "urbanised native". With the loss of the old native handicrafts, the creation of a demand for cash, and the commencement of European enterprise, labour began to flock to Blantyre and to the plantations in search of temporary work. Lugard remarked that the wages at this period were 3s. - 4s.

per/

per month for unskilled labourers, 4s. - 10s. for artisans, and 2s. - 3s. for women and girls. To earn these sums labourers would come from as far afield as Angoniland, walking some 300 miles for 6 month's work. During their employment they would live on their own food in order not to expend the cloth which they received in payment. When this food was finished they would work overtime cutting fuel or grass to sell for food.(15) The Angulu of the adjoining portions of Portuguese East Africa came in great numbers in hope of better conditions:

..."for many years refugees from other parts of the Protectorate have been gathering round the Mission station, the Lakes Company, Sharrer's Traffic Company and other large employers of labour, all of whom have brought men down from the lakes and up from the Zambesi, who have gradually made their permanent homes in Blantyre".(16)

Thus a movement which had originally been to the Mission stations in search of protection had now changed to the commercial centres in search of work. Most of the labour returned to the land for each rainy season, but a few remained to develop gardens near the place of their European employment. From this small beginning came a change in the pattern of native population density leading to the great concentrations around the European towns. By 1945 the highest density in Nyasaland occurred in Chiradzulu District lying between Blantyre and Zomba and with a population numbering 310 per square mile.

Road-making and repairing consumed a large part of

the/

the labour force, for Blantyre was totally dependent on the road communications to Katunga and Matope, and these, being of earth heavily used and severely battered during the rains, were in constant need of reconstruction. Johnston remarked on this point:

"As far back as 1891 we had commenced road-making. Captain Sclater had begun to clear a road from Chiromo to Zoa, with the intention of ultimately carrying on this road to Mlanje in one direction, and to Blantyre and Zomba in another. It was found, however, to be of more urgent need to the community that the road between Katunga and Blantyre should be made passable for waggons. Consequently Captain Sclater undertook the reconstruction of the Katunga road, which proved to be a very lengthy and expensive business and is not yet finally completed".(17)

From 1890 onwards the maximum depth of the Shire was reduced yearly and the period during which vessels could reach Katunga decreased with consequently a lessening in the value of Sclater's road, since goods were carried by alternative routes from other points further downstream, notably from Chiromo. By 1903 there was no water in the Shire between Lake Nyasa and the Ruo after July and water carriage was impossible above Vila Bocage during the dry season and above Chiromo during the wet.(18) By this time 3 traction engines and 2 motor waggons were in operation on Sclater's road, so the attempt was made to construct a road from Katunga to Chiromo to speed up supplies, instead of sending goods by the direct route from Chiromo which necessitated

the/

use of carriers.(19) By this time cotton had become a valuable export crop and the new road was thought necessary to get the cotton out before the following wet season.(20)

The greater the productivity of the Protectorate, the greater were the labour requirements of the plantations and of the road repairing and carrying organisations, with a resultant worsening in the difficulties of the colonists. At the same time the volume of transit traffic increased demanding still more carriers. The use of horse or ox drawn carts was possible in the Shire Highlands, but in the Lower Shire Valley was precluded by the existence of small belts of tsetse fly across the main routes. All loads had to be divided into 50 - 60 pound lots and conveyed on the heads of the natives until the introduction of mechanical transport at the turn of the century, and even then such transport was only feasible in the dry season and did enormous damage to the roads necessitating more labour for repair works. In 1900 it was complained that theemployment of carriers was ruinous to planting and other developments as three-quarters of the labour supply was used in the process.(21) The objection, however, was chiefly to wet season carrying for normally in the dry season there was a surplus of labour. Thus the planters' complaint of shortage of labour due to carrying was rather misdirected for the transport companies made their greatest labour demand at the time of highest water on the Shire, i.e. at the end of the wet season and the beginning of the dry, and also after the coffee and cotton harvests in September and October, and not throughout

the/

the wet season. During the period vital to the planter the native prefers to hoe his own garden. To work on a European estate he must become virtually landless and divorced from his village and tribe. Plantation farming is still short of labour to this day and for precisely this reason. The same difficulty, incidentally, has also militated against the success of the Groundnuts Scheme which makes enormous labour demands at harvest time when naturally the native prefers to gather his own crop. At Urambo only half the 1951 groundnut crop was gathered for this reason combined with the failure of mechanical pickers imported from the United States to overcome the labour shortage. However, there can be little doubt that the economic development of the Protectorate made too great a demand on its labour resources. The carrying organisations and the planters were both forced to raise wages in order to attract labour, and the increasing costs of production and transport eventually almost brought economic expansion to a standstill. In 1901 Sir Alfred Sharpe, commissioner of the territory, remarked on the Lakes route:

..."this route into Central Africa is becoming a favourite one for large portions of German Africa and the Congo Free State, the great bulk of the native population is now occupied in carrying loads of merchandise from the Lower Shire through the highlands to the upper river, a distance of some seventy miles. Natives prefer work of this description to work on plantations".(22)

For carrying a 60 pound load from Katunga to Blantyre, a distance/

distance of 26 miles involving a climb of 3000 feet, carriers received only 9d. For a distance of 30 to 40 miles the normal wage was 9d. plus one yard of calico valued at 2½d in lieu of food.(23) In 1900 it was estimated that 80,000 natives were required as porters, and that even this total was hardly sufficient for in November there were 100,000 loads lying at Katunga, some of which had remained there for over a year.(24) An added difficulty was the objection of many of the local Amang'anja to carrying, with the result that the bulk of the carriers was recruited from Angoniland over 300 miles away.(25) The notebooks of the District Commissioner at Chiromo record that by 1904 all imports to the Protectorate passed through Chiromo and "in years of exceptional drought" goods were carried overland to Blantyre, a distance of 70 miles. Such conveyance needed the regular employment of 2000 carriers covering 15 miles per day at a cost to the Protectorate each day of 3d. per head. Whilst the cost to the Protectorate was great and eventually provoked the construction of alternative routes from these parts of the interior previously served by the Lakes route*, the wages were in fact low compared with those of Southern Rhodesia and South Africa.

Likewise/

* The first serious decline of transit trade was in 1904 when the value dropped from £71,779 in the previous year to £40, 206 due partly to the limitations of the Shire transport system and partly to the desire of the colonial authorities affected to develop their own routes and thereby gain a measure of independence. The Katanga and Western Tanganyika began importing via the Congo, German territory around Lake Nyasa developed a direct route to the coast, and north-eastern Rhodesia was supplied via Tete. See Report on the Trade and General Condition of the British Central Africa Protectorate 1903-4, Cd. 2242, p.5.

Likewise the wages paid by the planters were lower than those offered by their southern counterparts and particularly by the big mining enterprises developing on the Witwatersrand and in the Rhodesias. As early as 1901 employers south of the Zambesi were endeavoring to draw labour supplies from the Central Africa Protectorate with the offer of higher wages.(26) In 1903 official permission was given for the recruiting of men in Nyasaland for work in the Transvaal mines and 936 went under agreements for 12 months.(27) A movement of young male workers was thus begun increasing in volume from year to year. British Central Africa or Nyasaland, although the first of the plateau African colonies had no mines and only a limited development of plantations due partly to a shortage of suitable land for the white settler and partly to the immense cost of export. Moreover, the main tide of employing white colonisation was from the south, and it was to the south, therefore, that the native of this densely populated territory looked. The minerals of the Rhodesias and of the Union could withstand the high costs of transport and laid a firm foundation for the eventual cheapening of freightage rates. At the same time they provided local markets for agricultural enterprise enabling the planter to pay higher wages than his Nyasaland neighbour. The increase in Nyasaland's native population, the demand for cash, the loss of the old crafts coupled with the idea of testing one's manhood by making the journey south brought this vast exodus- the greatest from any one territory in Africa. In 1904 it

was/

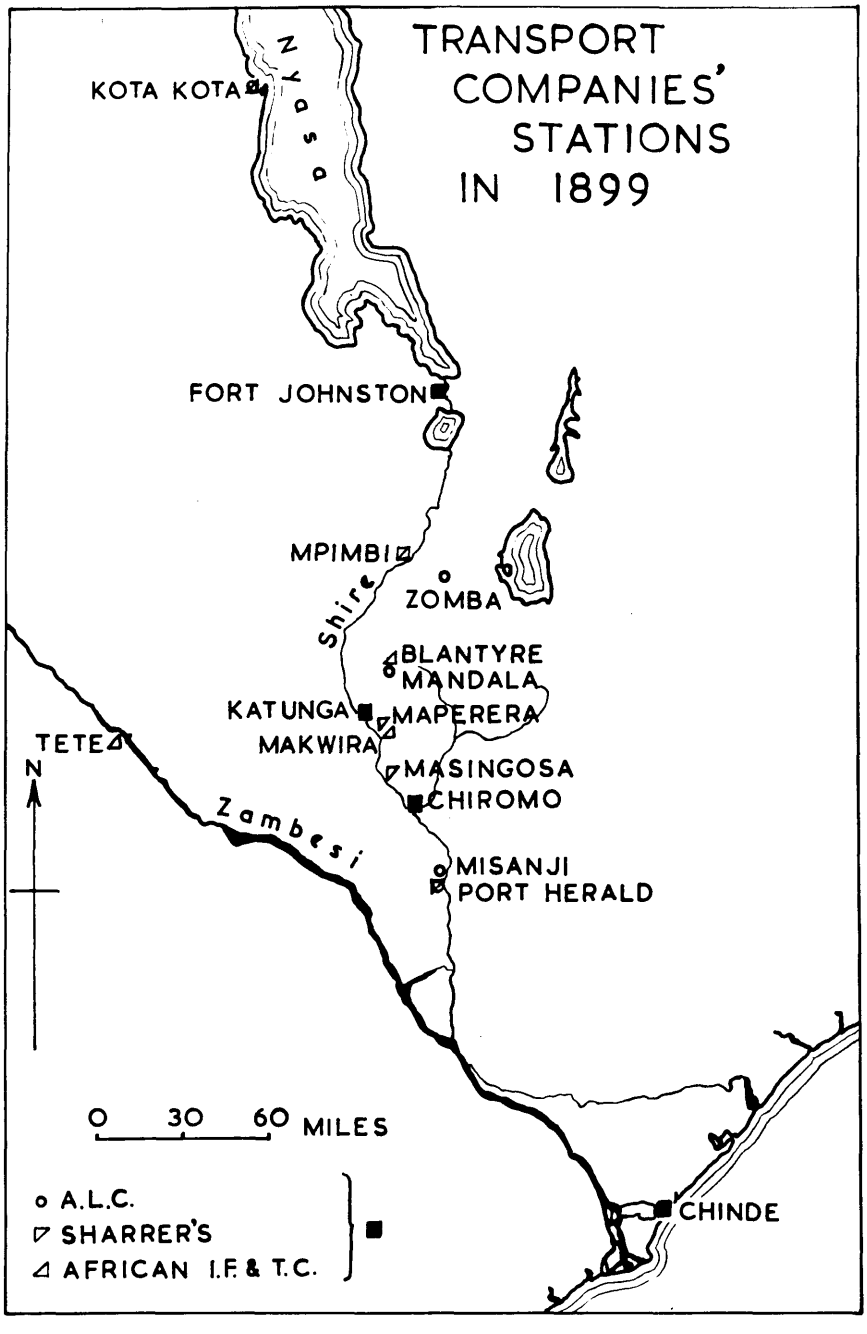
was decided to allow the departure of 5000 more men, but solely from the cooler areas and away from the Shire Highlands, i.e. chiefly from Angoniland and the district around the Lake. During the same year it was estimated that 9000 more men found their own way, chiefly to Salisbury and Buluwayo, whilst between 5000 and 6000 men moved from Central Angoniland to northeastern Rhodesia. The distance to Salisbury from Central Angoniland is only 320 miles compared with 300 miles to Port Herald, at that time offering the largest wage rate in the Protectorate for the purpose of railway construction, but still lower than the wages obtainable at Salisbury. The wage per month for unskilled labour in 1904 was 3s. - 4s. in the Protectorate compared with 5s. - 6s. in north eastern Rhodesia, 15s. - 30s. in Southern Rhodesia, and 45s. in the Transvaal.(28) Between July and December of 1905, 1714 natives were recruited for work at Johannesburg and since the Shire was unusable above Vila Bocage were made to walk to Fort Jameson and thence 450 miles to the rail head at Hartley. Of these,1549 arrived out of whom in one year 119 died. In the same year it was estimated that over 9000 natives had crossed the Zambesi at Feira in search of work.(29) The unsuitability of the Nyasaland native for labour in the differing climatic conditions, combined with the need to reduce the volume of the exodus, resulted in the forbidding of recruitment in the Protectorate for the Witwatersrand mines in 1914. The result was merely to increase the flow elsewhere, particularly to Southern Rhodesia and the Sena sugar estates of Portuguese East Africa, and large

numbers/

numbers continued to enter the Union unofficially. In the Protectorate the effect of this annual loss of a portion of the best labour was to aggravate further the difficulties of the planters and of the transportation companies. The costs of both rose still further, and in 1913 the Agricultural Department was engaged in experiments in the introduction of labour saving devises, in particular in the attempt to introduce stumping and disc ploughing in place of hoeing, thereby cutting down the amount of labour needed to prepare the ground for planting.(30) Moreover, this new type of labour migration was not seasonal, but by periods of a year or more. The task of gardening was in many cases now left entirely to the womenfolk who were thereby forced to assume the men's duties in addition to their own with in consequence a deterioration in the productive capacity of those areas affected, besides adverse social effects due to the absence of young men from the villages.

The labour difficulties described above were not the sole cause of the high cost of export from the Protectorate at the turn of the century. The high prices charged by the shipping companies operating on the Shire and Zambesi combined with the fluctuations in the level of the Lower Shire shared the responsibility. Rankin's discovery of the Chinde mouth was quickly exploited by the commercial companies. The concession at Chinde became the chief entrepôt for British Central Africa and for the Zambesi and Lakes districts. In 1893 Rankin was able to comment that in the port of Chinde, where he had camped only four years before, could sometimes

FIGURE 31



VESSELS USED IN 1899

	STERN WHEELERS	BARGES	CAPACITY (TONS) STERN W.	CAPACITY (TONS) BARGES	STEAM TUGS	STEAM LAUNCHES	BUILDING STERN W.	BUILDING BARGES
A.L.C.	5	36	250	850	1			
SHARRER'S	2	28	75	885		2	2	4
AFRICAN I.F. & T.C.	3	17	105	505			2	4

ACCORDING TO S.H.F. CAPENNY IN S.G.M. 1901

be seen 4 or 5 sea-going steamers with a fleet of steam river craft. Between Katunga and the coast there were then operating 3 steamers of the African International Flotilla and Transport Company, 2 of the African Lakes Company or Corporation as it was known after 1893, 4 Portuguese vessels plus 2 other steamships and 2 British gunboats.(31) Clearly the port of Quelimane had lost its Central African traffic, and its monopoly was now replaced by another based on Chinde. The success of the attempt to establish export crops in Central Africa was entirely dependent on the work of a few steamship companies of which by 1899 there were only 3 of any great importance and with only slight differences all charging the same exorbitant rates. Figure 31 shows the trading posts and the number of vessels together with capacities operated by the companies in 1899. The type of vessel used was a stern wheeler drawing between one and two feet of water. The latest model in 1899 was 85 feet long with an 18 feet beam. It could carry 20 passengers and 20 tons of cargo and in addition tow 2 barges each carrying 20 tons and attached one on each side of the steamer.(32) The freightage rate charged for such a vessel from Chinde to Katunga was £5 per ton or 4½d. per ton mile (downriver freight less by 25%) compared with 6d. per ton mile plus 5s. per ton, the cheapest rate on the Beira and Mashonaland Railway.(33) The rate, therefore, was not unfavourable compared with that of the railway system of Southern Rhodesia; but it is to be doubted whether the costs of maintaining the river craft were so high that the rate should be approximately

three-quarters/

three-quarters that of a newly opened African railway. By 1904 the rate had been lowered to £2.10.0d. per ton from Katunga to Chinde, compared with £2 at cheapest from Chinde to Liverpool. The additional cost of carriage from Blantyre to Katunga amounted to the enormous rate of £2 per ton.(34) Against the freightage rates of the river craft one also has to take into account the time taken over the journey amounting to an upstream total of between 8 and 10 days in the dry season and about 5 days in the wet season with slightly lower totals downstream.(35) River conveyance was clearly easiest at the end of the wet season whilst the connecting road conveyance was easiest in the dry season. The coffee and later the cotton crops needed to be moved towards the end of the dry season with, as a result, delays at the connecting points between river and road traffic and the piling up of loads at Katunga and Chiromo. Added exasperation was produced by the decline in river levels so that after 1904 Chiromo became the wet season head of navigation whilst the dry season limit was at or just north of Vila Bocage from where goods had to be punted upstream in canoes and light barges. From 1906 to 1908 immense quantities of sudd were brought into the Lower Shire, and gangs of men had to be employed on the task of keeping open a channel for the river craft.(36) A final difficulty was the condition of the port of Chinde. By 1899 Chinde had a total resident population of 1245, of whom 78 were British, 42 Portuguese, 7 German, 54 Indian, 19 Zanzibari, 545 Portuguese native and about 500 British native. The British concession of

25 acres leased in 1892 was, however, subject to continual washaways and a new concession had to be granted by 1899 since the old frontage had almost totally disappeared.(37) The cost of replacing wharves and warehouses proved great, and, in addition, the bar at the entrance did not prove as safe as Rankin had forecast, for it was subject to changes and by 1899 had to be "improved".(38) The disadvantages encountered were so great that as late as 1900 it was proposed to resuscitate the old Kwakwa route from Quelimane by constructing a canal from the Kwakwa to the Zambesi at Mazaro.(39)

All the above difficulties of labour and navigation united together to create a demand for a railway to expedite the passage of goods at all times of the year. In 1893 a charter was granted to a company to construct a railway from Quelimane to Shamo thus reviving the trade of Quelimane by drawing to it traffic from both the Zambesi and the Shire valleys.(40) The Nyasa Company of Portuguese East Africa was at about the same period under obligation to construct a line to Lake Nyasa.(41) However, neither line was constructed and nothing more heard of them with the excpetion of a note in "Le Tour du Monde" of 23rd December, 1905, that the Portuguese Government had decided to construct a line without delay from Quelimane to Port Herald in order to avoid the disadvantages of navigation on the Zambesi, and another note quoted in the Scottish Geographical Magazine of 1906 that a British company had projected a line from Porto Amelia to Porto Arroyo on Lake Nyasa.(42) In 1895 a company was formed to build a railway across the Shire Highlands

from/

from Mapere to Mpimbi and thus do away with costly road haulage. A survey made by Grieve Macrone in 1895 and 1896 claimed to show that the best route was from Chiromo by the valleys of the Ruo, Tuchila and Luchenza to Blantyre and thence to Mpimbi. A climb of 3800 feet was envisaged with no gradient steeper than 1 in 40, and a 2 feet 6 inches guage recommended. It was hoped that the Portuguese would construct the proposed railway from Quelimane to link with the Shire Highlands line and thus provide a quick route for passengers through the fever-ridden lowlands.(43) However, in 1897 the Government undertook its own survey and whilst agreeing broadly with Macrone's route, recommended a 3 feet 6 inches guage in order that rolling stock should be interchangeable with that in operation on the Beira and Mashonaland Railway and in South Africa. By 1901 contracts were concluded between the Imperial Government and the Shire Highlands Railway, Nyassaland Ltd., to construct the line to Blantyre with provisions for an extension to Lake Nyasa. It was commented at the time that the railway would:

...."connect the centres of the coffee industry with the sea by way of the rivers Shire and Zambesi, and will also benefit the chief industries of the country by releasing for labour in the plantations the natives who have hitherto been engaged in transport work; and when the Lake Nyassa extension is built, a valuable trade route of nearly 1200 miles in length will have been established through the heart of the lake country".(44)

By 1903 the task of construction from Chiromo was under way.(45)

Labour/

Labour difficulties were encountered and partly relieved by the use of the Caillet mono-rail system already employed by the British Central Africa Company between Blantyre and the Upper Shire. Blackwater fever and malaria took a heavy toll of the European employees, whilst the difficulties of bringing material up the Shire added to the annoyance of having to cease work at the commencement of every wet season. The demand for lime by the construction company resulted in the quarrying of the Karroo limestones of the Port Herald Hills at Lulwe and at Mkuche north of Malawe. This industry later disappeared owing to the lack of sufficient local demand and the high cost of transport from the quarries to the railway* By 1906, 11,000 men were employed by the railway company, and Chiromo and Port Herald had grown into small townships rivalling Blantyre in size. A temporary track had been laid from Chiromo to Port Herald by 1905 in order to facilitate the passage of railway stores and materials. By 1907 the line was completed to Blantyre and work begun on a bridge with a central lifting span across the Shire at Chiromo in order to give direct connection with Port Herald. The uncertainty of river transport led to the demand to extend the line to the Zambesi, for inevitably the bottle

neck/

* The only lime burning industry working in the valley today is based on a calcite outcrop at the western foot of Nyamasa Hill approximately half-way between Megaza and Chilomo in Portuguese territory.

bottle neck at Katunga was now transferred to Port Herald where in 1911 300 tons of grain were lost due to too long storage. Accordingly a contract to construct such a line was concluded in 1913. This railway from Port Herald to Chindio - the Central African - was built by 1915, but already it had been suggested that an extension should be made to Beira offering the best port facilities on the south-east African coast, as Chinde port was badly eroded and the bar too shallow. With the construction of the Trans-Zambezia Railway in 1922 from Murraca, opposite Chindio, to Dondo where it met the Beira Junction Line, a direct route to Beira was opened. This railway took over the stern wheeler fleets of the British Central Africa Company and of the African Lakes Corporation in order to eliminate competition, provide vessels for a ferry across the Zambesi, and maintain a supply of coal from the Benga coalfield at Tete. Washaways constantly changed the sites of the ferry points on the Zambesi and the crossing occasionally took as much as ten hours. In 1927 it was suggested that a bridge be built and this the longest railway bridge in the world (2 and three-quarters miles) was completed in 1935. The threat of disturbance from the Zambesi and Shire, however, was not entirely avoided. In 1927 communication between Port Herald and Chindio had been broken by washaways whilst Chiromo was converted into an island necessitating transport of goods by ship to a point about 4 miles up the Ruo. (46) In 1948 floods swept away the bridge at Chiromo and forced the employment of ferries until the erection of the present structure in 1950.

The/

The railway exit for export products did not bring cheaper transport except in so far as it operated over former carrier routes. Its advantage was that it was more reliable and faster. In 1913 steamer freightage rates per ton between Port Herald and Chinde, a distance of 200 miles, were £2.15s. upstream and £1.5s. down, compared with a railway rate for the 113 miles between Port Herald and Blantyre of £3.3s. both ways with a slight deduction for export goods.(47) In 1933 it was commented that the export of tea from Nyasaland competed unfavourably with that from India owing to higher transport charges. Shipment to Beira plus port charges cost 1.04d. per pound compared with 0.38d. from Assam to Calcutta, 0.23d. from Sylhet and 0.28d. from Dooars.(48) With the completion of a railway extension northwards to Lake Nyasa in 1934 - a line which avoided the capital, Zomba, in order to provide an outlet for agricultural districts north-west of Blantyre - Blantyre became the focus point of a transport system which had entirely replaced river traffic. Of a total European population in 1911 of 766, most were in or near Blantyre which with the strong influence of the Scots missions and of the A.L.C. was still predominantly Scottish. Of the 1911 total 273 were Scots compared with 237 English, 37 Irish and 10 Welsh. As yet the Indian total of 481 was still less than that of the Europeans. The new railway did not give Blantyre the added importance it might have expected. The railway company established its headquarters and works on the banks of the Limbe stream, the first major source of water crossed en route southwards

from/

from Blantyre, thereby gaining an independent source of water and adequate space for the many buildings and large native compounds needed. Since it became customary for trains to wait an hour at Limbe, the station there became in effect the station for Blantyre. The customs authority found it more convenient to have its headquarters at Limbe, and convenience with regard to loading goods led to Limbe's acquiring the tobacco auction floor and the headquarters of the Imperial Tobacco Company. Blantyre lost the lead in commercial importance to Limbe as it had already, in 1887, lost its administrative authority over the whole Protectorate to Zomba. It became a residential town whose chief significance is its function as the administrative centre of Southern Province, the most important commercially, and as the seat of the high court. The railway also reduced the importance of the Lower River districts since goods now passed through them instead of requiring handling at Port Herald and Chiromo, whilst the old port facilities provided at both these towns and at Katunga fell into disuse. Katunga became completely by-passed and there is little there now to mark its position as once the most important loading station in the Protectorate. The old port of Chinde similarly fell into decline. Although badly damaged by a cyclonic storm in 1922 it has still been able to command enough trade to continue existence, dealing with part of the Tete coal traffic and being still the headquarters of a few Portuguese stern-wheelers assisting in the movement of the Lower Shire Valley cotton crop. Port Herald and Chiromo which by 1913 had become flourishing townships with

revenues/

revenues and expenditures greater than those of Zomba, and even possessing hotels, ceased to be townships after 1918 when their function became merely those of markets and sub-administrative centres. Before the railway was built plantation sites along the banks of the Lower Shire had been valuable despite the hotter climate and aside from any question of soil fertility, for such sites were directly connected with the only means of exit from the territory and goods from them could avoid the "bottle-neck" of Sclater's road and Katunga. After the construction of the line to Chindio, however, such sites had no greater advantage for the export of goods than sites in the Shire Highlands, and great importance was now attached to the development of land in the southern portion of the Highlands previously considered too far from the commercial focus of Blantyre. Districts between Blantyre and Zomba had their export prospects improved by the construction of a macadamised road linked directly with Limbe. Thus the result of the new transportation system was in effect a greater centralisation of plantation development, and this was assisted by the types of crop introduced into the territory following the decline of coffee. Gradually the planters deserted the Valley for the higher ground. This new phase of development was of vital importance to the Lower Shire Valley and to the adjacent highlands outside Portuguese territory for it served to distinguish the two areas from one another in the extent of the contacts between native and European. The result was eventually to mark off the British section of the Lower Shire Valley as an

experimental/

experimental ground for attempts to raise the standard of native productivity outside the possibility of interference from European planters. Thus a further contrast was added to differentiate the Amang'anja and Asena of the lowlands from the Anyanja and Yao of the hills.

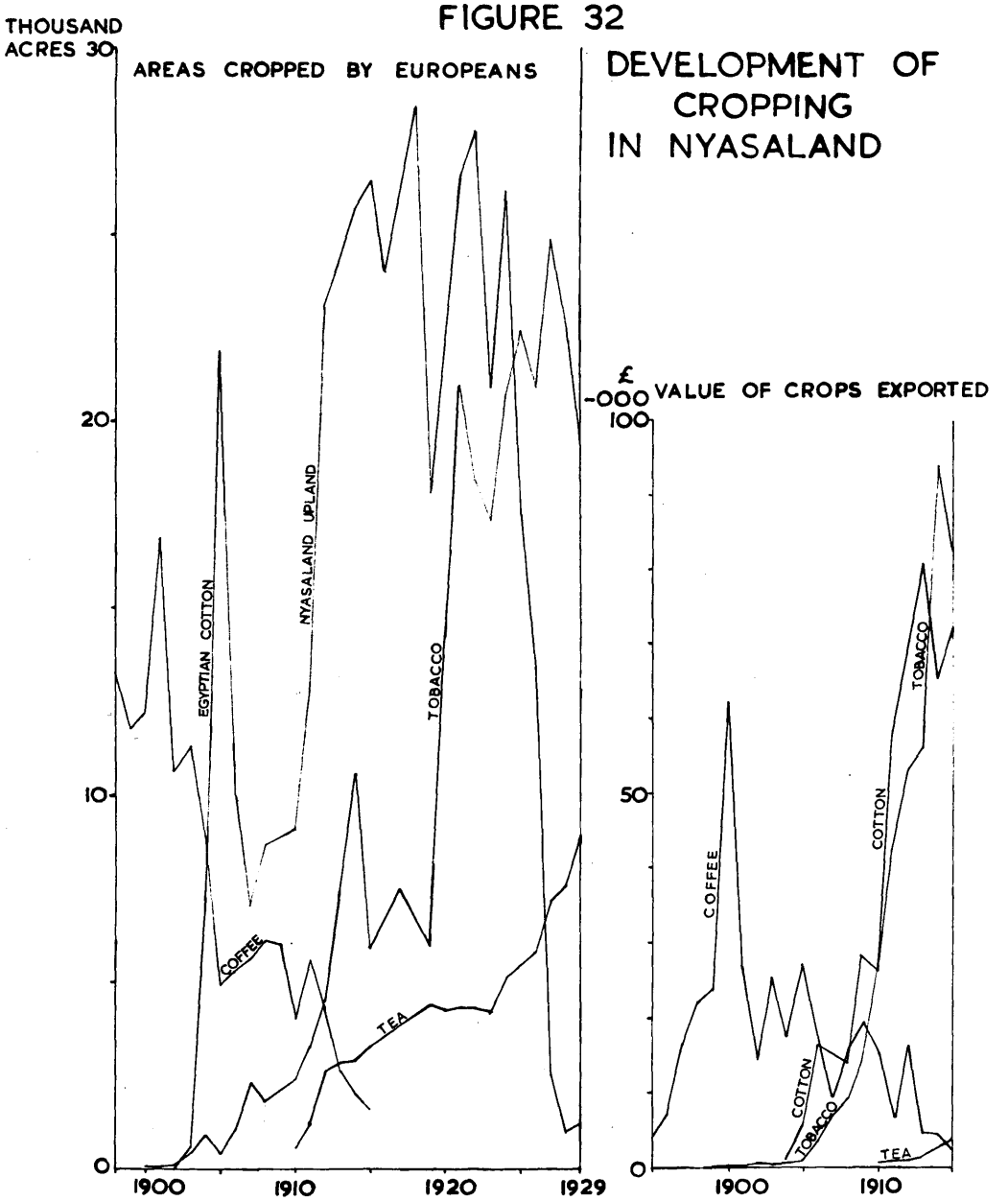
From the first few plants introduced by Buchanan and others coffee growing became the major export industry of the Protectorate (49). The bean was valuable enough to withstand the high cost of transport to the coast, whilst in most years the climatic conditions proved excellently suited for the production of a high quality product. In the early 1890's there seemd to be no limit to the possibilities of coffee production and the prosperity of the white settler in British Central Africa. Expansion of coffee growing was in consequence rapid and outside support from the Imperial Government the finances of the Protectorate became dependent on the fortunes of one crop. The exports of this period consisted of coffee, ivory, rubber, hippo teeth, beeswax, oil seeds and strophanthus (a wild creeper, the source of a drug valuable in certain diseases of the heart). These paid for less than a third of the imports consisting chiefly of alcohol, arms and amunition, hardware, provisions and cotton goods (50). In 1896 the coffee export was valued at just over £7,000 or £2,000 less than that of ivory. The following year the coffee export was greater than that of ivory by £12,000 and in 1898 the three leading exports were coffee £22,402, ivory £2,478 and rubber £1,045. In 1898, however, coffee growing received a set-back. The dertimining factor in the growth of the crop

is/

is the time at which the first rains commence. If these are late the crop is short, and in that year the October - November rains failed altogether. The following year saw a reduction in the area under coffee. In 1900 the area under coffee reached its peak of 17,000 acres and conditions for production were good. A number of bad years followed and in 1904 a glut in Brazilian production led to a severe drop in coffee prices ruining many of the growers, especially those producing a low quality bean at altitudes below 3,000 feet. There were other contributing factors to the decline in the coffee industry. The coffee tree tends to deteriorate after the first 5 years of bearing, and little or no attempt was made to replace old trees by younger stock. On the whole there was insufficient manuring, not enough attention paid to the provision of shade trees and finally the crop suffered from the attacks of the white stem borer. In Portuguese East Africa on the slopes of Morrumbala Mountain disease brought the ruin of the coffee plantations of the Zambezia Company which were abandoned by 1914. These dated from 1894 when the Zambezia Company received concession of the prazos or districts east of the River Shire, and combined coffee growing with a timber industry. (51) In Brazil the coffee growers had moved westwards to new land when the yields declined. In the highlands draining to the Shire this was impossible. There were other lands, but these were further from the Shire or the railhead, and transport was mostly by carriers at enormous cost instead of by waggons drawn by mule teams. Besides, a new crop had been found commanding better prices and more

able/

FIGURE 32


THOUSAND ACRES 30
AREAS CROPPED BY EUROPEANS
DEVELOPMENT OF CROPPING IN NYASALAND
20
10
0
EGYPTIAN COTTON
NYASALAND UPLAND
TOBACCO
COFFEE
TEA
1900
1910
1920
1929
£ -000
VALUE OF CROPS EXPORTED
100
50
0
COFFEE
COTTON
TOBACCO
TEA
1900
1910

able to withstand the uncertainities of the climate - cotton. It was the introduction of this crop which finally dealt coffee growing its death blow, for varieties of cotton were eventually produced which could be grown on the same lands. Figure 32 shows the replacement of coffee by cotton both in area and in export value. Before discussing the development of cotton growing, however, it would be well to mention certain crop failures of the coffee period. All these shared one factor in common - they were concentrated mainly in the Lower Shire Valley away from the chief urban centre and in a climate tolerable to only a few Europeans. The most notable failure was rubber. This was obtained from the wild Landolphia vine and from plantations of Ceará rubber. By 1899 the export of this product was valued at £13,000, but thereafter a drop in prices discouraged production. After 1914 when 10,500 acres were under Ceará, chiefly in abandoned coffee gardens, output steadily declined against the competition of the Malayan product, and in 1921 cultivation was finally abandoned on the sole surviving rubber estate of Nyatando in Port Herald District. The difficulty was chiefly that the industry in the Protectorate was too limited in scope to provide the proper grading and care possible under the large scale but better organised system in Malaya. At the turn of the century the attempt was made to grow oil seeds in the Lower Shire Valley. The cost of transport made it impossible to grow these further inland than Chiromo, and it was the cost of transport which proved the undoing of the growers combined with the introduction of the more remunerat-

cotton and a lack of care under European methods of production compared with the methods used by native growers (see the quotation from J.S.J. McColl on ground-nut cultivation, p. 50). Attempts were made to cultivate local fibres, notably Denje (Sida rhombifolia) and Sanseviera. These products failed to replace either jute or hemp in the British market, and moreover the efforts to grow them were made at a time when the world prices of fibres were too low to make experiment worth while. Success in fibre production did not come until after 1918 with the development of sisal plantations. Citrus fruit production has also been tried, but whilst it succeeded in the Shire Highlands it failed in the British section of the Lower Valley. However, on the Portuguese side of the Shire citrus growing has succeeded remarkably well and no European settlement is without its local supply of oranges.

Cotton proved like coffee a boom crop. The first plantings were made with Egyptian varieties, chiefly Ashmouni and Mitaffifi. These were best suited to floodland conditions and therefore might have been expected to be most successful in the Lower Shire Valley. Accordingly large estates were bought in the Lower River District and put under cotton. There was the advantage here that the crop when harvested could be made up into bales of 300-400 pounds whereas in districts away from the river, rail or good road communication and therefore needing carriers the bales were limited in size to 50 pounds. Typical of the new plantations were those of the Oceana Consolidated Company with a staff of 10

Europeans/

Europeans, and 1500 acres under cotton divided into two estates - one with a ginning factory at Kaombe 3 miles above Chiromo on the right bank of the Shire, and the other, a smaller unit, at Lilanje about 3 miles further north. Both these estates were connected with Chiromo by a trolley line. On the Portuguese side of the Shire other companies began to cultivate Nyasaland strains of Egyptian cotton, notably at Bompona in the extreme south and at Chilomo near the confluence with the Ruo.(52) Most of the new estate companies were large concerns amalgamating the holdings of individual settlers. In 1901 the Buchanan Estates including the original holdings at Michiru and Mlungusi were bought by Blantyre and East Africa Ltd. which also acquired many other properties and became the leading plantation owner in Nyasaland. The limited extent of European planting activities at this period may be guaged from the fact that of the 95,852 acres of "developed" properties acquired by Blantyre and East Africa Ltd. only 3,008½ acres were under cultivation. Michiru, one of the oldest estates, had only 193½ acres cultivated out of a total area of 3000. In addition the company held another 61,301 acres of "underdeveloped" land.(53) Estate owners tended to own more land than they could hope to use, regarding the original purchase as a gamble on the possibility of an increase in land values. The new companies and individual plantation owners could not be expected to take the same attitude to the land as that of the British farmer. They were not "attached to the soil". They were there purely for the business of producing an export crop so long as that

should/

should prove profitable. Whilst the growing of cotton was restricted to the floodlands, where the crop occupied soils valuable for dry season food gardens, success attended the planters' efforts. However, the high profits resulting led to an attempt to extend the growing of Egyptian cotton to mphala land with its low and varying rainfall and even to the Shire Highlands. The first cotton crash came in 1904-5, as figure 32 shows, with the steep drop in the area under Egyptian varieties. Cotton was abandoned at Kaombe after only 5 years of effort and rubber tried in its place, but with no more success. The corresponding and later decline in export values was comparatively slight owing to the slow rate of export of the previous "glut", enabling the production of the recovery period after 1910 to enter into the export returns before the immensity of the decline could be shown. The drop in acreage was due almost entirely to the planting of Egyptian varieties outside the floodlands and particularly in areas above 1500 feet where the maturing season was too short. The British Cotton Growing Association had been formed in Manchester in 1902 to promote cotton fields within the Empire. In 1903 some assistance was given to the European planters, and the following year the Association sent out seed and implements for the commencement of native production, for which cotton was well suited since it could be grown successfully in very small units. At the same time American Upland seed was introduced and eventually adapted for cultivation in the form known as Nyasaland Upland After 1904 therefore there came a distinct change in cotton

growing/

growing policy. Firstly a native industry was fostered - partly by tax rebatement to growers - and secondly European planters adopted Upland varieties at the higher altitudes whilst continuing to grow Egyptian varieties on the floodlands. The crop became of widespread distribution and the new Upland seed was sown with good results on former coffee lands. Tobacco growing was also developed by the Europeans, chiefly in the Highlands and, combined with cotton cultivation, gave the planters a greater measure of economic stability by having two cash crops at hand instead of only one. The development of the native industry realised at last the hope of David Livingstone, but it made possible not the destruction of slavery, long since gone, but the decline of plantation agriculture in Nyasaland. In 1906 the March and April rains failed in the Shire Valley, and since these are vital to mphala land cotton sown in January, the effect away from the floodlands was disastrous. In spite of this and in spite of drought in January 1907 together with the occurrence that year of angular leaf spot disease the native industry continued to expand. The Government also fostered the cultivation of maize which could be combined with that of ~~the crop~~ cotton and in 1909 came the first export of the crop from the Lower Shire Valley - to Hamburg. The Residents or, as they were termed later, District Commissioners, at Port Herald and Chikwawa were given the task of maintaining demonstration cotton gardens, and an experimental farm was begun at Nyachipere near Port Herald. The Egyptian varieties gradually proved themselves more and more susceptible to

disease/

disease, and moreover both European and native growers in the Lower Shire Valley failed to make sufficient provision for drainage with as a result occasional waterlogging of the crop. Nyasaland Upland strains proved more resistant and better able to grow on badly drained ground, and were therefore introduced in many areas in place of Egyptian. After several failures of Egyptian cotton due to blight the Nyachipere Farm in 1914 claimed that it had shown that Egyptian varieties were unsuitable for cultivation, and accordingly only Nyasaland Upland seed was thenceforth sown. The Government's position with regard to native cotton growing was one of complete control since it issued the seed and later (1931) bought the crop in addition to giving advice on cultivation. The seed cotton was supplied by the Government to the ginneries of the British Cotton Growing Association, the chief of which were at Port Herald and Chiromo and were powered by a fuel derived from cotton seed. In between these two ginneries lay the bulk of native cotton growing in the Protectorate. North of Chiromo in Chikwawa District cotton growing made only a slow beginning for the people there objected apparently to the measure of interference and Government control implied. This Government fostering of a native cotton crop did not mean a sudden change of policy away from the encouragement of white settlement. It was a logical continuation of the old policy of fostering every export crop possible in order to pay for the territory's imports. Coffee cultivation was possible only for those having large amounts of capital and therefore useless as a native enterprise. On

the Buchanan Estates in the 1900-01 period of 1120.82 acres under coffee only 363.53 were in bearing. The rest were in various stages of the 5 year growing period needed before the fruit can be picked, a period during which expense is incurred without any return.(54) Cotton cultivation, however, could easily be fitted into the already existing system of native agriculture. The question was one of the difference between annual and perennial crops. Throughout this period the publications of the Department of Agriculture continued to be concerned almost entirely with the problems of growing cash crops. One has: Notes on Cotton Cultivation in Nyasaland (1909), Ploughing and soil cultivation in Nyasaland (1912), The ground-nut (1915), Notes for intending settlers (1916), Practical notes on maize cultivation (1917), Soil and tobacco survey of Nyasaland (1923) and many more. The reports of the Department of Agriculture continued to lament not of the "evil practices" of the native grower as in later days, but of the planter's methods of continuous tobacco and cotton cultivation leading to deterioration of soil and crop and encouraging disease. However, what eventually brought the crash was not the backwardness of the European grower, but the world slump of the late 1920's.

After 1918 the area under tobacco grew at a faster rate than that under cotton owing to the higher prices obtainable per acre as was already evident by 1914. Tobacco became the post war boom crop. Cotton was still encouraged, however, for in 1918 the Government tried to foster developments by marking off 14 plots of 500 acres each in the Ndindi Marsh

for/

for the growing of the crop and leasing them chiefly to European ex-service-men. In the following two years these new settlers suffered badly from both drought and flooding. In spite of the difficulties there was a small post war increase in estate buying or leasing in the Lower Shire Valley in order to produce cotton, tobacco and also sisal. Other parts of the Protectorate were similarly affected and by the 1921 census the European population had risen to 1486, nearly double the 1911 total, whereas the number of Asiatics had increased by only 82. This growth of European settlement is surprising when one considers the risks involved in addition to a minimum capital expenditure of £2,000 excluding the costs of transport, inspection of the land to be purchased and training in tropical agriculture and estate management. The slump in world prices affected cotton first with the resultant drop in the European cotton xxxx acreage from 1924 to 1929. The tobacco acreage continued to increase until 1927 when it too began to decline. The slump marked the end of an era of Nyasaland's history. It did not mean the end of European plantation agriculture, but the end of its dominance in the economic life of the country. The slump provided enough discouragement to intending settlers to provoke a change in Government policy. It also provided a condemnation of fostering one or two cash crops at the expense of all else Moreover, the comparative decline of plantation agriculture was already inevitable with the growing productivity of native cash cropping, for the latter provided the native with cash for taxes and the purchase of metal goods and

cottons/

cottons without his having to enter European employment, and without cheap native labour in large quantities the plantations could not survive. Only one plantation crop of the period before 1929 began to increase in production after the slump, and that was tea grown entirely in Cholo and Mlanje Districts from seed introduced to the Blantyre Mission by Dr. Elmslie in 1884.(55) Tea being a perennial was impossible for peasant cultivation and could rely on the large demand in the United Kingdom. Sisal growing had one brief period of success after 1918, when by 1930 over 9000 acres were under the crop in the Nyasaland section of the Lower Shire Valley, whilst on the Portuguese side the Zambezia Company developed sisal estates along the banks of the Shire, chiefly at Aguas Quentes where a factory for fibre extraction was erected. After 1930 prices fell. In 1937 there was a small attempt at revival, but this too eventually failed before competition from other fibre producing centres.

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(4) The account of the Serpa Pinto expedition is taken from British Central Africa, pp. 80 - 89.

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(8)/

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(21) Patrick Robertson, The commercial possibilities of British Central Africa, S.G.M., Vol XVI, (1900) p. 244.

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(24) S.H.F. Capenny, Railway schemes in relation to British Central Africa, S.G.M. Vol XVII (1901) pp. 370-71

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(27) Cd. 2242, p. 15.

(28) Ibid. pp. 15-16.

(29) Colonial Annual Reports, British Central Africa, 1905-06 No. 499, Cd. 2684-45, pp. 25-26.

(30) Annual report of the Department of Agriculture, Nyasaland, for 1913, p. 12.

(31) /

(31) D.J. Rankin, The peoples and commercial prospects of the Zambezi Basin, S.G.M. Vol. IX (1893) pp. 233-236.

(32) Railway schemes in relation to British Central Africa, p. 366.

(33) Ibid. pp. 368 - 69.

(34) Cd. 2242, p. 49.

(35) Précis of information concerning the British Central Africa Protectorate, p. 28.

(36) Colonial Annual Reports, British Central Africa, 1906-07, N. 537, Cd. 3729 - 1.
Nyasaland, 1907-08, No. 574, Cd. 3729-28
1908-09, No. 619, Cd. 448 - 28.

(37) Railway schemes in relation to British Central Africa, p. ~~374~~ 365.

(38) Trade + Shipping of Africa (1899) C. 9223

(39) Railway schemes in relation to B.C.A. p. 374

(40) Note in Scottish Geographical Magazine, Vol IX (1893) p. 324.

(41) Railway schemes in relation to British Central Africa, p, 374.

(42) Notes in Scottish Geographical Magazine, Vol. XXII ~~xx~~ (1906) p. 166 and pp. 629-30.

(43) Railway schemes in relation to British Central Africa, pp. 371 - 73.

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(45) For railway construction see:

Cd. 2242
Colonial Annual Reports for British Central Africa and Nyasaland, Cd. 2684-18, Cd. 2684-45, Cd. 3729-1, Cd. 3729-28, Cd. 448-28 and
1910-11 No. 692, Cd. 5467-28,
1912-13, No. 772, Cd. 7050-13,
1913-14, No. 832, Cd. 7622-23,
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(46) G.L. Gamlen, Transport on the River Shire, Nyasaland, Geographical Journal, Vol 86, July-December 1935, p. 452

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(49) For the development of plantation agriculture see:

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Cd. 2242.
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VIII. THE NEW FORM OF DEVELOPMENT, 1930 TO THE PRESENT DAY - the attempt to improve peasant agriculture.

The great slump in production marked not merely an economic retreat, but a change in the importance attached to the different elements of Nyasaland's social structure. Henceforward the native was regarded as potentially the agriculturalist with the greatest possibilities for increased productivity, and the Government became the guardian of his interests. For the first time it was realised that the bulk of the Protectorate's agricultural land and production was in native hands and that it was native productivity which constituted the real economic strength of the territory from the long term point of view. An increase in output amongst native growers would mean a much greater advance in total productivity than an increase of the same proportion amongst European planters. By degrees the Government came to exercise the prerogative of the guardian in the instruction of the native cultivator with a view to improving his returns from the land. The experiment of fostering the growing of cotton by natives had been tried and had succeeded. This was followed by the encouragement of native tobacco growing in the Highland districts where a similar success resulted. As yet these attempts were merely a continuation of older policy. The change came with the effort to improve methods of cotton and tobacco cultivation and thus eventually the effort to change the whole design of native agriculture. Nowhere did this policy become more apparent than in the

Lower/

Shire Valley where it advanced in almost the same proportion as the area under European plantations decreased.

In 1924 the European plantations in Port Herald District totalled nearly 7,000 acres, of which approximately two-third was under sisal and nearly one-third under cotton. In Chikwawa District the totsl was just over 8,000 acres, nearly all of which bore cotton. In addition there were 1858 cattle under European ownership in both districts combined. The slump, followed by the disastrous floods of 1936 and later years, reduced the total acreages by 1939 to 212 and 193 respectively, mostly under maize and tobacco, whilst the spread of tsetse fly brought serious reductions in the number of cattle. Freehold land was sold back to the Government and leases were allowed to lapse. With the ending of hostilities in 1945 a new Government land policy was formulated. The land was henceforth to be regarded as being held in trust for the natives. Under the African Trust Land Order in Council of 1950 the lands were divided into African Trust Land, Public Land and lands held under Certificates of Claim, i.e. the remainder of the old freehold estates. No further grants of freehold land are to be made and leases of African Trust Land will only be granted providing such leases are not to the detriment of African interests. In 1951 African Trust Land in Nyasaland comprised 32,081 out of 36,779 square miles or 87.2%. Outside the area under Portuguese control private estates have today ceased to exist in the Lower Shire Valley. In the adjacent highlands of Cholo and

Mlanje Districts the big tea estates not only still flourish, but are increasing their productivity. All the cotton growing industry and approximately 60% of tobacco production by weight and about 40% by value are now in the hands of native producers, but tea which by 1937 was supplying some 37% by value of all exports and today is second only to tobacco in total worth still requires the great capital resources which only Europeans can provide. The climatic conditions of Cholo and Mlanje Districts, unique in the Protectorate, and the highly acid soils have combined to assist in the preservation of plantation agriculture in this fringe of the Shire Highlands. In the remainder of these uplands some tobacco estates still prosper, whilst a number of other land owners, notably the African Lakes Corporation, are engaged in the cultivation of tung for the sake of its valuable oil - the latest of the boom crops, introduced in 1934.

Whereas 1924 marked a post-war peak for European agriculture in the Lower Shire Valley, for the African cotton grower it marked merely a beginning. In that year 732 tons of seed cotton were produced in Port Herald District and 128 tons in Chikwawa District. Production increased in spite of the attacks of the boll-worm and various diseases. One finds that in 1925 the Agricultural Department had begun to take an interest in pest control amongst native grown cotton, and in the methods of cultivation used, for the report for that year states:

"The continual cropping of land with or without any rotation, and without fertilizer, is bound to affect the

growth of the plant adversely and render it less resistant to the attacks of both insect and fungus, and it is possible that the quickest cure will be obtained by a starvation period, otherwise cessation of cotton growing for one or more seasons".(1)

In 1931 the Agricultural Department attempted to advise the cultivator of the Lower River on the best dates for planting, but the local Agricultural Officer was forced to the conclusion that "dates convey little if any meaning to him".(2) In the 1931 report the threat of soil erosion in Port Herald District received comment and "ridge terracing" was suggested as a possible solution. Reports of 1932, 1933 and 1934 mention an attempt to introduce communal grain stores in order to offset food shortages, experiments with the U4 variety of cotton and its introduction in place of Nyasaland Upland, an attempt to foster the cultivation of more rice and its failure due to a shortage of water in 1933, the improvement of marketing and cotton seed depôt facilities, and various experiments with plants and methods of inter-cropping. The provision of good markets and of an effective system of seed supply did much to promote the growth of Government sponsored cash crops. The present marketing position is that private individuals are allowed to buy maize, but must sell it to the Maize Control Board. All tobacco and cotton grown on African Trust Land are purchased by the Native Tobacco Board and the Cotton Fund respectively, who use the profits from sales to equip markets and to provide a price assistance fund to stablise prices in the event

(3)
of a recession. The Government monopoly of cotton buying was established in 1931. Previously the monopoly had been held by the British Cotton Growing Association. The markets established in the Lower River Districts total 12 for cotton, and there are 15 cotton seed issuing depôts. South of Chiromo hardly any cotton or maize is bought, the chief items for sale being rice and groundnuts. North of Chiromo the (4)
proportions of cotton and maize in sales are overwhelming. After 1935 the great floods brought a dramatic loss of dimba land, then regarded as the most valuable cotton land in the Protectorate, and prevented the working of the ginnery at Port Herald. Until 1936 it had been the custom to obtain 2 cotton crops a year from the Lower River area by growing cotton in both mphala gardens and dimba, although concentrating chiefly on production from the latter. With the permanent rise in river level the loss of dry season crop land made it ~~impossible~~ imperative to conserve what was left for the production of food. Agricultural Department policy was now turned to the cultivation of U4 (a high quality cotton giving here normally a seven-eights inch staple) on mphala land, and it was decided to increase the area under the crop by introducing cotton cultivation into the Ngabu division of Chikwawa District, previously thought to be mostly waste land useless for cultivation, and to provide water for domestic purposes by means of wells dug by the Geological Department. Each of these incidentally was provided with a windlass which proved to be a needless extravagance as

apparently/

apparently the African womenfolk prefer to haul up the bucket directly. The result of the new policy by 1938 was that Port Herald District, where water supplies had also been improved by Government wells, had increased its production of seed cotton to 1472 tons whilst that of Chikwawa had risen to 2345 tons. 1938 was, however, an exceptionally good year. It was followed by an exceptionally bad year when the caprices of the weather and the attacks of boll weevil reduced the output to 455 and 829 tons from the two districts respectively. The change in the distribution of cotton growing was accompanied by a change in the distribution of population. Between 1931 and 1945 the estimated totals of African population dropped from 81,410 to 66,746 in Port Herald District and increased from 35,892 to 59,664 in Chikwawa District. For the relief of overcrowding the result was excellent; but the effect was not the removal of a food producing population from one district to another, but the removal of part of the population to a district where it became more dependent on a cash crop economy. By 1948 Port Herald District had increased its cotton seed production to 1940 tons, but Chikwawa produced the enormous total of 4853 tons. In 1950 six times as much seed cotton was offered for sale in Ngabu market as in all Port Herald District. In spite of set-backs from pests and floods cotton growing has become very profitable and not merely for the lint but for the seed which is not only used to power the ginneries, but is also exported to Britain for manufacture into oil cake. In 1948 Africans provided 98% of the cotton

export/

export together with all the maize, groundnuts and small grains exported. The native grower began to look more and more to his cash crop as his main support, and this was true not only of the cotton cultivator of the Lower Shire Valley but also of the tobacco grower of the Shire Highlands. The Colonial Report for Nyasaland of 1949 lamented that during a difficult season the African tobacco grower took more care of revenue producing cash crops than of food crops, looking to others to sell him food if the need arose.(5) The result with an increasingly greater incidence of famine was the development of Government Food Farms for emergency food production. One of these, the Kakoma Government Farm, was opened in 1948 a few miles west of Chikwawa in order to grow both maize and cotton with the aid of labour saving machinery and on marginal land with water supplied by deep borings. Apparently one of the purposes of this scheme is to provide food for the growing numbers of African Civil Servants. This reversal of the rôles of the European and the African would seem to imply some absurdity. The European came to grow cash crops for export, and has now introduced the practice of growing food crops for native consumption when native agriculture should be capable of growing all the food that is needed. The same is true of the Groundnuts Scheme in Tanganyika, now largely a producer of maize for African consumption. In the Urambo section in October 1952 whereas there were only 392 tons of groundnuts in shell and 256 decorticated altogether in stock, there were 3430 tons of maize awaiting shipment. What makes the absurdity worse in the Lower Shire Valley is

that in spite of the occurrence of famines, an increase in population total and a reduction in the area of the most productive land, there is no drive to increase food production by African agriculturalists comparable with the drive to increase cotton growing. Yet only one district in Nyasaland can be expected to produce a large food surplus - Karonga on Lake Nyasa - and famine may well affect an area of too large a population for that surplus to be adequate.

At the same time as the institution of the policy for obtaining immediate increases in the native output of cash crops, the Government also began work on the longer term problems of soil conservation and improvement in methods of cultivation. A.J.W. Hornby undertook the task of making soil studies.(6) Ridging along the contour was enforced in native cultivation in order to combat soil erosion by surface wash, and where slopes were steep the heavier task of contour bunding was made compulsory. Forest reserves were created in order to ensure against a future timber shortage and to protect the headwaters of streams from over-rapid erosion, whilst the planting of trees round villages for a local wood supply was encouraged. Cultivation close to river banks and roads was likewise forbidden as an anti-erosion measure, the destruction of cotton plants and mapira stalks immediately after harvest was ordered in order to kill pests living in the remains of the crop, and finally in some parts the added refinement of box-ridging was instituted as an anti-erosion measure. That these measures had to be enforced may be guaged from the following quotation from

the Agricultural Report of 1948:

"On the Chikwawa escarpment area of the Lower River District progress has been satisfactory, though many cultivators still persist in their practice of planting on market bunds. Apart from the people of the Malawe Hills the inhabitants of the Chiromo - Port Herald area, who had previously resisted attempts to introduce ridge cropping, were subjected to a special drive and substantial progress followed vigorous action by the Administration".(7)

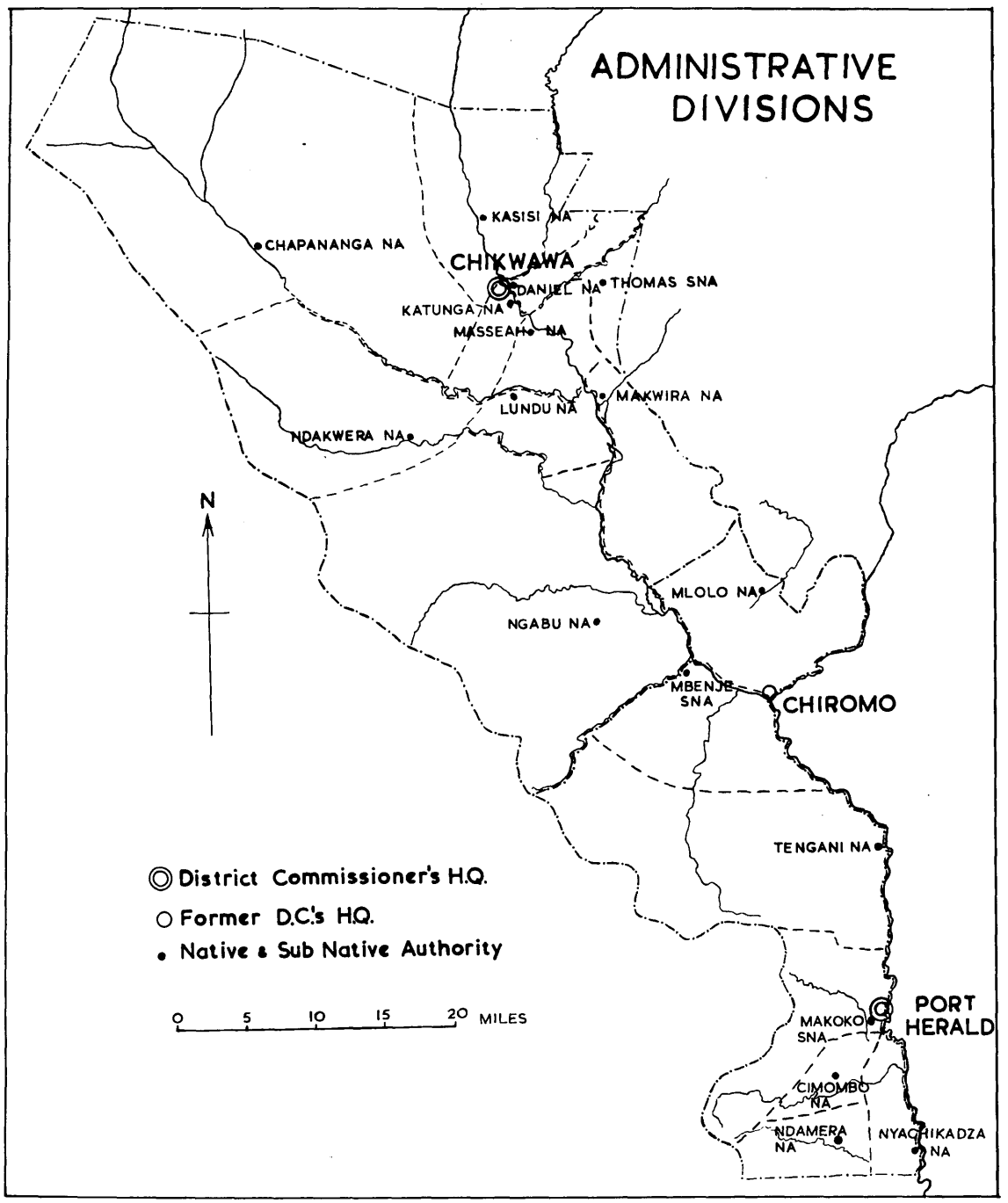
The resistance was not merely conservatism on the part of the people concerned. Ridging or terracing meant that more time and labour had to be devoted to the preparation of the gardens and to the maintainance of the ridges or terraces throughout the period of growth without any apparent increase in production. Forest and river bank conservation meant a reduction in the cultivated area just at the time when every available acre was needed. The immediate destruction of crop refuse clashed with the preparation of the crop after harvest and the completion of a number of tasks like hut repairing which had to be left until the commencement of the dry season. Of 189 offences under the Forest Ordinance in the districts of Port Herald and Chikwawa in 1949, 103 were related to river bank offences.(8) In 1951 it was found that about half the court cases were for agricultural offences. In Ngabu District of 254 cases of all types, 32 were for failing to uproot cotton plants, 34 for failing to ridge, and 55 for failing to destroy mapira stalks. At the end of 1951 it was planned to destroy a whole cotton crop in order

to/

to reduce the incidence of boll-worm, to complete box-ridging and contour bunding throughout the adjacent hill district and to plant grass around village sites in order to reduce the erosional effect of storm waters. However, this program has been delayed by the great floods at the commencement of 1952. One curious feature of the conservation plans is that although so much attention has been paid to ridging very little attempt has been made to dam the gullies which are quite large west of Port Herald and have assumed alarming proportions in Chapananga Native Authority about 12 miles west of Chikwawa. The speed with which the new policy has been instituted has resulted in the necessity for strict supervision. There has therefore been a corresponding increase in the size of the Nyasaland Civil Service. The District Commissioners have been relieved of the agricultural part of their burden by the appointment of local agricultural officers each in charge of native capitaos, one to every head village. The organisation has not as yet reached perfection, however, for a visit to the Lower River Districts reveals a decline in the quality of ridging proportionate to the distance from the centre of local authority. Quite often too there has been delay in the issue of cotton seed. In 1938 it was noted that although the optimum period for planting cotton was thought to be from 15th January to 15th ~~15~~ February seed distribution only began on 15th January and "took some time"(9). Steps were taken to remedy this situation, but in 1950 the Port Herald District Agricultural Officer admitted that "suspicion over seed distribution" held up

cotton/

FIGURE 33


ADMINISTRATIVE DIVISIONS
KASISI NA
CHAPANANGA NA
CHIKWAWA
DANIEL NA
THOMAS SNA
KATUNGA NA
MASSEAH NA
LUNDU NA
MAKWIRA NA
NDAKWERA NA
N
MLOLO NA
NGABU NA
MBENJE SNA
CHIROMO
TENGANI NA
District Commissioner's H.Q.
Former D.C.'s H.Q.
Native & Sub Native Authority
0 5 10 15 20 MILES
PORT HERALD
MAKOKO SNA
CIMOMBO NA
NDAMERA NA
NYACHIKADZA NA

cotton planting in the area, and the delay "caused havoc" in the gardens immediately round Tengani, Lulwe and Port Herald. The delay generally in planting crops at the onset of the rainy season has been attributed to over-much beer drinking from the produce of the previous harvest. This resulted in yet another unpopular measure - the prohibition of brewing in the hope of thereby encouraging early planting. Reference has already been made to the results of this on page 102.

The task of enforcing the decisions of a central authority upon the people has only been made possible by the division of the area into suitable local authorities adequately connected by roads with the centres of European power. These two factors have been essential in the process of changing the status of the people from that of being under the protection of Queen Victoria to that of being subject to the will of the Colonial Office. The chieftainships were formerly associated only with groups of people. Now under British Administration they have become associated with fixed areas of land (figure 33) and the chiefs are British appointees to enforce British justice at the village level. Thus a brake was applied to the movement of tribes and to the shifting system of agriculture, for with these a satisfactory colonial administration and even the maintainance of frontiers would have been impossible. Only with the cessation of the movement of head villages could a road system be developed to connect chiefs with the District Commissioners and thereby render administration effective. The first roads

outside/

outside the Blantyre area were cut in order to link the district authorities with the central government. From the offices of the District Commissioners paths were made to the head villages of the neighbouring chiefs and were used for regular inspections of the district and for the speedier collection of taxes. The notebooks of the District Commissioners of the Lower Shire Valley contain many references to road construction in the 1920's and earlier. One comment of 1921 with regard to moving villages and roads is of interest It refers to a route 18 miles in length near Chiromo:

"This is a somewhat circuitous route. Formerly there was a more direct route, of only 8 miles, nearer the face of the escarpment, but it is now unrecognisable, having ceased to be used by natives, as the villages formerly in existence along it have shifted to fresh sites".(10)

In 1922 Chiromo ceased to be an administrative post, for it was realised that with improved roads combined with the railway and the introduction of telegraph, the district which it administered could be as efficiently ruled in its valley section from Port Herald and in its upland section from Cholo. The Lower River District was therefore divided into 2 administrative districts instead of 3 and a road system constructed connecting all the head villages to European authority and providing outlets for native produce (figure 34). Before 1936 this system was somewhat more extensive for in addition a road ran south from Port Herald to Nachikadza, and another northwards from Chiromo between the Shire and the Elephant Marsh. The great rise in river level destroyed these routes

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Repairing a "drift" or ford across the bed of the Mwanza River in September on the road between Ngabu & Chikwawa.

and also forced the removal of the road from Chiromo to Port Herald approximately ½ to 1 mile westwards to its present site. In connection with drainage a point worth mention is that nowhere are there any road bridges. The perennial streams are crossed by ferries which offer some little local employment since manually operated. The rest are crossed by drifts, flooded in the wet season thereby breaking up road communications for a considerable part of the year and turning part of the valley into a series of islands connected only by rail. Large quantities of labour are needed to repair the drifts at the commencement of each dry season.

The modern roads not only unite district and provincial authorities, but connect rural markets with the towns. The roads are thus vital to an essentially centralised system both of government and exchange, for the Europeans and Indians, the managers and traders, are an urban people dominating the affairs of a rural African population, so that one has not merely the conflict of alien cultures, but of the townsman versus the countryman. In 1945 of the total of 1948 Europeans in Nyasaland, 1039 or 53% were in the 3 towns of Blantyre, Limbe and Zomba alone. These 3 towns also contained 54% of the Asiatic total of 2804, but only 0.7% of the African total of 2,044,707. By comparison there were in the Lower River Districts in 1945 28 Europeans, 175 Asiatics and 17 other non-Africans together with the African total of 126,410. It is notable that whilst development is slow in the country, in the towns it is fast. Blantyre like a number of other African towns, notably Salisbury the capital of

Southern/

Southern Rhodesia, has grown too fast for its water supply which now has to be rationed during the dry season. Some idea of the recent progress of European development may be obtained from the 1950 population estimates which show that in the last 5 years the European total of Nyasaland has almost doubled whilst the number of Asiatics has increased by 87% Most of this increase has been absorbed by the towns for there has been little advance by the plantations since 1945, to absorb so large an influx of Europeans and the Indians are concerned almost solely with trading or lesser managerial or executive positions. There is in this a suggestion of lack of balance, of towns growing in size out of proportion to the rural basis, since their support is largely derived from foreign sources, their inhabitants being of an alien culture and importing for their needs to a far greater extent than the country can strictly afford. Thus one has the common African colonial feature of imports outstripping exports by value. In Nyasaland the amounts are small as yet. Exports last exceeded imports in 1946. In 1949 imports amounted to £5,592,000 and exports to £4,690,000 In neighbouring Southern Rhodesia, the white nucleus of the proposed Central African Federation, however, the case is more serious. Since the war, imports have always been in excess of exports, amounting in 1949 to £54,586,000 and £29,621,000 respectively.

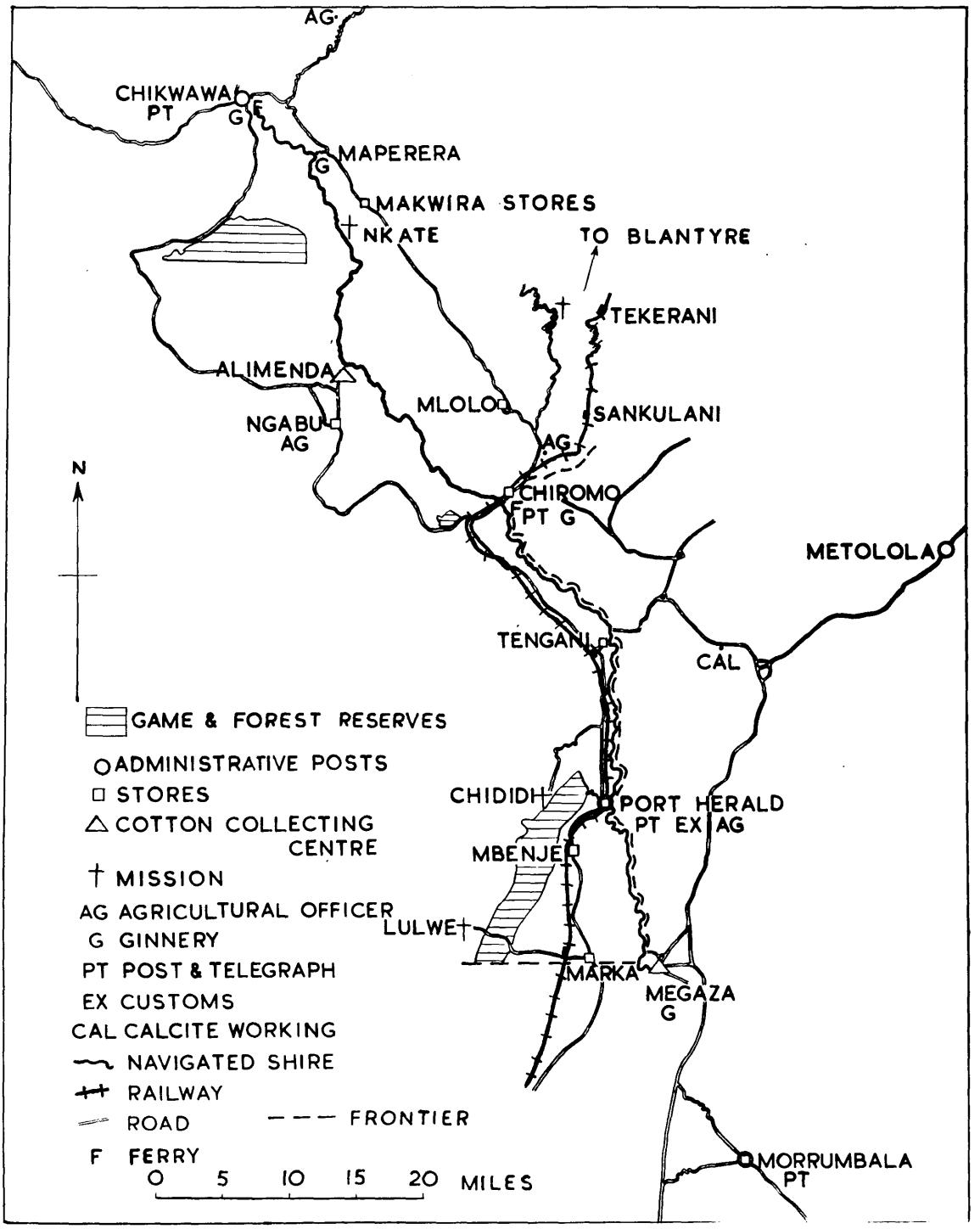
For the development of a cash crop to help the export position and thus support the towns the Lower Shire Valley

has/

has been particularly well placedin that its position betweer the Shire Highlands and the sea promoted the development of roads within it and the construction of a railway in its soul ern half. It was once suggested that a railway should be built in the northern section or Chikwawa District in order to open up the coalfield of Sumbu in the upper valley of the Nkombedsi wa Fodya. This field covers an area of at least 150 square miles and 12 seams have been found ranging from 4 to 12 feet in thickness.(11) Samples tested showed that the coal made a good fuel and was suitable for coke manufacture. A company called Nyasaland Minerals Ltd. put in two trial adit shafts, but the experiment was evidently a failure for the company wound up in 1930.(12) The capital expenditure involved in the construction of the line across difficult terrain was almost certainly too great for the size of the market. At present coal for the Nyasaland railways is obtain ed from mines near Tete in Portuguese East Africa or from the Wankie Colliery in Southern Rhodesia. The Portuguese are trying to develop the western end of the Sumbu coalfield and have commenced laying down a railway track. A similar attempt was made about 8 miles south of Port Herald at Goma where a contract between the Portuguese Government and Companhia Mulheira dò Zambezia was allowed to lapse in 1913.(13) The mineral record has therefore been most unsatisfactory for the promotion of railways whose main aim is still to serve the Shire Highlands, thus providing better facilities for transport in the Lower Shire Valley below Chiromo than

above/

FIGURE 34
EUROPEAN ELEMENTS



above it. However, the cash crop developments since 1935 resulting partly from the great floods have removed the focus of cotton planting into Ngabu N.A. away from the railway, and in this district a line to Sumbu would have proved useful. The changes in river level, however, provided their own solution to the new transport problems, for it now became possible once more to navigate the upper Shire to Katunga and Chikwawa throughout the year, and the stern wheelers are again in regular use carrying cotton bales from Chikwawa, Maperera and Alimenda to Chiromo. In the south the stern wheelers are also in operation carrying cotton bales against the current from the Portuguese cotton ginnery at Megaza to the railway at Port Herald (figure 34). The monopoly of cotton collection in Morrumbala Circonscripção based on the compulsory hectare per hut system centres on Megaza, and from there a fleet of lorries operates along roads connecting every important point in the district. Occasionally the prices offered for cotton at Megaza have been higher than in British territory tempting the people of Chikwawa and Port Herald Districts to evade the control of the Cotton Fund and sell to the Portuguese - as in 1938 when it was complained that large quantities were being sold in this way.(14) The web of modern development has added to it stores in many of the native head villages, usually managed by half-castes or people of Goanese descent in Portuguese territory and by Indians in Nyasaland. The Indians usually dig their own wells and are often suppliers of water during the dry season in districts where no Government wells exist.

Indian stores at Chiromo.

They have become the great intermediary in trade between the European and the African and dominate the retail trade of the African villages having competed unsuccessfully against the African Lakes Corporation with its Mandala stores. Agricultural officers have been established near Chikwawa, Chiromo and Port Herald, whilst a fourth is now constructing a house at Ngabu, the centre of the newest agricultural developments. Mission stations are confined mainly to British territory where they have provided medical and educational facilities and in some cases roads into districts otherwise difficult of access. The nearest hospital to the valley plains in British territory is on the escarpment at the Seventh Day Adventist Mission just off the Chiromo to Cholo road. In Morrumbala there are two hospitals, one at Megaza and the other at Morrumbala post.

Whilst plantation agriculture has disappeared from the British portions of the valley, the Zambesia Company is now making an attempt to retrieve lost fortunes by reopening a sisal plantation at Aguas Quentes. The Megaza cotton buying company also possesses a plantation at a point about 15 miles to the north of the ginnery. Food is grown there to feed the large ginnery staff and the staff of a small cattle "ranch" near Megaza on grasslands adjacent to the Shire. Cholo District with its tea plantations provides a very effective contrast with the valley floor. Out of a total estimated population in 1945 of 119,746, 74,465 were resident on private estates. The Makwasa Tea Estate near Cholo post may serve as an example. It possesses 840 acres of

contour/

contour ridged tea interplanted with silver oak, and with blue gum plantations on the steepest slopes and seedling beds in the valley bottoms. 500 men and 100 women are regularly employed mainly as pickers, of whom the majority are tenants on the estate. In the wet season from November to May when most of the plucking is done with picking every 10 days, up to 1500 men and women are employed. Quite a large casual labour force is therefore involved and a problem in economy is set by the fact that labour needs are greatest when the native prefers to attend to his own gardens. Comparatively little is grown therefore by those natives who elect to work on the estate during the wet season. They depend on cash earned and thus occupy a position comparable with that of the "cash croppers" of Ngabu. In the dry season they endeavor to cultivate their small dimba in the narrow valley bottoms. Those who work on the estate hold their hut and garden rent free providing they work for a minimum of 4 months during the vital rainy period when they receive a wage of 17s. 6d. per month plus 10s. per month in lieu of food. Those who live on the estate but refuse to work for the required period must pay a rent of £1 per year, but receive in exchange certain firewood, water and building rights plus greater security than is sometimes to be found on African Trust Land. The plantation with its tenantry is in fact hardly more destructive of the old system of African agriculture than the policy pursued in Ngabu. In both cases the native is looking for cash as the result of his labours. In both cases he is instructed as to the method of growing

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and tending the crop, and supervised in his work. The only serious difference is in the question of ownership of the crop which perhaps tends on the whole to give the Ngabu cotton grower a greater income than that of his tea growing counterpart.

An account of recent development has been given and shown to be inevitably an affair of European prodding or enforcement in order to produce both economic and social changes. The result of this development in British territory has been the evolution of a plantation tenant system on the one hand and a supervised peasantry on the other. One might indeed liken the Lower Shire Valley to one vast Government estate, for at the present pace of political and economic change that it what it is undoubtedly becoming. Moreover, whereas the tenant may always claim protection from heavy exactions by his supervisor by appeal to the District Commissioner, in Ngabu the District Commissioner's rôle is to enforce the supervisor's policy. In Morrumbala the policy pursued lies in between the above. The native must produce a cash crop and sell it to the monopolistic buyer, but how he produces it is his own affair. There is no interference with the methods of agriculture as such, although as yet there is still room enough for the practice of shifting agriculture and no threat of declining returns as at present exists in Nyasaland.

Taking the three contrasting examples of relationship in a dual society noted in the last two paragraphs, one notices that they are associated with three different regions

the Shire Highlands, the British portion of the Lower Shire Valley, the valley plain and plateau of Morrumbala. Of the last clearly its distinction is a matter of political differences, but of the differences between the first and second the most potent factor has surely been the contrasting physical conditions. Thus political and social contrasts are seen to be partly a function of place and the resultant today is the evolution of three separate communities of people.

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(1) Annual report of the Department of Agriculture, Nyasaland, for 1925.

(2) Annual report of the Department of Agriculture for 1931.

(3) Central Africa territories, Comparative survey of native policy (1951), p. 47.

(4) Report of the agricultural officer for Port Herald District for 1950 (unpublished).

(5) Colonial annual report, Nyasaland, 1949, p. 31.

(6) See for example,

A.J.W. Hornby, Studies of three important soil series of Nyasaland, Department of Agriculture, Nyasaland, (1930).

A.J.W. Hornby, Soil map of Central Nyasaland.

(7) Annual report of the department of Agriculture for 1948, p. 12.

(8) Annual report of the Department of Forestry for 1949.

(9) Report of the commission appointed to enquire into the financial position and further development of Nyasaland (1938), pp. 53-54.

(10) District books Chiromo, kept at Chikwawa.

(11) F. Dixey, Outline of the physiography, geology and mineral resources of Nyasaland (1932), p. 29.

(12) /

(12) District books Chiromo, Kept at Chikwawa.

(13) Geographical section of the Naval Intelligence Division Naval Staff, Admiralty, Manual of Portuguese East Africa, ID 1189 (1920), pp. 275 - 76.

(14) Annual report of the Department of Agriculture, for 1938.

IX FUTURE DEVELOPMENT — an age of government planning.

From this survey of development in the Lower Shire Valley and in the adjacent highlands certain problems have emerged needing solution if economic advance and self-governing status are to be realised. Practically all these problems are concerned directly with the question of improving agricultural production, the basis of life in Central and East Africa for all the importance attached to Rhodesian gold and copper or Tanganyikan diamonds. These problems occur throughout Central and East Africa in similar forms, although often in different contexts needing differences in the approach to them. Throughout all this vast territory an end to rotational bush-follow methods of cultivation is coming. Villages are becoming fixed to particular places. Throughout, Government departments are experimenting and seeking to change in a few years a way of life which took centuries to develop, whilst with the exception of the food producing estates of Southern Rhodesia plantations come and go with the boom crops — now tobacco, ground nuts and tung — and make heavy demands on labour resources. The movement of able bodied men from Nyasaland to work in other territories is only part of a great labour migration across the Central and South African territories. Problems of drought, flood, famine and overcrowding recur in

almost/

almost every African territory. William Allan has given examples of overcrowding and resettlement in Northern Rhodesia under conditions of agricultural development and relationship to European government bearing a marked similarity to those of the Lower Shire Valley.(1) Other examples of pressure on the land have been cited in W. M. MacMillan's Complex South Africa.(2) In Bechuanaland migration problems have been studied and described by Schapera,(3) whilst the whole host of problems attendant on the question of population distribution in Tanganyika have been studied in a report to the United Nations.(4) The clash between the interests of the peasant agriculturalist and those of the planter combined with the problems of capital investment and the production hazards of the latter may be seen in the development of the Delamere Estates in Kenya(5) and of the Groundnuts Scheme in Tanganyika. The Lower Shire Valley shares its problems with virtually all Africa south of the Sahara. However, different problems receive different degrees of emphasis from place to place. Certain features assume an importance limited to only certain places. In the case of the area studied the outstanding feature is the practice of small scale peasant production in an area of "marginal" rainfall as in the cases studied by Allan in Northern Rhodesia. In both areas the most outstanding

problems are firstly the amount and the distribution of cultivable land, and secondly the possibilities for improving the methods of cultivation used and the quality of the crop grown.

The attempt in the Lower Shire Valley to find a solution to these basic problems in addition to the policy hitherto tried of attacking the smaller scale difficulties according to immediate needs, came about indirectly. The first real advance came with a report by Pearson and Mitchell on their researches into the status and control of insect pests of cotton in the Lower River districts in the years 1940-1944.(6) Their conclusions were that the downward trends in cotton yields in the area were due chiefly to the attacks of the Red Bollworm and secondly to increasing interplanting with food crops resulting from losses of floodland with the rise in the Shire River. The immediate solution suggested to the Bollworm difficulty was by planting early in order to limit the production of fruit, the food of the larvae. The long term solution was to make seasonal floodland or irrigated land available for cotton growing and delay planting so that the moths would die before any food was available from the new crop. In advance of both these methods prohibition of cotton growing for one complete season would be needed. This last suggestion

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has already been put into effect. A Government foreword to the report stated that after consideration it was proposed to take the following action:

"(a) To arrange for a survey to be carried out by an expert to determine the possibility of reclamation of flood land in the Lower River Area with a view not only to adopt the late planting method of Bollworm control but more especially to increasing generally agricultural production in that area.

(b) If as a result of this survey, the flood control method of Red Bollworm elimination should prove impracticable, the recommendation contained in the report for a non-cotton year in the whole area should be adopted, to be followed by the introduction of early cropping of cotton and the agricultural measures ancillary to this as advocated in the Report."

Thus the problem of boll-worm control becomes basically a question of acreages and changes in the methods of cultivation, thereby demonstrating once more the close linkage of the many problems affecting an African territory and the fallacy of one sided solutions which must inevitably affect a whole field. In this connection there is one interesting feature in the report. Pearson and Mitchell were concerned with the improvement in

cotton production, and accordingly whilst recognising that intercropping was essential over a large part of the area on the grounds of land shortage, recommended that the practice should be discouraged in areas where there was no scarcity of land. Doubtless for cotton production the effect of pure stand cultivation would be beneficial; but the question of the difference in net return per acre of pure stand cotton and mixed cotton and cereal was not asked. Nor apparently was it realised that mixed cropping is an essential feature of African cultivation and almost certainly represents an adaptation to environmental conditions in terms of non-manuring hoe cultivation as does likewise the size of the African garden and the size of the family cultivation unit.

The Pearson and Mitchell Report was followed in 1946 by the publication of the report of the post-war development committee.(7) This report carried the 1945 proposals a stage further. Its two most significant remarks for the Lower Shire Valley were:

> "We consider that the problem of controlling the flood-water in the Lower Shire Valley should be investigated as a logical extension to the project for the stabilisation of the lake (Lake Nyasa) level, partly for the purpose of eradicating the Red Bollworm menace, but more especially in the interests of agricultural

production generally, and we recommend that the necessary survey be undertaken as soon as possible." "We doubt whether the acreage cultivated by natives should be greatly increased. The problem is to improve the productive capacity of the land and to maintain soil conservation and it is to be hoped that, in time, the native can be induced to lay down pastures."

The first statement recommends a policy of all-round agricultural improvement based on proposals to improve cotton production and to stabilise the level of Lake Nyasa. Thus there is not merely a linkage of the many problems of the lower valley region, but the recognition of connecting these problems with the difficulties of development at Lake Nyasa. The second statement, however, is vague and almost certainly based on insufficient evidence. There has been detailed research on the Red Bollworm, but until now little or no attempt has been made to assess the acreage needs of the population against the acreages cultivated and those available for an extension of cultivation. The phrase "greatly increased" is unsatisfactory in the absence of evidence for the possibilities of or the needs for an increase. The proposal to induce the native to lay down pastures is unrealistic without a suggestion as to the provision of

land/

land for such pastures especially in view of the lower returns per acre of cattle rearing compared with crop raising. Increased cattle rearing with its resultant manure would be invaluable to keep the land in good heart under the present static system of cultivation, but it would require a tremendous increase in the number of cattle maintained on the land to be of sufficient use plus the provision of more land in order to allow for fallow even with allthe improvements in crop production at present conceivable.

In 1948 the Kanthack report on the stabilizing of the water level of Lake Nyasa was published.(8) In order to solve the problems of changing lake levels Kanthack recommended the construction of a barrage near Liwonde on the Upper Shire. The effect of this would be to combine the generation of electricity with control of the discharge of the Shire River, and thereby exert a partial control on the extent of flooding in the Lower Shire Valley. The control would only be partial because no similar control was envisaged over the Ruo, the "back-flooding" of the Zambesi felt as far up as Port Herald, and the not inconsiderable discharges of the Mwanza, the Nkombedzi wa Fodya and the Likubula. Unfortunately it was estimated by Kanthack that the range of discharge necessary to achieve the stabilisation of Lake levels

would/

would be such that the arable dambo of the Lower Shire Valley must still be subject to flooding. There is the additional factor that no dam at Liwonde could prevent a rise in level of the Lower Shire like that from 1935 to 1937 which was due to water collected from the basin below Matope. However, Kanthack suggested that reclamation might be achieved by the construction of a series of basins which could be flooded in the wet season and dewatered at the end of the rains for the growing of crops, combined with a flood-water canal. Such constructions would depend upon levels ascertained by extensive and detailed surveys.

In 1951 the survey work was begun and it was estimated that two years would be required to complete the task. At the same time plans were made to begin work on the control of the boll-worm and on an irrigation project. It is proposed to begin this last enterprise in the small arid triangle of land near the banks of the Shire and immediately south of the Nkombedzi wa Fodya, extending later possibly north of the river. The agricultural officer appointed to Ngabu District will thus have the task of ensuring the success of this new scheme in addition to initiating improvements in cotton production in the chief cotton growing area. It was claimed locally that about 10,000 acreas will be involved in

this irrigation scheme which will thus provide a valuable addition to the cultivated area. Unfortunately the cost of the water will be high for it is proposed to pump supplies upwards from the river, i.e. over the cliff face of the right bank terrace. The cost of this will mean that a high value cash crop must be grown on the lands affected, and the proposal is to raise sugar cane and ship it from the nearby cotton exporting port of Alimenda. This plan should mean an increase in the earning capacity of the area and the introduction of a second cash crop making for greater economic stability than the cultivation of only one. However, it will do nothing to increase food production, and the area will be just as dependent on importing supplies in the all too frequent periods of scarcity. It might be possible to extend the scheme to the empty mphala lands north-west of the Nkombedzi wa Fodya, although this would mean reducing the area of the Lengwe Game Reserve. Dry season irrigation of mphala land generally would not be feasible since at present the soils can barely withstand the effects of one crop a year, and the cost of pumping would be prohibitive to everything except high value crops. Moreover irrigation brings with it the danger of salt efflorescence, and the evidence of the abandonment of many well diggings by the Geological Department due to the high salinity of

the water discovered suggests that in many places there is a highly saline sub-soil. The same danger of salting applies to the scheme for reclamation of dimba lands. Here the menace is of water-logging on low lying gardens and there will need to be provision of adequate drainage facilities possibly with resort to pumping when river levels are unusually high. Until the task of levelling is completed it is too early to suggest how much of the 120,000 acres lost through flooding by 1939 may be reclaimed. A conservative estimate by the Port Herald agricultural officer is that another 10,000 acres may be recovered. If this be all, then in spite of the higher productive capacity of dambo soils compared with mphala there will hardly be sufficient land to make up for the loss of the 64,500 acres under cotton in the 1950-51 season by transference of planting as proposed in the Pearson and Mitchell report.

The schemes for the future improvement of productivity in the Lower Shire Valley have a number of disadvantages of which not the least is their tendency to concentrate on only one or two aspects of the whole general problem. The four months spent by the author in Nyasaland are insufficient for an authoritative pronouncement on the problems facing the area. Some suggestions only can be made by assessing the effect of such schemes in relation to resources as a whole. If the plans for irrigation and reclamation succeed there is the possibility of removing all cotton cultivation to floodland and of making up the cash loss of possibly

producing/

producing less cotton on the reduced acreage, by growing sugar in the irrigated area. Thus 64,500 acres of mphala under mixed cotton and cereals will be released from cotton. It has been suggested that part of this, about 30,000 acres or one-fifth of the present mphala total, should be put under pasture, leaving the rest for food production and thereby increasing the supplies of milk and meat and making manure available for land improvement. This would be the first real attempt to produce an answer to the basic problem - the adoption of a static system of agriculture. Colonisation brought an increase of population by immigration. This factor combined with flooding resulted in the reduction of the acreage per capita to an amount below that required to work the system of shifting agriculture. The result was the adoption of the soil selection system which is staving off complete famine by the progressive worsening of the type of crop grown as soils decline and by reducing fallow and the size of gardens. The process of adaptation to changed conditions has therefore already started. What is needed is a policy able to combat the deterioration in productivity implied by this form of adaptation by arresting the decline in the quality of the soils. The introduction of manures if in sufficient quantity can arrest the fall in production and provide the basis for regaining lost ground. With this suggestion the main effect of the new schemes would be to permit the keeping of more cattle thereby improving the productive capacity of the land and maintaining soil conservation as suggested in the 1946 report of the post-war

development/

development committee. A mere fifth of mphala under pasture plus the little grazing land already available will hardly provide an adequate basis for manuring all crop land, but at least it will be a step in that direction. However, it will be an expensive step unless the newly reclaimed and irrigated lands can provide a greater return than was previously obtained from the land proposed for pasture. The burden of the cost of these schemes will fall inevitably on the cash crop producers who will need therefore to produce more if they are to maintain their present incomes. Moreover, since it is cotton land which will be most affected, it is Ngabu District which will provide the bulk of the new pasture land. It has already been demonstrated that soil deterioration is most serious not in Ngabu but in the south of Fort Herald District. It is in this latter area that manures are most needed. Therefore it would seem that in order to apply pasturing in those places where the need is greatest a considerable amount of population redistribution will be necessary. Movement of people will in any case be needed in order to farm the new lands available.

Land improvement may make possible the reversal of the process by which Machewere and Mayere have replaced Mapira on the lighter soils and thus increase food production. Against this one has the prospect of lower immediate returns on land converted to pasture since cattle produce less food per acre than cereals. It will be difficult to make the African appreciate the long term advantages of this policy

in spite of the desire for more meat and milk. It will be difficult also to persuade the African to use manures which at present he regards only as fuel or useless dirt. Add to this the question of moving people combined with a much greater degree of control over the uses to which land is put, and the effect must be further Governmental coercion resulting in the development of antagonism to the new programme and to European rule. Any other new development like the extension of the principle of mixed cropping by replacing one of the cereals in the main food gardens by a legume in order to provide a better balanced use of soil in those areas where deterioration is greatest must also face this problem.

The new schemes have other implications. To increase the number of cattle there will be needed increased capital for the purchase of stock. Better protection against trypanosomiasis must also be provided. In addition there will have to be increased provision for dry season feeding, for the salt lands exposed as the flood level of the Shire drops are hardly enough. Possibly part of the proposed pasture land will need to produce a feed crop against the dry season shortage of grass. There is still a considerable area of mphalaland untouched by the cultivator because of shortage of water in the dry season. It might be possible to destroy the present forest cover of this and replace it by pasture grasses, although much care would have to be excercised to prevent soil erosion by wind action in the

dry/

dry season, for such erosion would affect not only this area, but would encroach on surrounding cultivated lands. There is a further point and that is that any improvement in the breed of cattle will need fencing, an added capital expenditure.

Consideration of the population movements necessary for the schemes leads one to the problem of deciding who will be chosen to cultivate the new lands and to the possibility of forced removal against opposition. The floodland area if devoted to pure stand cotton would be best divided amongst present cotton growers. The sugar scheme provides the only real colonisation problem and one would suggest that the most likely claimants for land would be found amongst the young people and that of these, the people of the crowded southern districts, particularly Tengani N.A. so beset by food shortage, should receive first choice. With regard to village planning there is in both schemes an opportunity to profit by the examination of village sizes with the revelation of a tendency towards larger units, and also an opportunity to plan against difficulties of sanitation and of gully erosion hitherto resulting from the fixed site.

Without the success of the schemes proposed the resultant problems will be so great as to be incapable of solution without the drastic removal of part of the population from the area to others parts of Nyasaland or even to other territories. As there is developing a shortage of good agricultural land throughout Africa this last

step is becoming increasingly difficult and leads one to the conclusion that the soil resources of Africa are indeed poor at the present level of technique. The need in the Lower Shire Valley is to increase the output of food per man, and now that the expansion of agriculture appears to have reached its limits any increase in the area under cash crops at the expense of the area under food may well prove disastrous. Whilst there is a need of cash, it would be foolish in the extreme to concentrate so much on the sale of crops that food must be imported, for in effect the world is threatened with a food shortage and territories like Nyasaland have no great bargaining power on the world markets for the purchase of food in time of crisis. In addition dependents on cash crops will have the most unfortunate results during a period of trade recession in which agricultural products have always been more adversely affected than industrial. The first aim must therefore be to produce more food. A second assisting project might be to earn cash by other means than the growing of crops and thereby release land under cash crops for food production, This will include the production of minerals and manufactured goods for export or to replace similar materials imported. In this connection the Shire Valley Project, as it is now called, is planned to produce hydro-electricity. The resultant power will be useful not only for the increase of light industries, but for the reduction in the import of oil fuels at present used to generate electricity. One very suitable light industry would be the manufacture on

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a small scale of cotton cloth. The quality of workmanship needed is not high. Labour is cheap and would be better employed nearer its families than at Buluwayo or Salisbury. The cotton, the power and ~~the~~ a good market are all at hand. The lack is capital. Admittedly the market is valuable for British cloth exporters, but Nyasaland is a Congo Basin Treaty country and cannot join any scheme of Imperial Preference against, for example, Japanese goods which in textiles have a price advantage over their British rivals. A home textile industry by virtue of the cheapness of the local labour might hope to compete. Higher wages will have to be offered than are at present the case to attract migrant labour back to Nyasaland or to keep local labour once it has developed a taste for industrial work. The 1949 estimated labour requirements of European enterprises at the peak of season were 97,525, whereas the numbers actually at work at the peak were 72,597 and on the 15th November, the estimated minimum employment date, 60,334.(9) A project which should be of assistance in increasing the amount of light industry is that of the Africa Export Corporation to manufacture paper at Chiromo from the common reed of the Shire marshes known as mbango. This reed is also plentiful at Lake Shirwa in the Shire Highlands, but there adequate transport facilities are lacking. It is a pity that so little effort has been made to develop the Sumbu coalfield for here is power in abundance, a saving of the import of coal to maintain the railway and again another industry to

attract/

attract Nyasaland's migrant labourers home.

With a limit to the further expansion of agricultural land each acre must be made to produde more, but the changes which may possibly lead to this are far reaching in their affects. For example, the introduction of more efficient agricultural implements such as the plough must inevitably mean the need for slightly larger agricultural units per family and therefore fewer people on the land, although once the advantages of the implement are realised it may possibly encourage the keeping of cattle for draught purposes thereby assisting an attempt to increase the pastoral acreage. The introduction of mechanical equipment at this stage is to be strongly deprecated. As the Colonial Office Report of mechanisation in Africa admits:

"In some areas pressures of human population on natural resources are so great that efficiency of labour in farm work is not the principal cause of low productivity per caput. In such areas mechanisation of agriculture will usually be worth while only if demands for labour in non-farm work are substantially increased". (10)

The introduction of new techniques must await the full assessment of the changes they will bring. The social difficulties brought by forcing changes on a conservative people can result eventually in severe political repercussions. Haste in the introduction of new schemes can be fatal to their success. Already there is evidence in the Lower Shire Valley of a tendency amongst a few to escape the new "impositions" by leaving for Portuguese territory. The/

The more gradual introduction of contour ridging might have resulted in a less hostile attitude to the proposal to stop cotton growing for a whole season. Another difficulty is that there is amongst many a lack of incentive to make changes. Whilst some may wish to attain a higher standard of living others do not. There is a tendency to work for no more than the wage necessary for the simplest of requirements. An increase in wages quite often results in correspondingly less work. Wages are very low, hardly £1 per month plus food allowance, but the amount of work done is low. By European standards enormous quantities of labour are needed for road repairs, so little is the amount of work performed by each man. The attempt to increase efficiency will have little value unless the labour saved can be put to other uses. To quote again from the report on mechanisation, this time on mechanical appliances, to save the labour of women: "But without incentives, guidance, education and social changes generally, the labour saved might have little real value".(11)

In the present pattern of agricultural units and crop combinations one has the result of a successful adjustment to environmental conditions. Part of the answer to present difficulties is not to destroy that pattern or the methods attendant with it, but to adjust certain features to the changed conditions, i.e. to introduce manures and green manuring and to experiment with rotations of mixed crops. Green manure crops might be especially advantageous when interplanted with cotton since the crops which shade the

surface/

surface between the cotton rows, keep down weeds, act as a cover during the dry season and conserve soil moisture. Rotation is needed in the main food crop units to conserve soil fertility. Here the extention of oil seed production or of groundnut cultivation might prove useful. For the labour and cash earning problems the answer can only be in the increase of capital investment, and from the British Governmental sources this must be slow at present after the expenses incurred in other schemes and with so many other colonial commitments. In some respects slowness may be desirable in view of the unfortunate results already evidenced by too rapid expenditure. It is not impossible that some small capital investments may be made by the Africans themselves. At present outside Government loan funds it is difficult for Africans to collect together large sums of money owing to legal restrictions on their receiving credit. One man at least in the Lower Shire Valley had profited enough from the growing of cotton to buy a maize mill with which he intended to earn a further income. However, a 1946 report lamented that Africans did not know what to do with large sums, that whilst those with large amounts of back pay from service in the King's African Rifles did occasionally invest in cattle or improved housing or "hotels", many buried paper money or merely threw it away.(12) One possible solution to the difficulties of obtaining capital is by the formation of cooperative organisations. In some cases

villagers/

villagers have combined to raise funds in order to build schools. Another possibility is that capital may come from the Indian minority which has already taken over a large part of the commercial activity and before long may well have financial control of the territory. European investors would seem to be more interested in the rapidly expanding industries of Southern Rhodesia or of the Union of South Africa which offer greater returns and a greater measure of security. With regard to the political issues it seems a pity that there is no common policy by British and Portuguese for the development of the Lower Shire Valley, for on the Morrumbala side of the Shire there is enough land to solve immediate problems and thereby provide a sound basis for the more gradual introduction of changes needed to increase productivity. The Portuguese have raised no objections to the Shire Valley Project since its effect on their territory will be slight with the little control that will be exerted over the river.

In addition to attempting the improvement of conditions in the Lower Shire Valley, work has begun on the problems of the Shire Highlands in a pilot project in the Domasi Valley near Zomba.(13) Here a Native authority previously subject to famine had been made a separate administrative district and a plan of development put into practice by three stages:

(i) replanning of residential areas

(ii) contour bunding right throughtthe village lands regardless of garden boundaries.

(iii) consolidation and reallocation of holdings.

In this district the shortage of land has become so acute that holdings cannot be made any smaller, with the result that a system of female primogeniture is developing in order to keep what remains intact. Those who cannot obtain land locally must migrate elsewhere, most commonly to the towns. While a scheme designed to bring improvements must earn praise for its aims, one criticism must be made and this applies also to the Shire Valley Project - there has been little or no attempt to obtain a mandate from the people affected by the proposed changes. The new scheme is being forced on the people with the result that a large amount of opposition has been incurred and police work has become necessary. There is a need to train Africans for administrative and techhical posts that the impetus for new developments may come partly from Africans and not entirely from an alien people. As MacMillan remarks: "Indirect Rule, at least till it has trained more African helpers, will not necessarily increase and may even impair the energy now applied to reconstruction, to the promotion of health, education and scientific agriculture." (14) If Africans are not trained to fill higher posts not only will development be impeded, but there will be a tendency for the more able Africans to leave for Portuguese territory where an African of high enough educational standing and not occupied in peasant cultivation can attain the status of full citizenship.

This study began as an examination of development in

order/

order to view the possibilities of improving productivity and thereby establishing a basis for self-government. It has ended by examining the possibilities of maintaining the present standard of living, of preventing in fact a decline. All this would seem to put the hope of self-government further away, for yet greater improvements in productivity must follow in order to create enough wealth to support the institutions necessary. It may be argued, therefore, that the proposed federation of the Central African Territories of Southern and Northern Rhodesia together with Nyasaland is too precipitate. At present it is difficult to discuss the British Government's proposals on the subject, for the terms by which federation will be effected have not yet been settled. However, it is clear already that participation of the native community in the business of self government as envisaged in the Passfield Report is not proposed, nor apparently is the Devonshire idea of native interests being paramount to be extended to Central Africa. All initiative in any future Central African Government and the real control will remain in the hands of the white settlers, so that policy with regard to developments will be decided as before by Europeans. The demand for federation is coming chiefly from Southern Rhodesia, and the Bledisloe Commission (15) pointed out in 1939 that the idea of amalgamation had in fact been encouraged by the growing dependence of the industries of the Rhodesias upon the supply of native labour labour from Nyasaland. Ten years earlier the Hilton Young Commission showed that

opportunities for Africans would be limited by the restrictive practices in force in Southern Rhodesia, that native interests under federation would receive less consideration, that the European electorate was too small for so large a responsibility (in Southern Rhodesia in 1950 the Europeans were only 6% of the total population), and that native opinion opposed federation. Native opinion throughout the Lower Shire Valley and in those parts of the Highlands visited still opposes federation, fearing an extension of South African policy further north through the medium of Southern Rhodesia. This opposition, were federation granted, would widen the rift between the African and the European and make further improvements in development more difficult. Finally unless there is a change of heart in the Government of Southern Rhodesia it is unlikely that future schemes for the development of purely native concerns will win as much support as they do at present in Nyasaland. The result of all the increases in productivity and of all the political changes in South, Central and East Africa has been to make the clash between European and African interests more apparent. With the present lack of detailed information and with the problems posed by an alien physical environment and a society of at least three parts, Central Africa is a land in which one can only describe the problems and their background and make a few tentative suggestions with regard to the future. It is hoped that the nature and scope of the difficulties in one small part of Central Africa and their relationship to some of the problems of Africa as a whole

have/

have been demonstrated.

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APPENDIX A.

Glossary of African terms employed in the text.

batata	sweet potato
capitao	native assistant, foreman or official appointed by Europeans
chambo	tilapia squamipinnis
Chiperoni	dry season drizzle in the Shire Highlands
cilimwe	dry season
dambo	land subject to annual flooding
denje	sida rhombifolia, a fibre plant
dimba	garden in land subject to annual flooding
kacasu	native brandy, spirits
kokalupsya	first rains of the rainy season
kundwe	haematite
mabonda	a marsh reed
machewere	bulrush millet
maenza	rainy season
makande	saline dambo earth
mapira	sorghum
masao	zizyphus africana, a fruit tree
mayere	finger millet
mbango	marsh reed, useful for paper manufacture
mbawa	mahogany, khaya nyasica
mbila	pterocarpus angolensis
mkuyu	ficus
mlamba	Nyasaland catfish
mombo	brachystegia longifolia, boehmii or woodiana
mowa	native beer
mpande	Nyasaland parch
mphala	non-flooded alluvium

mphumbu/

mphumbu	brown earth derived from alluvial deposits
msuku	uapaca kirkiana
mtondo	cordyla africana, a fruit tree
mtsinje	a fordable water course
mtunda	hill land
mtwana	brachystegia bussei
nangale	combretum imberbe
napine	terminalia sericea
ncheni	tiger fish
ndiwo	relish eaten with porridge
ndlongo	black "cotton" soil
ng'ama	haematite
nkeca	very light sandy soil
nsangalabwe	sandy alluvial earth
~~nsengu~~	
ntondo	*isoberlinia*
nyanja) nyasa)	unfordable water, lake or river. On pp. 366-67 of Livingstone's narrative there is some confusion with regard to translation: "The natives regarded the Upper Shire as a prolongation of Lake Nyasa; for where what we called the river approaches Lake Shirwa, a little north of the mountains, they said that the hippopotami, 'which are great night travellers', pass from one lake into the other".
tengo	tree, bush, forest
tonje kadja) tonje manga)	native cotton) foreign cotton) in Livingstone's narrative
tsekela	thatching grass

APPENDIX B

Maps and aerial photographs.

The maps used for compiling this work comprise the following:

(1) A map of the Shire Highlands in Johnston's British Central (1897), facing p. 188.

Useful only as an historical document.

(2) Nyasaland Protectorate 1:1,000,000 compiled in the Topographical Section, General Staff (1906).

Again useful mainly as an historical document. Relief by spot heights and form lines.

(3) International 1:1,000,000, Salisbury-Beira S.E.-36 (1943)

Contouring at 200 metres, then at 500 metre intervals - of doubtful accuracy as little levelling has been attempted either in Nyasaland or in the relevant section of Portuguese East Africa. Many representations of watercourses and places inaccurate.

(4) Physical map of Nyasaland by F. Dixey (1931), based on G.S.G.S. 2136 corrected to 1923.

A good general picture of relief but many places the alignments and representations of relief and watercourses are incorrect.

(5) Sketch maps of the Geological Survey to show the positions of wells constructed in the Lower Shire Valley in the 1930s.

(6) Sketch maps by F. Dixey to illustrate the geology of the country west of the Shire.

(7) Preliminary Plot 1:50,000, based on aerial photographs.

(8) /

Shows watercourses, some but not all villages, roads, paths and railway. Height indicated by escarpment shading and spot heights on Portuguese territory. Distinguishes 3 densities of forest based on the appearance of the canopy in the photographs, scrub and marsh. Villages described as "kraals", a form peculiar to Southern Rhodesia.

(8) Aerial photographs, taken from 17,000 feet (1948). Taken during the dry season at a height so great that the scale is too small to distinguish either gardens or villages clearly in most of the prints. In many cases it was extremely difficult to distinguish scrubland from cultivated, and the examples given in figure 20 were carefully chosen as areas of which the author had detailed knowledge from actual visits.

(9) Blantyre - Limbe sheet, 1:25,000, compiled and drawn from aerial photographs by Directorate of Colonial Survey (1949). Heights based on railway levels brought up from Beira. The only detailed contour map of any part of Nyasaland. Used as a basis for the section diagrams of figure 5.

The maps in the thesis are based on the above items. The relief map makes no claim to accuracy except in its representation of water-courses and in the positions of the main hill features. The geological map is based on additional information from José de Oliveira Boléo, Geografia Física de Moçambique (1950). All maps have been corrected from observations in the field. The state of geographical knowledge may

be/

be judged by the fact that the Anglo-Portuguese border has not yet been correctly demarcated. From time to time corrections have been made to the consternation of those living in the immediate vicinity. Even the area of Nyasaland is not known with any accuracy. In the census of 1926 it is given at 37,596 square miles, in the Dominions Office and Colonial Office List of 1940 as 37,374 square miles, and in the census of 1945 as 36,829 square miles - all without boundary changes.

APPENDIX C

Census methods in Nyasaland

Population.

Censuses were made in 1911 (Europeans and Indians only), 1921, 1926, 1931 and 1945 for, amongst other purposes, an estimate of hut and poll tax returns. There was therefore some advantage in avoiding inclusion in the census. The work was done by native enumerators who attempted during the 3 weeks before the census day to count all people domiciled in the villages whether or not they were actually there on the census day. It is claimed that this, the de jure method, gives a greater accuracy than the methods employed in a number of other territories.

See criticism by R.R. Kuczynski: Demographic Survey of the British Colonial Empire, Vol. II (1949), Nyasaland pp. 522 - 639.

Climatic statistics.

In the Lower Shire Valley comparative figures for the three stations of Makanga, Tengani and Port Herald by months are only available for the period since 1943, and only in manuscript form from the Department of Agriculture Nyasaland or from the local Agricultural Officers who are in charge of keeping meteorological records. Observations have been taken at Port Herald since 1911, but again in detail are only in unpublished form. Throughout the figures give only short runs before breaks in the series occur. For comparison of the 3 stations it was found that the longest continuous rainfall "run" was from 1945 - 50 and the longest temperature

"run"/

"run" was from 1944 - 49. In outlying stations such as these the figures are less reliable than those recorded at Zomba or Blantyre, since much of the work is delegated to native capitaos with little or no training in meteorology or the handling of scientific instruments. This criticism applies particularly to observations made before 1945, for the war brought an increase in the number of men trained in the King's African Rifles and thereby improved in their efficiency for work under Europeans. Records have been taken at Zomba since 1892, whilst at Salisbury, Southern Rhodesia, a properly constituted meteorological service has been in existence since 1921.

Gardens and crops.

The gardens were counted by native enumerators, who had as many as 2000 gardens each to record, and their areas estimated by ~~passim~~ pacing 2 sides or as near 2 sides as possible Crops were entered for each garden. The number involved was possibly of sufficient quantity to make the error not over great when averages are calculated, and the graphs show a certain degree of uniformity. The gardens of approximately 5% of the agriculturalists of the Lower River Districts have been omitted from the census since their villages were too difficult of access.

No figures of crop yields either by area or by quantity of seed sown are available other than the approximate estimates given. Only the amounts of cotton grown are computed satisfactorily and any calculation of return per acre of

this/

this crop must take into account the fact that it is sown with either maize or mapira. The fluctuations in return due to the ravages of pests are so great as to make its use as an indicator of comparative fertility of land quite valueless.

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