

EXTRAVENEREAL TREPONEMATOSIS ('DICHUCHWA')

in the

B A K W E N A \_ R E S E R V E

of the

BECHUANALAND PROTECTORATE

A Study of a Common Childhood Infection  
from the Social, Epidemiological,  
Clinical, Therapeutic and Control Aspects.

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T H E S I S

FOR THE DEGREE OF M.D. OF EDINBURGH UNIVERSITY

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## C O N T E N T S.

	<u>Page</u>
Some Notes on the Orthography used in this Thesis	i
1. The Aim and Purpose of the Study	1
2. Notes on the Bakwena Reserve of the Bechuanaland Protectorate	3
2.1. Topography	3
2.2. Ethnology	7
3. Extraveneral Treponematosi in the Bakwena Reserve	15
3.1. History	15
3.2. Local Name and Extent	20
4. Conduct and Organisation of the Study	24
4.1. Participating parties	24
4.2. The Field Team	25
4.3. The Plan of Operations	25
4.4. The Difficulties Encountered	30
4.5. The Villages and Numbers Seen	34
5. Epidemiological Considerations	35
5.1. A Disappearing Disease	35
5.2. A Disease of Low Hygienic Standards	37
5.3. A Family and Childhood Disease	40
6. The Course and Clinical Features of Extraveneral Treponematosi ('Dichuchwa') in the Bakwena Reserve	42
6.1. The Early Lesions	42
6.2. The Late Lesions	49
6.3. Summary of Cases seen in the Bakwena Reserve	60
6.4. The Question of 'Superinfection'	63
6.5. The Question of Congenital Spread	68
6.6. The Serological Findings	71
6.7. The Treponema Immobilisation Test	74
6.8. Isolation of the Organism in the International Treponematosi Laboratory	77

	<u>Page.</u>
7. The Treatment of 'Dichuchwa' with PAM.	78
7.1. The drug used and Dosage.	79
7.2. The Clinical Results of PAM Therapy	83
7.3. The Serological Results of PAM Therapy	86
7.4. The Epidemiological Results of PAM Therapy	87
8. Some Illustrative Case Histories	90
9. The Relationship of 'Dichuchwa' to Witkop	141
10. The Relationship of 'Dichuchwa' to other Extraveneoreal Treponematoses (apart from Yaws)	146
11. The Relationship of 'Dichuchwa' to Venereal Syphilis	152
12. The Relationship of 'Dichuchwa' to Yaws	156
13. Summary of Relationship of 'Dichuchwa' to Yaws, Bejel, Endemic Syphilis and Venereal Syphilis	158
13.1. Summary in Table Form	159
13.2. The Unitarian View of Treponematoses	159
14. Associated Clinical Conditions	160
14.1. Skin Infections	160
14.2. Nutritional States	161
14.3. Eye Conditions	162
14.4. Infectious Fevers	163
14.5. Hernias	164
14.6. Longevity	164
15. Methods for the Control of 'Dichuchwa'	164
15.1. Mass therapy	165
15.2. Improved Social and Hygienic Conditions	168
16. Summary	169
17. Acknowledgements	173

	<u>Page.</u>
18. References	176
19. Tables	180
20. Illustrations	
20.1. The Maps	
20.2. The Figures	
20.3. The Plates	

Some notes on the Orthography used in this thesis:

1. By "Batswana", is meant the indigenous inhabitants of the Bechuanaland Protectorate. The singular is "Motswana".
2. By "Setswana" is meant the language spoken by the Batswana.
3. By "Bakwena" is meant the inhabitants of the Bakwena Reserve of the Bechuanaland Protectorate. They are the senior tribe of the Batswana in the Protectorate. The singular is "Mokwena".
4. By "Bangwaketse" is meant the people of the Ngwaketse tribe, one of the tribes of the Batswana. The singular is "mongwaketse".
5. By "Bamangwato" is meant the people of the Ngwato Tribe; another of the tribes of the Protectorate. The singular is "Mongwato".
6. By "Makgalagadi" is meant the people of a subservient tribe of Batswana, living for the most part in the Kalahari desert area but scattered throughout the whole Protectorate. The singular is "Mokgalagadi".
7. By "Masarwa" is meant the Bushmen of the Kalahari Desert. The singular is "Mosarwa".

## 1. AIM AND PURPOSE OF THE STUDY.

In the Bechuanaland Protectorate, there is a form of extravenereal treponematosi s known by the local native name of "Dichuchwa". This condition affects a considerable percentage of the indigenous population of the country, causing a good deal of suffering and morbidity. The disease is well known by the local population and by the Government medical officers and medical missionaries working in the country, but very little has been recorded about the disease. Little is known about the clinical course; its relationship to other forms of treponematosi s; and its response to modern therapeutic measures.

The aim of this study is therefore threefold:

- 1.1. To study "Dichuchwa" from the social, epidemiological, clinical, and therapeutic aspects in a defined pilot area.
- 1.2. To compare the disease with other forms of treponematosi s and to define its position in relationship to them.
- 1.3. To treat all cases and contacts of the disease found, and if possible eliminate the disease from the pilot area.

The pilot area was that part of the Bechuana-  
/land.....

land Protectorate in which, for the past few years I have been working as a medical missionary; namely the Bakwena Reserve, a vast area of undeveloped bushveld with an estimated population of about 45,000 people.

2. NOTES ON THE BAKWENA RESERVE OF THE  
BECHUANALAND PROTECTORATE.

An investigation such as this is governed to a large extent in its success and in its methods by the geographical background of the country and by the mode of life and social customs of the people, and so an outline must first be given of the country and people amongst whom the investigation into Extra-Venereal Treponematosi was made. It will be realised as this report is studied that the Bechuanaland Protectorate presents problems affecting the carrying out of mass surveys and mass therapeutic campaigns which are probably quite unique and it is very doubtful if there is any other country where these particular problems are found to the same extent.

2.1. Topography.

The Bechuanaland Protectorate is a very sparsely populated country of some 275,000 square miles. The estimated population is about 300,000 people of whom about 3,000 are Europeans. This figure is only approximate as there are many families of nomadic bushmen scattered in the great Kalahari area whom it is impossible to locate. (Map 1)

The territory is divided into eight main

/tribal.....



tribal areas, or reserves, and each reserve has its Paramount Chief and its native courts. The seat of the Government is in Mafeking, in the Cape Province of the Union of South Africa, but in each tribal area there is a Government Official known as the District Commissioner, with his administrative staff. The aim of the government is indirect rule through the hereditary chiefs and the chiefs have very great power over their people. The Chief's word is absolute law for his people. It is obvious therefore that it is of the utmost importance in a project such as this report covers to gain the full support of the chief at the outset.

The senior tribe in the Bechuanaland Protectorate although not the largest numerically, is the Bakwena whose capital is at Molepolole and it was amongst this tribe that a detailed study of Extra-Venereal Treponematosiis was undertaken as a preliminary step before launching a mass therapy campaign throughout the whole of the Bechuanaland Protectorate.

The Bakwena Reserve (Map 2) lies in the Southern part of the Protectorate between latitudes

/23°.....

23° 15" and 24° 30" south and longitudes 23° to 26° east and is estimated to cover about 10,000 square miles of country. The greater part of this vast area consists of the arid, waterless bush veldt known as the Kalahari desert which extends westwards far into South West Africa and southwards through the neighbouring Bangwaketse reserve into the Cape Province. The majority of the inhabitants live in the eastern part of the reserve, not far from the railway line which runs due north and south through the territory. In this eastern part of the reserve the soil is more fertile than in the west and there are more wells, bore-holes and rivers. The rainfall is very variable averaging 15" to 20" per year. Unfortunately droughts are a frequent occurrence and even in a good year most of the rain may fall in a few weeks leaving long spells of very hot dry weather. Theoretically the rainy season lasts from October until the end of March and this is also the time of the hot weather. This uncertain and variable rainfall has influenced tribal life and custom to a greater extent than any other factor and it has profound effects on the people from the medical and epidemiological aspects.

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In the summer months the days are very hot and the relative humidity very low whilst in the winter months the day temperature is often around 70°F., but at night there is an intense cold, often below freezing point. Before the rain commences in October the atmosphere is full of dust which rises in fine clouds from the sandy roads, whenever a truck, a waggon, an animal or a human being passes. It is easy to imagine how difficult it is for a people living under such conditions to keep clean when there is a shortage of water combined with the presence of a dust-laden atmosphere.

The capital of the Bakwena country is Molepolole, a large sprawling town of approximately 4000 huts and 15,000 inhabitants, and here are found the Paramount Chief's house with the tribal office and tribal meeting place known as the 'Kgotla'; the District Commissioner's office; Post Office; Prison and Hospital. Molepolole is 36 miles from the railway and is linked with the railway station at Gaberones by a dirt road. There are no telephones but a police radio maintains daily contact with the Government headquarters in

/Mafeking.....

Mafeking 120 miles away. At distances from Molepolole varying between five and 200 miles are approximately thirty small villages varying in size from 5000 inhabitants to 100 or so and, as is explained later, between these villages, scattered and hidden away in the vast bush veldt are innumerable hamlets and cattle posts.

## 2.2. Ethnology.

### 2.2.1. The Inhabitants.

The original inhabitants of Bechuanaland were the nomadic bushmen or Masarwa as they are called. These were followed by people of Bechuana stock known as the Makgalagadi "people of the Kalahari". These, like the Masarwa were a primitive and semi-nomadic people, but were more settled than the Masarwa in that they sowed crops and herded cattle. Then, later, at the same time as the first European settlers were arriving at the Cape the other Bantu tribes came down in their great treks from the north and the Bechuana tribes settled in what is now known as the Bechuanaland Protectorate, British Bechuanaland in the Cape Province and the Transvaal. As the Bakwena

/settled.....

settled in their present area they conquered the Ma-Kgalagadi, driving them west into the Kalahari and making them a subservient people. Today, then, Molepolole and the villages in the eastern part of the reserve are mainly occupied by Bakwena or similar people whilst to the west, on the edge of the Kalahari area, and deep in that area the people are mainly Makgalagadi. Living their ageold nomadic life far in the great plains of the Kalahari live the Masarwa, shy and untouched by modern civilisation. Today the Makgalagadi are still a servile people and the inhabitants of each Kalahari village and settlement know in which district of Molepolole their ancestral masters live. From the epidemiological point of view the importance of the Makgalagadi people is that they are the main reservoir of Extra-Venereal Treponematosi in the reserve, and there is a continuous travel of these people from the Kalahari area to the eastern part of the reserve, where they come into close contact with the Bakwena. This constant movement of the people is dealt with in greater detail below.

/2.2.2. ....

2.2.2. Mode of Life.

The home of the Bakwena is in the town of Molepolole and in the other villages scattered about the reserve. Each town has a central place where the chief or headman lives, and in Molepolole this is where all important tribal gatherings are held and where the chief and his counsellors sit to try cases and to discuss tribal affairs. Each town is further divided into districts and each district, known as a "kgotla" has a name and a headman who is directly responsible to the chief. Each kgotla is further divided into family units whose huts are close together and often in the same courtyard. The family units are, of course, divided up into individual families of a man, his wife and children. It is said that each man in the tribe knows his exact position in the long line of seniority.<sup>49</sup> Family life then, is the very foundation of tribal life, and the whole tribal structure builds itself up from this to the highest authority which is the Paramount Chief.

From the point of view of this study however,

/the most.....

the most important factor in the life of the people is their semi-nomadic mode of living. As just stated, each man and his family have a home in Molepolole or another village, and yet it is true to say that only for about three months of the year are the families found at home. Around every village at distances between five and fifty or more miles are areas where crops are sown known as "lands" or "gardens", and when the rains come in October the people scatter from their villages to these areas for ploughing; and when they scatter, everything is taken with them including chickens, pigs, pots, pans and the sewing machine!. Huts of a poorer and more temporary type than the town dwellings are built and here the people stay until after the harvest in August. Often their garden settlements are widely scattered; one finds two huts here and after two miles a few more huts and so on and this extends over a vast area of land and between the groups of huts the only roads are sandy tracks or mere footpaths.

Not all members of the family, however move out to the lands at ploughing time. School children

/for example.....

for example stay at home in the village, often being left in the care of an old grandmother or aunt. Sometimes children of several families will live together, cooking for themselves when all their relatives are busy at the lands. Only a small minority of the children of the tribe are allowed to attend school and those are mainly girls. As soon as school is over on Friday afternoons these children scatter in all directions to their parents' lands and on Sunday afternoons they walk back to Molepolole in time for school on Monday.

This migratory picture is further complicated by the presence of "cattle posts". The Bakwena, like all Batswana are cattle owners and the cattle are kept at special places where there is grazing and wells, known as cattle posts. These are separate from the garden areas and are often much further away from the village.

Here again, huts are built and the boys from about the age of ten onwards live more or less permanently at these posts. When there is a lull in the work at the lands, the women and children will trek off to the cattle posts for a few weeks

/in order to.....



in order to obtain milk which they love to drink. Sometimes also some of them will go back to the village home for a week or so, or some of the children will be sent to help relatives at other lands for a few months. Sometimes the first born girl is handed over more or less permanently to the grandmother to help her in her home and at her lands.

Often in this scattering to the lands the people of one village are mingled with people from another village, and in certain areas with Makgalagadi people. Further more, if there is much rain, the Bakwena will call their own Makgalagadi to come to help them with hoeing and reaping or, if there is a scarcity of rain the Makgalagadi will go to work for the Bakwena in the hope of obtaining enough to eat. This means that for the greater part of the year the people of many villages are intermingled, and so Extra-Venereal Treponematosi can easily spread from a village which is a reservoir of the infection to a previously unaffected village.

Another factor in population movement is labour

/migration.....

migration. Every year hundreds of boys and men go from Molepolole to the gold mines of Johannesburg on contracts of four or nine months. Schapera<sup>47</sup> states that in Bechuanaland Protectorate 40 to 50% of the able bodied men may be away at any one time and in 1954, 2715 men left the Bakwena reserve for Johannesburg. The advantage of this is, of course that these men receive an additional income which helps to raise their economic status. Fairly large numbers of girls also go away from the Bakwena Reserve to work in the cities of the Union, and other boys and girls go away to secondary schools.

Two facts emerge from this which have most important bearings on the epidemiology of a disease such as Extra-Venereal Treponematosi s, and on the carrying out of a mass survey of the tribe; namely that there is a constant and very widespread movement of the people between village, lands, cattle posts and outside cities and secondly that most families are almost always split up. Only very rarely can a complete family be found in one place. For example time and again on the survey one found a situation such as this: mother with two young children seen at the lands, father at the mines in Johannesburg, one daughter at school in

/Molepolole.....

Molepolole thirty miles away, one boy at the cattle post twenty miles in another direction and the eldest daughter with her grandmother fifteen miles in another direction!

### 2.2.3. Statistics.

No very accurate figures are available of the population of the Bakwena reserve although a census was taken in 1946. It has been variously put at 28,000 to 50,000. Squires<sup>50</sup> for example in 1946 stated that Molepolole had a maximum population of 10,000 whilst this year's survey has shown that it must be at least 15,000. The figures of people examined this year indicate that the population must be between 40,000 and 45,000 for the whole area. This figure is higher of course than the figure for the 1946 census.

### 2.2.4. Diet.

The staple food of the Batswana is Kaffir corn (sorghum spp) and mealies (maize) and these foods are supplemented by meat when available, beans, wild fruits and melon, milk and beer. The diet is very deficient in ascorbic acid<sup>51,52</sup> and in first class protein.

/2.2.5.....

2.2.5. Social and Religious Customs.

The Bakwena, like the other Batswana live a simple pastoral life. Most of the men today are monogomists although polygamy is still common in the Kalahari area and also many of the monogamists have concubines. Promiscuity is common and appears to be on the increase. Superstitious beliefs and taboos are very common although the people say they are no longer 'heathen' as in the old days. About 5% are Christian and the remainder believe vaguely in a Supreme Being and in an active world of spirits.

The question of the common use of eating and drinking vessels, huts and blankets in relation to Extra-Venereal Treponematosi s is discussed under Epidemiology.

3. EXTRA-VENEREAL TREPONEMATOSIS IN THE BAKWENA RESERVE.

3.1. History.

Sax<sup>46</sup> states 'all observers agree that syphilis did not exist amongst the Natives of South Africa prior to their intimate contact with /white men'.....

white men'. It appears from early accounts that syphilis spread gradually north from the costal areas through contacts of the Bantu inhabitants with Europeans; slaves from the east; half breeds and Hottentots; and early reports indicate that the disease was extremely common in the Cape amongst these people. Henry Lichtenstein the traveller, quoted by Sax<sup>46</sup> found no trace of syphilis amongst the Xhosa people in the years 1803 to 1806. After the middle of the 18th century, Hottentots, half-breed Griquas and Koranas spread north of the Orange River and came into contact with the southern Batswana tribes, and it is said that they captured female Batswana as slaves and that these eventually took syphilis back to their homes. Robert Moffat, the great missionary to the Batswana, worked particularly amongst the Batlhaping tribe at Kuruman, and in his journal he mentions a disease which he calls 'kwatsi'.<sup>36</sup> He writes, 'On 30th March 1825, we were deeply affected to hear of the death of Pechu the young prince..... he died of what is called kwatsi a disease which appears to be endemical which assumes the form of a carbuncle....

/It is always.....

It is always accompanied by considerable swelling, attended with stupor and comparatively little pain'. Today in the Bakwena country the people use the word 'Kwatsi' to mean a large indolent ulcer on the body or limbs, and sometimes it is used for the gross naso-pharyngeal ulceration which is one of the late signs of Extra-Venereal Treponematosiis. It appears therefore, that the Batswana people around Kuruman, who at that time had had considerable contact with Europeans, Coloureds and Hottentots from further south were already infected with syphilis. Livingstone who worked amongst the Bakwena around Molepolole from 1845 to 1851 found that there was no syphilis amongst them although he mentions that it was common amongst the tribes nearer the coast. He writes<sup>27</sup> 'A certain loathsome disease which decimates the north American Indians and threatens extinction to the South Sea Islanders dies out in the interior of Africa. The Bangwaketse who brought it from the west coast lost it when they came into their own land south west of Kolobeng. It seems incapable of permanence in the centre of the country in persons of pure African blood.

/Amongst.....

Amongst the Barotse I found a disease called Manassah which closely resembles the Foeda Mulier of history'. After the opening of the diamond mines at Kimberley in 1866 many Batswana men came south and there was intimate contact between these men and the people from further south who, as already mentioned, were by now heavily infected with syphilis. Amongst the workers in the diamond mines syphilis was especially prevalent. The fifty years following the opening of the mines saw a very rapid spread of syphilis amongst many of the Bantu tribes of South Africa. Warren's expedition into Bechuanaland in 1885 found the natives there already badly infected and in 1909 3.7% of the Bantu population of Mafeking, Kuruman, Taungs and Vryburg were treated for syphilis, (McArthur and Thornton).<sup>32</sup> These southern Batswana tribes were in intimate contact with the Batswana to the north and so the disease spread rapidly north through Bechuanaland. It would seem therefore that syphilis was probably brought to the southern Batswana tribes by their contacts with people from the coast and then gradually spread to their more northern neighbours.

/The.....

The possible relationship between this venereal syphilis and Extra-Venereal Treponematosiis is discussed later.

The first full account of Extra-Venereal Treponematosiis amongst the Batswana was written by McArthur<sup>31</sup> in 1922. He worked amongst the Southern Batswana round Taungs in the Cape Province and his account describes the disease very much as we see it today in the Bakwena Reserve and in other parts of Bechuanaland. He probably confuses congenital and hereditary spread of the disease with the extra-venereal spread. He also discusses the condition known as Witkop which he regards as a syphilitic condition affecting the Bantu. This is discussed later in this report.

It is only within the last thirty years or so that Government and Missionary doctors have been working in the Bechuanaland Protectorate, and all medical officers have known well the presence of a form of syphilis, affecting particularly young children, but it was not until 1952 that an account of the condition was published by Murray et alia.<sup>37</sup> This paper which gave a brief summary of the main

/features.....



features of the condition stated that the disease was in many ways similar to other forms of endemic syphilis reported throughout the world.

3.2. Local Name and Extent.

In the Bakwena dialect the word used for syphilis is "Dichuchwa" and this includes both the venereal and the non-venereal types. It is difficult to find out what the derivation of this word is. It appears to be a relatively new word in the language, but all the people know that Dichuchwa means a definite clinical entity, showing sores of a definite type in the mouth and on the ano-genital areas; that it is a disease affecting mainly children, and that it is a family disease. They also know that it affects the 'blood' although the people do not associate the later manifestations of the disease with an attack of 'Dichuchwa'. Whilst there is a certain amount of shame attached to the disease, this appears not to be due to any feeling that the disease is associated with immorality but to the fact that the sores appear on the genital organs and that the disease is so common amongst the Makgalagadi. On asking the Bakwena if they

/have.....

have ever had 'Dichuchwa' one is frequently given the reply "Certainly not! We do not know that disease, it is a disease of the Makgalagadi". There appears to be no differentiation made between dichuchwa spread extravenereally and that spread venereally. Venereal syphilis is not well known by the people, they say it is uncommon but they know gonorrhoea well and realise how it is spread.

Throughout the other reserves in the Bechuanaland Protectorate, Extra-Venereal Treponematosi s is also a very common condition but the word 'Dichuchwa' is not used. The commonest word is 'Thosola' which is used by most of the Bechuanaland Protectorate Tribes and infers juvenile syphilis. It is not associated with venereal syphilis and like dichuchwa it is a comparatively new word in the vocabulary. In the Bamangwato Reserve, which occupies the greater part of the northern Bechuanaland Protectorate, venereal syphilis and gonorrhoea and indeed any sore due to sexual infection are known by the same word namely 'Rrasepipi'. One frequently hears people say, "I am not well; I have Thosola blood", by which they mean that they

/have had.....

have had thosola as a child and they believe it has affected the blood. Some of the store-keepers used to sell medicine known as "thosola medicine" for purifying the blood and no doubt this had iodides and mercury perchlordide in it. The iodide mixture which is given out at dispensaries in cases of syphilis is called by the local people 'potash' and is very popular.

The Bangwaketse tribe to the south of the Bakwena use the word 'Matsabane' for Extra-Venereal Treponematosi and this word implies a spilling over or a spreading type of sore. Another word in use is 'Khunwane'. Whichever word is used the local people mean exactly what the Bakwena mean when they talk of dichuchwa. The disease is well known by the people and just as the Arabs<sup>22</sup> are reliable when diagnosing Bejel and differentiating it from scabies and other skin diseases, so the Bakwena seldom make a mistake in their diagnosis of dichuchwa. Occasionally one has seen a doubtful case and if the diagnosis is referred to the patient or his parents for advice one is always given a definite answer which is usually confirmed later by

/the.....

the serological tests. The older people state, however that the disease is much less common now than it was about twenty years ago and this fact is borne out by this present survey. Indeed, as will be shown later dichuchwa is a disease which is disappearing.

There are very few figures available for serological results of test performed on sections of the community in the Bechuanaland Protectorate although the present Director of Medical Services, Dr. M. L. Freedman, O.B.E, states that at Serowe in the Bamangwato tribe he found a sero-positivity rate of 40% amongst hospital patients. Squires<sup>50</sup> states that 25% of hospital patients in the Bechuanaland Protectorate give positive serological tests for syphilis and that a small series of tests performed on healthy African police showed 16% positive reactions. He also tested the blood of 105 healthy school children in Molepolole and found that seven of them gave a positive result. The seropositivity rate appears to vary from place to place. In addition to the above figures it is stated in the 1946 Annual Medical Report of the Bechuanaland Protect-

/orate.....

orate Government that<sup>a</sup> group of 377 outpatients at Mahalapye showed a seropositivity of 64%.<sup>3</sup>

In the Scottish Livingstone Hospital which serves the Bakwena tribe, about 5% of the yearly outpatients are diagnosed as syphilis and about 30% of the Ante-natal clinic patients showed positive serological tests for syphilis.

#### 4. THE CONDUCT AND ORGANISATION OF THE STUDY.

##### 4.1. The Participating Parties.

This study was undertaken during the period November 1953 to February 1955, during which time I was working as Field Medical Officer for the World Health Organisation in Bechuanaland.

The investigation into Extra-Venereal Treponematosi s was initiated and organised by the Medical Department of the Bechuanaland Protectorate Government with the technical assistance of World Health Organisation and with certain supplies and equipment furnished by the United Nations International Childrens' Emergency Fund (UNICEF). The South African Institute for Medical Research co-

/operated by.....

operated by undertaking the laboratory investigations and, for this purpose a field laboratory was established at the Scottish Livingstone Hospital. Most of the photographs in this thesis were taken by the author as also the radiographs but the developing and printing of them was done by the Photographic Department of the South African Institute for Medical Research.

#### 4.2. The Field Team.

The team on the field consisted of two sections, namely the travelling team and the laboratory staff.

##### 4.2.1. The Travelling Team.

This consisted of the World Health Organisation Medical Officer; an African clerk; a Medical Orderly; a Staff Nurse; a Driver; a Lorry boy; the Chief's Representative and the cook.

##### 4.2.2. The Laboratory Staff.

This consisted of a European technician and two African assistants.

#### 4.3. The Plan of Operations.

Before the actual campaign began in November 1953 a good deal of preliminary

/propaganda.....

propaganda had been carried out. The local District Commissioner was most useful in this and he was very co-operative in helping to gain the full co-operation of the Chief. Some weeks before the commencement of the campaign a large tribal kgotla meeting was held at which the whole project was explained to the people, and at which the tribesmen showed considerable enthusiasm for the project.

4.3.1. In November 1953 the field team went into operation. The aim was to interview and examine as many people as possible in the Bakwena Reserve and complete a punch card for each one, giving details of past history of 'Dichuchwa' and any signs of the disease at the time of examination. A sample of blood was taken from as many people as possible and examined for serological tests for syphilis. Cases giving a previous history of 'Dichuchwa' or showing signs of the disease were treated with P.A.M. and any other diseases discovered incidentally were also treated.

4.3.2. The year's work was really in two sections. For the first eight months an attempt was made as mentioned above, to obtain samples of blood from

/as many.....

as many people as possible. At the end of that time the supply of venules for taking blood samples was exhausted and so the last four months of the year were devoted to interviewing people and making a note as to their history in regard to previous infection with dichuchwa, and blood specimens were not taken routinely. Blood specimens were only taken from any clinical cases found and from cases being rechecked. The punch cards used in the first phase of the year's work were white whilst those used in the second phase were pink in colour.

4.3.3. Each month in consultation with the Chief's Representative, an itineration was planned to cover certain villages and areas of lands and cattle posts. This plan had to be changed frequently as for example when rains blocked certain roads. The Chief's Representative went out to a village a day or two before the team was due to arrive and contacted the local headman who sent word for his people to gather on the appointed date. He also made arrangements for a hut to be made ready for use as an examination and injection room.

4.3.4. On arrival at the appointed village or

/land.....



land area the team would immediately start work. I would explain very briefly and simply to the people, what was about to happen, and then the clerk would set up his table under the shade of a tree and call the people to line up in family groups. (Plates 1 and 2). A punch card (Figure 1) would be written for each person. On it was recorded name, village, kgotla, head of the family, age, sex, and marital state and the whereabouts of the missing members of the family. Each person was given a metal disc to wear round his neck or wrist, numbered with the same registered number as on the card.

Having received this card and disc each person would then move on to the Medical Orderly who had, in the meantime set up his table in the shade of a hut or tree, and he would by means of the venules (vacunes) take a blood sample from each, carefully marking the specimen with the appropriate number. (Plate 3). In the cases in which he failed to obtain a blood specimen he would mark the card in the 'Not Done' space.

The person, still holding his card would then move on to where I was sitting at a small table,

/either.....

either inside a hut or in the shade outside. I would question him as to previous attacks of dichuchwa and examine him for any signs of dichuchwa or other disease. These facts would be recorded on the punchcard. If I decided that the person required an injection of PAM he was given a small piece of paper on which was written the dose needed and this was taken to the Staff Nurse who gave the injection.

At the end of the day the punch cards were carefully counted and checked against the blood specimens taken, and the PAM given was checked against the dosage cards. The blood specimens and cards were then handed to the driver who would travel back to the laboratory with them and return next day to the team. Sometimes the driver had to travel far into the night in order to get the specimens back. Next day in the laboratory the sera were separated and examined for syphilitic reactions and when the results were obtained they were entered on the cards. The cards were punched in the laboratory.

/Every.....

Every month the field team would spend a few days analysing the cards and filing them away under the headings of village, kgotla and head of family.

4.4. Difficulties encountered.

4.4.1. Travel.

One of the main difficulties was travel. The project commenced at the beginning of the rainy season and frequently the trucks became bogged in mud on the way to a village. On several occasions the time from mid-morning until late afternoon was spent in extricating the truck from deep mud, and when the village was reached the people had dispersed. In the Kalahari area the villages are often very small, (Plate 4), and travel between them is most difficult. The trucks often have to bush-crash through the veld with the risk of tyres being pierced by stumps and springs being broken. In the dry season deep sand impeded progress in the same way as mud did in the rainy season.

4.4.2. Dispersal and Scattering of the People.

Some reference to this has already been made, but how wide and extensive this disper-

/sal is,.....

sal is, was not realised until attempts were made on the survey to find complete families. As already pointed out, there is a constant movement of the population between the village home, lands and cattle posts; but within this constant circle of movement there are other movements of the people such as going away to cut grass in the veld for several weeks; going off on hunting expeditions; going to initiation ceremonies, social visiting and so on. An example of these difficulties was illustrated by the case of a young girl who was seen with dichuchwa and treated. Six months later an attempt was made to find her to assess her response to treatment. The journey of 50 miles west of Molepolole brought the team to the village where she was originally treated and there it was learnt that she had moved with her parents to another village 18 miles away. This village was reached with considerable difficulty on account of deep sand and here the parents informed the team that the girl was living with relatives at a village 12 miles away. Another rough journey brought the team to this village to find that she had left two days

/previously.....

previously for her lands which were 10 miles away, and which could only be reached by bush-crashing along a narrow footpath. Eventually she was located and a specimen of blood obtained, but the whole day had been spent in the chase! On another occasion the team went to find a small boy who had been treated for dichuchwa some months previously and was told, "Oh, we have lost him, he wandered off and we think the lions have eaten him".

Only occasionally did we find whole villages in which the people were difficult. At one village when we arrived we saw the inhabitants fleeing as fast as possible into the surrounding bush but we learned later that they thought it was the police who were after them for hunting eland. Gradually as the news spread that it was the doctor and his team they came back. Masarwa were always difficult to find and usually hid themselves. In every village there were some stubborn or lethargic people who hid themselves until the team had gone.

#### 4.4.3. The Accuracy of Statements.

Another very definite difficulty was that the people's statements were not always

/accurate.....

accurate. For example, if a person was anxious to have an injection of PAM he would be sure to say he had had dichuchwa or if he was frightened of an injection he would say that he had never been infected. Statements as to size of families were not always accurate. If a child was living with the grandmother, she would say that there were two in the family, meaning herself and the child, but the child when seen would probably give the number of the father's family which might be as many as six or more. Some men, when giving the number in the family would include servants and other relatives whilst when the wife was seen, perhaps at a different place she would only include her own children. The names of children presented another problem. Sometimes a woman was seen at the gardens and she gave the names of her children who were elsewhere, and these names were recorded on the card. Later the children were seen at home or at school in the village and the names they gave did not correspond with the names which their mother gave. The fathers would probably call them by different names again!

/4.5.....

4.5. Villages and Numbers Seen.

As there are no recent census figures for the tribe, and as the people are so widely scattered and so vague in their statements it is impossible to estimate with any accuracy the coverage rate of the population. In some villages it was as high as 100% whilst in others it was as low as 67%. The 1946 census has been used as a rough guide to percentage of numbers seen. In the 1946 census several villages which this report treats as separate units were treated as one village and there has obviously been some big population movements since 1946, as the census gives the figures for Tsetseng for example as 114 whilst 422 people were seen there by the team. These census figures can be taken therefore, as only very approximate.

Table I gives a list of the villages visited, and the number of people examined in each, the 1946 census figures where available, and the approximate percentage of people seen.

Villages 1 to 12 which are in the non-Kalahari area are populated mainly by non-desert people,

/that is,.....

that is Bakwena people, whilst the Kalahari villages 13 to 29 are inhabited almost exclusively by Makgalagadi people.

It is important to realise that not all the people were seen on the first visit to a village. Indeed most of the people were seen at lands or cattle posts outside the villages, and frequently people of several villages were found together at these areas but, in compiling the figures, each person was allotted to his or her stated home village.

## 5. EPIDEMIOLOGICAL CONSIDERATIONS.

### 5.1. A Disappearing Disease.

The population of Bechuanaland is essentially rural and dichuchwa has not been reported amongst the Bantu population in the cities of the Union of South Africa (Murray et alia).<sup>37</sup>

The disease is not uniformly spread over the Bakwena reserve. By far the largest number of cases is found in the desert area, among the Makgalagadi, whilst in the villages to the eastern

/side the.....



side the disease is less prevalent. An analysis of gross figures based upon active cases and those giving a history of previous dichuchwa is shown in Table 2. Reference to Table 12, however shows that there is an appreciable proportion of seropositive bloods in persons giving no previous history of the condition. Figure 2 shows the distribution of active and latent cases and of seropositive people without history of the disease in the 22,809 examined during the first 8 months of the investigation in the Kalahari and non-Kalahari areas.

The highest percentage of active cases found in any one village was 5.2%. In the tribal capital, where hygiene and general living conditions are as good, if not better, than anywhere else in the reserve 1.0% showed active lesions in 14,311 examined.

Table 4 shows an analysis of the clinical status in relation to endemic syphilis of the 35,043 people seen during the campaign. The analysis is based upon a clinical assessment of each case, those showing primary, secondary or tertiary lesions being grouped as active cases and those

/who.....

who gave a history but showed no clinical evidence of the disease or had completely burned out inactive lesions being classified as latent. In the older age groups the great majority of patients giving a prior history of dichuchwa stated that they had had it in childhood. Willcox<sup>57</sup> in his study of njovera also noted that older persons generally admitted to having had the disease in childhood whilst the youngest age groups denied infection.

Our impression is that the disease is becoming less common than it was 20 to 30 years ago, an impression that is supported by statements of older people who frequently say 'Of course I had dichuchwa, for when I was young everyone had the disease, but the children of today do not get it. It is being stamped out by the white peoples' injections.'

5.2. A disease of low hygienic standards.

Table 3 shows that the disease is more common among the Makgalagadi inhabiting the Kalahari villages than among the Bakwena and Table 4 that the latent form of the disease (as judged

/by.....

by anamnesis) increases with age. Both these facts are related to social conditions and hygienic standards of the people. The Makgalagadi are far more backward and primitive than the Bakwena in their mode of life and dress. Their hygienic standards are exceedingly low. Many of them still dress in animal skins which are never washed. Water in the Kalahari area is scarce; sometimes the women have to walk many miles for a pot of water and so bodily cleanliness is almost unknown. Dirt is absolutely ingrained into the skin and clothes of many of the people, and particularly men and boys rarely, if ever wash more than their hands and mouths. They eat with their fingers, usually from communal bowls or pots and drinking mugs are also in common use. (Plates 5 and 6). The huts in which the people live are smaller than the huts of the Bakwena, being approximately 12 - 15 feet in diameter and often they have no windows. Dust covers everything; food, clothing and blankets and flies are always present in great numbers, clinging tenaciously to children's mouths and eyes and alighting on any open sore or wound. (Plate 7).

/As the.....

As the Makgalagadi are hunters, skins of animals, pieces of bone, and drying meat are often hanging just outside the huts and these also attract great numbers of flies. The people usually sleep on skin mats on the floor of the huts and in a hut 12' in diameter there may be the parents and several small children all sleeping close together, and often the children share blankets or skins. Usually the blankets are absolutely filthy. Spitting on the floor of the hut or blowing the nose into the blankets or on to the floor of the hut is the usual practice. There is no sanitation apart from the bushes near the huts.

Conditions in the town of Molepolole and other villages in the eastern part of the reserve are very much better than those described above, although even in these places one may still find common eating and drinking vessels in use. The huts, however are bigger, being usually about 20 to 28 feet in diameter and have windows. They are less crowded for sleeping, as the older children have their own huts alongside those of their parents in the family kraal. The people are very

/much

much cleaner in themselves as the Government has now sunk bore-holes in most of the villages so that there is an abundant supply of water. It is only when the people are busy working at their lands that they become slack in their habits of cleanliness and more nearly approach the Kalahari type of life. The impression one gains is that most cases of dichuchwa amongst the non-Kalahari people originate at the lands. Nowadays too, large numbers of children in Molepolole attend school and here there is a daily inspection for cleanliness.

Csonka<sup>7</sup> quotes Hudson as stating that the mere presence of a school in a village is a major factor in causing the disappearance of Bejel amongst the Arabs and no doubt the same applies for dichuchwa. Cases are rarely found amongst the children of the better class, well washed, well fed and well educated Africans.

### 5.3. A Family and Childhood Disease.

Dichuchwa is well known by the local people to be a family disease. If one child has dichuchwa other cases usually follow in the family. It is also well recognised as a disease of childhood.....

hood. Grin<sup>11</sup> and Willcox<sup>56</sup> in their descriptions of endemic syphilis in Bosnia and Southern Rhodesia respectively, both stress these two points. A typical family history is illustrated by the cases described on page 106 and by Plates 21-25.

The age distribution of 289 cases with condylomata and other secondary manifestations and of 205 cases with late destructive lesions is shown in Table 5 and Figure 3. From the table it can be seen that mucosal and condylomatous lesions occur in the youngest ages, while the tertiary lesions tend to occur at a later age.

The proportion of active dichuchwa to total endemic syphilis (active and latent) by agegroups has been shown in Table 4.

This, together with Table 5, shows that active dichuchwa is a disease primarily of childhood. As fresh infections amongst children in an area decrease, relatively more cases of latent syphilis are found in the higher age groups.

The proportion of females to males seen in the investigation was 1.5:1 and that of active female to male cases was 1.3:1. There appeared, therefore,

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to be no difference between the sexes in the incidence of the disease.

This differs from Csonka's<sup>6</sup> findings in bejel which appeared to be slightly more common in females. He gave as his explanation the fact that girls usually have a closer contact with small children than do boys. In Bechuanaland the girls are often left in charge of the small children whilst their mothers are working at the lands and frequently carry them on their backs for long periods (Plate 8), but this does not appear to have affected the sex distribution of the disease.

The Bakwena do not regard dichuchwa as being spread primarily by sexual contact and there is no doubt that the main mode of spread is non-venereal through the use of communal eating and drinking vessels and blankets, and by flies, dirt and direct contact of children with one another.

6. THE COURSE AND CLINICAL FEATURES OF EXTRA-  
VENERAL TREPONEMATOSIS ('DICHUCHWA') IN THE  
BAKWENA RESERVE.

6.1. Early Lesions.

/6.1.1.....

6.1.1. Primary Lesions.

Primary lesions in dichuchwa are exceedingly rare. This fact agrees with the observations of other writers on endemic syphilis such as Hudson,<sup>20</sup> Grin<sup>11</sup> and Willcox.<sup>56</sup> In the present investigations only two cases were found and these were identical; namely primary sores of the nipples in women feeding children with infective mouth lesions. Another type of breast lesion is discussed below under the heading 'Superinfection'. The first case seen was that of a Mokgalagadi woman who was nursing a child aged seven months (Plate 9). The child had very florrid lesions of dichuchwa; mucous patches on the lips and fauces and ano-genital condylomata with circular condylomatous sores on thighs and buttocks. A few weeks later the mother who had no previous history of dichuchwa developed a typical dichuchwa sore on the left nipple. This was followed by condylomata of the vulva with a strongly positive Kolmer reaction. Soon afterwards another child in the family developed dichuchwa. The second case was identical. A child aged about one year being breast fed developed dichuchwa with  
/very florrid.....



very florid<sup>r</sup> mouth, skin and ano-genital lesions, and a few weeks later the mother who had no previous history of dichuchwa developed typical lesions on both nipples. (Plates 10 and 11).

All reports on endemic syphilis stress the rarity of primary lesions although as illustrated above they do occur. When syphilis is acquired venereally there is inevitably, heavy inoculation of mucous membranes with treponemes and it is at this site of massive inoculation that the primary sore develops. In Extra-Venereal Treponematosis however it is not often that treponemes are transmitted in large numbers at one site. It is more likely that there is repeated exposure to small numbers of organisms. The use of common drinking vessels and the touching of children playing together could transmit repeated small doses of treponemes which, whilst not sufficient to cause a primary sore in one place, could give a generalised body infection to cause the appearance of the secondary lesions. Occasionally in Extra-Venereal Treponematosis a heavy transmission of treponemes occurs at one site with the production of

/primary.....

primary sores as in the two cases mentioned above.

Akrawi<sup>2</sup> describes two cases of bejel which developed primary sores. One was a breast lesion identical with these cases and the other was a pubic chancre in a man, derived from his wife who had active bejel.

#### 6.1.2. The First Signs of the Disease.

The first signs of the disease are usually aching of the legs with slight swelling of the tibiae and the appearance of mucous patches in the faucial area or the larynx. Several cases were found in which the parent brought the child and said "This child has dichuchwa: his legs are aching and swollen, but the dichuchwa are still inside". Blood examination showed a strongly positive reaction, although clinically there were no signs apart from very slight tenderness over the anterior surfaces of the tibiae.

Often the mucous patches cover the whole of the faucial area and extend on to the palate. The dorsum and tip of the tongue and the inner side of the lips are also common sites for mucous patches. (Plates 15, 23 and 56). Another common site noted

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was the foreskin of the penis and this was often found without condylomata. Quite often a hoarse voice is the only sign of dichuchwa. The child is brought by the mother who says "This child's voice has been hoarse for some weeks. He has dichuchwa". In these cases blood examination frequently shows a strongly positive Kolmer test.

Condylomata around the anus and genital organs may appear at the same time or a week or two after, or even before the oral lesions. They are of the typical condylomata lata type and, like the mucous patches they are teeming with spirochaetes. (plates 17, 18, 19, 20, 22, 24, 25, 27, 30, 32). Sometimes the only sign of the disease is condylomata. Several cases were seen where the only sign of the disease was one condyloma at the side of the anus or on the scrotum or on the vulva. Condylomata were also noted, although less commonly, in the axillae where there was frequently one on the chest wall opposite (Plates 28 and 31), the groins where they usually spread from ano-genital ones (plate 26) the skin folds and on the face (Plate 29). Several cases were seen where there were condylomata of a circinate

/type.....

type like large rings on the skin under the folds of the breasts and on the abdomen in infants. Associated with these lesions, split papules at the angles of the mouth were often noted. (Plate 16). One has to be careful in an area such as this where avitaminosis is common not to confuse the angular stomatitis of vitamin B deficiency with the split papules of dichuchwa. In bejel, angular stomatitis is often confused with that due to vitamin B deficiency.<sup>22</sup> Akrawi<sup>1</sup> points out, in discussing bejel that the white patches of B2 avitaminosis at the angles of the mouth encourage the transmission of spirochaetes. It was noted that split papules of dichuchwa were usually associated with mucous patches on the inner side of the mouth and lips and other lesions of dichuchwa. They were also much bigger and more moist than the lesions due solely to avitaminosis.

Generalised papilliform rashes may also occur at the early stage. Taylor<sup>53</sup> noted these in his case and I found, like him that the rash had a 'Chicken Pox' type of appearance and indeed in some cases the rash is so extensive that one wonders at

/first.....

first glance if the child is not suffering from Small Pox. The rash is not however, vesicular as in Chicken pox but these extensive, papular rashes cover the face, head, limbs and body and are chiefly found in infants and very young children.

(Plates 11, 12, 13, 14).

The blood Kolmer reaction is always strongly positive in these early cases - usually 160 units.

These lesions last, on the average from six to nine months if untreated although they may last a good deal longer. One boy with large anal condylomata said he had had them for four years. The usual course is that spontaneous regression occurs; the lesions disappearing entirely to be followed in a few cases by the development of tertiary lesions at a later date. Sometimes the spontaneous regression is slow and incomplete. Cases have been met with, where mucous patches appeared in the mouth and after some months disappeared, to be followed a few months later by condylomata. The patient may regard this as a second attack of dichuchwa, but I am inclined to believe that it was part of the original infection. True second attacks of dichuchwa

/have not.....

have not definitely been proved to occur. Several cases showing the features of early dichuchwa have stated that they had attacks when younger but unfortunately in none of these cases did I have blood-serological findings before the presenting attack.

The great majority of cases of early lesions became latent cases, that is, they show no signs of the disease apart from a positive serological reaction. The factors determining whether a case will become latent or develop tertiary lesions are matters for interesting speculation and research, but one of the likely factors is discussed below under the heading of 'Superinfection'.

## 6.2. Late Lesions.

There are three common groups of late lesions, namely, skin ulceration, nasopharyngeal ulceration and bone lesions. At times these produce great disfigurement or deformity on account of the extensive tissue destruction which occurs. The local people do not connect these late manifestations with an attack of dichuchwa.

### 6.2.1. Skin ulceration.

This may occur on almost any part of

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the body. There are two main kinds of lesions. One is a deep indolent ulceration, circular or oval in shape with a raised margin. This often occurs as single large ulcers which may cause quite extensive local destruction of tissue. These ulcers have especially been noted on scalp, chest, abdomen, shoulders, limbs and genital organs. (Plates 33, 34, 35, 36, 39, 43, 59, 60, 62). One man seen recently had the whole penis destroyed by such ulceration and a girl of 20 had a large ulcer on the labium major. (Plates 61 and 54). One day three people presented themselves at the Molepolole Hospital from the village of Sojwe. One had an oval shaped ulcer on the chest wall (Plate 34), one had a rounded ulcer on the epigastric region (Plate 35) and one had two small circular ulcers over the left side of the frontal bone (Plate 36).

The other type of skin lesion is a more extensive superficial ulceration which may affect large areas of the body especially the flanks, buttock and thighs (Plates 40, 41, 42). The skin around the mouth and nose is also often affected by this type of ulceration (Plate 37). When this lesion

/heals,.....

heals, extensive areas of scarred skin are left (Plate 44) and often in this scarred tissue there are areas of depigmented skin (Plate 45 and 63). This type of ulceration is, of course, quite often infected with pyogenic organisms. Rather similar to this type of lesion is a bilateral rough papular type of ulceration which occurs occasionally on the backs of the elbows. Chronic gummatous ulceration of the breasts occurs in women who have previously had dichuchwa and who are suckling a child with active dichuchwa. (Plate 53). One woman had had such an ulcer for three years and it began whilst feeding a child which had dichuchwa in the mouth. (Plate 52). Another woman recently seen had quite extensive ulceration over both breasts following suckling a child with oral dichuchwa. This type of lesion is discussed below.

#### 6.2.2. Nasopharyngeal Ulceration.

This is the commonest late lesion and all stages of destruction are found. Many of these cases are in elderly people and the lesion has long since healed, leaving a scarred and distorted nasopharyngeal area and in some of these cases the

/serological.....





serological reaction is negative. The youngest active case seen was in a girl of about eight years.

The worst cases present a shocking appearance with great tissue destruction and ulceration of the nose, lips, palate and pharynx. Great disfigurement can be caused, especially when the nose is eaten away and a gaping hole lined with yellow slough is left. The foetor can be recognised from afar off. Some cases are similar to the case of mutilating bejel described by Jones.<sup>25</sup> Some cases present with just nasal disfigurement the nasal bone having been destroyed; others with a small hole through the palate and others with extensive destruction of fauces, palate, uvula and pharynx. (See Plates 46, 47, 48, 49, and 50).

### 6.2.3. Bone lesions.

Bone lesions are often associated with skin ulceration or with nasopharyngeal ulceration. Frequently the bone lesions occur by themselves. The bones usually affected are the long bones, the frontal bones, the clavicle and phalanges. Other small bones are very occasionally affected. As already mentioned, in the early stages of the disease, tenderness...

ease, tenderness and slight swelling over the anterior surfaces of the tibiae are quite common, presumably indicative of a mild periostitis. This rapidly subsides, and then, in certain cases after a lapse of several months or years the late bone lesions appear. The lesions are mainly those of periosteal and endosteal proliferation with areas of rarefaction. The first signs are those of periosteal thickening with resultant increase in the calibre of the bone. This process may proceed simultaneously in several bones. Radiology at this stage shows thickening and dense sclerosis of the cortical bone. As the disease process advances the medulla of the bone is filled with this new dense sclerosed bone and at the same time areas of rarefaction appear in the bone. These areas are circular in outline and give a characteristic moth-eaten appearance on radiological examination. The shaft of the long bones become greatly distorted by this process of periosteal-endosteal proliferation and great deformity can be produced. Of the long bones, the tibiae and ulnae are the most commonly affected. The earliest case recorded was in an

/infant.....

infant of two years of age who had an attack of dichuchwa when several months old. Usually the lesions are found in cases over the age of ten to twelve. At first the periosteal new bone is laid down parallel to the long axis of the bone but later it may be laid down at right angles to the bone giving the bone outline, an irregular, fuzzy, indefinite appearance.

The bone lesion may be either diffuse or localised. In diffuse cases the disease process may reach the joint and it was found that the elbow joints were affected more often than the knee joint.

The joint involvement affects usually just one articular cartilage and the apparently firmly ankylosed joint responds quite well to treatment. In the localised cases there usually develops a spindle-shaped swelling often in the upper third of the tibia, and radiological examination shows dense sclerosis of the bone with greatly thickened cortical bone. Very often in these lesions one finds an area of cortical destruction and there may be sequestrum formation. In the smaller bones such as the phalanges the main lesions seems to be

/rarefaction.....

rarefaction of bone. Cases have been seen where there is skin ulceration over the diseased bone and a sinus forceps can be put down through the ulcer to the bone. It is probable that pyogenic infection may occur readily in these diseased bones as several of the cases seen had large sequestra lying in the thick sclerotic new bone and these have had to be treated surgically. These lesions are very similar to those described in bejel by Rost<sup>45</sup> and those shown by Hackett<sup>15</sup> in his treatise on Yaws. This similarity with the lesions of yaws is discussed under section 12 of this report. These bone lesions are further illustrated by the case histories and by Plates 51, 64-67, 72, 75-100.

Whilst these three groups of lesions account for most of the late cases of dichuchwa there are other less common manifestations.

#### 6.2.4. Joint Involvement.

This is not common but it does occur. It is of two main types. Perhaps the commonest is a painless synovitis often bilateral, with, at times large amounts of strawcoloured synovial fluid. The knee joints are particularly affected. The

/other.....

other type, in which the joint surface itself is affected is more severe. In this type one articular cartilage only is affected, the opposite cartilage being normal and there is usually irregular erosion in the underlying epiphysis. No destructive joint lesions comparable to Charcot joints have been seen.

#### 6.2.5. Ganglia.

These have been reported as being one of the later lesions of endemic syphilis in other parts of the world and in this investigation several cases with strongly positive serological reactions were found with ganglia.

#### 6.2.6. Interstitial Keratitis.

This was also noted in a few cases.

#### 6.2.7. Witkop.

This was frequently found associated with both early and late lesions. Its significance is discussed in Section 9. of this report.

#### 6.2.8. Cardiovascular Syphilis and Central Nervous System Involvement.

Hudson<sup>19</sup> states that cases of cardiovascular syphilis and meningovascular syphilis are

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rarely if ever seen in bejel and other writers on endemic syphilis have supported that view. In discussing the clinical aspects of bejel Csonka<sup>7</sup> states that, 'clinical examination of many thousands of people by our teams has failed to detect a single case of cardiovascular syphilis or central nervous system involvement'. Grin<sup>11</sup> however, after his investigation in Bosnia in 1934 to 1935 showed 'that all forms of neuro-syphilis occur in endemic syphilis but that atypical and stationary forms are frequently encountered. Cardio-vascular involvement is also well known in endemic syphilis'.

The present investigation supports the view that these types of late lesions do occur but that they are not common. During the year only one case of cardio-vascular syphilis was recorded and that was a man of about fifty years of age with an enlarged heart and a well marked aortic incompetence (B.P. 190/50) whose blood Kdmer gave a positive reaction of 40 units. This patient also had a positive reaction of the cerebrospinal fluid. In the Scottish Livingstone Hospital however, every year one or two cases of aortic valvular disease

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are seen and these are usually diagnosed as syphilitic aortitis. In 1952 a Tuberculosis Survey<sup>48</sup> was made in the Bakwena Reserve and mass miniature radiology carried out revealed some significant findings, in that 18 cases of aortic aneurysm were discovered and 52 cases of cardiac enlargement; and there can be no doubt that syphilis was one of the etiological factors in these findings. In the whole of the Bechuanaland Protectorate 1.3% of people were found to have enlarged cardiac shadows and of these 32% were aortic aneurysms.

Hemiplegia consequent upon cerebral thrombosis is also seen amongst the Bakwena, and in some cases this is probably of syphilitic origin particularly as atheroma and hypertension are not common amongst the local people. No definite cases of neurosyphilis were discovered in this survey although, again the hospital records show that neurological cases such as hemiplegia, monoplegia, optic atrophy and other atypical manifestations do occur and probably have a syphilitic basis.

Although it is not easy to collect specimens of cerebro-spinal fluid on a field campaign a

/number.....

number of specimens from latent and active cases were examined and a few positive fluids were found. In all of these there were no clinical signs of neuro-syphilis and so the cases could be what Grin<sup>11</sup> called 'stationary', although it must be remembered that 'experience has shown that changes in the cerebro-spinal fluid reflect accurately the syphilitic inflammation in the central nervous system'. (Idsoe et alia)<sup>23</sup>

In the 98 specimens examined 3 positive Kolmer Cardioliipin Wasserman results were obtained: two of these were in late active cases and one in a latent case. Forty three of the specimens were from active cases; eight early cases showing mucous patches and condylomata and 35 late cases with lesions of nasopharyngeal, skin ulceration bone.

The result of the examination are given in Table 6.

#### 6.2.9. Hyperkeratosis.

Two cases with showed what I called hyperkeratosis were seen. One was of the soles of the feet in a small boy who had early lesions

/of dichuchwa.....



of dichuchwa elsewhere and the other was on the palms of the hands in a young woman who had had dichuchwa as a child. (Plates 55 and 57).

6.2.10. Sex distribution of lesions

Table 7 shows the sex distribution of active lesions.

As the proportion of males to females in the proportion examined was 1:1.5 it would not appear from Table 7 that there was any special sex distribution of the lesions in the cases although Csonka<sup>7</sup> found periostitis commoner in males (probably due to trauma) whilst nasopharyngeal ulceration was more common in females.

6.3. Summary of Cases of Extravenereal Treponematosi.

Primary.....	2
Secondary.....	287
Tertiary.....	205
Latent.....	9162
	-----
Total	9656
	-----

Analysis of Clinical Findings.

A. Primary.

Breast 'throw back type'..... 2

/B.....

B. Secondary.

1. Mucous Patches - lips and mouth.....	93	
- fauces.....	70	240
- larynx.....	52	
- tongue.....	21	
- nostrils.....	4	
2. Angular Stomatitis.....	48	
3. Condylomata - anal.....	89	
- vulva.....	80	
- scrotum and penis..	29	233
- axilla.....	25	
- body and limbs.....	4	
- face.....	6	
4. Papular rash.....	16	
5. Aching legs with or with slight swelling.....	39	
6. Vague pains and ill health (no other signs).....	1	

C. Tertiary.

1. Nasopharyngeal ulcerations - healed.	95	
- active.	13	108
2. Skin Ulceration - limbs.....	56	
- face and head.....	13	98
- body.....	29	
3. Depigmented Skin lesion .....	6	
4. Bone Affection - tibia and fibula..	76	
- ulna and radius...	20	
- frontal.....	4	106
- clavicle.....	2	
- phalanges.....	2	
- calcaneous.....	2	
5. Joint Affection - synovitis.....	12	
- articular cartilage (ankylosis).....	7	19
/6. Keratitis.....		

6. Keratitis.....	13
7. Ganglia.....	7
8. Witkop (with other lesions of Extra-Venereal Treponematosi)s).....	21
9. Aortic Valvular lesion.....	1

D. Latent Cases.

1. History of prior dichuchwa but either showed no signs or had completely healed "burnt out" lesions.....	9162
2. Positive serology only i.e. - cases which give no history of previous dichuchwa and showed no lesions but had positive serology.....	2341

Order of Frequency of Lesions.

Secondary Lesions.

Mucous patches on lips.....	93
Condylomata anus.....	89
Condylomata vulva.....	80
Mucous Patches - fauces.....	70
Mucous Patches larynx.....	52
Angular Stomatitis.....	48
Aching legs.....	39
Condylomata scrotum and penis.....	29
Condylomata axilla.....	25
Mucous patches tongue.....	21
Papular rash.....	16
Condylomata face.....	6
Solitary sores.....	5
Condylomata body and limbs.....	4
Mucous patches nostrils.....	4

Summary of Order of Frequency of Main Early Lesions.

/Mucous.....

Mucous Patches.....	240
Condylomata.....	233
Angular Stomatitis.	48
Aching legs.....	39
Papular rash.....	16

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### Tertiary Lesions.

Nasopharyngeal ulceration.....	108
Bone Affection.....	106
Skin Ulceration.....	98
Witkop.....	21
Joint Affection.....	19
Keratitis.....	13
Ganglia.....	7
Depigmentation.....	6
Valvular disease.....	1

### 6.4. Superinfection.

In considering tertiary lesions one always wonders why some cases develop late lesions whilst the majority of cases become latent; and what factors decide which system is to be affected by the tertiary lesions and at what age they should develop. Questions such as the effects of trauma and friction cross the mind, for example women often have ulceration round the waist where the rough skin skirt is tightly tied, or on the back where the baby's body presses when being carried. Csonka<sup>7</sup> states that in bejel the areas of the body

/exposed.....

exposed to trauma are the sites of election for skin gummata.

One noticed at once in this investigation that tertiary lesions were commoner in the patients in the Kalahari area. In the older age groups the incidence of latent syphilis was higher in the Kalahari area than in the non-Kalahari area, and the proportion of patients developing tertiary lesions is also greater. The ratio of tertiary lesions to persons examined was 1:68 (15 per 1,000 population) in the Kalahari whereas it was only 1:278 (3.6 per 1,000 population) in the non-Kalahari area.

Why are the Bakgalagadi more prone to develop late manifestations of the disease than the Bakwena?

In the main it was due simply to the higher incidence of the disease amongst them. Early active lesions occurred at a rate of 18 per 1,000 population in the Kalahari as compared with 5.7 per 1,000 in the non-Kalahari area. The more advanced and gross state of the tertiary lesions in the Kalahari area may be due to nothing more than the fact that they come less frequently into contact with Western medicine. But one must also consider what Grin<sup>11</sup> calls 'superinfection'. It has already been pointed

/out.....

out that cases of early dichuchwa are becoming increasingly uncommon amongst the Bakwena whilst they are still quite common amongst the more primitive Makgalagadi. Thus it seems that where fresh cases of dichuchwa are common, tertiary lesions are also common. This state of affairs was also noted in Bosnia.<sup>11</sup>

When a fresh case of dichuchwa occurs in a family the whole family is affected to some extent and the extent depends upon the degree of cleanliness and hygiene. Frequently those members of the family who have never had dichuchwa develop the typical early lesions whilst those who have previously had dichuchwa are infected with organisms again but do not develop dichuchwa on account of the immunity which they have acquired. The tissues of the body are, however, sensitised to the organism and the sensitivity may result in a reaction which shows itself as destructive gummatous lesions.

When this reinfection or superinfection is not a massive localised reinfection at one point but a more slow generalised re-infection then the body may react in a generalised way, such as by lesions

/in.....

in the long bones or in lesions in wide skin areas. If, however, the reinfection is localised to one area then the tertiary lesion will develop at that area. This is illustrated by the cases already mentioned, of women who are suckling children with florrid lesions of dichuchwa in the mouth. If the mother has not had dichuchwa she will develop typical early infectious lesions on the nipples but if she has had dichuchwa she will develop gummatous ulceration of the breast. This appearance is quite different from the early infectious nipple lesions and sometimes both breasts are affected. Several cases of gummatous ulceration of the penis were seen and one case of gummatous ulceration of the vulva and it is possible that these lesions resulted from massive inoculation of the organisms acquired during sexual intercourse with a person suffering from dichuchwa, or from venereal syphilis. The already sensitised tissue responded by the production of localised gummata at the site of massive inoculation. This theory of superinfection is, of course, an old theory much discussed by early syphilologists and certainly the theory seems to be

/applicable.....

applicable in connection with the tertiary lesions of dichuchwa.

Grin<sup>11</sup> even goes so far as to regard the incidence of tertiary lesions in an area as the index as to whether endemic syphilis is active or not in that area. If there are numerous fresh cases of tertiary lesions then endemic syphilis is active in that area.

It is probable therefore that superinfection of an already infected and sensitised host by treponemes is the reason for the large number of tertiary cases seen in the Kalahari area, where early active cases of dichuchwa are common. In the Kalahari area living conditions are still very primitive and unhygienic, and so there is little obstacle to the repeated invasion of a sensitised host by the treponemes from infectious cases. This is also the probable explanation of the tertiary lesions which sometimes occur in very young children

One girl was seen aged about eight years with active gummatous ulceration in the nasopharynx. She had had a typical attack of dichuchwa two years previously and the ulceration of the nasopharynx had commenced soon after an infectious case of dichu-

/chwa.....



chwa occurred in the family.

6.5. The Question of Congenital Spread.

No case of definite congenital syphilis was seen on this survey. The rarity or even absence of congenital syphilis in cases of endemic syphilis is also noted by writers on bejel<sup>19</sup> Njovera<sup>56</sup> and endemic syphilis in Bosnia and elsewhere.<sup>11</sup> Indeed congenital syphilis seems to be uncommon all over Africa for Jelliffe<sup>24</sup> in his paper on 'The African Child' contrasts the comparatively high rate of syphilization in adults with the uncommonness of clinically diagnosable congenital syphilis. He thinks that there may be a condition of mild latent congenital syphilitic infection of African children. The explanation, however, of this rarity of congenital syphilis is probably that advanced by Grin<sup>11</sup> namely that in cases of syphilis, as is well known, the degree of infectiousness decreases with time and also, as is well recognised, the likelihood of an infected woman's transmitting the disease to her children decreases with time and with the number of children.

/In ordinary.....

In ordinary venereal syphilis contracted in adult life there is considerable likelihood of the infection being transmitted through the placenta to the children. Dichuchwa, is, however, mainly a childhood disease, many years usually pass between the attack and the attaining of adult life and so there is a greatly reduced probability of the infected mother giving birth to syphilitic children.

In Bechuanaland and especially in the Kalahari area the neo-natal death rate is very high, such diseases as enteritis, broncho-pneumonia, and skin infections carrying off many children. There is therefore the possibility that the occasional syphilitic child, already weakened by the disease will be carried off by these illnesses before surviving many weeks.

The figures in Table 8 are taken from the Ante-natal Clinic of the Scottish Livingstone Hospital and they suggest that there is a higher rate of miscarriages, stillbirth and neo-natal deaths in women infected with dichuchwa although the above series is rather small to be of great statistical significance. Hudson<sup>22</sup> investigating

/100.....

100 women with histories of previous infection with bejel and positive serology and 92 with negative serology found that sero-positive women had a slightly higher percentage of living children than the sero-negative and also that the sero-positive women had fewer miscarriages.

This study of the congenital spread of dichuchwa will have to be continued over a period of years before any definite conclusions can be reached as to the congenital spread of the disease. It is hoped to follow up babies whose cord bloods at birth are positive and test their serological reactions after three and six months intervals.

During the year of investigation an attempt was made to examine the cord bloods of babies born in hospital and the results obtained were as shown in Table 9.

It is seen therefore that a mother infected with dichuchwa in childhood and having a positive blood Kolmer reaction is capable of giving birth to a sero-positive child although the number of such cases is small and the later effects on the child are not yet ascertained.

/6.6.....

6.6. Serological Reactions.

In the field laboratory at Molepolole two tests were used, namely the VDRL test and the Kolmer Cardioliipin Wassermann. The former was used mainly as a screen test. Early in the campaign all sera were tested by the VDRL and quantitative Kolmer tests, but as the volume of work increased the VDRL test alone was performed on cases giving a negative history. Any positive reactors in this group were then tested with the qualitative Kolmer test. All cases giving a history of past infection were tested by the VDRL and qualitative Kolmer tests whilst clinical cases were tested by the VDRL and quantitative Kolmer tests.

The VDRL was carried out as a tube flocculation test and the Kolmer Cardioliipin Complement Fixation test was carried out by standard methods using reagents prepared in the serological department of the South African Institute for Medical Research.

In the first 8 months as many blood specimens as possible were taken but in the last four months of the project blood specimens were taken only from clinical cases or contacts. In the first part of

/the.....

the campaign 22,809 people were interviewed and of this number 17,537 had their blood tested. 5272 patients were not tested, usually because the veins were unsatisfactory, the person refused, or the specimen was haemolysed or unsatisfactory in some way. The results are analysed in Table 12. Table 10 confirms the value of the VDRL as a screen test, for in only five cases where the VDRL was negative was the Kolmer positive whilst in 1047 cases the VDRL was positive and the Kolmer test was negative. In 8698 cases giving a sero-negative reaction to the VDRL test the Kolmer test was not done.

Of the 22,809 people examined in the first phase of the investigation 28.5% showed seropositivity, 48.4% were sero-negative and 23.1% were not done.

Of the 17,537 sera which were examined 37.0% gave a positive reaction and 63.0% were negative. The sero-positivity rate in the Kalahari was much higher than in the non-Kalahari area. Table 11.

During the last four months of the campaign serological tests were done only on clinically active or interesting cases.

/The.....

The clinical cases which showed a negative serological result were with one exception cases with tertiary lesions, mainly those of nasopharyngeal ulceration. The one exception was a woman who had developed a sore on the nipple while suckling a child with dichuchwa. Some weeks after the first examination her blood was retested and the result was still negative, a result for which there is no clear explanation but unfortunately circumstances prevented a darkground examination being carried out in this case.

With regard to the latent and negative cases in Table 4 the classification is based purely on the history given by the patient at the time of examination which, as already pointed out, is not always reliable. That it is not altogether reliable is shown by Table 12 and Figure 2 from which it will be seen that a proportion of apparently healthy people, who gave no history of past infection, showed seropositivity upon testing of their blood.

Table 5 and Figure 3 confirm the point made under epidemiology, namely that the younger age groups show the maximum incidence of early active  
/infection.....

infection and Table 4 that history of past infection increases with age. The age distribution of seropositivity is shown in Table 11. Unfortunately the relatively small number of persons seen over the age of 60 makes the number in this group too small to be significant and probably vitiates the seropositivity rate at that age.

6.7. The Treponema Immobilisation Test.

In view of the greatly disturbed blood chemistry which exists amongst the Bakwena people and the presence of some cases of malaria it had been thought that some of the serological results might be biological false positives. Le Riche et alia<sup>26</sup> after their studies on Bantu boys concluded that, in the Bantu, serological tests for syphilis are not always reliable and that there is a possible relationship between seropositivity and liver damage due to malnutrition, which is so common amongst the Bantu. One feels that this question requires still further investigation but the present small group gives no support to Le Riche's theory. A random survey of blood chemistry in patients from this survey, including the 40 on  
/whom.....

whom the Treponema Immobilisation test was carried out, shows marked disturbances of the lipo-proteins and grossly abnormal liver function tests.

Forty sera were taken from cases with or without a history of previous dichuchwa who had, at their initial examination, shown positive serological reactions. The sera were sent to the International Treponematoses Laboratory at Copenhagen where a Treponema Immobilisation test was carried out. Table 13. Of the 40 sera 39 were positive to the Treponema Immobilisation test and therefore there can be no doubt that the seropositivity found in this random group was in fact due to infection with treponemata and not to the presence of false positive reactors. The patients were chosen at random at Molepolole and though few in number, can be accepted as representative of the group as a whole. Cases were chosen which had, at their initial examination, shown positive serological reactions to the VDRL and Kolmer Cardioliipin Wassermann tests with titres ranging from 5 to 160 units.

The Kolmer titre in the series 10 months later,

/at the.....



at the time of the Treponema Immobilisation Test, ranged from 0 - 160 units. All the cases giving a history of dichuchwa had had PAM injections of 0.3 to 1.2 mega units at their initial examination, and three of the non-infected cases had also, as contacts been given PAM.

In the interim there had been a decrease of titre in the majority of cases and five had become sero-negative. The only increase of titre occurred in untreated patients who, though sero-positive at the initial examination had not received PAM injections because they gave no history of having had the disease and showed no clinical signs.

The cerebrospinal fluid was examined in each of the 40 cases. None showed pleocytosis and all gave negative Kolmer reactions.

The only choice exercised in the selection of cases was to pick at random approximately half who gave a prior history of dichuchwa and half who did not. The patients were equally distributed between the sexes and ranged from puberty to ± 60 years of age. The only negative treponema immobilisation test was obtained in a male over 60 years of age

/who.....

who gave no prior history of dichuchwa. His serological reactions in November 1953 were VDRL positive and Kolmer Cardioplipin Wassermann 40 units. No clinical evidence of past or present infection was found. He was not treated with PAM and when his blood was re-examined twelve months later, it showed a negative VDRL result. At the Statens Serum Institute the serum showed a negative C-Wr-M reaction and a  $\frac{1}{2}$ + VDRL reaction at a dilution of 5/1. Undiluted serum was not tested. His treponema immobilisation test was negative at dilutions of 3/1 and 4/1 after 18 and 42 hours.

#### 6.8. Isolation of the Treponemes.

Treponemes were successfully isolated from two typical cases of dichuchwa by subcutaneous inoculation of hamsters. The animals were transferred by air to the International Treponematoses Laboratory at Johns Hopkins Hospital, Baltimore where the strains were studied by Prof. T. B. Turner and Prof. D. H. Hollander.<sup>54</sup> In a personal communication Prof. Turner informs us that the strains were compared morphologically and by cross immunity experiments in rabbits and hamsters with the  
/standard.....

"standard" Nichols strain, with yaws strains and with strains from cases of endemic syphilis in Bosnia and cases of bejel in Syria and Iraq. As a result of the animal experiments it appears that the "Bechuanaland strains do not belong unequivocally within either the syphilis group of strains or the yaws group. They partake of characteristics of both, and in that respect resemble other strains of transmitted treponematosi, including bejel and endemic syphilis." The results of these investigations will be published from the International Treponematosi Laboratory in greater detail in due course.

#### 7. TREATMENT OF DICHUCHWA WITH PAM.

Co-incident with the investigation into the clinical features and epidemiology of dichuchwa a mass treatment campaign of the population was carried out. It was hoped by this to eliminate the disease as a serious problem from the Bakwena Reserve and at the same time obtain information about the results of treatment and the reactions of the

/people.....

people which would be of use when carrying out mass treatment campaigns throughout the rest of the Protectorate.

7.1. The Drug used and Dosage.

The only drug used was Procaine Penicillin G in oil with 2% aluminium monostearate (P.A.M.) which has proved so effective in the mass treatment of yaws<sup>42,55,43</sup>, in various parts of the world, in bejel<sup>6</sup> in pinta<sup>41</sup> and in endemic syphilis especially as reported by Grin in Bosnia.<sup>11</sup>

The PAM used had been tested to meet the international requirements established by W.H.O; the essential features of which are that a test dose of 300,000 units intramuscularly gives a treponemacidal penicillaemia for a minimum of 72 hours and about 0.03 units per ml. serum tested by standard technique.<sup>55</sup>

P.A.M. was used for all stages of the disease and in a vast country like Bechuanaland with its widely scattered, semi-nomadic people it is the ideal drug for a mass treatment project. The main value of PAM is in its ease of administration; its rapid action which is prolonged for some days; its non-  
/toxicity.....

toxicity; and above all in the short period of treatment which is required, and in the fact that so far no evidence has been reported of penicillin resistance in treponemes. Furthermore, so far, investigations have shown that all treponemes from different parts of the world are equally sensitive to penicillin. Nell<sup>38</sup> could find very little difference in the sensitivity of seven strains of *T. pallidum*, two strains of *T. pertenue* and three strains of bejel treponemes to penicillin in vitro. The mass treatment campaigns already referred to have shown conclusively that PAM is the ideal drug for the treatment of cases of Extravenerreal treponematosi; for the prevention of the spread of the disease in contacts of cases and for the abortive treatment of contacts already harbouring the infection.

The main drawback in the treatment aspect of the campaign has been the tremendous difficulty of following up and re-surveying the cases and villages.

The country is so vast and the people so scattered and so much on the move from place to place that, as already pointed out, a whole day or even longer may be spent in looking for one particular case.

/Furthermore.....

Furthermore when a village is re-checked after say six or nine months many of the people who were seen at the first visit are now absent and other people who were not seen have moved in.

The treatment schedule was that laid down by the World Health Organisation in the Draft Plan of Operations as shown in Table 15.

In addition to the above treatment schedule other diseases which are known to respond to penicillin were treated as they presented, especially such conditions as impetigo, secondarily infected scabies and skin wounds, boils, carbuncles, and pneumonias. At the same time a number of people were given PAM for what was marked on their card as 'propaganda'. That is, they were people who gave no history of dichuchwa and had no signs of that disease or any other for which penicillin was indicated. but they begged to be injected. It was well known that if these people were sent away without an injection they would grumble and groan for many days and would advise all other people not to go to the team as 'they would get no help'. Therefore they were given an injection of PAM (0.3 mega-  
/units.....

units) simply for propaganda purposes. Fortunately such cases were relatively few. And the effect was good as usually such people went away with their faces wreathed in smiles and did all in their power to encourage their neighbours to attend!

Cases classified as 'Early Cases' were of course, those showing the highly infectious early lesions. Those classified as 'Symptomatic Late Stage' were those showing destructive gummatous lesions or bone lesions. Those classified as 'Latent Stage' were those who gave a previous history of dichuchwa but who showed no signs of the disease at the time of examination. 'Contacts' were defined as those who were in the same family as infectious cases. In some cases, owing to the tremendous demand by the people for injections the term 'contacts' was extended to include members of the families of latent and late cases.

The PAM was well tolerated even when the larger doses were given. A watch was kept for two possible types of reaction viz. an immediate sensitivity reaction and a later Herxheimer type of reaction. Only one case of urticaria was noticed but this is

/not.....

not surprising as the vast majority of people treated had never been treated previously with penicillin.

No Herxheimer reaction was noted but it must be remembered that such reactions might have been missed as the team was rarely in one spot for more than a day and after the injection patients would immediately set out to walk to their huts which might be anything up to ten miles through the bush so that it was unlikely that any examples of Herxheimer reaction would be brought to notice. Table 16 shows the number of injections given and the dosage of PAM used.

#### 7.2. The Clinical Results of PAM Therapy.

The early clinical lesions of dichuchwa disappeared rapidly after the administration of PAM. Twelve hours after an injection of PAM, dark ground examination showed that all treponemes had disappeared from the mucous patches and condylomata. After two days condylomata were beginning to heal and after seven to ten days only the scars were left. Occasionally resistant cases were encountered but they were exceptional. Most of the early cases treated could only be seen again for re-check after  
/an.....



an interval of six to nine months and in almost all cases after this length of time the lesions were quite healed.

The late lesions of dichuchwa did not respond well to the single dose of PAM recommended. According to the schedule laid down the dose for all cases in adults of skin gummata, naso-paryngeal ulceration, and bone lesions was 1.8 mega units of PAM. The clinical response to this single injection was, on the whole poor and we believe that for the treatment of late destructive lesions much more prolonged therapy is needed although the actual dose does not need to be higher. Unlike Rost<sup>45</sup> who states, "Bone lesions respond rapidly to small amounts of anti-syphilitic treatment, less than one gramme of bismuth metal rendering any one lesion temporarily asymptomatic and producing X-ray evidence of the healing process"; we found that bone lesions required prolonged treatment with large doses of PAM before any symptomatic or radiological improvement was noted. Willcox found<sup>60</sup> that most venereal disease clinics throughout the world were using much more prolonged therapy for tertiary

/cases.....

cases than the one shot dose used in most of our cases.

It is noted that Grin<sup>11</sup> in the bosnia campaign used repeated doses of PAM in the treatment of the late lesions of endemic syphilis there.

The girl illustrated in Plates 71 and 72 reported with the bones of both forearms affected and severe skin ulceration over the diseased bones. Her condition was of several years duration and she had previously had anti-syphilitic treatment with arsenic and bismuth preparations. She was given 1.2 mega units PAM alternate days for 12 doses, a total of 14.4 mega-units. Two weeks after the end of this treatment the arms were as seen in Plate 73. Healing had progressed slowly but definitely. She was seen again a few months later and the skin ulcers were all healed but the bone deformity remained although radiological examination showed definite arrest of the disease process in the bones.

The woman shown in Plates 37 and 38 was treated for severe nasopharyngeal ulceration with three doses of PAM 1.8 mega units alternate days. The appearance shown in Plate 38 is ten days after

/treatment.....

treatment commenced.

We found synovitis of the knee joints very resistant to treatment although one very severe case in a young man did clear up completely after some months following a course of six injections of PAM. 1.8 mega units. Several cases of osteitis required operation for sequestrectomy before treatment was of any avail.

Csonka<sup>7</sup> noted that PAM given early caused repigmentation in bejel lesions but given late has no effect on these lesions. The few cases we saw of depigmented skin lesions were all of some years standing and as was to be expected, no repigmentation occurred after PAM therapy.

### 7.3. The Serological Results of PAM Therapy.

Owing to the constant movement of the population it proved impossible to do serological resurveys of entire villages and so an attempt was made to do serological rechecks on individual cases.

Of the 1179 cases in which Kolmer titres had been determined in the earlier part of the year (Table 17 and Figure 4) quite a large number could no longer be found in the later months; some had gone to the  
/cities.....

cities, some into the Kalahari and others for different reasons, were not available. In all the early cases in which re-check serology was done there was a reduction in the titre of the quantitative Kolmer reaction. In some cases the previously positive titre had become negative. The same type of response was seen in the late cases although in these the response was, on the whole, less marked. (Table 18 and Figure 5).

The importance of treating latent cases was fully realised and, as indicated earlier in this report, all cases giving a history of previous infection were treated with PAM. Recheck serological examinations on 109 latent cases showed a reduction in the titre in the majority of cases (Table 18 and Figure 5).

#### 7.4. The Epidemiological Results of PAM Therapy.

In a disease such as dichuchwa the epidemiological results of PAM therapy are of the utmost importance. Theoretically the disease could be stamped out if all infectious early cases with their contacts could be treated within a relatively short period of time. Unfortunately the very nature  
/of the.....

of the country and the mode of life of the people make such an ideal almost impossible to achieve. Nevertheless, the attempt was made and it is believed that the incidence of the disease has been greatly reduced in the Bakwena Reserve which augurs well for the success of the mass therapy campaign of the next two years throughout the Bechuanaland Protectorate.

The following figures, taken from the records of the Out-patients Department of the Scottish Livingstone Hospital at Molepolole, show the number of cases diagnosed as early dichuchwa in three consecutive years.

1952	=	499
1953	=	397
1954	=	153

The campaign commenced in the latter half of 1953 and it is seen that in 1954 there has been a considerable decrease in the number of cases presenting at the normal out-patient dispensaries at Molepolole and the surrounding villages. The medical officers state that so far in 1955 they have seen very few cases of dichuchwa.

At the beginning of 1955 villages rechecks  
/were.....

were carried out from the purely clinical aspect to see if any new cases of dichuchwa were occurring. Unfortunately the exceptionally heavy rains which affected the whole of Southern Africa at that time blocked roads and caused an even greater scattering of people than usual with the result that some of the villages could not be reached for the survey. The results in the villages which were reached are set out in Table 19. In the resurveys no blood specimens were taken. The villages were visited on a certain day and the people made to file past the medical officer who questioned each and made an examination for signs of early or late dichuchwa. The clerk counted the people in age groups as they were recorded in the appropriate age group.

It will be seen from Table 19 that the check surveys did not cover the large numbers of people seen in the original survey because, as already explained, several visits to each village were necessary before the majority of the population could be seen. Nevertheless it is felt that the figures suggest that the mass therapy of the past year has greatly reduced the incidence of dichuchwa

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in the Bakwena Reserve. The methods to be adopted in maintaining this progress and in preventing the disease re-asserting itself as a major problem are discussed below under section 15.

#### 8. SOME ILLUSTRATIVE CASE HISTORIES.

Out of the numerous cases seen during the course of the study an attempt has been made to pick out cases illustrating the various aspects of the disease to which reference has been made in the previous sections. The following case histories illustrate the different types of early lesions, the various forms of the late lesions, the mechanism of superinfection and immunity and the spread of the disease in families.

##### Case I. Primary Lesions of Dichuchwa.

Name: Kaichieja Gakalebone. Female aged + 26 yrs. Reg. No. 25,078. A Mokgalagadi from the village of Letlakeng. First seen on 15.9.54.

History: She states that she has sores on the breast of several weeks duration. She is nursing a child which developed dichuchwa with oral lesions. Some three to four weeks after the child developed  
/dichuchwa.....

dichuchwa with oral lesions. Some three to four weeks after the child developed dichuchwa she noticed the sores on the nipples and she recognised them as dichuchwa. She has never had the disease previously.

Examination: There is atypical lesion of dichuchwa on the left nipple. (Plate 9). There are genital condylomata which the woman says, came after the nipple lesion.

Serological Reactions: VDRL positive and Kolmer positive 40 units.

Treatment: PAM 1.2 mega-units.

Re-Check: She was seen again on 30.11.54 and the lesions were found to be healed. She was still seropositive (Kolmer  $2\frac{1}{2}$ ) units .

Case 2. Primary Lesions of Dichuchwa:

Name: Nkilane Phuthego. Female aged 35 years.

Reg. No. 30985. A Mokwena from the village of Gabane. First seen 27.10.54.

History: She is suckling a child which has dichuchwa, with oral lesions and an extensive papular rash. A few weeks after the child had developed these lesions, sores appeared on the nipples which she says  
/are.....



are dichuchwa. She has never had dichuchwa previously.

Examination: There are sores on both nipples typical in their appearance of early lesions of dichuchwa. The child, which she is holding has very florid lesions of dichuchwa and shows particularly well the papular rash which sometimes is seen. (Plates 10 and 11).

Serological Reactions: VDRL and Kolmer test were both negative.

Treatment: PAM 1.2 mega units.

Re-check: She was seen again on 4.1.55 and the lesions were quite healed. She was still seronegative.

Case 3. Typical Early Lesions - Papular Rash.

Name: Makgae Mosotle. Male aged 12 years.

Reg. No. 25,123. A Mokgalagadi of the village of Letlakeng. First seen on 15.9.54. He was seen along with his young brother who also had dichuchwa.

History: He says he has dichuchwa, of several weeks' duration.

Examination: There are mucous patches on the tongue and fauces and scrotal condylomata. There are

/numerous.....

numerous papules over the perineum and legs.

(Plates 12 and 13).

Serological Reactions: VDRL positive and Kolmer positive 160 units.

Treatment: PAM 0.6 mega units.

Re-check: He was seen again on 30.11.54 and all lesions were healed. He was still seropositive Kolmer 40 units.

Case 4. Typical Early Lesions - Papular Rash.

Name: Mosiame Jee. Male aged 18 months. Reg. No. 14,647. A Mokgalagadi child from the village of Sesung. First seen on 19.5.54.

Examination: The child has mucous patches in the mouth and on the faucial area; angular stomatitis; anal condylomata and there is a papular rash over the face, body and limbs. (Plate 14).

Serological Reactions: VDRL positive and Kolmer positive 160 units.

Treatment: PAM 0.6 mega units.

Re-Check: The child was seen again on 23.12.54 and all lesions were healed. He was still seropositive.

/Case 5.....

Case 5: Typical Early Lesions - Mucous patches.

Name: Gobopamang Setefane. Female aged  $\pm$  9 years.  
Reg. No. 671. A child of Molepolole. She was first seen on 1.12.53.

Examination: The child has mucous patches on the inner side of the lips and on the faucial area.

There are no other lesions. (Plate 15).

Serological Reactions: VDRL positive and Kolmer positive 160 units. The cerebrospinal fluid gave a negative reaction Kolmer.

Treatment: PAM 0.6 mega units.

Re-check: She was seen again on 30.10.54 and the lesions were healed. She was still seropositive.

Case 6: Typical Early Lesions - Angular Stomatitis.

Name: Golekwang Mosotle. Male aged 4 years.  
Reg. No. 13179. A Mokgalagadi of the village of Letlakeng. First seen on 15.9.54 along with his brother (Case 3).

Examination: There is very well marked angular stomatitis along with mucous patches in the mouth and a circular sore on the chin. (Plate 16).

Serological Reactions: VDRL positive and Kolmer test positive 160 units.

/Treatment.....

Treatment: PAM 0.6 mega units.

Re-Check: He was seen again on 9.11.54 and all lesions were healed. He was still seropositive.

Case 7: Typical Early Lesions - Condylomata lata.

Name: Gladys Balotlegi. Female aged ± 18 years. Reg. No. 21035. A Mokwena of Molepolole. She was first seen on 7.8.54.

Examination: There are many condylomata lata on the vulva and perineum with extension on to the adjacent thighs. She has no oral lesions. (Plates 17 and 18).

Serological Reactions: The VDRL is positive and the Kolmer test is positive, 80 units. The cerebrospinal fluid is Kolmer negative.

Treatment: PAM 1.2 mega units.

Re-check: She was seen again on 5.10.54 and the lesions were quite healed. The VDRL test was still positive but the Kolmer gave a doubtful result.

Case 8: Typical Early Lesions - Condylomata Lata.

Name: Gakebantee Gagohungwe. Female aged 18 months. Reg. No: 22038. A Mokgalagadi from the village of Metsebotlhoko. First seen on 10.8.54.

/Examination.....

Examination: There are ano-genital condylomata which, the mother says, are of six months duration. The child was playing with other infected children before the lesions appeared. The parents are both seropositive with previous histories of dichuchwa, four other children in the family are seropositive and two are seronegative. (Plate 19).

Serological Reactions: VDRL positive and Kolmer positive 160 units.

Treatment: PAM 0.6 mega units.

Re-check: The child was seen again on 11.11.54 and the lesions were healed. She was still seropositive.

Case 9: Early Dichuchwa - No obvious Lesions.

Name: Kgotletsa Lamb. Male aged 3 years.

Reg. No. 20249. A Mokwena child from Molepolole.

He was first seen on 27.7.54.

The child's father states that the boy has aching legs and that at times they are slightly swollen. The father states that the cause is dichuchwa, although there are no other signs and the boy has never had the disease.

Serological Reactions: VDRL positive and Kolmer positive 80 units.

/Treatment.....

Treatment: PAM 0.6 mega units.

Re-checks: He was seen again on 6.11.54 and had no complaints. He was still seropositive Kolmer 20 units.

Case 10: Early dichuchwa - Hoarse Voice as only Sign.

Name: Kopolo Motlotheqi. Male aged 10 years.  
Reg. No. 19121. A Mokwena of Molepolole. First Seen on 16.7.54.

The child has had a hoarse voice for several weeks and his mother says it is due to dichuchwa. He has never had the disease before. Laryngoscopic examination shows a reddening and swelling of the vocal cords. The VDRL test is positive and the Kolmer is positive 80 units. He was treated with PAM 0.6 mega units and seen again on 27.10.54 when he was quite fit. The Kolmer test now gave a weakly positive result.

Case 11: Early Dichuchwa - No Obvious Lesions.

Name: Kooagamang Ramotopi. Male aged 4 years.  
Reg. No. 20398. A Mokgalagadi child from Letlakeng. First seen on 27.7.54.

/The.....

The parents brought the child saying that he was off colour and becoming thin. He is restless and will not play with other children as before. He has been in contact with children having dichuchwa. They say that they think the cause of his trouble is dichuchwa. He has never had the disease previously. There are no signs of dichuchwa on the child.

Serological Examination: VDRL is positive and the Kolmer is positive, 80 units.

Treatment: He was given PAM 0.3 mega units.

Re-check: The child was seen again on 5.1.55 and found to be quite healthy. Unfortunately a blood specimen was not obtained at this time.

Case 12: Typical Early Lesions - Occurring at an Early Age.

Name: Gobotsamang Letlhare. Female aged two mths.  
Reg. No. 27550. A Mokgalagadi child of Letlakeng.  
First seen on 2.10.54.

This baby developed dichuchwa when one month old. Children having dichuchwa had been in the hut where the mother was lying. The mother states that the disease began with the arms of the child swelling and then the sores appeared. There are extensive

condylomata on the ano-genital region and also on the body and face. The ones on the face and body are flat and circular in shape. There are mucous patches in the child's mouth.

The mother and her three other children are all seropositive but the father is seronegative.

Serological Reactions: The VDRL test is positive and the Kolmer is Positive 160 units. (Fontanelle blood specimen).

Treatment: PAM 0.3 mega units.

Re-check: The infant was seen again on 6.1.55 and all lesions were healed. The mother refused to let another blood specimen be taken.

Case 13: Early dichuchwa - Minimal Signs.

Name: Mnamarusa Kelerese. Female aged + 12 years. Reg. No. 26521. A Mokwena girl from Molepolole. First seen on 23.8.54.

This girl was brought by her father who said she had early dichuchwa in the mouth. Examination revealed a small lesion like a tiny blister on the left side of the tongue. Her legs and arms were aching and there was very slight tenderness along

/the.....



the anterior borders of the tibiae. She has not had dichuchwa previously and she cannot remember being with any other children having the disease.

Serological Reaction: VDRL is positive and the Kolmer test is positive 40 units.

Treatment: PAM 0.6 mega units.

Re-check: She was seen again on 6.1.55 and found to be quite fit. Unfortunately the blood specimen was haemolysed and so unsuitable for examination.

Case 14: Early Lesions - Long Duration of Lesions.

Name: Ntwaakgokong Ranogane. Male aged about 19 years. Reg. No. 26907. A Mokalagadi of Molepolole. First seen on 29.9.54. He has condylomata on the ano-genital regions and in the avillae which he says are of four years' duration.

Serological Reactions: VDRL positive and Kolmer positive 160 units.

Treatment: PAM 1.2 mega units.

Re-check: Several attempts were made to find this patient again but he had disappeared far into the Kalahari desert.

Case 15: Early Lesions - Long Duration of Lesions.

/Name.....

Name: Bokae Lebebe. Female aged 7 years. Reg. No. 14930. A Mokgalagadi child seen at Letlakeng. First seen on 4.6.54. This child has anal condylomata which, the parents say, are of three years' duration.

Serological Reactions: VDRL is positive and the Kolmer reaction is positive 160 units.

Re-check: She was seen again on 28.11.54 and the lesions were found to be healed. She was still seropositive Kolmer 40 units.

Case 16: Early lesions - Resistance to Treatment.

Name: Masweamodimo Radisigo. Male aged 6 years. Reg. No. 14310. A Mokgalagadi child seen at Letlakeng. First seen on 25.5.54. The child was brought with mucous patches in the mouth and over the faucial area. They were of three to four months duration.

Serological Reactions: VDRL positive and Kolmer positive 160 units.

Treatment: PAM 0.6 mega units.

Re-check: The child was seen again on 15.10.54 and was found to have mucous patches on the inner side

/of.....

of the lips. He was still seropositive, Kolmer 20 units. Another injection of PAM 0.6 mega units was given.

Case 17: Early Lesions - Resistance to Treatment.

Name: Boitlhoko Thunyane. Male aged 5 years.

Reg. No. 19378. A Mokwena child seen at Gabane Village. First seen on 17.7.54.

The child has angular stomatitis and mucous patches in the mouth and on the faucial area. The duration of these is several months.

Serological Reactions: VDRL positive and Kolmer positive 160 units.

Treatment: PAM 0.6 mega units.

Re-check: The child was seen again on 4.1.55, and the lesions were still as when first seen. He was still seropositive. The PAM was repeated.

Case 18: Early lesions - A possible Second attack.

Name: Watsons Sakeng. Male aged 3 years.

Reg. No.: 31656. A Mokwena of Molepolole. First seen on 1.11.54. The child was brought with mucous patches in the mouth. His mother states that about a year ago he had anal condylomata for which he

/received.....

received acetylarsan injections. The condylomata healed and then a few months later the mucous patches appeared in the mouth.

Serological Reactions: VDRL is positive and the Kolmer test is positive 40 units.

Treatment: PAM 0.6 mega units.

Re-check: He was seen again on 10.12.54 and all the lesions were healed. He was still seropositive.

Case 19: Early Lesions - A possible second attack.

Name: Malepa Kate. Female aged 15 years.

Reg. No. 9974. A Mokwena girl of Molepolole.

First seen on 15.5.54.

Examination: This girl has mucous patches in the mouth, angular stomatitis; and extensive anogenital condylomata. These lesions appeared a few months ago, after she had been in contact with some younger infected children. Shortly after these lesions appeared, her mother developed lesions of dichuchwa also. This girl thinks that when she was a child she had an attack of dichuchwa. (Plate 20).

Serological Reactions: VDRL positive and Kolmer positive 40 units. Cerebro-spinal fluid, Kolmer test negative.

/Treatment.....

Treatment: PAM 1.2 mega units.

Re-check: She was seen again on 4.10.55 and all lesions were found to be healed. The Kolmer test was positive 10 units.

Case 20: Early Lesions - A possible Second Attack.

Name: Tshimologo Motswakhumo. Female aged 16 years Reg. No. 15026. A Mokwena girl of the village of Ntsweletau. First seen on 5.6.54.

Examination: This girl has condylomata on the anogenital region. She states that she had dichuchwa on the same area in 1953. After some months they disappeared, without treatment, and then early in 1954 they appeared again. Other children in the family have dichuchwa.

Serological Reactions: VDRL positive and Kolmer positive 80 units.

Treatment: PAM 1.2 mega units.

Re-check: She was seen again on 13.1.55 and the lesions were found to be healed. She was still seropositive.

Case 21: Early Lesions - Inoculation of Hamsters.

Name: Sennye Rahele. Female aged 8 years.

Reg. No. 8434.

/A child.....

A Mokwena child of Molepolole. First seen on 2.4.54

Examination: This child has extensive vulval condylomata of some months duration. No other lesions. The VDRL was positive and the Kolmer Positive 160 units.

Serum was taken from the condylomata and inoculated into hamsters which had been sent out from the laboratory at Baltimore. The inoculation was made on one side in the groin and intratesticularly on the other side. (At the same time two similar cases were used and two hamsters inoculated from each case). The hamsters were taken back to Johannesburg and flown to Baltimore where the treponemes were later identified and compared with other strains from different parts of the world.

Case 22: Early Lesions - Non-Venereal spread.

Name: Banaang Noko. Female aged 30 years.

Reg. No. 34597. A Mokwena woman of Molepolole.

First seen on 20.11.54.

Examination: There is one condyloma in the left axilla. She states that her child, a boy aged four  
/years.....

years developed dichuchwa on the ano-genital area and that soon afterwards she noticed that she had dichuchwa in the axilla. This is her first attack.

Serological Examination: VDRL is positive and Kolmer test is positive 40 units.

Treatment: PAM 1.2 mega units.

Re-check: She was seen again on 11.1.55 and the lesion was healed. Her Kolmer reaction was weakly positive.

Cases 23, 24, 25: Early Lesions - Case illustrating Family Spread.

On 7.7.54 a man brought his three children whom he said, all have dichuchwa. (Plate 21). The histories are as follows:-

Name: Mosarwa Rankunyane. Female aged 6 years.  
Reg. No. 21020.

History: The child was affected with dichuchwa, first in the family. She had been playing with other children who had the lesions. The lesions appeared first in the mouth and then in the genital region.

Examination: There are mucous patches on the tongue, inner side of the lips, palate and fauces.

/There.....

There are anal condylomata. (Plates 22, 23).

Serological Reactions: VDRL positive and Kolmer positive 160 units.

Treatment: PAM 0.6 mega units.

Name: Warona Rankunyane. Male aged 4 years.

Reg. No. 21022.

History: Three weeks after Mosarwa developed dichuchwa, they appeared on this child. (Plate 24).

Examination: There are mucous patches in the mouth and on the fauces and anal condylomata.

Serological Reactions: VDRL is positive and Kolmer is positive 160 units.

Treatment: PAM 0.6 mega units.

Name: Mum Rankunyane. Female aged 12 years.

Reg. NO. 21021. Three weeks after Warona developed dichuchwa this child also developed the disease.

Examination: There are mucous patches on the palate and faucial area and ano-genital condylomata. (Plate 25). There is slight swelling and tenderness of both tibiae.

Serological Reactions: VDRL positive and Kolmer positive 160 units. Cerebro-spinal fluid Kolmer

/negative.....



negative.

Treatment: These three children were seen again on 13.11.54. All the lesions were healed. All three children were still seropositive.

Cases 26 and 27: Early Lesions - Family Cases Often have Similar Lesions.

Name: Ditaelo Baatweng. Male aged 10 years.  
Reg. No. 9451. Seen 10.4.54.

Keseboyne Baatweng. Female, aged 2 years.  
Reg. No. 7864. Seen 13.3.54.

This female child was seen with ano-genital condylo-  
mata and about a month later her brother was seen  
with similar lesions. Neither child had mucous  
patches or other lesions. Both were strongly sero-  
positive, and both responded well to PAM therapy.  
Other children of a family have been seen in which  
the only lesions were mucous patches and each child  
had similar lesions to the brothers and sisters.

Case 28. Early Lesions - Venereal and Non-venereal  
Spread in a Family.

Name: Kgonono Kgetsietsile. Male aged about 50 yrs.  
Reg. No. 25147. A Mokgalagadi from the village of  
Khudumalapye. First seen on 16.9.54.

History: This man states that some months ago his

/wife.....

wife developed dichuchwa with oral and genital lesions and then after a few weeks, he also had signs of the disease. A few weeks later his three children had the disease. He states that his wife and children are at a far away cattle post and that the children still have signs of the disease although the wife's lesions have disappeared.

Examination: This case shows the presence of widespread condylomata lesions. They are on the foreskin, scrotum, anus, perineum and adjacent thighs, in the axillae and on the elbow regions. (plates 26, 27, 28). There are no mucous patches to be seen.

Serological Reactions: VDRL is positive and the Kolmer is positive units 80.

Treatment: PAM 1.2 mega units.

Re-Check: This man was seen again on 1.12.54 and all lesions were healed. He was still seropositive Kolmer 40 units.

Case 29. Early lesions - Venereal Spread in a Family.

Name: Meathobolo Mhetwe. Male aged about 45 years.

Reg. No. 25146. A Mokgalagadi from the village of

/Kgesakwe.....

Kgesakwe. First seen on 16.9.54.

History: He states that he has had dichuchwa for ten months and that his wife, who is many miles away at a cattle post also has the disease. He says that he does not remember who developed the disease first.

Examination: There are condylomata lata on the scrotum, anal region, in the axillae and on the chin. (Plates 29, 30, 31). There are no oral lesions.

Serological Reactions: VDRL is positive and the Kolmer is positive 160 units.

Treatment: PAM 1.2 mega units.

Re-Check: He was seen again on 1.12.54 and all lesions were healed. He was still seropositive Kolmer 40 units.

Case 30. Early lesions - Extra-marital Venereal Spread.

An example of venereal dichuchwa is shown in Plate 32. This unmarried girl presented with anogenital condylomata which, she stated, appeared a few weeks after intercourse with a man whom she thinks had dichuchwa. She also has gonorrhoea.

/Case 31.....

Case 31: Early Lesions - Immunity Confirmed by  
Dichuchwa against Venereal Syphilis.

Name: Lephatlalalo Ranwane. Male aged + 38 years.

Reg. No. 23343. A Mokwena of Molepolole. A poly-  
gamist. First seen on 26.8.54.

Examination: There are very extensive condylomata  
on the ano-genital area, the axillae and on the chin.

He developed these after intercourse with his  
second wife who had developed dichuchwa, probably  
derived from children. He has been living with  
his first wife for some months, but she has not  
developed any signs of dichuchwa. She had dichuchwa  
as a child and she is seropositive. This man was  
strongly seropositive and was treated with PAM 1.2  
mega units.

Case 32. Early and Late Lesions Occurring Together.

Name: Tshenolo Ketlogetswe. Male aged 8 years.

Reg. No. 131541. A Mokwena of Molepolole. First  
seen on 17.5.54. This boy has mucous patches in  
the mouth of about five months' duration. For four  
months he has had swelling and deformity of the  
tibiae and the ulnae. The swelling is typical of  
the late lesions described in the cases below.

/Serological.....

Serological Reactions: VDRL is positive and the Kolmer is positive 80 units.

Treatment: PAM 0.6 mega units.

Re-check: He was seen again on 9.11.54 and the mucous patches were found to be healed. The bone condition remained the same. He was still seropositive Kolmer 10 units.

Case 33. Late Lesions of Dichuchwa, Witkop and Scabies together.

Name: Keotlelwe Ramosetlha. Female, aged + 12 yrs. Reg. No. 14080. A Mokgalagadi child of the village of Kgesakwe. First seen on 25.5.54.

This child was found to have swelling of both tibiae following an attack of dichuchwa some years ago, together with severe Witkop. She also had extensive scabies over the whole body. These three diseases, having a common epidemiological background are frequently found associated with each other.

Serological Reactions: VDRL positive and Kolmer positive 160 units.

This child's family consisted of father, mother and one brother who all had scabies and Witkop and were seropositive and one brother who had scabies and Witkop but was seronegative.

Case 34: Late Lesions - Gummatous Ulceration Neck.

Name: Sebilo Mhulapudi. Male aged + 25 years.

Reg. No. 25311. A Mokgalagadi of the village of Khudumalapye. First seen on 16.9.54.

History: Ulceration at the base of the neck has been present for several months and the ulcer is gradually increasing in size. He had dichuchwa when young which healed without treatment.

Examination: A large gummatous ulcer is present at the base of the neck on the left side. There is secondary infection with pyogenic organisms. There are scars of old ulceration on the inner side of the left arm and on the back. (Plate 33).

Serological Reactions: VDRL is positive and the Kolmer test is positive, 160 units. The cerebrospinal fluid is negative for the Kolmer test.

Treatment: PAM 1.8 mega units.

Re-check: He was seen again on 15.10.54. The ulcer was healing well, although an area in the centre remained unhealed. He was still seropositive Kolmer 160 units. Another injection of PAM 1.8 mega units was given.

/Case 35.....

Case 35. Late Lesions - Gummatous Ulceration Chest  
Wall.

Name: Nonyane Ramosesane. Female aged + 40 years.  
Reg. No: 7855. A Mokgalagadi of the village of  
Sojwe. First seen on 22.2.54.

History: Ulcer on the chest wall of three to four  
months duration. She had dichuchwa when young which  
healed without treatment.

Examination: There is an oval-shaped ulcer about  
2" long by  $1\frac{1}{2}$ " wide on the chest wall just below the  
left clavicle. (plate 34).

Serological Reactions: VDRL positive. Kolmer  
positive 40 units.

Treatment: PAM 1.8 mega units.

Re-check: She was seen again on 21.10.54. and the  
ulcer was found to be quite healed, only a scar  
being visible. The VDRL test was still positive,  
but the Kolmer was negative.

Case 36. Late Lesions - Gummatous Ulceration  
Abdominal Wall.

Name: Diau Lelokwane. Male aged + 40 years.  
Reg. No. 7852. A Mokgalagadi of the village of  
Sojwe. First seen on 22.2.54.

History: He complains of an ulcer on the front of

/the.....

the abdomen of four months duration. He had dichuchwa which was not treated when a child.

Examination: There is a large, deep circular ulcer with a raised margin and a rough, yellowish base on the epigastric region of the abdomen. (Plate 35).

Serological Reactions: VDRL positive. There was not enough serum to do the Kolmer test.

Re-check: On 19.10.54 an attempt was made to find him but his relatives said he had gone away to Johannesburg. They said his ulcer was healed.

Case 37. Late Lesions - Gummatous Ulceration Skin of Temporal Region.

Name: Gaselfufa Tshékong. Female aged + 30 years. Reg. No. 7854. A Mokgalagadi woman from the village of Sojwe. First seen on 22.2.54.

History: Ulcers on the side of the head of some months duration. She had dichuchwa as a child and this was never treated.

Examination: There are three small, deep ulcers on the side of the head just near the junction of the frontal and temporal bones. There is affection of the underlying bone as a sinus forceps can be put down through the ulcers to the bone. (Plate 36).

/Serological.....



Serological Reactions: VDRL and Kolmer tests both positive.

Treatment: PAM 1.8 mega units.

Re-check: She was seen again on 19.10.54 and the ulcers were healed.

The VDRL was positive but the Kolmer test was negative.

Case 38. Late Lesions - Gummatous Ulceration Face.

Name: Gaboinewe Gabohakwe. Female aged 25 years. Reg. No. 7850. A Mokgalagadi from Letlakeng. First seen on 22.2.54.

History: Ulceration of the face for some months. She had dichuchwa when very young and she thinks she had a few injections at that time.

Examination: There is extensive gummatous ulceration over the nose, cheeks, upper lip and left eyelid.

There is a small hole through the soft palate which she says, came after ulceration some years ago.

(Plate 37).

Serological Reactions: VDRL positive and Kolmer positive 160 units.

Treatment: PAM 1.8 mega units.

Re-check: She was seen again on 20.10.54 and the  
/ulceration.....

ulceration was healed, leaving scar tissue. (Plate 38). She was still seropositive.

Case 39. Late Lesions - Gummatous Ulceration  
Back of Elbow.

Name: Otsweleng Molotlhanyi. Male aged 12 years.  
Reg. No. 15063. A Mokgalagadi from the village of  
Khudumalapye. First seen on 8.6.54.

History: Sore on the back of the right elbow of  
six months duration. He had dichuchwa as a child.

Examination: There is a large gummatous ulcer on  
the back of the right elbow. (Plate 39).

Serological Reactions: VDRL positive; Kolmer  
positive 160 units.

Treatment: PAM 1.2 mega units.

Re-check: He was seen again on 16.9.54 and the  
ulcer was healed. He was still seropositive.

Case 40. Late Lesions - Gummatous Ulceration over  
Right Trochanteric Region.

Name: Mmotoronyana Ramoleele. Female aged + 25 yrs.  
Reg. No: 5203. A Mokgalagadi of Letlakeng. First  
seen on 6.2. 54.

History: Sore on the upper part of the right thigh  
for six months. She had dichuchwa, untreated as a  
child.

/Examination.....

Examination: There is an area of ulceration just below the trochanteric region of the right thigh, circular in outline and about 4" in diameter, She is in the fifth month of pregnancy. (Plate 40).

Serological Reactions: VDRL is positive and the Kolmer test is positive 80 units.

Family History: PAM 1.8 mega units.

Re-check: She was seen again on 14.9.55. The ulceration was healed. She was still seropositive Kolmer 10 units. She had had a premature labour in the seventh month.

Case 41. Late Lesions - Extensive Gummatous Ulceration of Skin.

Plates 41 and 42 are of a bushwoman who had dichuchwa many years ago, and who has had extensive ulceration of the skin of the chest, arms, back and flanks for over a year. She has also had nasopharyngeal ulceration leading to deformity of the nose. She was seropositive. This case was seen before supplies of PAM became available but she responded satisfactorily to injections of arsenic and bismuth preparations.

/Case 42.....

Case 42. Late Lesions - Ulceration in the Popliteal Fossa.

Plate 43 shows a larger circular gummatous ulcer in the popliteal fossa of a Mokgalagadi boy aged about 15 years. He had had dichuchwa as a child. He was seropositive but absconded before any treatment could be given.

Case 43. Late Lesions - Healed Gummatous Ulceration in Elbow Region.

Name: Thebolo Rannobe. Female aged ± 20 years.

Reg. No. 1118. A Mokwena Girl of Molepolole. First seen on 4.12.53.

History: Some years ago she had extensive ulceration round the elbow region. She had dichuchwa which was treated by injections when a child.

Examination: There is extensive scarring of the skin over the medial aspect of the right elbow region and there is some limitation in the movements of the joint (Plate 44).

Serological Reactions: VDRL positive, Kolmer positive 160 units. Cerebrospinal fluid Kolmer test negative.

Treatment: PAM 1.8 mega units.

Re-check: She was seen again on 9.10.54 and there  
/was full.....

was full range of movement in the elbow joint but of course the scars remained as before. She was still seropositive Kolmer 40 units.

Case 44. Late Lesions - Depigmentation in Scar Tissue.

The case illustrated in Plate 45 is that of a Mokgalagadi man aged about 40 years who, for over a year had had ulceration on the back at the right side. The ulceration had gradually healed without treatment and in the healed parts there are areas of depigmentation. He had had dichuchwa as a child and he was strongly seropositive.

Case 45. Late Lesions - Rough Papular type of Rash

Name: Goitsewang Raditladi. Female aged 7 years. Reg. No. 7502. A Mokwena girl from the village of Gabane. First seen on 17.2.54.

Examination: This girl has a rough papular rash on the back of both elbow regions. The lesion appeared some months ago. She had dichuchwa about three years ago.

Serological Reactions: VDRL is positive and Kolmer positive 160 units.

Treatment: PAM 0.6 mega units.

/Case 46.....

Case 46. Late Lesions - Nasopharyngeal Ulceration.

Name: Molatakhumo Kangong. Male aged  $\pm$  40 years.

Reg. No. 22,559. A Mokgalagadi from the village of Sesung. First seen on 16.8.54.

History: Ulceration of the face, nose, mouth and throat of long duration. He had dichuchwa, untreated as a child.

Examination: There is very advanced scarring of the whole face, mouth and nose. The nose is destroyed and so also is the soft palate and the faucial area. The mouth is fixed open by dense scar tissue. There is active ulceration of the eye-lids. (plate 46.)

Serological Reactions: VDRL is positive and the Kolmer is positive  $2\frac{1}{2}$  units. The cerebrospinal fluid is negative Kolmer test.

Treatment: PAM 1.8 mega units.

Family History: His father, mother and sister have all had dichuchwa and are all seropositive.

Re-check: He was seen again on 10.11.54 and it was noticed that the orbital ulceration had improved. The VDRL test was positive but the Kolmer test was now negative.

/Case 47.....

Case 47. Late Lesions - Nasopharyngeal Ulceration.

Name: Konea Horetwe. Male aged + 34 years.

Reg. No. 20307. A Mokgalagadi from the village of Botlhapatlou. First seen on 27.7.54.

Examination: There is severe ulceration of the left side of the nose and upper lip. The upper lip is destroyed and adherent to the gum. This man had dichuchwa untreated, as a child. (Plate 47).

Serological Reactions: VDRL is positive and the Kolmer test is positive 40 units.

Treatment: PAM 1.8 mega units.

Family History: His wife and daughter both give histories of previous infection with dichuchwa and both are seropositive.

Case 48. Late Lesions - Naso-pharyngeal Ulceration.

Name: Mmadipitse Moloiwa. Female aged + 40 years.

Reg. No. 12967. A Mokgalagadi of the village of Letlakeng. First seen on 14.5.54.

This woman had dichuchwa, untreated as a child. Now she has scarring of old ulceration round the mouth and destruction of the nasal septum by old ulceration (Plate 48).

Serological Reactions: VDRL is positive and the  
/Kolmer.....

Kolmer test is positive 5 units.

Case 49. Late Lesions - Nasopharyngeal Ulceration.

Name: Poto Posi. Male aged ± 50 years.

Reg. No. 22566. A Mokgalagadi from the village of Kgari. First seen on 15.9.54.

There is destruction of the nasal septum following ulceration in the nose. He states that he never suffered from dichuchwa. (Plate 49).

Serological reactions: VDRL test is positive and the Kolmer is positive, 5 units.

Case 50. Late Lesions - Nasopharyngeal Ulceration.

Name: Khutsana Moretwa. Female aged ± 60 years.

Reg. No. 22393, a Mokgalagadi woman from Letlakeng. First seen on 11.8.54.

This woman had dichuchwa, untreated as a child. Now she has nasal deformity following destruction of the septum. The uvula is destroyed and there is scarring and distortion of the faucial area. The left tibia is also swollen and deformed. (Plates 50 and 51).

Serological Reactions: The VDRL test is positive but the Kolmer is negative. The cerebrospinal fluid

/is.....



is also negative to the Kolmer test.

Case 51. Late Lesions - Superinfection (Breast Lesion.)

Name: Gabantoe Mkwadi. Female aged ± 40 years.

Reg. No. 22267. A Mokgalagadi from Sesung. First seen on 11.8.54.

History: She has had a sore on the left breast for three years. When pregnant three years ago, she had an attack of dichuchwa with genital and oral lesions. These healed just after delivery. The child, however, when about a month old, developed dichuchwa with marked oral lesions. After some weeks of suckling the child she developed a sore on the breast just to the side of the left nipple. The child died at the age of about five months.

Examination: There is an area of ulceration in the lower, outer quadrant of the left breast. The lesion shows areas of healing with fresh areas of ulceration. (Plate 52).

Family History: Her husband and her three children all give histories of previous dichuchwa and all are seropositive.

Treatment: PAM 1.8 mega units.

/Re-check.....

Re-check: She was seen again on 10.11.54 and the ulceration was found to be healed. She was still seropositive. Kolmer 40 units.

Case 52. Late Lesions - Superinfection (Breast Lesion).

This case is similar to the above. The Mokgalagadi woman shown in Plate 53 gave a history of dichuchwa as a child. The ulcer on the right breast commenced some months ago whilst she was feeding a child which had oral dichuchwa. She was strongly seropositive to the Kolmer test.

Case 53. Late Lesions - Superinfection - (Vulval Lesion).

Name: Kootwaele Ramatota. Female aged ± 20 years. Reg. No. 7853. A Mokgalagadi from Sojwe. First seen on 22.2.54.

History: She has a sore on the vulva of several months duration. She says that some months ago she had intercourse with a man she thinks had dichuchwa and soon afterwards the ulceration commenced. She had dichuchwa, untreated as a child.

Examination: There is a deep, gummatous-looking ulcer on the right labium. (Plate 54).

Serological Reactions: The VDRL is positive and  
/the.....

the Kolmer is positive 160 units.

Treatment: PAM 1.8 mega units.

Case 54. Late Lesions - Superinfection - (Penile Lesion).

Name: Gabotloge Rankhibidu. Male aged ± 35 years.

Reg. No. 9965. A Mokwena seen on 28.4.54.

Examination: This man who had dichuchwa untreated as a child, had a large gummatous looking ulcer on the penis just behind the glans. This ulceration commenced after he had connection with a women whom he thinks had active dichuchwa.

Serological Reactions: VDRL is positive and the Kolmer is positive  $2\frac{1}{2}$  units. His cerebrospinal fluid is negative to the Kolmer test.

Treatment: PAM 1.8 mega units.

Re-checks: He was seen again on 9.10.54. The ulceration was healed. The VDRL was still positive but the Kolmer reaction was now negative.

Case 55. Late Lesions - Superinfection - Bone Lesion).

Name: Mphiri. Male aged ± 10 years. A Mokgalagadi boy from Letlakeng. Seen on 25.2.55.

History: This boy was seen about eight months ago

/at.....

at Letlakeng when the team was working in this area. He gave a history of dichuchwa and was seropositive at that time. He had no signs of early or late dichuchwa. He was given 0.6 mega units PAM for latent extravenereal treponematosi.

about six weeks ago his young brother developed active dichuchwa and soon afterwards his legs and arms began to ache and to swell.

Examination: There is swelling and deformity of both ulnae and both tibiae.

Serological Reactions: He is strongly seropositive for the Kolmer test. The cerebrospinal fluid is negative to the Kolmer test.

Case 56. Late Lesions - Ganglion.

Name: Monang Motlhabenkwe. Female aet ± 60 years. Reg. No. 1321. This old woman of Molepolole was first seen on 10.12.53. She had a large ganglion on the dorsum of the right foot of some years duration. She had dichuchwa when very young. Her serum was positive to the Kolmer test 80 units, and her cerebrospinal fluid is negative to the same test. She was given PAM 1.8 mega units and when seen again on 5.10.54 the ganglion was very much smaller. She was still seropositive, Kolmer 10 units.

Case 57. Late Lesions - Synovitis.

Name: Bill Seboni. Male aged ± 24 years.

Reg. N<sup>o</sup>. 1748.

This educated young clerk was first seen on 16.12.53 with a severe bilateral synovitis of the knee joint. He had had dichuchwa as a child and his Kolmer reaction was strongly positive, 160 units.

Considerable amounts of straw coloured fluid were aspirated from the joints on several occasions and, as indicated in the section on treatment, he responded well to large doses of PAM.

Case 58. Late Lesions - Hyperkeratosis of Palms:

Name: Rosy Tomeletso. Female aged ± 26 years.

Reg. No. 2442. A Mokwena girl of Molepolole

First seen on 4.1.54.

There is a superficial roughening and ulceration of the skin of this girl's hands, which, she says, has lasted for over a year. She had dichuchwa as a child. (Plate 55).

Serological Reactions: The VDRL test is positive and so also is Kolmer 40 units. The cerebrospinal fluid gave a positive Kolmer reaction.

Treatment: PAM 1.8 mega units.

/Treatment.....

Re-check: She was seen again on 4.10.54. Her condition was unchanged. The cerebrospinal fluid still gave a positive reaction to the Kolmer test and the serum was positive 40 units. There are no signs of affection of the Central Nervous System apart from the positive reaction of the cerebrospinal fluid.

Case 59. Hyperkeratosis of the Feet.

Name: Tau Bogosi. Male aged 12 years. Reg. No. 22545. A Mokgalagadi boy of Letlakeng. First seen on 16.8.54.

This boy has mucous patches on the inner surface of the upper lip and on the faucial area. He has anal condylomata. There is cracking and hyperkeratosis of the feet. (Plates 56 and 57).

Serological Reactions: VDRL and Kolmer tests both positive.

Treatment: PAM 0.6 mega units.

Re-Check: He was seen again on 30.11.54 and all the lesions were healed. He was still seropositive. Kolmer  $2\frac{1}{2}$  units.

Case 60. Late Lesions - Cardiovascular System and Central Nervous System Involvement.

/Name.....

Name: Kabelo Mokao. Male aged ± 56 years. Reg. No: 4899. A Mokwena from Kopong village. First seen 4.2.54.

This man has an enlarged heart with a well marked aortic incompetence. He had dichuchwa as a child and he is strongly seropositive to the Kolmer and VDRL tests. His cerebrospinal fluid is also positive to these tests. There are no signs of affection of the Central Nervous System apart from the positivity of the spinal fluid.

Case 61. Late Lesions - Extensive Skin and Bone Involvement.

Name: Rabanyane Phamodi. Male aged ± 35 years. Reg. No: 21156. A Mokgalagadi from the village of Kunwane (far in the Kalahari desert).

History: This man was first seen on 4.9.54 having been brought into Molepolole by a hunter's lorry. He was complaining of multiple ulcers over the body, of many months duration. He had dichuchwa untreated as a child. He is not married.

Examination: The skin of the face is scarred following ulceration which occurred some years ago.

There are three ulcers  $\frac{1}{2}$ " to  $1\frac{1}{2}$ " in diameter on the

/top.....

top of the left shoulder and the largest of these ulcers is fixed to the clavicle. On the outer surface of the right ankle and extending on to the back of the heel, there is an extensive, deep ulcer, heavily infected with pyogenic organisms. There is ulceration on the front of the scrotum and there is no sign of the penis. He states that some months back he had very severe ulceration and the penis sloughed off. On the back of the right thigh just below the fold of the buttock is a deep ulcer of three months duration. There are scars of large, healed ulcers over the lower part of the back and over the abdomen and in one of these scars there is an area of depigmentation. There is some swelling along the anterior border of the tibiae and of the forearm bones. (Plates 58, 59, 60, 61, 62, 63, illustrate these lesions).

Radiological Examination: The tibiae show increased density and sclerosis of cortical bone with extension of the sclerosis into the medullary cavity. There is considerable periosteal new bone formation. In the dense, sclerosed bone there are circular areas of rarefaction. The fibulae show cortical thickening along the whole length of the shafts.  
/at.....



At about the middle of the shaft of the right radius there is an area of cortical thickening which forms a definite bulge of the bone. There is a generalised thickening of the cortical bone along the whole lengths of the shafts of the ulnae and radii.

At the distal end of the clavicle there is an area of rarefaction just beneath one of the ulcers described above. There is a definite crater in the bone outline.

Over the posterior surface of the calcaneus there is great irregularity of the bone surface due to bone destruction and with this there is evidence of new bone formation. (Plates 64, 65, 66, 67).

Serological Reactions: The VDRL test is positive and the Kolmer is positive 80 units. The cerebrospinal fluid is negative to the tests.

Treatment: This patient was admitted to hospital and the ulcers dressed with cetavlon lotion. He was given PAM 1.8 mega units alternate days for four injections and then 1.2 mega units alternate days for four doses. A total of 15.6 mega units of PAM.

/The ulcers.....

The ulcers responded well to this treatment and the appearances at the end of treatment are shown in Plates 68, 69, 70. He was seen again some weeks after discharge from hospital and the ulcers were quite healed. The bony deformities remained and he was still seropositive.

Case 62. Late Lesions - Severe Bone Affection with Overlying Ulceration.

Name: Mususu Mosarwa. Female aged 15 years.

Reg. No: 21081. A Mokgalagadi from the village of Lephephe. First seen on 19.8.54.

History: She complains of severe ulceration of the arms and swelling of the bones of two years duration. She had dichuchwa in 1951 which was not treated.

Examination: There are scars of old skin ulceration over the face, and scars of angular stomatitis at the angles of the mouth. There is extensive, deep ulceration of the skin of both forearms and these ulcers are fixed to the underlying bones. The bones of both forearms are swollen and deformed. There is a swelling of both the tibiae in the upper third anteriorly. (Plates 71 and 72).

Serological Reactions: The VDRL test is positive and the Kolmer test is positive 80 units. The cere-

brospinal fluid is negative to these tests.

Treatment: This girl was admitted to hospital and dressings applied to the ulcerated areas. She was given PAM as recorded on Page 85 for a total of 14.4 mega units and after two weeks the ulcers had almost healed. (Plate 73).

Case 63. Late Lesions - Severe Skin Ulceration with Affection of the Long Bones.

Name: Tshikeri Thotsana. Female aged + 24 years.

Reg. No: 1100. A Mokgalagadi from Khudumalapye.

Married. First seen on 17.12.53.

History: This patient was admitted to the hospital on 17.12.53 complaining of swelling of the bones for over a year and severe skin ulceration for four to five months.

Examination: There is extensive superficial ulceration of the skin over the left thigh, leg and left hip region. In this extensive area there are parts where healing has occurred leaving scar tissue and other parts where the ulceration is still active. There is swelling and deformity of both forearms and several of the proximal phalanges are swollen. Both tibiae are swollen and deformed. (Plate 74).

/Radiological.....

Radiological Examination: Both tibiae and fibulae are distorted and there is a generalised moth eaten appearance of the bones. There is marked evidence of periosteal new bone formation and there are circular areas of bone destruction. The femora show cortical sclerosis and thickening and the same moth eaten appearance. There are similar, although less marked changes in the humeri. The fourth proximal phalanx of the right hand shows an area of rarefaction with cortical destruction. (Plates 75, 76, 77.)

Serological Reactions: The VDRL test is positive and the Kolmer is positive 160 units. The cerebrospinal fluid is negative to the Kolmer test.

Treatment: Daily dressings were applied to the ulcerated skin area. PAM was given in large doses namely 2.4 mega units every third day for six doses, a total of 14.4 mega units. The skin ulceration healed well. She was seen again in June 1954 and the ulceration was quite healed. The bony deformities were much less marked. She was still seropositive, Kolmer 20 units.

Family History: Her father and four other children in the family have all had dichuchwa and are sero-  
/positive....

positive. Her mother has had dichuchwa but is sero-positive. Her youngest sister has not had dichuchwa and is seropositive.

Case 64. Late Lesions - Bone affection (Frontal Bone).

Name: Kelaoleng Kgothang. Female aged 22 years. Reg. No. 34999. A Mokgalagadi from the village of Letlakeng. Married. First seen 23.11.54.

History: There is a swelling on the forehead which began to appear nine months ago. She had dichuchwa untreated as a child.

Examination: Over the right frontal region there is a smooth, painless swelling of the bone. (plate 78). Radiological Examination shows increased density of the bone with a fuzzy margin where the swelling is situated due to new growth of bone. (Plate 79).

Serological Reactions: The VDRL test is positive and the Kolmer is positive 40 units. The cerebrospinal fluid reaction is negative.

Treatment: PAM 1.8 mega units.

Re-check: She was seen again on 28.12.54 and there was no change in her condition. She thinks the

/swelling.....

swelling is slightly bigger. She was still sero-positive.

Case 65. Late Lesions - Affection of Long Bones.

Name: Shebale Sebolai. Male aged 11 years.

Reg. No. 20911. A Mokgalagadi from the village of Metsebotlhoko. First seen on 10.8.54.

History: He complains of swelling of the arms and legs and ulceration on the back of the right leg of many months duration. He had dichuchwa some years ago.

Examination: Both tibiae are swollen anteriorly and there is deformity of both the forearms. There is limitation of movement in the left elbow joint.

There is ulceration over the back of the right leg just above the ankle. (Plates 80 and 8L).

The radiological appearances are those of cortical sclerosis and anterior bowing of the tibiae. The sclerosis extends into the medullary cavity. (Plate 82).

Serological Reactions: The VDRL is positive and the Kolmer test is positive.

Treatment: PAM 0.6 mega units.

Re-check: He was seen on 11.11.54 and the ulcer had  
/healed.....

healed but the bone condition remained the same.  
He was still seropositive Kolmer 20 units.

Cases 66-76. Late Lesions - Affection of Long Bones.

These cases all have the same history, namely, swelling and deformity of the bones following an attack of dichuchwa some years previously. They are illustrative of the radiological appearances in the bones of late cases of dichuchwa. All were strongly seropositive.

Name: Ranthukge Sebokelo. Age 6 years.

The tibiae and fibulae show deformity, increase in calibre and a combination of increased bone density with rarefaction giving a moth eaten appearance. (Plates 83 and 84).

Name: Johanna Raduiko. Age 14 years.

This case illustrates the dense and extensive sclerosis which is often seen in the bones on radiological examination. There is thickening and dense sclerosis of the cortical bone and this sclerosis is extending into the medullary cavity. (Plate 85).

/Name.....

Name: Tlalang Gamogang. Age about 48 years.

This case illustrates the bone disease limited mainly to the upper part of one bone. There is cortical and medullary sclerosis at the upper end of the tibia and this has caused considerable thickening of the bone giving an almost scabre appearance. (Plate 86).

Name: Keadirele Semokola. Female aged + 26 years.

This case illustrates the effect, often produced in these bone lesions, of small areas of rarefaction on a dense background of sclerotic new bone. There is increased calibre of the bone and an irregular bony outline with, in places, a fuzzy outline to the bone. (Plates 87 and 88).

Name: Goirawang . Female age 22 years.

In this case the prominent radiological lesions seems to be rarefaction. There is a localised swelling at about the middle of the shaft of the radius due to the laying down of peristeal new bone and in this area there are large areas of rarefaction. A very similar appearance is seen in the tibia. In the fibula, there are cortical areas of destruction.

/Plates 89, .....



(Plates 89, 90 and 91).

Name: Ntukane. Male aged + 9 years.

This case shows very clearly on radiological examination the appearance of circular areas of rarefaction in dense, sclerotic new bone. (Plate 92)

Name: Kitso. Female aged + 20 years.

This radiological appearance is of dense new bone, causing considerable thickening and distortion of the shaft of the tibiae. The fuzzy irregular bone margin due to the new bone formation is clearly seen. (Plate 93).

Name: Matoba. Aged + 11 years.

This case shows a localised lesion at the lower end of the humerus. There is swelling of the bone and areas of rarefaction inside the new bone. The forearm bones and the tibiae show cortical thickening. (Plates 94, 95, 96).

Name: Kebolestse. Age + 13 years.

There is gross thickening and sclerosis with very dense new bone formation at the lower end of the femur. There is considerable new bone formation.

/This.....

This is the type of case in which pyogenic infection can be suspected and sequestrum formation may occur. (Plate 97).

Name: Mosidi. Aged + 20 years.

This case is a good example of a localised lesion at the upper end of the tibia. The forearm bones show the changes of increased density with areas of rarefaction. (Plates 98 and 99).

Name: Eleanor. Aged about 24 years.

This case shows affection of the forearm bones with cortical sclerosis and there is extension on to the articular cartilage of the ulna causing limitation of joint movement. The articular surface of the humerus appears normal. (Plate 100).

#### 9. RELATIONSHIP OF DICHUCHWA TO WITKOP.

The relationship of Witkop to syphilis is still a matter for discussion in South Africa, although very few papers have appeared on the subject in recent years.

Witkop is an Afrikaans word meaning "Whitehead". The Setswana name for the condition is "Dikgawaba".

/Witkop.....

Witkop is a skin condition of the scalp, affecting Bantu children and usually commencing between the ages of two and ten years. It is only rarely found as a new condition in adults, although adults with the disease are often seen in the Bakwena Reserve. In these cases the disease commenced in childhood and persisted into adult life.

The disease usually commences with the appearance of small, white, discrete and slightly raised spots on the scalp. (Plate 101). These white spots gradually spread and coalesce and become more raised and crusted. (plate 102). Eventually the whole scalp becomes a mass of white raised crusts. (Plate 103). As the disease extends, the hair falls out. The cervical lymph nodes are usually enlarged, probably due to the pyogenic infection which sooner or later occurs on the scalp. With the application of ointments or oily dressings the thick white scabs can be removed and a tender looking pink surface is left, which quickly crusts over again unless the dressings are continued. The disease is very chronic and resistant to treatment and many children have it for years until, in adult life, it eventually cures itself leaving a patchy baldness of the  
/scalp.....

scalp known in Afrikaans as, 'kaalkop'. The local people treat the disease by rubbing in axle grease. The affected scalp, unless covered by a cloth or cap, which is commonly done, is a mass of flies.

In the paper to which reference has already been made McArthur<sup>31</sup> discusses the condition and comes to the conclusion that it is a manifestation of syphilis. Mitchell and Robertson<sup>35</sup> in their paper quote McArthur and Thornton<sup>32</sup> as saying in a paper read at the South African Medical Congress in Cape Town in 1910 that the disease is a manifestation of hereditary syphilis. They, however, doubt that, and conclude that the disease is a fungus infection, closely allied to favus. From their cases they isolated a fungus similar to *Achorion schonleini* which was easily transmitted to mice. Fraser<sup>10</sup> is sceptical of Witkop's being a fungus infection because, he says, it is non-contagious and heals under anti-syphilitic treatment. In my cases however, I found that often several members of a family were infected, which seems to indicate that the condition is contagious and all the cases were quite resistant to anti-syphilitic treatment with PAM.

/Marshall.....

Marshall and Wilson<sup>30</sup> in a fairly recent paper, regard witkop as being a specialised form of pustular syphilide. They agree that the condition bears a close resemblance to favus infection, but they state that close inspection and pathological investigation make that diagnosis unlikely. They state that "all reports agree that witkop is commonest amongst congenital syphilitic children aged 2 - 10 years". Schechter<sup>48</sup> makes the bold statement, with which I am certainly not in agreement, that "witkop is always accompanied by syphilitic stigmata and yields to arsenical treatment".

There is no doubt that witkop is frequently found in cases of early and late dichuchwa but so is scabies, and that is certainly not a manifestation of syphilis! Witkop has not been reported as a manifestation of endemic syphilis from any other part of the world, whilst all the other lesions noted in dichuchwa have been reported as occurring in bejel or other endemic syphilis. Guthe<sup>12</sup> however states that Grin observed some cases of witkop in Bosnia during his survey of endemic syphilis.

/A personal.....

A personal communication from Lurie<sup>28</sup> of Johannesburg says that four cases out of six examined by him microscopically and culturally have shown the presence of favus organisms.

On this survey I was able to collect a larger number of cases of Witkop than has previously been reported and I endeavoured to determine whether there was any causal relationship between dichuchwa and witkop. A total of 815 cases were seen of which 378 occurred in males and 437 in females. The maximum number of cases was seen in the 5 - 10 year age group and the condition was uncommon before the age of one year or after 15 years. Serological tests were carried out on 349 cases and showed a seropositivity rate of 40.2% as compared with 37.0% in the general population. The percentage of cases which in addition to witkop, also showed active lesions of dichuchwa or gave a history of past infection was 25.5%. Taking into consideration the male/female distribution of the population and the serological and clinical findings it is apparent that there is no significant difference in incidence of witkop in the general population and in that suffering from dichuchwa.

/There.....

There is no evidence of sex predilection in and no causal relationship between dichuchwa and witkop could be demonstrated. My opinion is that witkop is not a manifestation of dichuchwa but that it is a favus infection of the scalp. The reason that it is so commonly seen amongst cases of dichuchwa is a purely epidemiological one; it is, like dichuchwa and scabies, a disease of the less hygienic members of the community.

10. RELATIONSHIP OF DICHUCHWA TO OTHER EXTRA-VENEREAL TREPONEMATOSES (APART FROM YAWS).

The extra-venereal treponematoses include yaws, pinta and the various forms of endemic syphilis reported from different parts of the world.

10.1. Pinta, which is caused by *T. carateum*, an organism indistinguishable morphologically from the organisms of yaws and syphilis is different in many ways from dichuchwa. It was first described in Mexico in 1957 (Willcox<sup>59</sup>), and is endemic in Mexico and central America. There is a primary lesion at the site of inoculation and secondary lesions follow one month to one year later. They

/consist.....

consist of erythematous papules which become scaly. The papules then become pigmented, at first copper in colour and then a slaty blue colour. They are now called pintides and these gradually regress becoming depigmented. Unlike dichuchwa there are no bone lesions and the cerebrospinal fluid is always normal. Occasionally, as in dichuchwa aortic valvular lesions occur.

10.2. The term endemic syphilis includes such clinical entities as bejel, njovera and the endemic syphilis of Bosnia and other countries. Considerable interest has been shown in this condition since Hudson first described bejel in 1928.<sup>19</sup> A number of papers published from various parts of the world since his paper, indicate that endemic syphilis is a very definite problem, and that it is quite prevalent in some of the less hygienic and underdeveloped parts of the world.

History shows that it has been a problem of great magnitude in various countries over the past centuries. In their monologue<sup>14</sup> 'Treponematosis - A World Problem' Guthe and Willcox give many examples from history of outbreaks of extravenereal

/treponematosis.....



treponematosi s other than yaws. These examples confirm that endemic syphilis has been of common occurrence in the past in such places as Europe, where it is now rare, and the epidemiology of it has been, in all cases similar to that of dichuchwa in the Bakwena Reserve today. It is possible that the Biblical plague of Moab<sup>17</sup> was syphilis and Morbus Gallicus, a disease which was common in Europe after the discovery of the New World by Columbus was also probably syphilis. In Scotland in the 17th Century there was a disease known as Scottish Yaws or Sibbens which was probably a mixture of venereal and non-venereal syphilis, and was probably spread through the use of common drinking bowls, towels, other utensils and by suckling. It is only one hundred years ago since the last case of Sibbens was reported in Britain. The Norwegian 'radesyge' of 18th century has also been recognised as extravenereal syphilis and the 'spirocolon' of 19th century Greece and Russia was the same. In the 18th century Canada had outbreaks of syphilis amongst the Indian tribes and many children were affected.

In Chicago in 1949<sup>9</sup> a local outbreak of asexual  
/syphilis.....

syphilis amongst children was recorded, due to poor social conditions.

In Yugoslavia, until the mass treatment campaigns of 1948 - 1952 extravenereal syphilis was exceedingly common; 5% of the population being affected.<sup>11</sup>

Willcox<sup>57</sup> has described njovera, an extravenereal treponematosis occurring in the Bantu population of Southern Rhodesia which, he says is syphilitic and probably identical to Bejel. He also wrote<sup>56</sup> 'heresay evidence suggests that a similar condition exists in Bechuanaland also'.

In 1953 Taylor<sup>53</sup> reported an outbreak of endemic syphilis in a coloured community in South Africa and he lays particular emphasis on the sociological aspects of the disease.

Foci of endemic syphilis have been reported from various other parts of the world. Cutler<sup>8</sup> reported the disease in Afganistan, Willcox in Turkey,<sup>58</sup> Manson-Bahr in East Africa<sup>29</sup> and Ranjan and Rangiah in Madras.<sup>40</sup>

The latest report on endemic syphilis is that from Gambia by McFadyan and McCourt<sup>33</sup> which is of

/great.....

great importance, as they describe two different treponematoses in the same country, namely yaws and endemic syphilis. The two disease appear to occupy different geographical parts of the country and this observation is rather like that of Hackett<sup>16</sup> who found that in Uganda, yaws and endemic syphilis have become defined into two areas in which one or the other predominates. The climatic conditions where endemic syphilis is common in Gambia seem to approximate to those found in the Bechuanaland Protectorate that is, intermediate between tropical conditions and pure desert conditions, and where water is not prevalent. Strangely enough, Csonka<sup>6</sup> states that most bejel is found near water, be it rivers, marshes or lakes. In their preliminary comments on the Gambia cases the authors state that the most common tertiary lesion is hyperkeratosis of the palms and soles of the feet, associated later with depigmentation, whilst lesions of the long bones are rare. In Bechuanaland I found that lesions of the long bones are common and hyperkeratosis is uncommon.

The first report of dichuchwa amongst the

/Bakwena.....

Bakwena was made in 1952 by Murray et alia<sup>37</sup> and I described a typical case illustrating the bone lesions in 1953.<sup>34</sup>

10.3. A study of the above mentioned descriptions of bejel, njovera and the various other forms of endemic syphilis leads to the conclusion that dichuchwa is an extravenereal treponematoses identical with these forms. All these clinical entities have the following points in common with dichuchwa:

1. Non-venereal spread is usual.
2. Diseases found in communities of poor hygienic standards.
3. Causative organisms indistinguishable from *T. pallidum*.
4. Primary sore unusual. If found it is produced by similar conditions.
5. Oral mucous patches and ano-genital condylomata commonest early lesions.
6. Nasopharyngeal ulceration, skin gummata and bone lesions are common late lesions.
7. Cardiovascular system and central nervous system involvement occur but are not common.
8. Seropositivity to flocculation and complement fixation tests as in syphilis.
9. All show good response to penicillin therapy.

/11.....

11. RELATIONSHIP OF DICHUCHWA TO VENEREAL SYPHILIS.

The lesions of extravenereal treponematosi<sup>s</sup> as seen in the Bechuanaland Protectorate and particularly as studied in the Bakwena Reserve differ very little from the lesions seen in case of sporadic syphilis. These differences can, in most instances, be accounted for by epidemiological factors, rather than by any differences in the organism.

The absence of the primary sore in most cases has already been discussed, and examples given of how in certain circumstances, primary lesions are found, as in women suckling infected children. Akrawi<sup>2</sup> studying bejel, which I now take to be identical with dichuchwa, produced primary sores of the lips following scarification in volunteers. It seems quite definite<sup>t</sup> that in dichuchwa, as in other types of endemic syphilis, if the contact is close enough and the dose of treponemes large enough primary sores can develop.

The secondary manifestations of mucous patches, condylomata lata and skin rashes are very like the lesions of venereal syphilis, although mucous patches appear to be more common in dichuchwa than in

/venereal.....

venereal syphilis and in this respect also dichuchwa is like bejel.

The late lesions of dichuchwa are similar to the late lesions of venereal syphilis except that gummatous ulceration of the palate is commoner in dichuchwa and gummata of the viscera are extremely rare in dichuchwa as compared with venereal syphilis. The bone lesions seen in our cases are typical of syphilis and the radiological appearance of a combination of bone destruction with irregular and usually marked bone production in the same lesion always make one suspicious of syphilis. (Holmes and Lingley<sup>18</sup>). Certainly, the late manifestations of cardio-vascular disease and neurological involvement do not appear to be so common in extravenereal treponematosi s as they are in venereal syphilis, but cases do occur and further study may show that they are commoner than is thought at present. No case of General Paresis of the Insane or Tabes Dorsalis has been seen on the survey, although a few cases of meningo-vascular syphilis have been seen amongst the hospital cases in the past few years. No evidence has yet been found to suggest that cases of  
/neuropathic.....

neuropathic jointdisease of the Charcot type are found following cases of dichuchwa.

A suggestion has been made as to why congenital syphilis is so uncommon in cases of dichuchwa and why it is more common in cases of venereal syphilis.

Willcox<sup>56</sup> points out that as endemic syphilis is a childhood disease it is more likely to imitate congenital syphilis than venereal syphilis and in congenital syphilis cardiovascular system involvement is never found.

There is a good deal of evidence to show that dichuchwa, although usually spread non-venereally can be spread venereally and that in a family both types of spread can occur. A family was seen in which the disease started in a young child who contracted it whilst playing with other children. This child infected his brothers and the youngest of these infected his mother, who developed mucous patches followed by genital condylomata. The husband was then infected venereally by his wife. The opposite state of affairs can occur. A man may be infected venereally and passes the disease sexually to his wife who passes it extravenereally to her  
/children.....

children. Promiscuity is common amongst the local people and so this combination of venereal and non-venereal spread is well recognised.

The question of immunity is important. Dichuchwa gives an immunity to venereal syphilis as illustrated in the case reported, No. 31, of a man who was examined and found to have extensive and highly infectious condylomata of the penis and scrotum which he admitted had developed after extramarital intercourse. He had never had dichuchwa as a child. He was having regular intercourse with his wife who had had dichuchwa as a child and showed no signs of the disease. The same question arises as has been raised by Akrawi<sup>1</sup> in discussing bejel, whether, by wiping out endemic syphilis, a way will be opened for the spread of the more severe type of venereal syphilis, or to use Biblical language one devil is put out and seven worse devils enter.

It would appear then, from this survey that dichuchwa is very similar to sporadic venereal syphilis and that the differences are mainly caused by epidemiological factors.



12. RELATIONSHIP OF DICHUCHWA TO YAWS.

Yaws is a very common extravenereal treponematosis found mainly between the tropics of Cancer and Capricorn, and showing many epidemiological factors and clinical features similar to endemic syphilis. Like dichuchwa and other forms of endemic syphilis it is found amongst people of a low social and hygienic standard. One point of difference in this connection is that yaws is associated with the presence of water and a high humidity and there is a greater incidence during humid weather; whilst dichuchwa along with bejel, njovera and the endemic syphilis of Bosnia and Gambia are found in dry semi-tropical climates.

The early manifestations of dichuchwa are not quite the same as in yaws. There is not usually a primary sore to correspond to the "Mother Sore" of yaws. The cutaneous, early lesions of yaws are much more florrid and profuse than is usually seen in dichuchwa. In dichuchwa there are, typically, well marked mucous patches in the mouth which are not typical of yaws. Occasionally in dichuchwa one sees, especially in young children, cutaneous rashes

/of a.....

of a very extensive type which are quite framboesi-  
form in character. The tertiary lesions of dichuch-  
wa have much in common with those of yaws. Thus the  
ulceration of the palate and nose are common in  
both, although the gangosa and goundou of yaws are  
usually more extensive and severe than the corres-  
ponding lesions in dichuchwa. Periostitis, gang-  
lion formation and gummatous skin ulceration are  
common in both conditions. No cases of juxta-  
articular nodes were found in my cases of dichuchwa.

In his book on the bone lesions of yaws  
Hackett<sup>15</sup> shows illustrations of bone lesions which  
are very similar to the radiological pictures of  
late bone lesions of dichuchwa and he states that  
apart from the absence of osteochondritis in yaws,  
there is no lesion that occurs in it which may not  
be observed in syphilis. It should be noted that no  
cases of osteochondritis were found in his survey.  
I found several cases which had bony lesions of  
hands, face and skull such as are common in yaws.

Involvement of the central nervous system and  
the cardiovascular system are not found in yaws but  
do occur in dichuchwa and congenital spread of the

/disease.....

disease is possible in dichuchwa whilst it does not occur in yaws.

Blacklock<sup>4</sup> states that 'The evidence that yaws is other than syphilis modified by age, race and various local conditions, does not appear convincing'. Few people would accept this viewpoint which implies that yaws is an altered or transitional form of syphilis; or in this case that dichuchwa is a modified form of yaws. The suggestion might be made that dichuchwa is a transitional condition between venereal syphilis on the one hand and yaws on the other. The evidence here collected however would seem to indicate that dichuchwa, like bejel and the other forms of endemic syphilis is distinct in its clinical aspects from yaws. The work of Turner<sup>54</sup> and his colleagues seems to indicate that though the etiological agents are morphologically indistinguishable, there are immunological differences between yaws, classical venereal syphilis and endemic syphilis.

13. SUMMARY OF RELATIONSHIP OF DICHUCHWA TO YAWS, BEJEL, ENDEMIC SYPHILIS AND VENEREAL SYPHILIS.

/13.1.....

13.1. Table 14 summarises the similarities and differences found in the main treponematoses.

13.2. The Unitarian View of Treponematoses.

Hudson<sup>21</sup> stresses the point that yaws and syphilis of the various types, are all treponematoses. The unitarian interpretation advances by him is that, arguments as to whether syphilis is yaws or not have no meaning when the fact is realised that both are treponematoses. Diseases should be named if possible on the basis of their specific causes which are assumed to be constant, and not on the basis of their epidemiological courses which may fluctuate. Once having established the disease treponematosis is caused by *T. pallidum* it is reasonable to divide it into venereal and non-venereal types, if it is recognised that this classification is based upon environmental rather than etiological factors. This view point is especially applicable in relationship to the therapeutic aspect of the treponematoses. The epidemiological and sociological factors influencing yaws and syphilis of the masses are similar and, as is discussed later, in PAM we have an effective remedy.

/14.....

14. ASSOCIATED CLINICAL CONDITIONS.

As the survey progressed opportunity was taken to note other clinical conditions amongst the people, although after eight years of practice amongst them one had a good idea of the conditions which would be found.

14.1. Skin Infection.

In some areas, especially in the Kalahari, scabies is almost universal. About 100% of the population in some villages were suffering from scabies and in many cases it was associated with severe secondary infection with pyogenic organisms. Nearly every active case of dichuchwa which was seen, also had scabies, indicating that the epidemiological features of the two conditions are similar. Scabies is a dirt disease and so is dichuchwa.

Infected abrasions and scratches of the skin were exceedingly common, especially amongst the herd boys.

In the Kalahari area the skin frequently presents a dry, scaly, inelastic appearance due to fluid and vitamin deficiency coupled with the  
/effects.....

effects of the fierce rays of the sun. The skin of the face becomes heavily wrinkled at a relatively early age. Skin fissures at the angles of the mouth, and cracked lips are frequently noted and Akrawi, in the paper to which reference has already been made<sup>1</sup> thought that these lesions provided easy access to the entry of the spirochaet in cases of bejel.

A peculiar condition noted quite often amongst herd boys was an ulceration of the lower lip. The appearance could be described as an erosion of the lip; the whole of the lower lip was red, raw and tender. The condition was very resistant to treatment and although it was found in a few cases of dichuchwa, there seemed to be no syphilitic basis. The condition is probably due to a combination of vitamin deficiency and exposure to the dry, burning sun of the Kalahari.

One case of squamous epithelioma of the forearm was seen.

#### 14.2. Nutritional States.

Squires<sup>51</sup> has shown that the Batswana people can remain relatively healthy on very small  
/amounts.....

amounts of ascorbic acid, and certainly in the Kalahari area the people eat very little food containing ascorbic acid or vitamin A. No frank case of scurvy was seen although unhealthy gums were exceedingly common. Pyorrhoea is almost universal but dental caries is uncommon.

No definite case of pellagra was seen but numerous children had the pavement stone pattern of the skin and mild glossitis, indicating that they were on the borderline of frank pellagra.

Most of the children, both in the Kalahari and non-Kalahari areas are thin and small compared with European children of the same age. This fact was noted by Schechter<sup>48</sup> in his Tuberculosis Survey.

An opportunity was taken to examine the blood proteins of many of the people and at the same time other tests such as agglutination reactions were carried out. In almost every case the blood proteins were well below the European standard of average and the albumin/globulin ratio was reversed.

#### 14.3. Eye Conditions.

Eye diseases are very common amongst the Batswana and again, especially so in the dusty  
/Kalahari.....

Kalahari area. Simple catarrhal conjunctivitis and purulent conjunctivitis due to gonorrhoea are common. Trachoma is frequently seen and advanced cases show all the complications of entropion, corneal ulceration and blindness.

Blindness due to corneal scarring following Small-pox is not uncommon.

#### 14.4. Infectious Fevers.

Many old cases of Small-pox were seen, as in 1949-50 a severe epidemic swept through the Kalahari region. No fresh cases were seen.

Measles, Whooping-cough and chicken-pox were commonly encountered.

Pulmonary Tuberculosis was common and the impression one gained was that the disease is much more prevalent than the survey of 1952, which showed 1.3% active cases, would lead one to imagine. Bone and joint, as well as glandular tuberculosis are common. It may be noted, in passing, that tuberculosis of cattle is rare in Bechuanaland Protectorate.<sup>5</sup>

In the Kalahari area some severe cases of malignant tertian malaria and some cases of relapsing  
/fever.....



fever were found.

14.5. Hernias.

Inguinal hernia is almost unknown amongst the Bakwena but umbilical hernia is fairly common amongst the children. This may be the result of infection of the umbilicus in the neo-natal period. Usually the cord is cut with an old razor blade and left long enough to reach the baby's knee and mild infection is quite common. These hernias seem to cure themselves as adult life is reached.

14.6. Longevity.

A few Batswana live to a very old age, but the majority seem to die relatively young. They age rapidly after the age of fifty years. This is no doubt due to a combination of factors, but the high seropositivity rate amongst the tribe may be a factor. Rosahn<sup>1/1</sup> has shown that syphilitic people have a higher mortality rate than non-syphilitics of similar age, sex and race.

15. METHODS FOR THE CONTROL OF DICHUCHWA.

/It.....

It is obvious from all that has been written that the control and eventual eradication of dichuchwa in the Bechuanaland Protectorate must be conducted along two lines, first by means of Mass Therapy Campaigns and second by improving the social and hygienic standards of the people.

15.1. Mass Therapy.

In a mass therapy campaign the aim is to deal with the disease village by village and house by house, systematically hunting out the cases. In Bechuanaland this is difficult, but it can be done if determined efforts are made and if the right approach is made to the Chief, Headmen and people. In this systematic examination all active cases which are found are treated with PAM, along with all the household contacts. It has been shown that PAM can abort cases of endemic syphilis and bejel<sup>55</sup> if given in the incubation period and I believe that the same is true of dichuchwa. Latent cases found are also treated in the hope of preventing relapses and tertiary lesions. The higher the percentage of the population seen in a village the  
/greater.....

greater chance there is, of course, of eradicating the disease. Unfortunately in Bechuanaland it is almost always impossible to see more than 70% of a village at any one time and indeed frequently only about 20% of a village would be found at home at any one time. One day the village of Kumakwane was visited unexpectedly in the search for certain cases of dichuchwa which were being rechecked and out of the village of perhaps 700 people only 6 were found at home. The rest were scattered at their lands weeding and working there. The result of this is that often a case which has just left a village will escape detection, or a whole family at some distant cattle post may have dichuchwa and move to their home in the village, some days or weeks after the team has left. So, although the whole village has been treated and cleared the disease is now re-introduced. It is these small, hidden reservoirs of infection which keep the disease smouldering in an endemic form and which are the main problem in mass therapy. Today these small reservoirs of infection are found mainly in the Kalahari area and they are particularly found in the small groups of

/Makgalagadi.....

Makgalagadi who live far out in the Kalahari area in little compact groups, and who come into the bigger villages occasionally for visiting or for trade. A mass therapy campaign in the Bechuanaland Protectorate must be concentrated mainly on the Kalahari area for if the reservoir of infection in that area is wiped out the disease will rapidly disappear from the rest of the country. After a mass therapy campaign, especially in such a wide country as this, the work of eradicating extravenereal treponematosiis is far from finished. Some cases are inevitably missed and from these cases the disease can easily assume serious proportions again. Reynolds and Guthe stress that<sup>43</sup> the gains obtained with mass therapy must be consolidated by resurveys of the population at regular intervals to prevent early recrudescence of extravenereal treponematosiis In the Bakwena Reserve and in the Bechuanaland Protectorate as a whole this will have to be done during the routine work of medical officers and medical orderlies at village dispensaries.

Guthe et alia<sup>13</sup> after a wide experience of mass therapy campaigns against the various types of  
/extravenereal.....

extraveneral treponematosis stresses the importance of having primary control areas in a campaign area where serological tests can be carried out and accurate statistics kept of response to treatment and so on. In the campaign for the eradication of extraveneral treponematosis in Bechuanaland Protectorate the Bakwena Reserve has served as this primary control area and the way is now clear for the commencement of the mass therapy throughout the whole country.

15.2. Improved Social and Hygienic Conditions.

The figures given in this report have shown that dichuchwa is a disease which is gradually dying out in the Bakwena Reserve. There is no doubt that with better education and improved economic status, with consequent improved hygienic standards, the disease would gradually disappear over the course of many years. In the non-Kalahari area of the Bakwena Reserve the social and hygienic standards of the people have improved greatly over the past few years and furthermore, bore-holes have been sunk in many places with consequent better facilities for cleanliness. Schools are established in

/almost.....

almost every village and there is a daily cleanliness inspection at school. More and more children are wearing clothes and there is no doubt that many people take a pride in cleanliness of clothes and body. The result of all this is that dichuchwa is becoming an uncommon disease in the more advanced villages. This improved hygienic standard is slowly penetrating to the Kalahari area and bore-holes are being sunk and schools opened.

To abolish dichuchwa by improving the standards of hygiene alone would no doubt succeed but very many years would be required to do that: but by combining that with a mass therapy campaign on the disease with PAM the disease can surely be eliminated in a relatively short time. It is believed that in the experimental area of the Bechuanaland Protectorate, that is, in the Bakwena Reserve, the above methods have succeeded in controlling the disease and its disappearance as a serious public health problem has been achieved.

16. SUMMARY.

1. There is a form of extravenereal treponematosi  
/in the.....

in the Bakwena Reserve of the Bechuanaland Protectorate known by the local word of 'dichuchwa'. This disease is similar to bejel, njovera and the endemic syphilis reported from Bosnia and other parts of the world.

2. It is probable that syphilis was introduced to the Batswana people in the late 18th century soon after their first contacts with Europeans, Coloureds and Hottentots. This venereal syphilis, on account of the epidemiological factors present in Bechuanaland soon became non-venereal in its form of spread. Large numbers of the population were then affected.

3. Today the disease is well known throughout all parts of the Bechuanaland Protectorate. It is known by different names by the different tribes. Reports suggest that throughout the whole of the Bechuanaland Protectorate there is a seropositive rate of about 30%. In the Bakwena Reserve as a whole the rate is 37%.

4. The essential characteristics of the disease are, that it is a childhood and family disease spread usually, non-venereally, although venereal spread

/can.....

can occur. It affects mainly the more primitive and unhygienic members of the tribe, amongst whom it spreads through the common use of domestic utensils and through direct contact. The early lesions are similar to the secondary lesions of sporadic venereal syphilis and these lesions are followed in a number of cases by tertiary lesions. The tertiary lesions mainly affect the skin, causing gummatous ulceration; the nasopharynx and the long bones.

5. Primary lesions are rare. They occur only if the size of the inoculum is large enough and if the epidemiological conditions are satisfactory. These conditions are present when a mother develops primary sores on the nipples through feeding an infected infant.

6. Lesions of the cardio-vascular system and central nervous system, although rare, do occur.

7. Congenital syphilis is also very rare but congenital spread is possible. The rarity is probably accounted for by the fact that many years usually elapse from time of the attack of dichuchwa to the birth of the child.



8. Superinfection of an already infected and allergic host is probably the chief reason for the frequency of tertiary lesions. When the number of infectious cases decrease in an area so also does the number of tertiary cases.

9. The highest infection rate was found amongst the Makgalagadi people living in the western part of the Reserve in the Kalahari desert. It is emphasised that it is in this area that the mass treatment campaign in the rest of Bechuanaland will have to be concentrated.

10. Treatment of the disease with PAM is very effective. Mass treatment of cases and contacts combined with improved standards of hygiene could eradicate the disease. It is important after a mass treatment of a village to return fairly soon to search out cases which escaped the first visit and which constitute a reservoir for the infection.

11. The World Health Organisation team worked in the Bakwena Reserve from November 1953 until February 1955 and the methods adopted in this field campaign are described.

17. ACKNOWLEDGEMENTS.

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/laboratory.....

laboratory arrangements and also for having the record cards analysed in Johannesburg by the Hollerith people. He gave constant encouragement and advice during the year.

17.4. The local Government officials and particularly the District Commissioners at Molepolole, gave every possible assistance.

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17.6. The Acting Superintendent and Staff, both European and African of the Scottish Livingstone Hospital were most helpful in many ways to the team during the year of investigations.

17.7. I am most grateful to Mr. D. de Villiers, the laboratory technician who with only two untrained African assistants, and working under conditions which were far from ideal, did all the serological testing and recording of results on the punch card.

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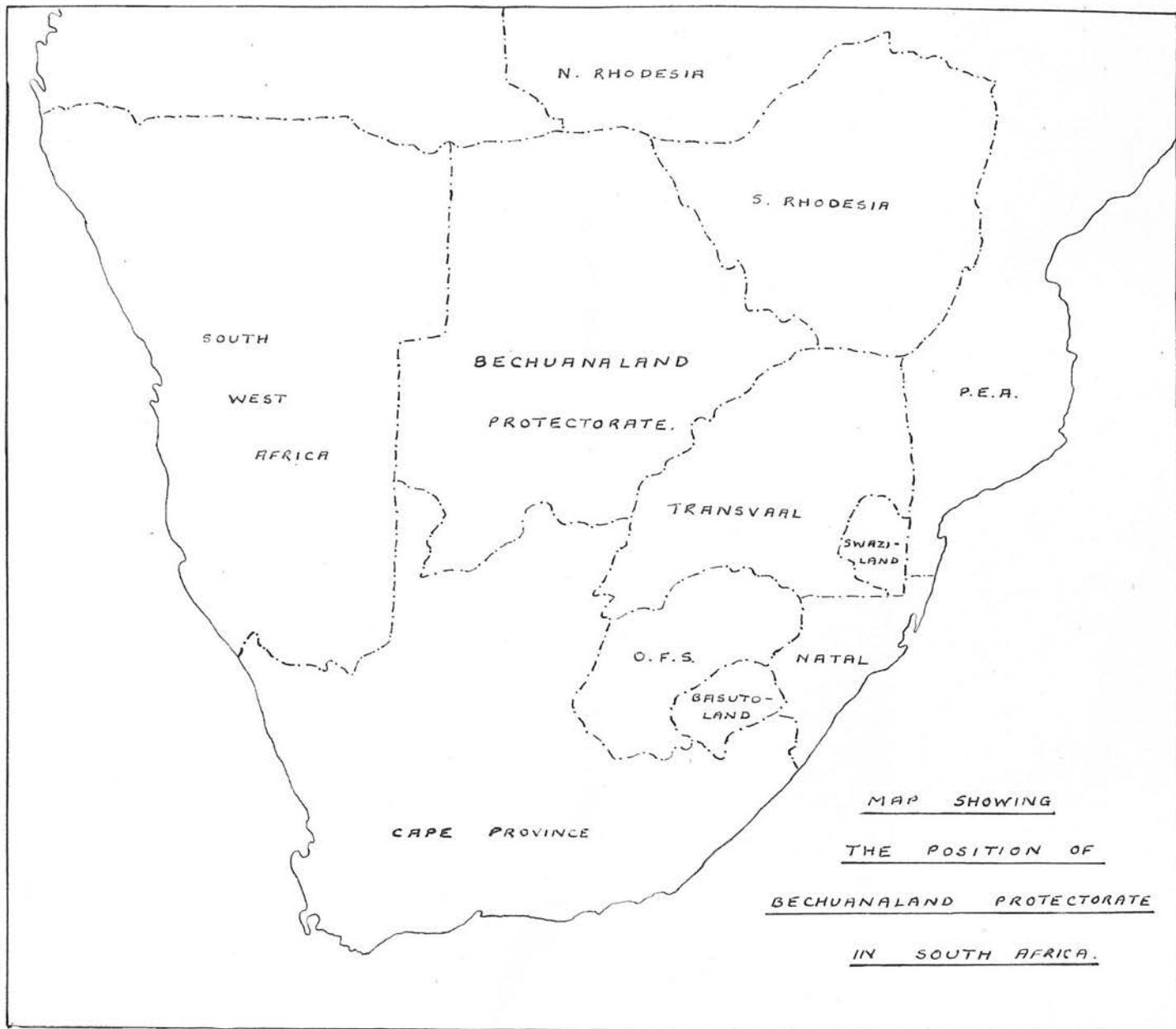
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MAP SHOWING  
THE POSITION OF  
BECHUANALAND PROTECTORATE  
IN SOUTH AFRICA.

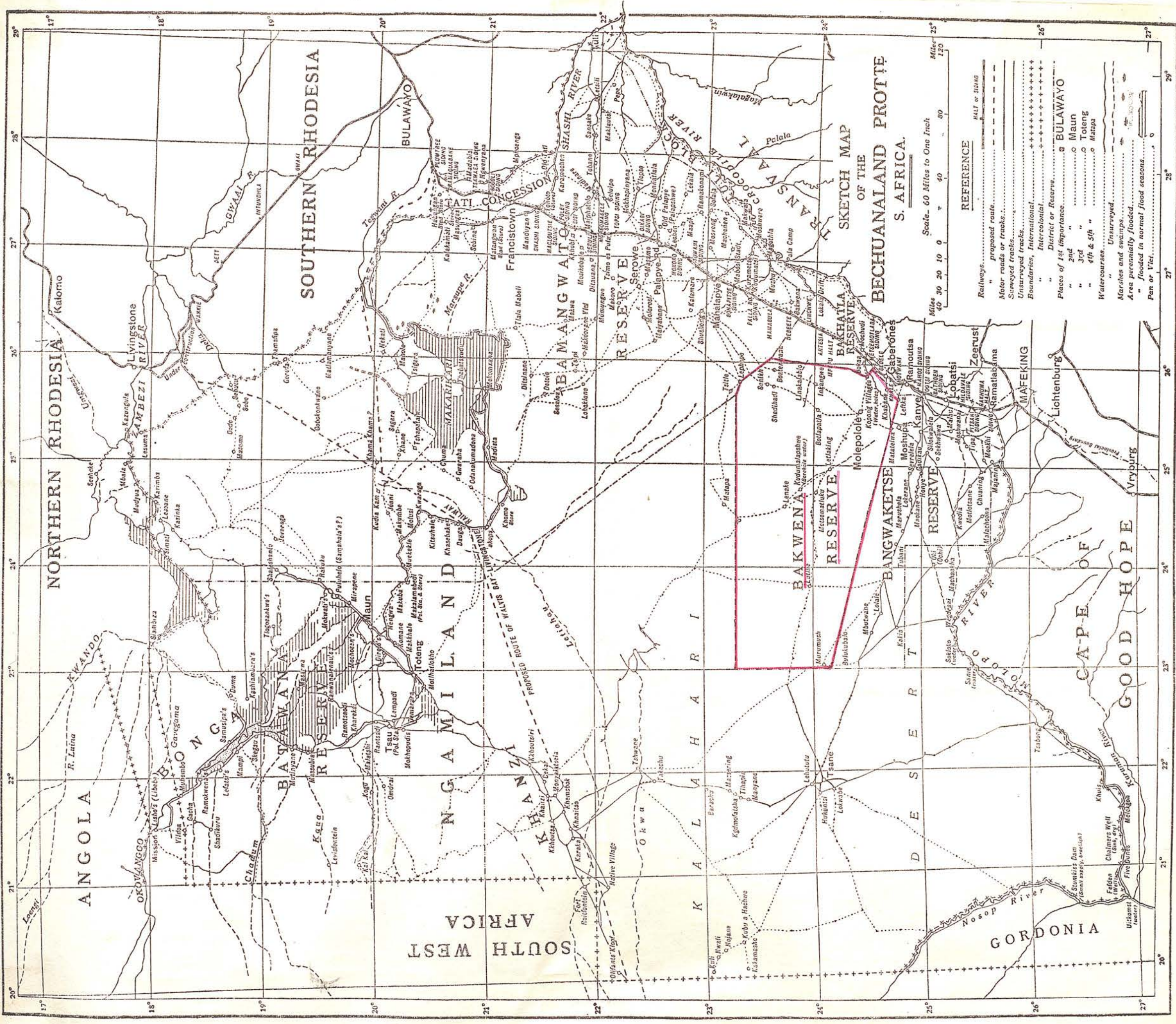
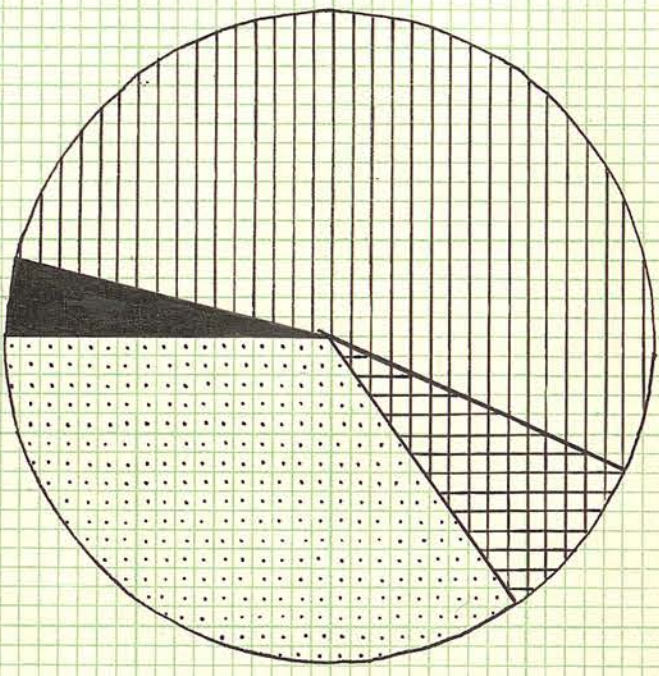


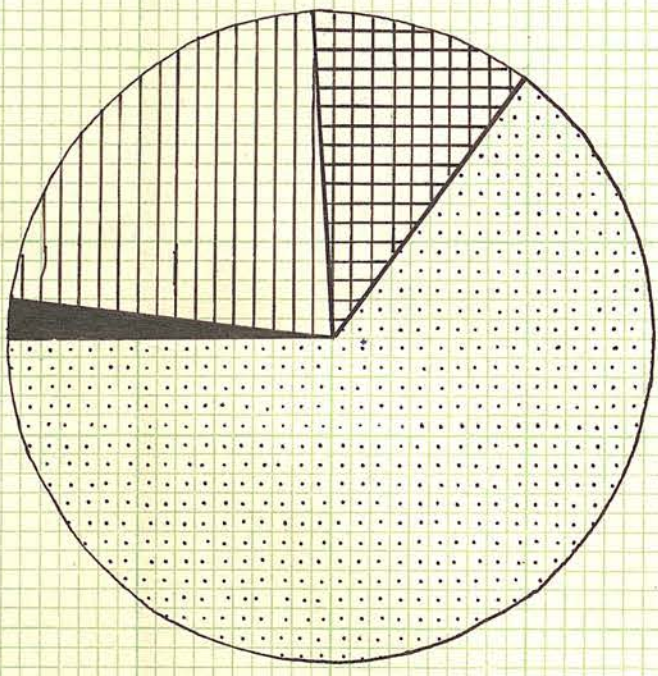






FIG. 2.

1. KALAHARI AREA.



2. NON-KALAHARI AREA.



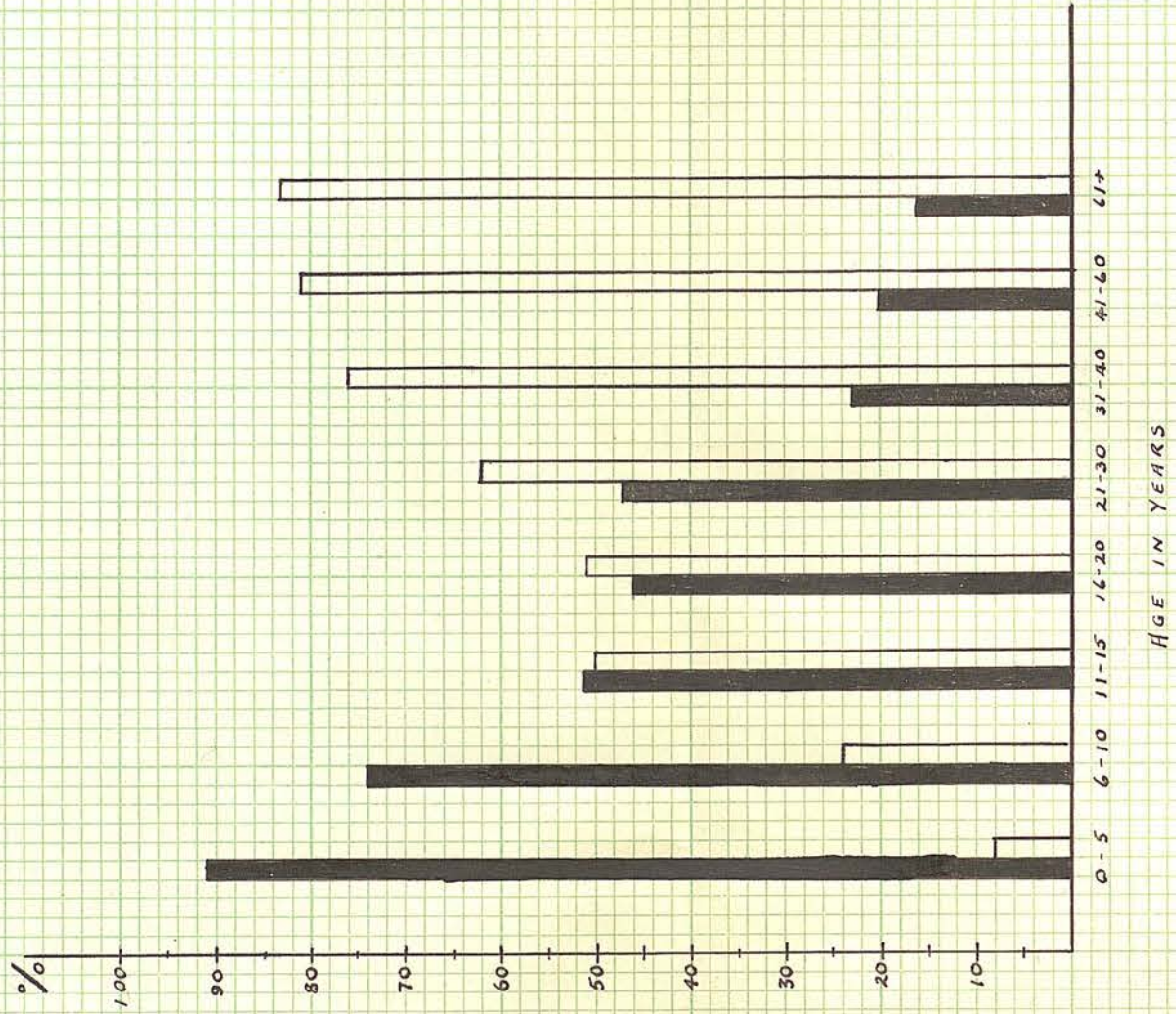
	ACTIVE		LATENT
	SERO POSITIVE (NO ACTIVE LESIONS, NO HISTORY OF PAST INFECTIONS, BUT SERO POSITIVE)		HEALTHY - SERONEGATIVE. (NO ACTIVE LESIONS, NO HISTORY OF PAST INFECTIONS.)

DISTRIBUTION OF ACTIVE AND LATENT CASES  
OF ENDEMIC SYPHILIS IN 22,809 PERSONS  
IN THE BAKWENA RESERVE.

Figure 2.

FIG. 3.

EARLY  
LATE

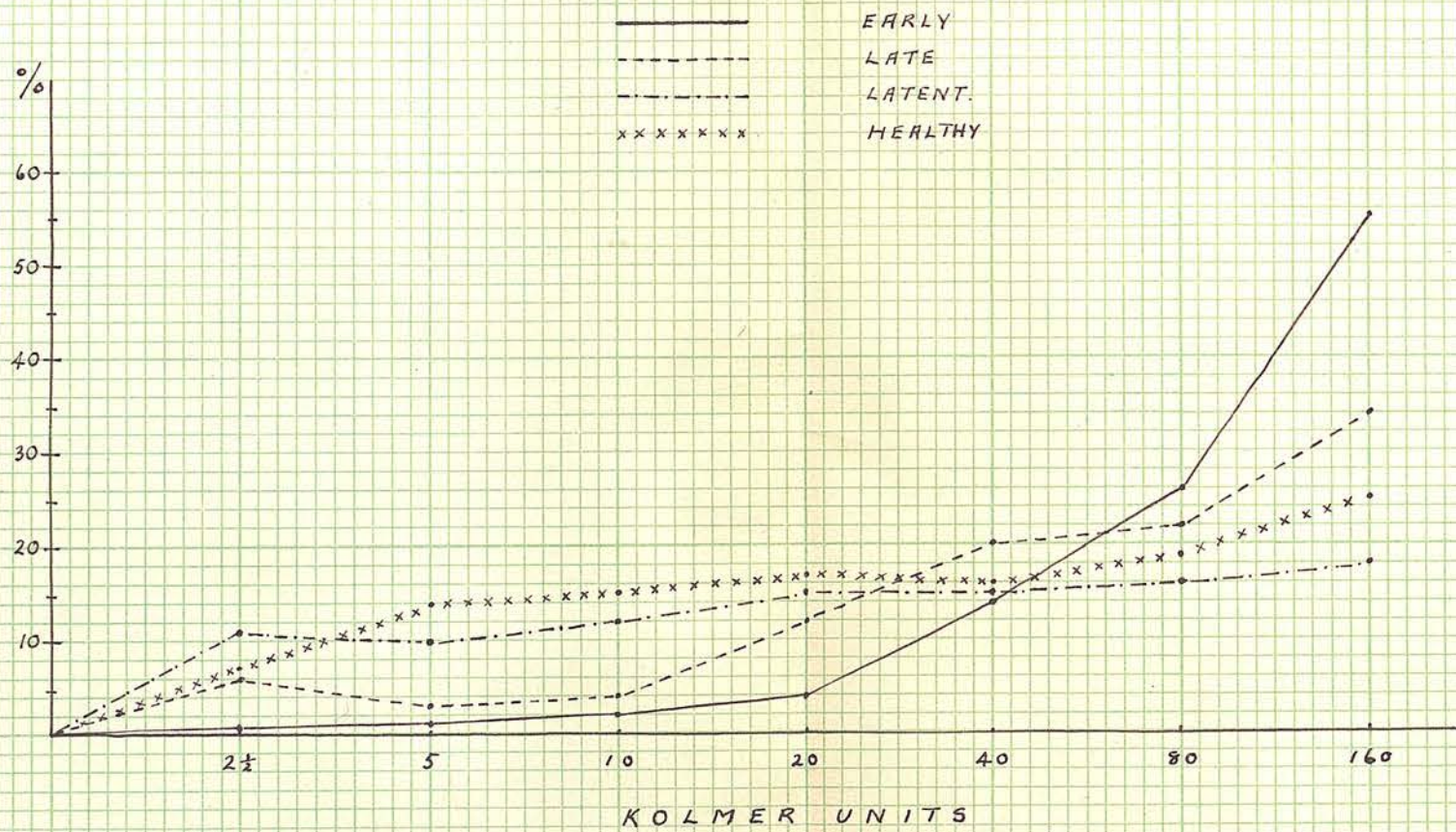


AGE GROUPS IN 494 CASES OF  
EARLY AND LATE ENDEMIC SYPHILIS IN

THE BAKWENA RESERVE.

Figure 3.

FIG 4

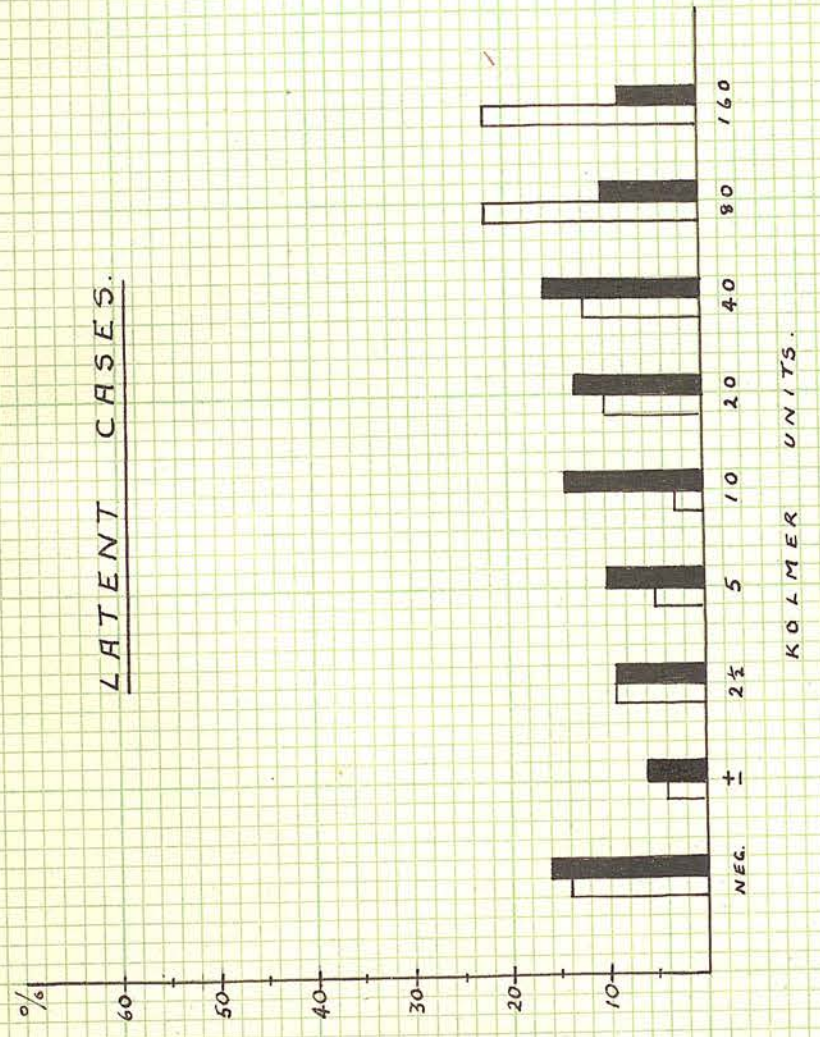
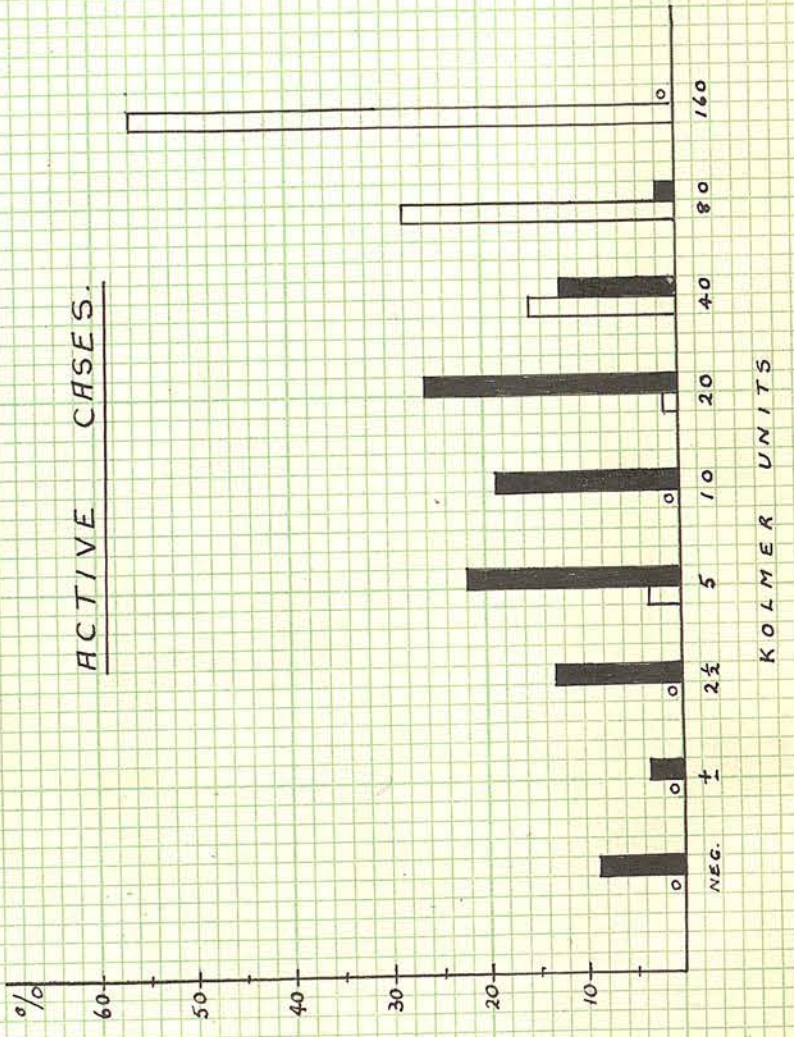


PERCENTAGE DISTRIBUTION KOLMER TITRES IN 895 CASES OF ENDEMIC SYPHILIS  
AND 284 APPARENTLY HEALTHY PERSONS IN THE BAKWENA RESERVE.

Figure 4.

FIG. 5

BEFORE TREATMENT  
AFTER TREATMENT



KOLMER TITRE IN 218 CASES  
BEFORE AND AFTER P.A.M. TREATMENT.

Figure 5.

**TABLE 1** Population examined compared with 1946 Census Figures in the Bakwena Reserve.

Village	Persons Examined	1946 Census Figures	Approximate Percentage Examined
1. Molepolole	14311	14805	95
2. Ga-Thamaga	3775	5663	67
3. Gabane	3237	3335	97
4. Mankgodi	2075	2047	100
5. Ntsweletau	1101	1020	100
6. Kopong	1026	1064	97
7. Khumakwane	668	905	72
8. Mogoditshani	795	851	92
9. Boatlaname	288	1373*	
10. Lephephe	230	also includes vil-	
11. Mahetlwe	192	lages 22 and 23	
12. Mophane	117		
13. Letlakeng	1949		
14. Khudumalaype	999		
15. Sesung	621	3938*	100
16. Metsebotlhoko	394		
17. Mmone	338		
18. Kgesakwe	281	558	100
19. Kgari	329		
20. Moshawe	153		
21. Tsetseng	422	114	
22. Dutlwe	156		
23. Sojwe	468		
24. Botlhapatlou	416		
25. Ngwari	172	778	75
26. Suping	128		
27. Gantshonyane	171		
28. Dithejwane	198		
29. Dhunwane	33		

\* Census figures include more than one village.



TABLE 2. Percentage of active and latent cases of endemic syphilis observed in the Kalahari and non-Kalahari areas of the Bakwena Reserve.

	Active Cases	Latent Cases	Total population observed
Whole Bakwena Reserve	494 (1.4%)	9162 (26.0%)	35,043
Kalahari Villages	233 (3.2%)	3688 (31.0%)	27,815
Non-Kalahari Villages	259 (0.95%)	5474 (19.7%)	7,228

TABLE 3 Distribution of seropositivity in villages in the Bakwena Reserve.

Village	Clinical Cases	Latent Cases (Anamnesis)	Total Cases	Percentage of Cases in the Population Examined	Seropositivity		Percentage of Positive sera in those Examined	Total Population Examined
					Sero-Positivity	Total Serology		
<u>Non-Kalahari Area.</u>								
1. Molepolole	153	2758	2911	20.3	1622	6164	26.3	14311
2. Ga-Thamaga	11	491	502	13.2	333	1483	22.4	3775
3. Gabane	46	654	700	21.6	957	2346	40.7	3237
4. Mankgodi	11	483	494	23.8	240	594	40.4	2075
5. Ntsweletau	14	328	342	31.0	252	714	33.8	1101
6. Kopong	3	184	187	18.4	155	512	30.2	1026
7. Kumakwane	7	157	164	24.5	184	492	37.3	660
8. Mogoditshani	4	173	177	22.2	159	473	41.0	795
11. Mahetlwe	3	37	40	20.8	47	152	30.9	192
9. Boatlana								
10. Lephhepe	*	209	216	-	34	138	-	635
12. Mopane								
<u>Kalahari Desert Area.</u>								
13. Letlakeng	61	1095	1156	99.3	768	1301	59.0	1949
14. Khudumalaye	44	559	603	60.3	339	561	61.4	999
15. Sesung	27	378	405	65.2	234	362	64.6	621
16. Metsebotlhoko	18	276	294	74.6	209	290	72.0	394
17. Mmone	2	220	222	65.6	141	215	57.5	338
18. Kgesakwe	12	133	145	51.7	78	174	44.9	281
19. Kgari	10	135	145	44.0	130	236	55.0	329
20. Moshawe	1	31	32	20.9	48	124	38.7	153
21. Tsetseng	9	222	231	54.7	149	353	41.9	422
22. Dutlwe	7	81	88	56.4	60	124	64.5	156
23. Sofwe	9	239	248	52.9	122	168	57.7	468
24. Botlhaptlou	22	106	128	30.7	149	333	44.7	416
25. Ngwari	7	61	68	39.9	73	139	52.5	172
26. Suping								
27. Gantshonyane	*	152	158	-	9	29	-	530
28. Dithejwane								
29. Kumwane								
Total	494	9162	9696	27.6	6492	17537	37.0	35043

\* Percentages were not worked out for these villages as the proportion in whom serological investigations were carried out was very small.

TABLE 4. Distribution of Active and Latent Cases by Age Groups in the Bakwena Reserve.

Age Groups	Active	Latent	Percentage Active to Total Cases	Healthy	Total
0 - 5	108 (1.4%)	427 (5.5%)	20.2	7090 (93.1%)	7625
6 - 10	118 (2.1%)	1068 (18.6%)	9.9	4544 (79.3%)	5730
11 - 15	91 (1.7%)	1134 (20.7%)	7.4	4256 (77.6%)	5481
16 - 20	38 (1.4%)	566 (20.5%)	6.3	2159 (78.1%)	2763
21 - 30	54 (1.1%)	1776 (35.6%)	2.9	3157 (63.3%)	4987
31 - 40	47 (1.2%)	1927 (47.8%)	2.4	2060 (51.1%)	4034
41 - 60	32 (0.9%)	1977 (50.5%)	1.5	1903 (48.6%)	3912
60+	6 (1.2%)	287 (56.1%)	2.1	218 (42.7%)	511
Total	494 (1.4%)	9162 (26.1%)		25387 (72.5%)	35043

TABLE 5. Age Distribution of 494 Active Cases - Early and Late  
Dichuchwa.

Age Groups	Early	Late	Total
0 - 5	98 (90.7%)	10 ( 9.3%)	108
6 - 10	88 (74.6%)	30 (25.4%)	118
11 - 15	46 (50.5%)	45 (49.5%)	91
16 - 20	18 (47.4%)	20 (52.6%)	38
21 - 30	21 (38.9%)	33 (61.1%)	54
31 - 40	11 (23.4%)	36 (76.6%)	47
41 - 60	6 (18.7%)	26 (81.3%)	32
60+	1 (16.7%)	5 (83.3%)	6
Total	289 (58.5%)	205 (41.5%)	494

TABLE 6. Cerebrospinal Fluid Findings in 98 Cases in the Bakwena Reserve.

Clinical Status	Cerebro-Spinal Fluid Serology			
	Positive		Negative	
	Positive	Negative	Positive	Negative
	B l o o d S e r o l o g y			
	Positive	Negative	Positive	Negative
	Positive	Negative	Positive	Not Done
Early Active	-	-	7	1
Late Active	2	-	31	1
Latent	1	-	28*	-
Healthy	-	-	23	-
Total	3	-	89	1

\* The Treponema Immobilisation Test was carried out on the blood of 19 of this group and in all a positive result was obtained.

TABLE 7. Sex distribution of 494 active cases of dichuchwa in the Bakwena Reserve.

	Male	Female	Total
Primary sore	-	2	2
Early mucosal and condylomatous lesions	129	158	287
Nasopharyngeal Ulceration	18	19	37
Skin Ulceration	21	48	69
Bone Lesions	50	49	99
Total Population	14519	20524	35043
Cases per 1000 population	15.0	13.5	14.0

TABLE 8. Stillbirths and Miscarriages in Seropositive and Seronegative Women at the Scottish Livingstone Hospital in the Echuamanaland Protectorate.

	Seropositive	Seronegative
Number of parous women	184 (29.0%)	451
Total births	593	1461
Live births	396 (66.7%)	1065 (72.9%)
Miscarriages and Stillbirths	55 ( 9.3%)	112 ( 7.6%)
Neo-natal and infant deaths	142 (23.9%)	284 (19.6%)
Number of women with miscarriages	38 (20.6%)	90 (19.9%)
Number of pregnancies per patient	3.2	3.2

TABLE 9. Serology of Cord Bloods in 137 Infants Born to Seropositive and Seronegative Mothers.

	Cord Blood Positive	Cord Blood Negative
Mothers with + serology ( 36)	15 (41.6%)	21 ( 58.4%)
Mothers with - serology (101)	0 0	101 (100.0%)
Total (137)	15 (10.9%)	122 ( 89.0%)



Table 10.

TABLE 10. VDRL and Kolmer Cardiophilin Wassermann results in 22809 cases in the Bakwena Reserve.

	V D R L		
	+	-	ND
PH	51143	5	-
EH			
WM	1047	2347	-
LO			
K	ND	297 + 8698	5272

TABLE 11. Serological results according to age and sex in 17,537 cases in the Bakwena Reserve.

Age Groups	K A L A H A R I						N O N - K A L A H A R I					
	Male		Female		Total		Male		Female		Total	
	Positive	Total	Positive	Total	Positive	Total	Positive	Total	Positive	Total	Positive	Total
0 - 5	35 (25.9%)	135	48 (29.0%)	165	83 (27.6%)	300	59 (14.0%)	420	78 (17.2%)	453	137 (15.7%)	873
6 - 10	193 (50.7%)	380	220 (53.5%)	411	413 (52.1%)	791	182 (19.2%)	945	279 (23.4%)	1188	461 (21.6%)	2133
11 - 15	291 (69.6%)	418	316 (73.3%)	431	607 (71.5%)	849	244 (22.7%)	1071	392 (22.7%)	1726	636 (22.3%)	2797
16 - 20	78 (58.2%)	134	171 (68.9%)	248	249 (65.1%)	382	116 (26.5%)	437	218 (26.4%)	825	334 (26.4%)	1262
21 - 30	85 (51.7%)	164	448 (63.4%)	706	533 (61.2%)	870	189 (42.1%)	448	677 (36.8%)	1834	866 (37.9%)	2282
31 - 40	138 (54.7%)	252	241 (55.6%)	433	379 (55.3%)	685	306 (46.3%)	660	551 (44.9%)	1227	857 (45.4%)	1887
41 - 60	100 (38.6%)	259	138 (48.5%)	285	238 (43.7%)	544	323 (41.6%)	776	313 (38.3%)	816	636 (39.9%)	1593
61+	9 (28.1%)	32	10 (50.0%)	20	19 (36.3%)	52	42 (30.4%)	138	24 (24.0%)	100	66 (27.7%)	238
Total	929 (52.3%)	1774	1592 (58.9%)	2699	2521 (56.3%)	4473	1461 (29.8%)	4895	2532 (32.2%)	8169	3993 (30.5%)	13064

TABLE 12. Serological findings in 22,809 cases in the Bakwena Reserve.

VDRL and/or KOLMER	K A L A H A R I   A R E A					N O N - K A L A H A R I   A R E A					Total Cases in Both Areas
	Positive	Negative	Total Sera Examined	Not Done	Total Cases	Positive	Negative	Total Sera Examined	Not Done	Total Cases	
Active Cases	159 (94.0%)	10 ( 6.0%)	169	17 ( 9.0%)	186	132 (79.5%)	34 (20.4%)	166	33 (16.5%)	199	385
Latent Cases	1850 (68.1%)	866 (31.8%)	2716	282 ( 9.4%)	2998	2010 (57.2%)	1498 (42.7%)	3508	342 ( 9.6%)	3850	6848
Healthy	500 (32.0%)	1054 (67.8%)	1554	852 (35.4%)	2406	1841 (19.5%)	7583 (80.3%)	9424	3746 (28.4%)	13170	15576
Total	2509 (66.5%)	1930 (43.4%)	4439	1151 (20.5%)	5590	3983 (30.4%)	9115 (69.5%)	13098	4121 (23.9%)	17219	22809

TABLE 13. Results of Treponema Immobilisation test in forty random sera positive to S.T.S.

Past history but no clinical evidence of dichuchwa	No history or signs of dichuchwa
VDRL and Kolmer Positive T.P.I. Positive T.P.I. Negative	VDRL and Kolmer Negative T.P.I. Positive T.P.I. Negative
20	19
20	1

TABLE 14. Summary of the similarities and differences between Yaws, Bejel, Dichuchwa and Venereal Syphilis

Feature	Yaws	Bejel	Dichuchwa	Venereal Syphilis
Organism	<u>T. pertenue</u>	Morphologically indistinguishable from <u>T. pallidum</u>	Morphologically indistinguishable from <u>T. pallidum</u>	<u>T. pallidum</u>
Mode of Spread	non-venereal	usually non-venereal	usually non-venereal	venereal
Primary	yes (extra-genital)	not usual	seldom found	yes (genital)
Mucous Patches	Uncommon	profuse	profuse	present
Rambrosiform lesions	profuse	rarely	rarely	no
Nasopharyngeal ulceration	severe	tend to be less severe	tend to be less severe	not marked
Visceral Gummata	no	no	no	yes
Positivity C.S.F.	no	yes, but not common	yes, but not common	yes
Involvement C.V.S.	no	rare	rare	yes
Patchy depigmentation	no	yes	yes	no
Neuropathic joints	no	no	no	yes
Juxta-articular nodes	yes	occasional	no	no
Congenital spread	no	no	not proven	yes
Childhood disease	yes	yes	yes	no
Family disease	yes	yes	yes	no

Table 14.

TABLE 15. Table of disages of PAM used in the campaign in the Bakwena Reserve (dose in mega units).

	Early Stage	Symptomatic Late Stage	Latent Stage	Asymptomatic Contacts
Infants	0.3	0.6	0.3	0.15
Children	0.6	0.9	0.6	0.3
Adults	1.2	1.8	1.2	0.6

TABLE 16. PAM used 16,820 cases in the Bakwena Reserve Campaign  
1953/54.

	D o s e   i n   M e g a   U n i t s						
	0.15	0.3	0.6	0.9	1.2	1.8	2.4
Early dichuchwa	4	38	195	4	28	18	2
Late dichuchwa	1	3	74	4	75	36	12
Latent dichuchwa	0	194	3159	58	5729	21	1
Contacts	292	1132	202	1	3	-	-
Other Reasons	651	445	667	18	82	1	-
Total	948	5482	4297	85	5917	76	15
							16820

TABLE 17. Kolmer Titres in 1179 patients according to the phase of endemic syphilis in which they were observed.

Titre	Total	Early	Late	Latent	Healthy
1	4	-	-	1	3
2 $\frac{1}{2}$	94	1	7	65	21
5	111	1	4	68	38
10	122	2	4	77	39
20	159	6	12	95	46
40	170	26	22	82	40
80	212	50	25	92	45
160	307	107	39	109	52
Total	1179	193	113	589	284



TABLE 18. Kolmer titres in 218 cases before and after treatment.

Titre in Kolmer Units	A c t i v e   C a s e s		L a t e n t   C a s e s	
	1st examination Number of Cases	2nd examination Number of cases	1st examination Number of Cases	2nd examination Number of Cases
Negative	0	8	15	17
Doubtful	0	2	4	6
2 $\frac{1}{2}$	0	13	10	10
5	2	21	6	12
10	0	18	4	15
20	1	25	10	13
40	14	11	12	17
80	27	1	24	10
160	55	0	24	9
Total	99	99	109	109

TABLE 19. Clinical Resurveys of villages

Village	Males Seen	Females Seen	Total Seen	Active Cases	Percentage Active
1. <u>Mimone</u>					
1st Visit	145	193	338	2	0.6
2nd Visit	81	122	203	1	0.5
2. <u>Kgesakwe</u>					
1st visit	124	157	281	8	2.8
2nd visit	33	54	87	-	0.0
3. <u>Sesung</u>					
1st visit	270	351	621	27	4.3
2nd visit	106	204	313	-	0.0
4. <u>Khudumalaptswa</u>					
1st visit	432	567	999	46	4.6
2nd visit	48	142	190	-	0.0
5. <u>Kopong</u>					
1st visit	454	572	1026	3	2.9
2nd visit	96	149	245	-	0.0
6. <u>Khumakwane</u>					
1st visit	305	363	668	7	1.04
2nd visit	89	112	201	-	0.0
7. <u>Lephephe</u>					
1st visit	105	125	230	3	1.3
2nd visit	39	74	113	-	0.0
8. <u>Bojwe</u>					
1st visit	188	280	468	9	1.9
2nd visit	73	159	232	-	0.0
9. <u>Boatlaname</u>					
1st visit	131	157	288	3	0.5
2nd visit	59	105	164	1	0.6
10. <u>Ntsweletau</u>					
1st visit	489	612	1101	14	1.2
2nd visit	105	254	359	-	0.0
<u>Totals</u>					
1st visit	2643	3377	6020	123	2.0
2nd visit	729	1378	2107	2	0.1



Plate 1.

People of a Kalahari village lining up in family groups to register for "DICHUCHWA" examination. The small settlement of a few roughly built huts and the flat bushland in the background are typical of the Kalahari area.



Plate 2.

The African Clerk prepares punch cards for a group of women and children. The women are dressed in animal skins, whilst the children are almost naked.

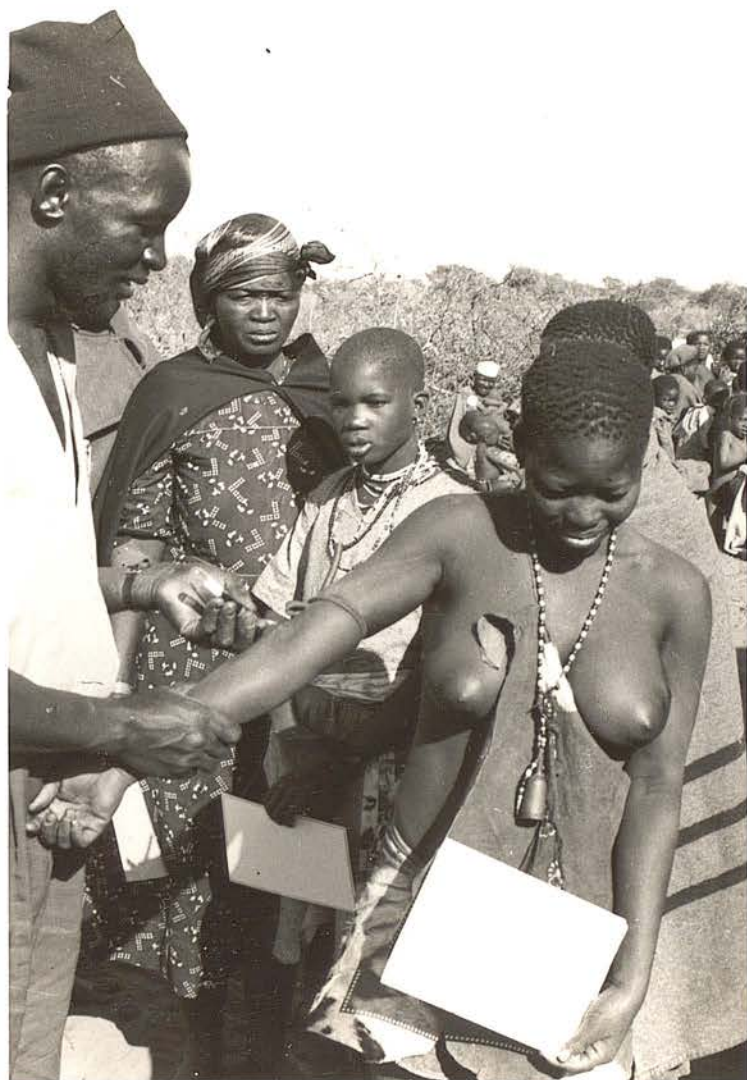


Plate 3.

The Medical Orderly takes a blood specimen from a Mokgalagadi girl. The girl is dressed in a skirt of goat skin and round her neck is her snuff box. She holds her punch card in her hand.



Plate 4.

A typical village scene in Bechuanaland. These huts are of the poorer Kalahari type, and similar small settlements are scattered over a vast area of flat, sandy bushland.

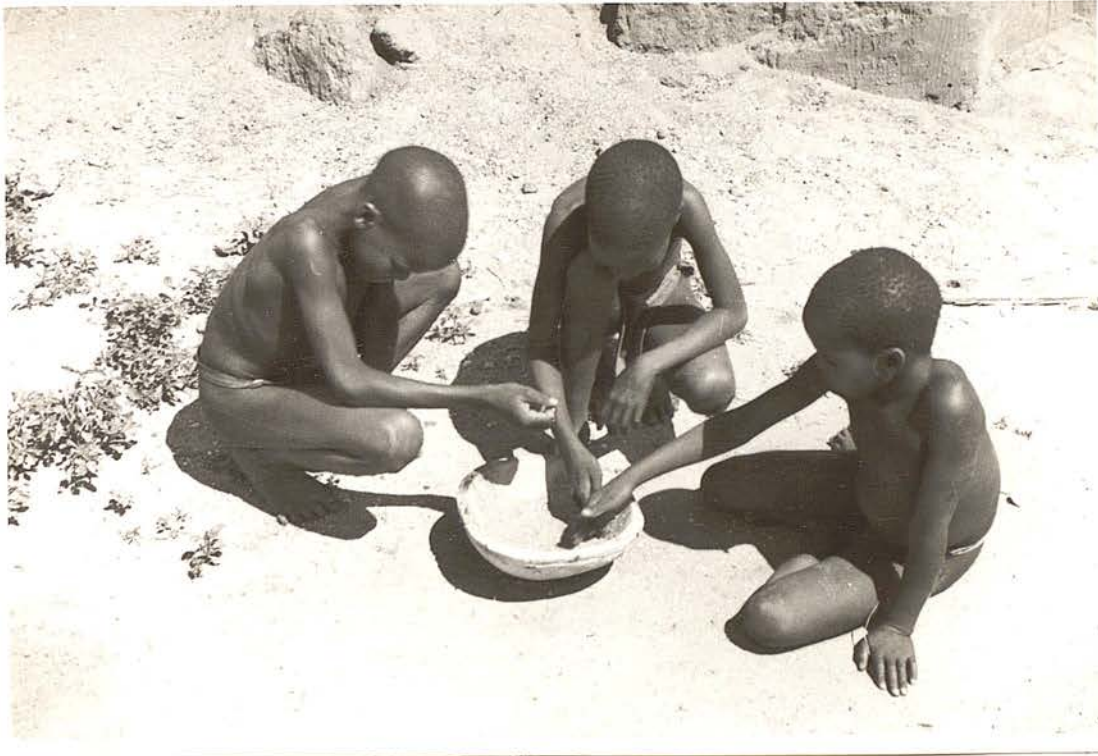


Plate 5.

These little boys enjoy a meal of thick porridge. Note that they eat with the fingers from a communal home-made wooden bowl. One can imagine how easily spirochaets could pass from one child with infectious lesions to the others during the meal.



Plate 6.

A group of children are sharing a mug of milk, passing the mug round until the contents are finished. DICHUCHWA may be spread from child to child in this way.





Plate 7.

Flies alight on the sores of DICHUCHWA on the vulva of a small girl. DICHUCHWA always attracts many flies and it is possible that the disease can be spread by means of flies.



Plate 8.

Small children are often carried on the backs of other children, in the way illustrated here. In this way, large areas of skin surfaces come into close and prolonged contact. If one child has infectious lesions of DICHUCHWA spread may readily occur.



Plate 9.

Primary sore of DICHUCHWA. This woman developed a primary sore on the left nipple after suckling her child which had infectious oral DICHUCHWA.

See case No. 1.



Plate 10.

Primary sore of DICHUCHWA. This woman developed sores on both nipples after suckling a child with oral lesions. See case No. 2.



Plate 11.

Papular type of rash. In young children a "Chicken pox" type of rash commonly occurs associated with other lesions of DICHUCHWA. See case No. 2.



Plate 12.

Papular type of rash. See case No. 3.



Plate 13.

Papular type of rash associated with  
scrotal condylomata. See case No. 3.



Plate 14.

Papular type of rash associated with oral  
DICHUCHWA in a young child. See case No. 4.



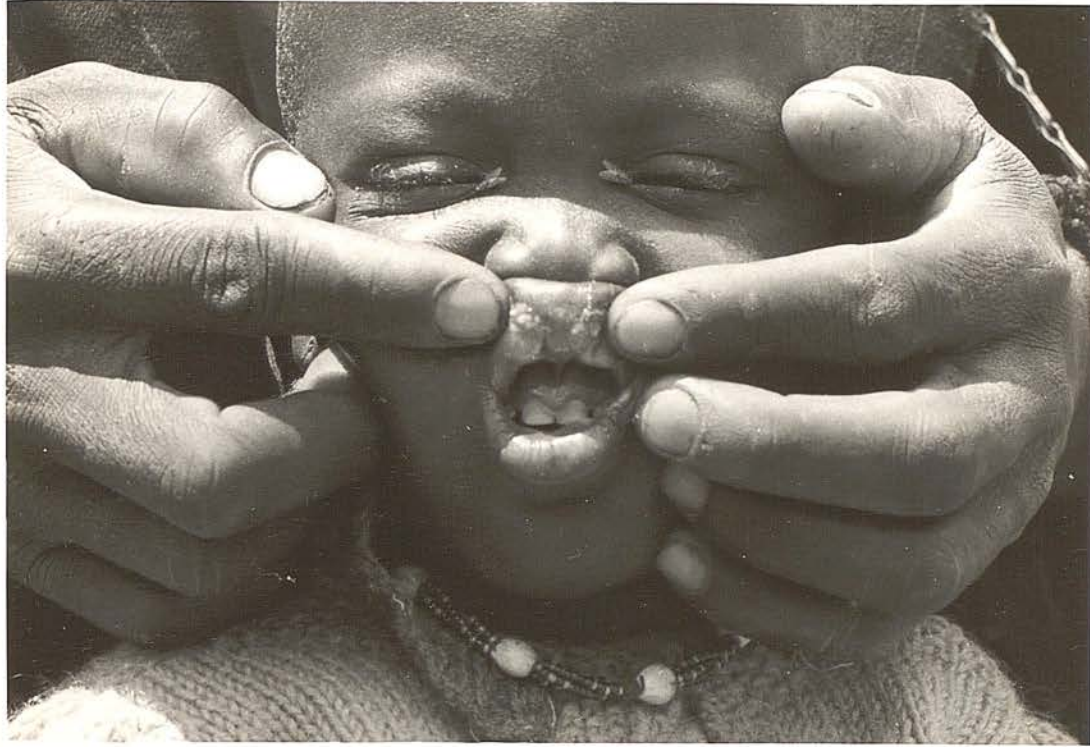


Plate 15.

Mucous patches. Typical mucous patches on the inner surface of the upper lip in a young girl. See case No. 5.



Plate 16.

Angular Stomatitis. Moist papules at the corner of the mouth in a young boy. See case No. 6.



Plate 17.

Condylomata lata. Typical ano-genital  
condylomata in a girl with DICHUCHWA. See case No. 7.



Plate 18.

Condylomata lata. The same case as in  
Plate No. 17.



Plate 19.

Ano-genital condylomata in a young child  
of eighteen months. See case No. 8.



Plate 20.

Ano-genital condylomata in a girl with extension on to the adjacent thighs. This girl stated that this was her second attack of DICHUCHWA. See case No. 19.

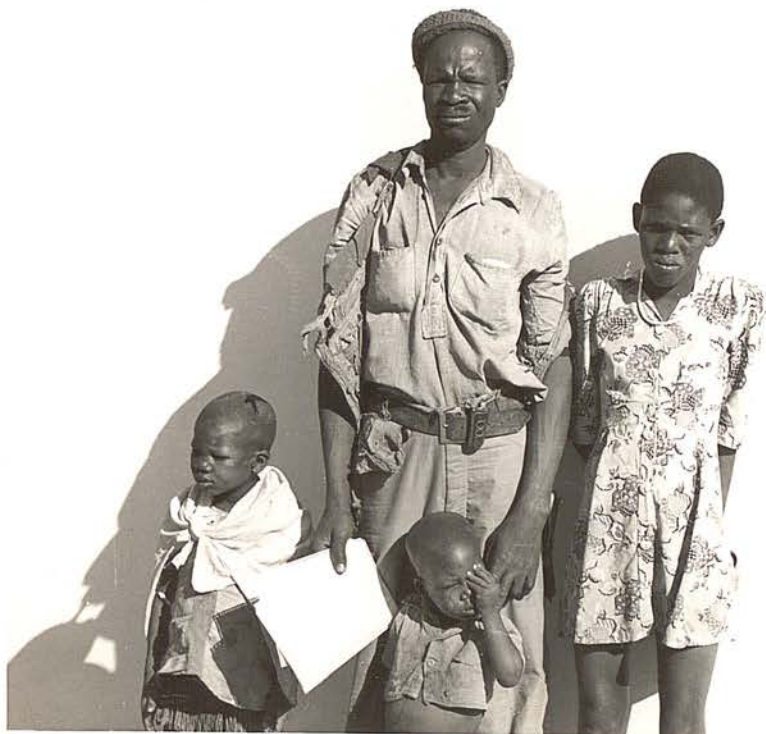


Plate 21.

A Family Disease. A Mokwena man with his three children all suffering from DICHUCHWA.

See cases Nos. 23, 24 and 25.



Plate 22.

Genital Condylomata in a small girl of the family shown in Plate 21. See case No. 23.





Plate 23.

Mucous patches in the mouth of the same case as in Plate 22. See case No. 23.



Plate 24.

Anal condylomata in a small boy in the family group shown in Plate 21. See case No. 24.



Plate 25.

Extensive ano-genital condylomata in a girl aged 12 years in the family group shown in Plate 21.



Plate 26.

Extensive ano-genital condylomata in a man  
who probably acquired the disease from his wife.

See case No. 28.



Plate 27.

Extensive ano-genital condylomata. The same case as in Plate 26.

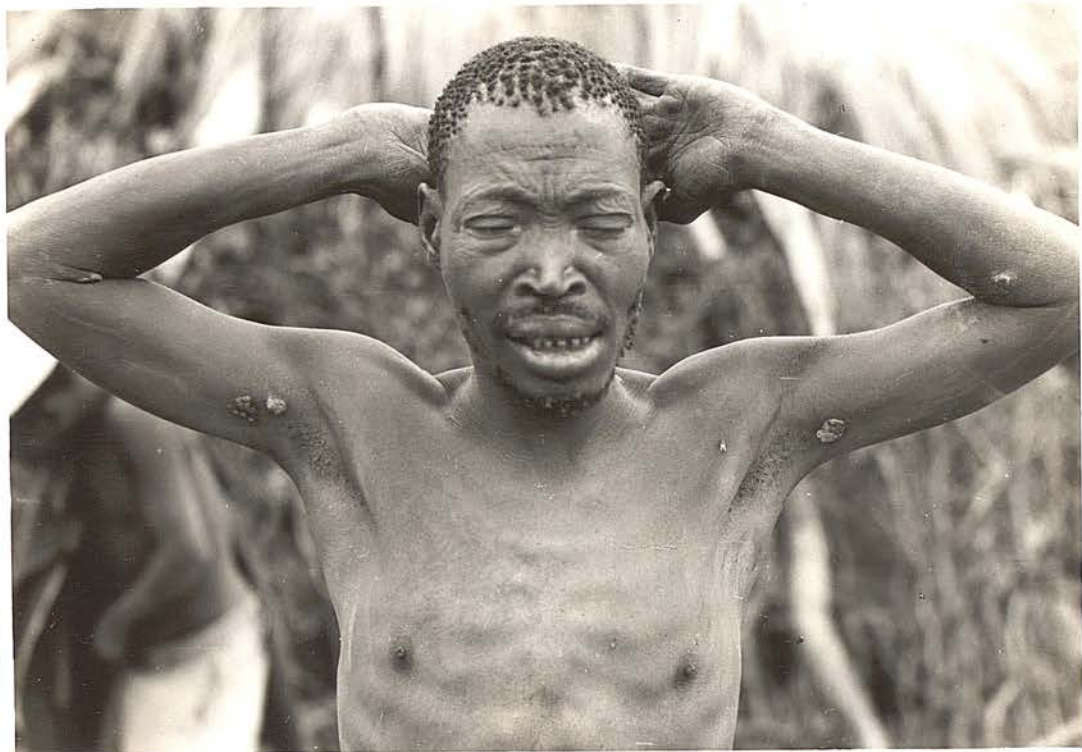


Plate 28.

Axillary condylomata in the same case as shown in Plates 26 and 27. Note the symmetrical pattern of the lesions and the ever-present flies.

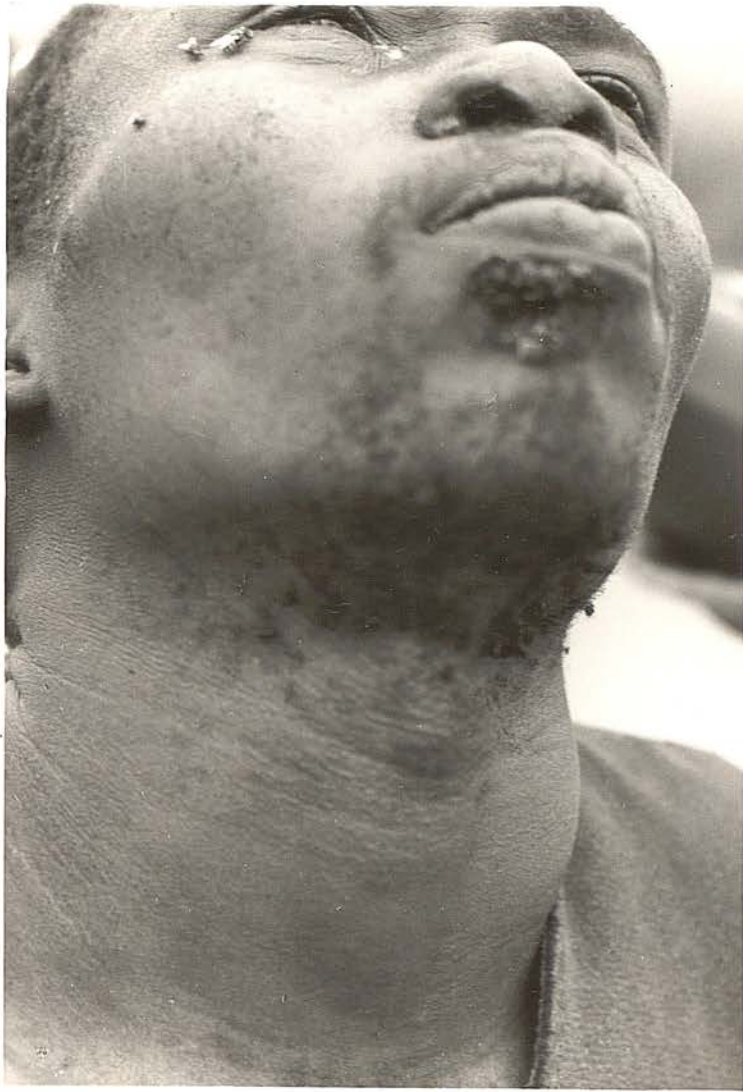


Plate 29.

Large flattened condylomata on the chin  
of a Mokgalagadi man. See case No. 29.



Plate 30.

Axillary and anal condylomata of many months' duration. These are in the same case as shown in Plate 29.





Plate 31.

Axillary and anal condylomata. The same case as in Plate 30.



Plate 32.

Ano-genital condylomata following sexual infection, identical in appearance with the lesions of non-venereal DICHUCHWA. See case No. 30.

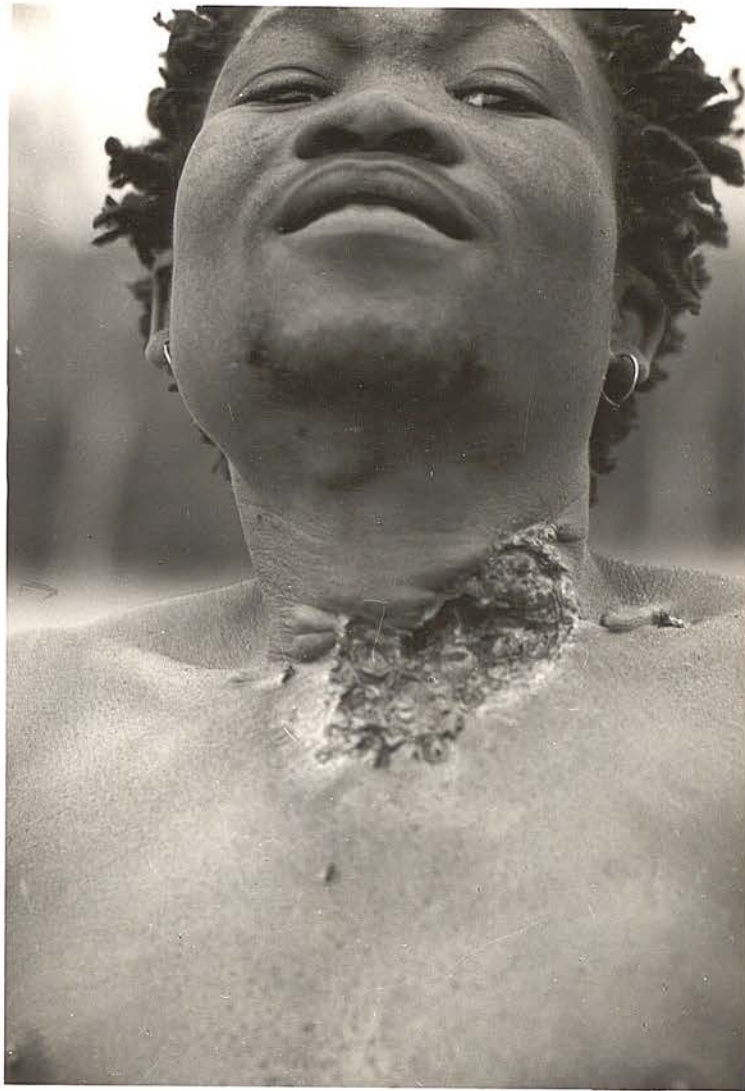


Plate 33.

Gummatous ulceration of the neck in a  
Mokgalagadi man following an attack of DICHUCHWA.  
See case No. 34.

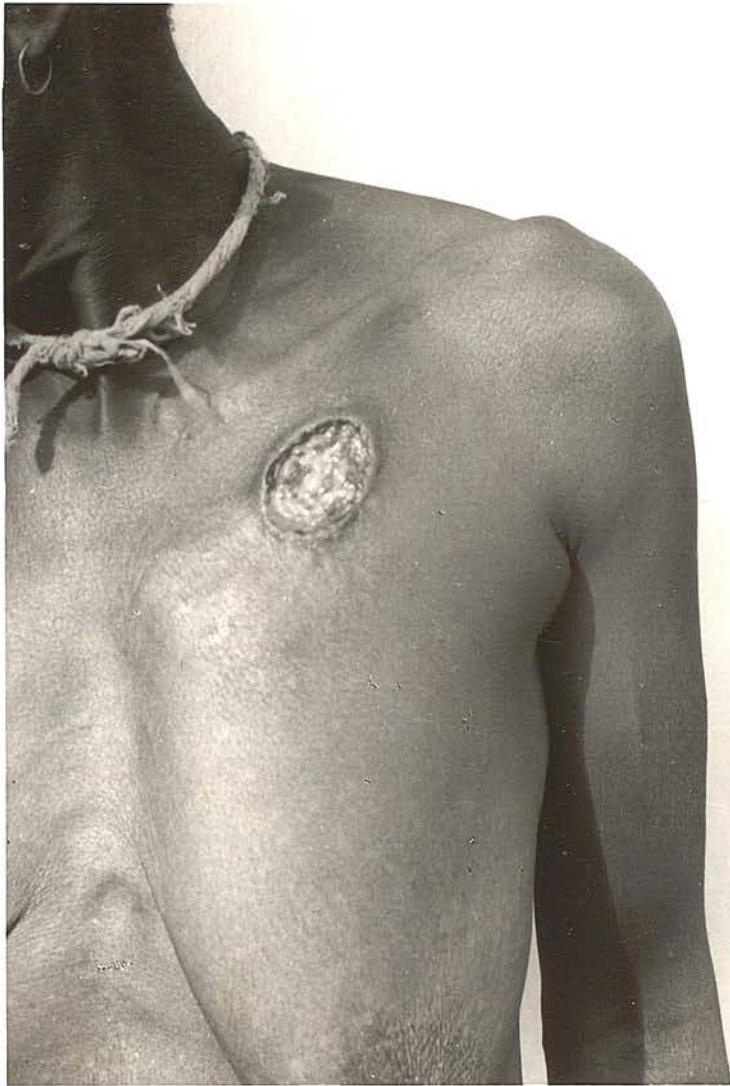


Plate 34.

Gummatous ulcer on the chest wall of a Mokgalagadi woman following an attack of DICHUCHWA. Note the circular appearance of the ulcer and the raised margins. See case No. 35.



Plate 35.

Large circular gummatous ulcer on the abdominal wall in a Mokgalagadi man, following an attack of DICHUCHWA. See case No. 36.



Plate 36.

Gummatous ulceration on the side of the head in a Mokgalagadi woman. See case No. 37.



Plate 37.

Extensive gummatous ulceration of the face in a Mokgalagadi woman. See case No. 38.

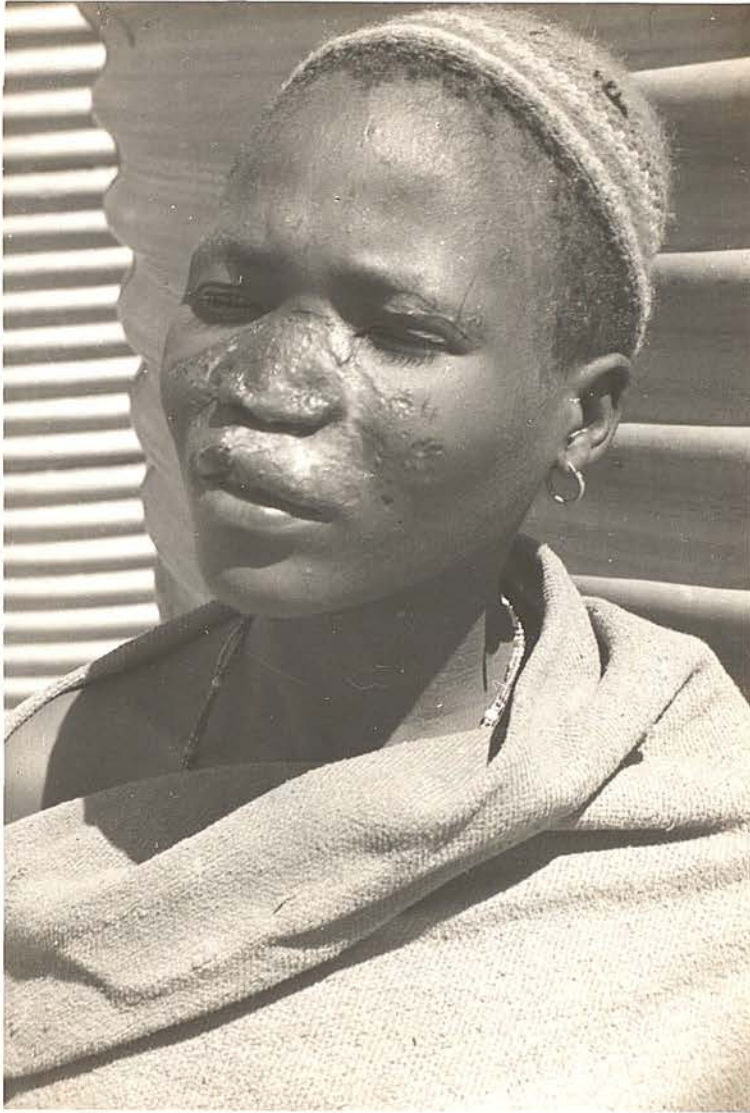


Plate 38.

The same case as shown in Plate 37 after  
treatment with P.A.M.





Plate 39.

Gummatous ulceration on the back of the elbow in a Mokgalagadi boy, following an attack of DICHUCHWA. See case No. 39.



Plate 40.

Gummatous ulceration over the right trochanteric region in a young Mokgalagadi woman who had had DICHUCHWA as a child. See case No. 40.

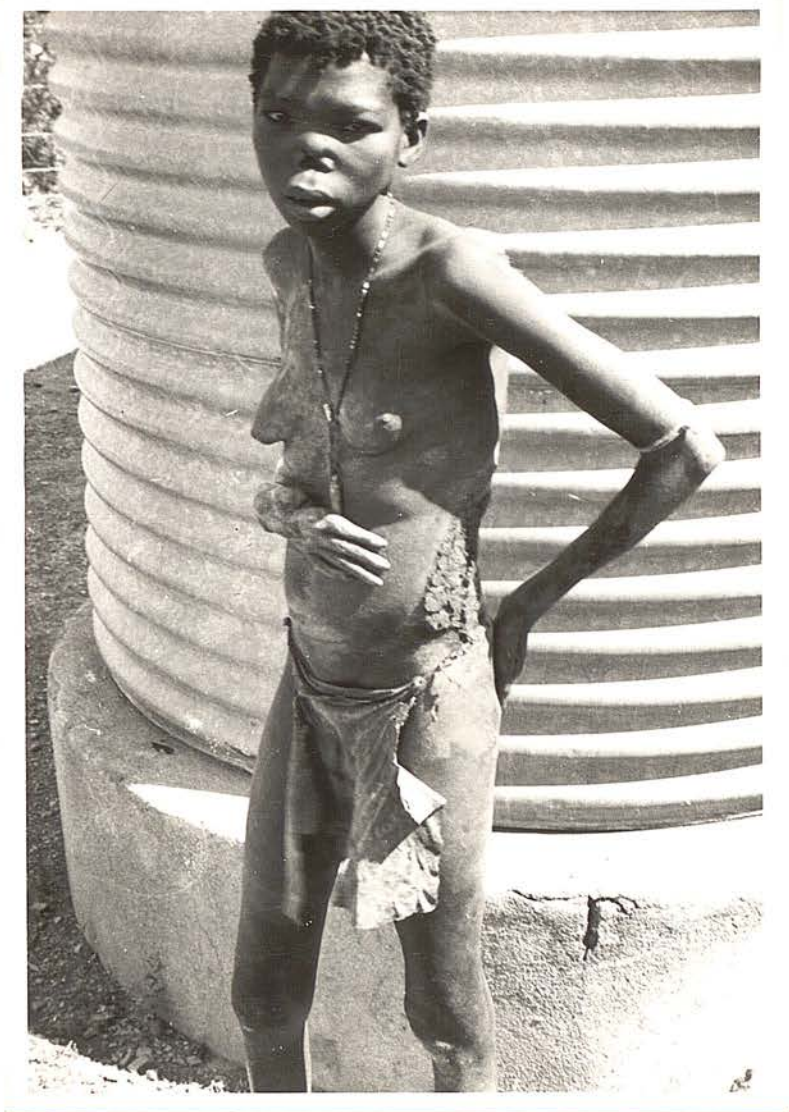


Plate 41.

Extensive gummatous ulceration of the skin  
in a Bush woman who had had DICHUCHWA long ago.  
Note also the Naso-pharyngeal ulceration.  
See case No. 41.



Plate 42.

The same case as shown in Plate 41.



Plate 43.

A deep gummatous ulcer in the popliteal fossa of a young male Mokgalagadi. See case No. 42.



Plate 44.

Extensive scarring of the skin on the inner side of the elbow following superficial gummatous ulceration. See case No. 43.



Plate 45.

Depigmentation occurring in the scar tissue  
from old gummatous ulceration following DICHUCHWA.

See case No. 44.

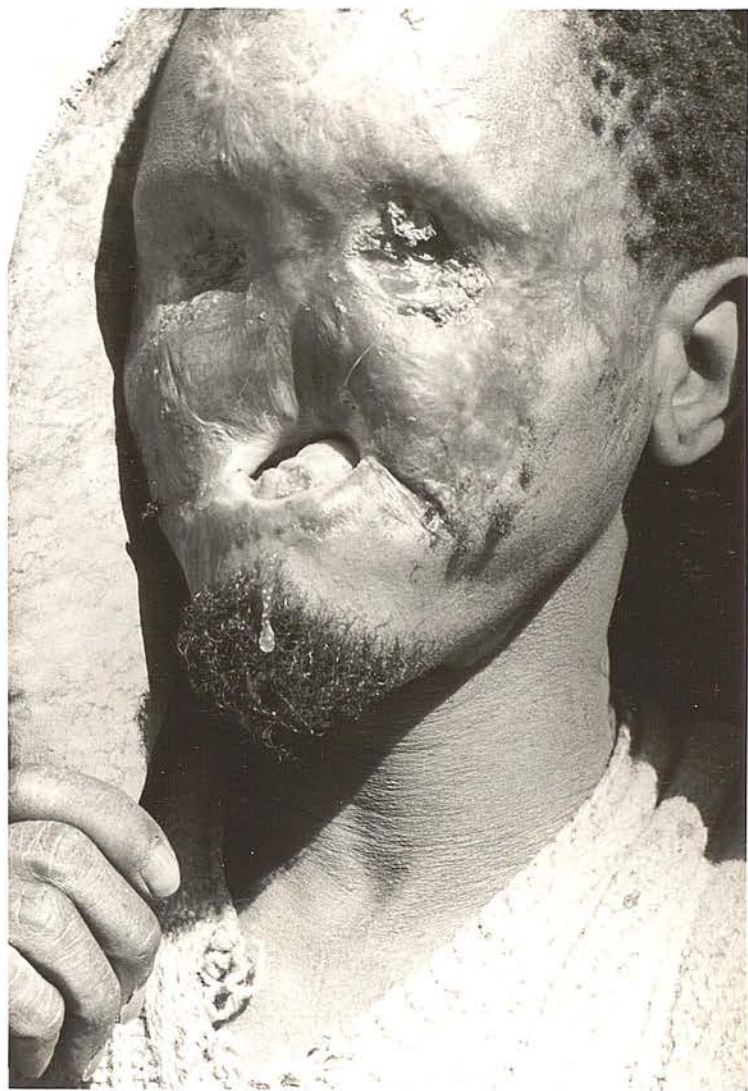


Plate 46.

Old extensive facial and naso-pharyngeal ulceration in a male Mokgalagadi who had DICHUCHWA many years ago. There is ulceration of the eyelids, and the mouth is fixed open by dense scar tissue. See case No. 46.



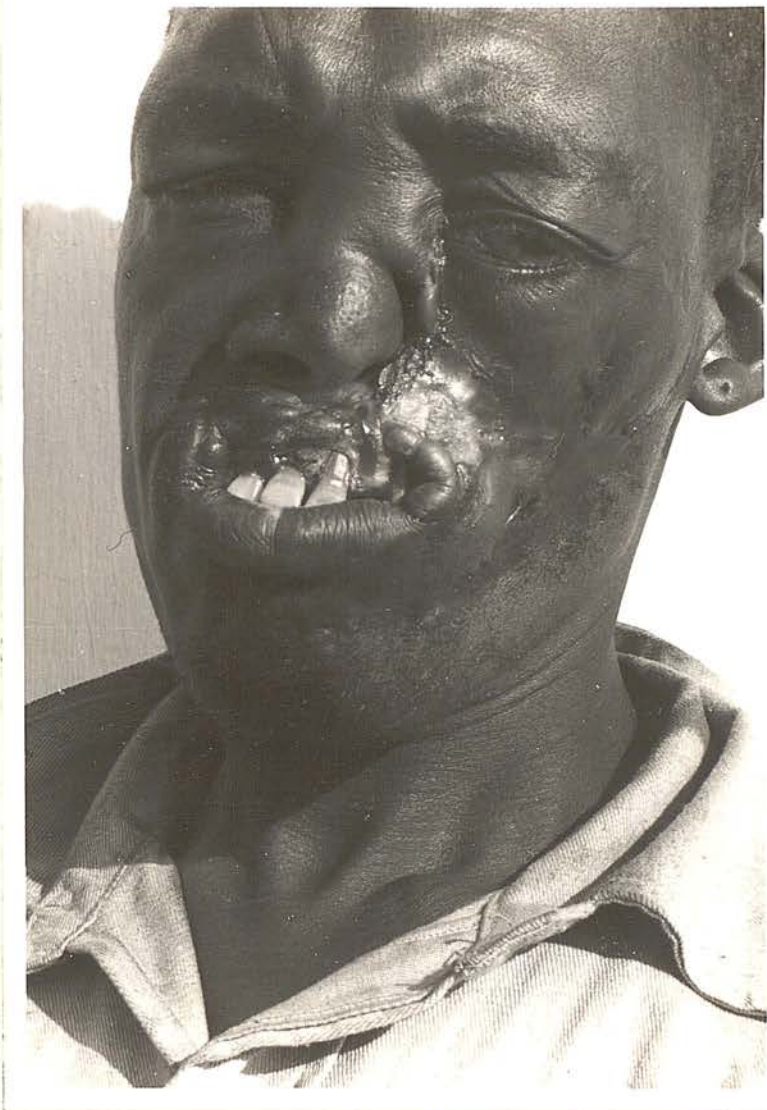


Plate 47.

Active naso-pharyngeal ulceration in a male Mokgalagadi. The upper lip is ulcerating away and being replaced by scar tissue. See case No. 47.

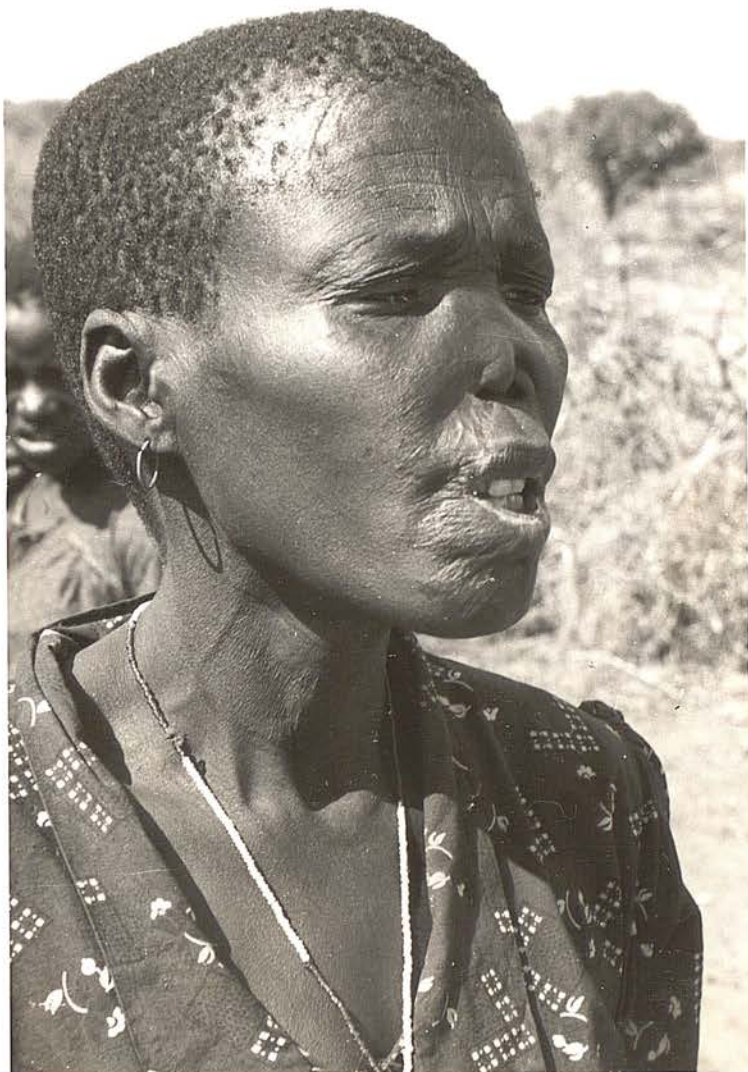


Plate 48.

A case illustrating the formation of scar tissue following gummatous ulceration round the mouth. There is also nasal deformity following naso-pharyngeal ulceration. See case No. 48.

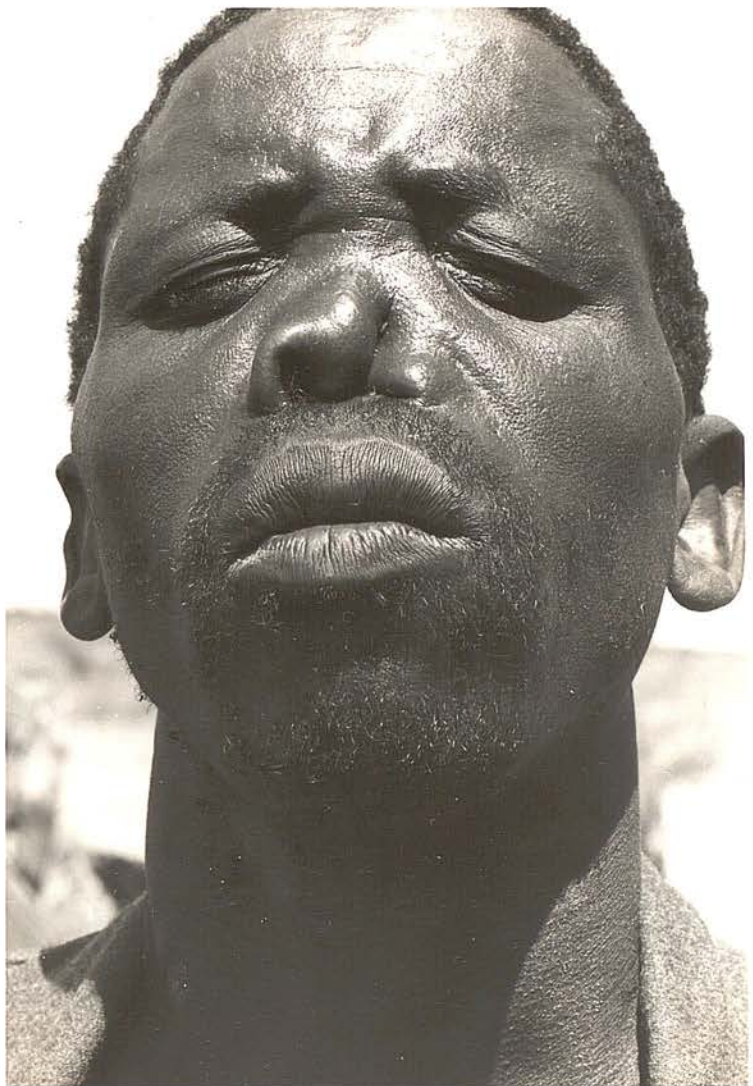


Plate 49.

Nasal deformity in a man following active  
gummatous ulceration some years previously.

See case No. 49.



Plate 50.

An old Mokgalagadi woman with severe nasal deformity following active naso-pharyngeal ulceration.



Plate 51.

Deformity of the tibiae in the same case  
as shown in Plate 50. See case No. 50.



Plate 52.

Gummatous ulceration of three years' duration on the breast of a woman who had DICHUCHWA as a child and had been feeding a child with active DICHUCHWA. See case No. 51.

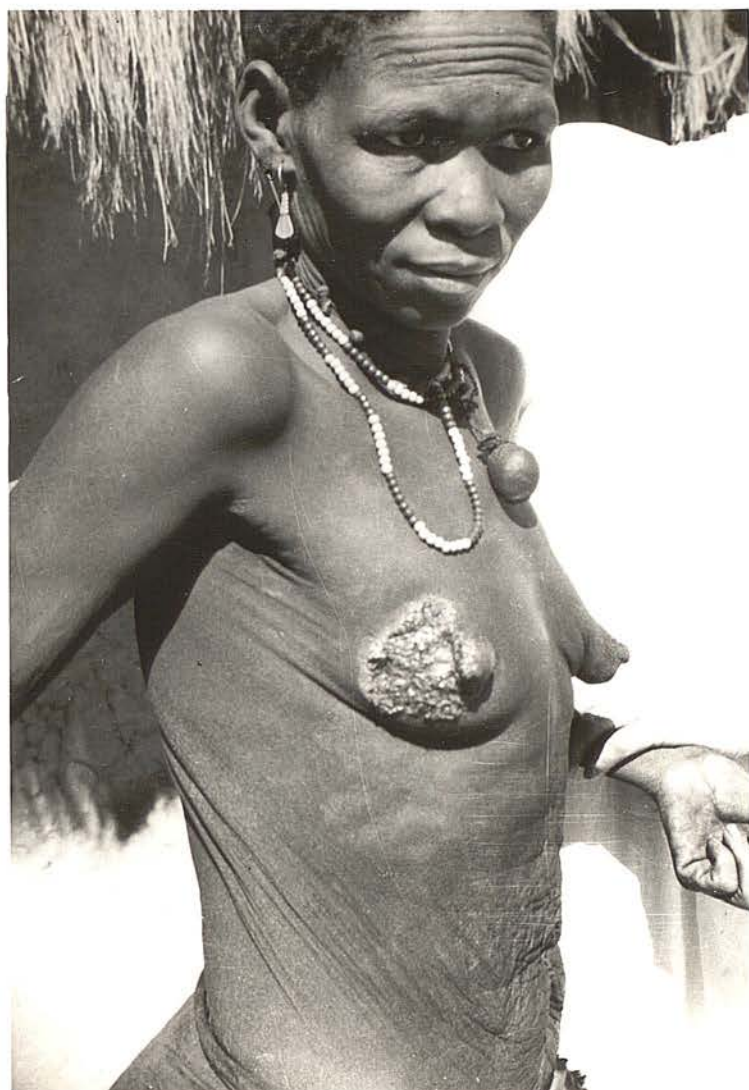


Plate 53.

A similar case to that shown in Plate 52.  
The breast ulceration commenced after the woman had  
been feeding a child with active DICHUCHWA.  
See case No. 52.



Plate 54.

Gummatous ulceration of vulva.

See case No. 53.





Plate 55.

Superficial roughening and ulceration on the palms of the hands in a young woman who had DICHUCHWA as a child. See case No. 58.

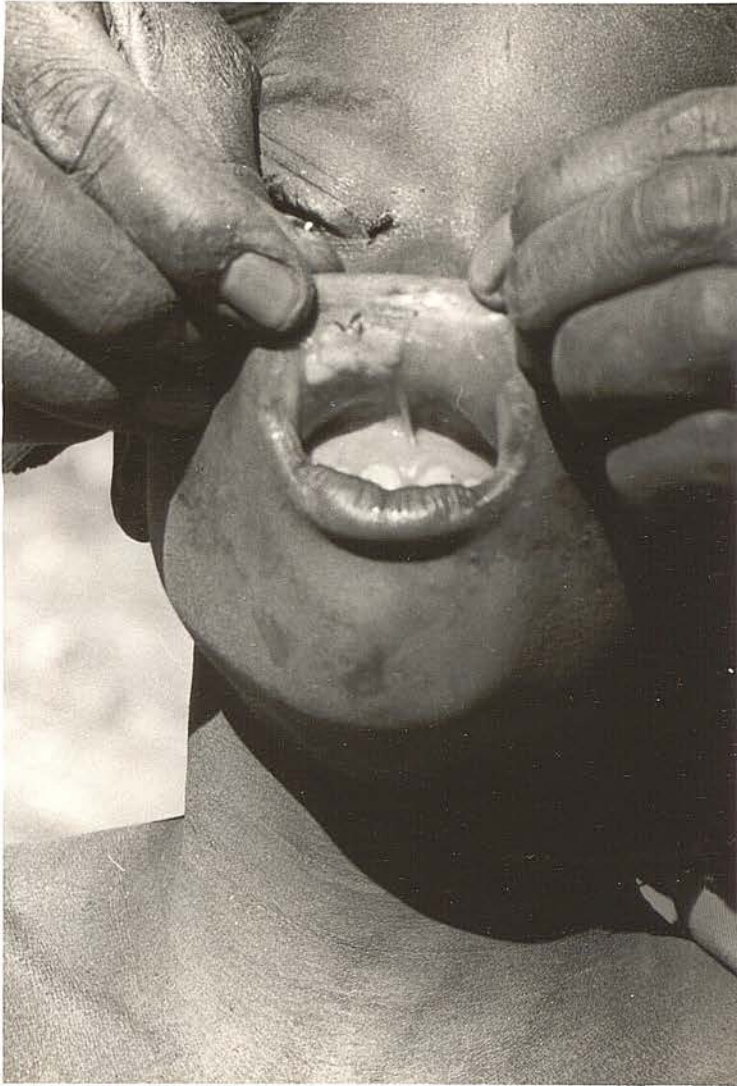


Plate 56.

Mucous patches in the mouth of a young boy,  
who at the same time had hyperkeratosis of the feet.



Plate 57.

Hyperkeratosis of the feet in a young boy  
with active DICHUCHWA. The same case as shown in  
Plate 56.

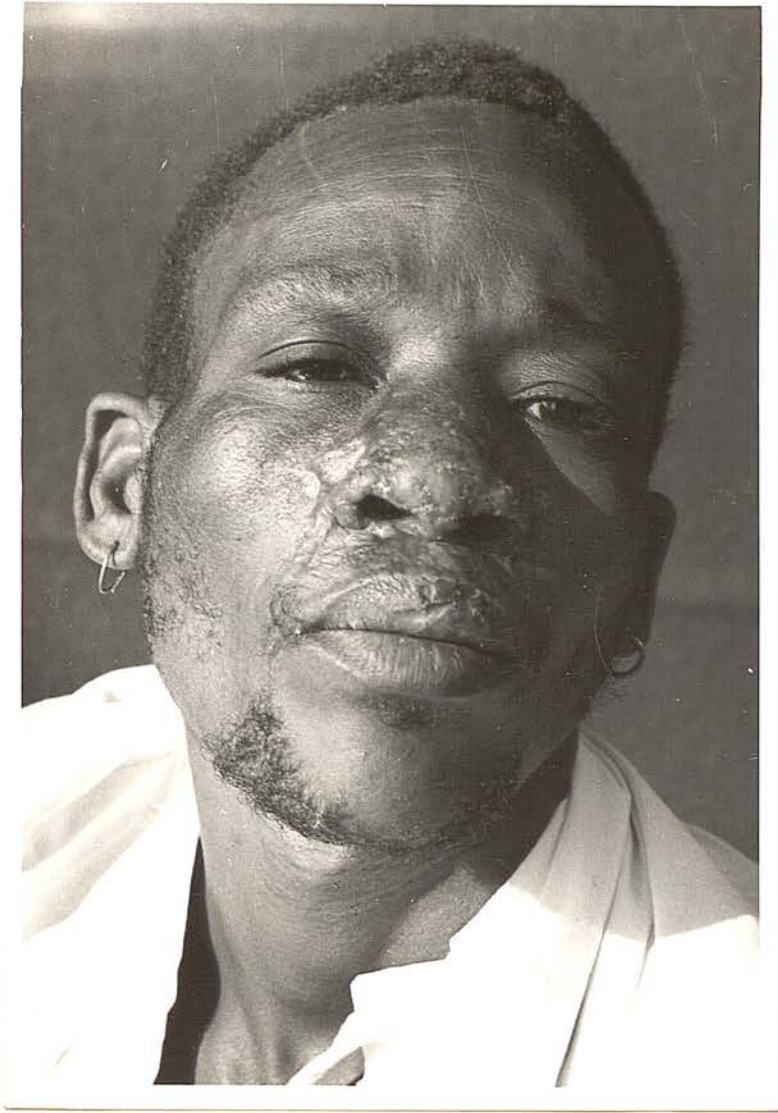


Plate 58.

This, and the following twelve plates are all of the same case. The pictures illustrate very extensive and widespread lesions in many parts of the body. This plate shows old scars of the face following superficial gummatous ulceration of the skin. See case No. 61.

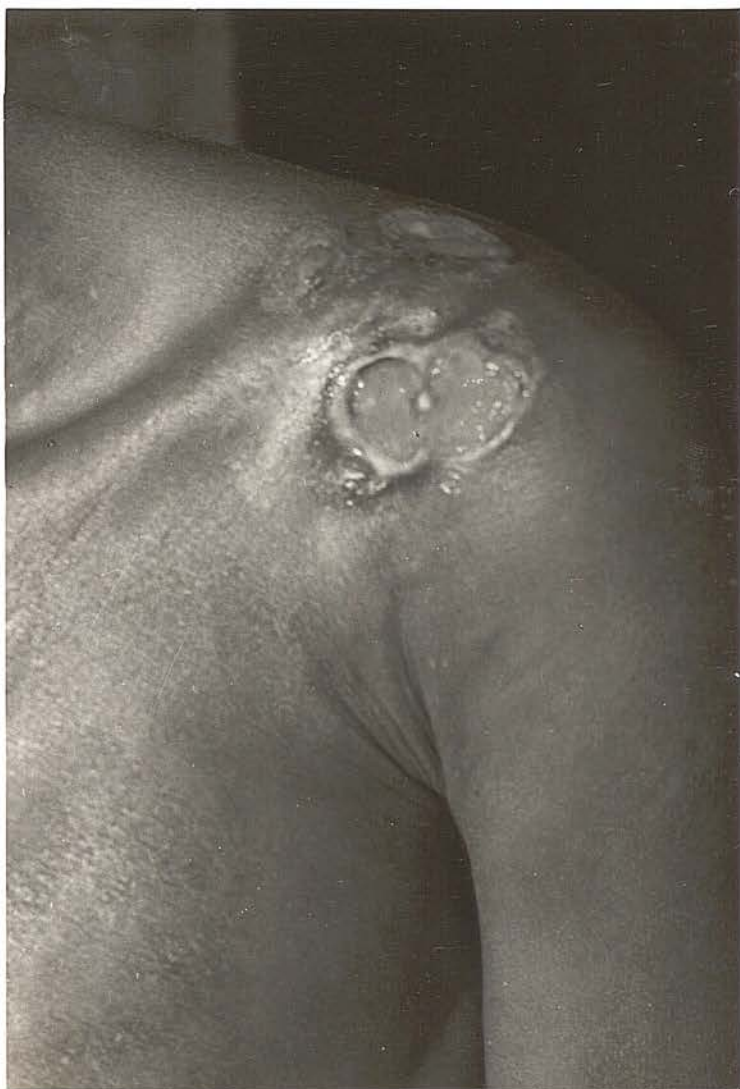


Plate 59.

Gummatous ulceration of the skin over the left shoulder region. This ulceration is very chronic and the underlying bone is affected.



Plate 60.

Gummatous ulceration of the skin on the outer side of the right ankle with affection of the underlying bone.



Plate 61.

Gummatous ulceration of the scrotum with  
destruction of the penis.



Plate 62.

A large deep gummatous ulcer on the back  
of the right thigh.





Plate 63.

Depigmentation in scar tissue following  
gummatous ulceration of the abdominal wall.



Plate 64.

Radiological appearance of leg bones in a case of extensive late lesions following DICHUCHWA. This picture shows well the periosteal new bone formation, the sclerosis of the cortical bone and the irregular areas of rarefaction all of which are typical of the lesions of late DICHUCHWA.



Plate 65.

Radiological appearance of the forearm bones in the same case as shown in the preceding plates. Note the cortical thickening and new bone formation.



Plate 66.

Radiological appearance of the left shoulder region. Note the erosion in the lateral end of the clavicle underlying the ulcer shown on Plate 59.



Plate 67.

Radiograph showing affection of the calcaneus underlying the ulceration illustrated on Plate 60. Note the irregular bone destruction together with new bone formation.



Plate 68.

The effect of P.A.M. therapy on the ulceration shown in Plate 59.



Plate 69.

The effect of P.A.M. therapy on the ulceration of the ankle shown in Plate 60.



Plate 70.

The effect of P.A.M. therapy on the ulceration of the scrotum and thigh shown in Plates 61 and 62.





Plate 71.

Slight superficial gummatous ulceration of the skin of the face in a young girl who had extensive bone and skin lesions elsewhere.

See case No. 62.



Plate 72.

Severe ulceration of the skin overlying the forearm bones which were affected with the late lesions of DICHUCHWA. See case No. 62.



Plate 73.

The effect of P.A.M. therapy on the ulceration shown in Plate 72. See case No. 62.

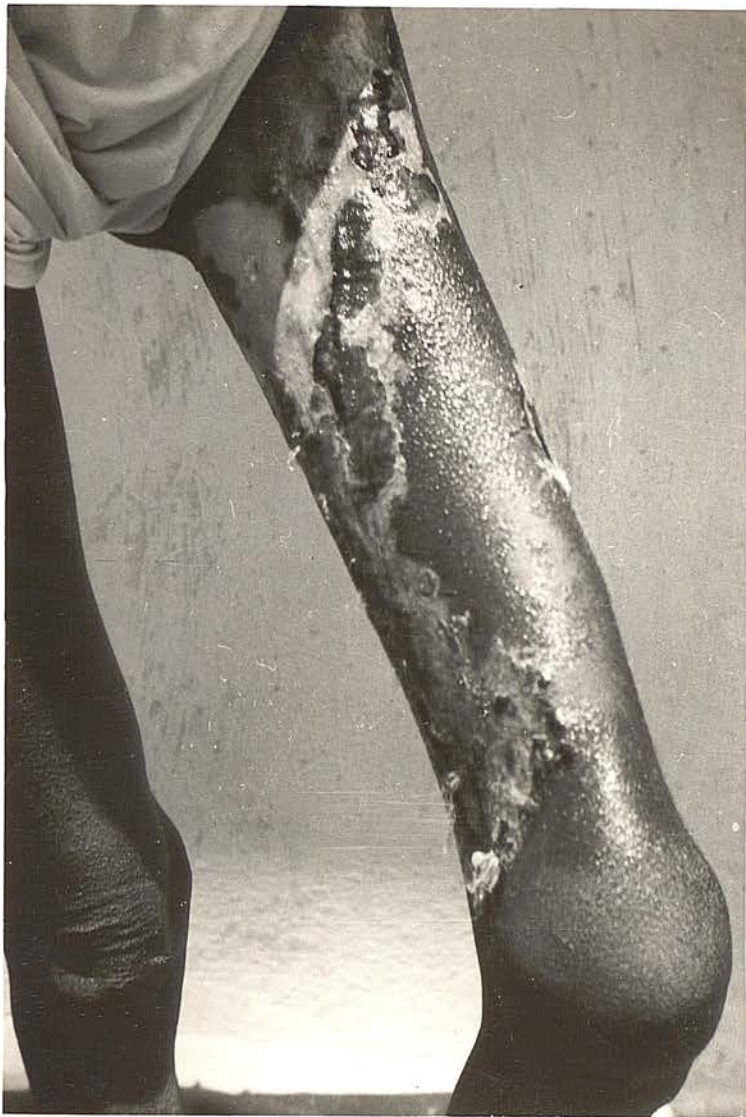


Plate 74.

Extensive superficial skin ulceration of the thigh in a young woman who had widespread skin involvement and also bone affection following an attack of DICHUCHWA some years before. See case No. 63.



Plate 75.

Radiological appearance of the leg bones in the case shown in Plate 74. Note the extensive shaft involvement with the 'moth-eaten' appearance. See case No. 63.



Plate 76.

Radiological appearance of the femora in the case shown in Plates 74 and 75. There is marked localised bone affection at the lower end of the right femur. See case 63.



Plate 77.

Radiological picture of the bones of the hand in the same case as illustrated in the previous Plates. Note particularly the rarefaction in the fourth proximal phalanx. See case No. 63.

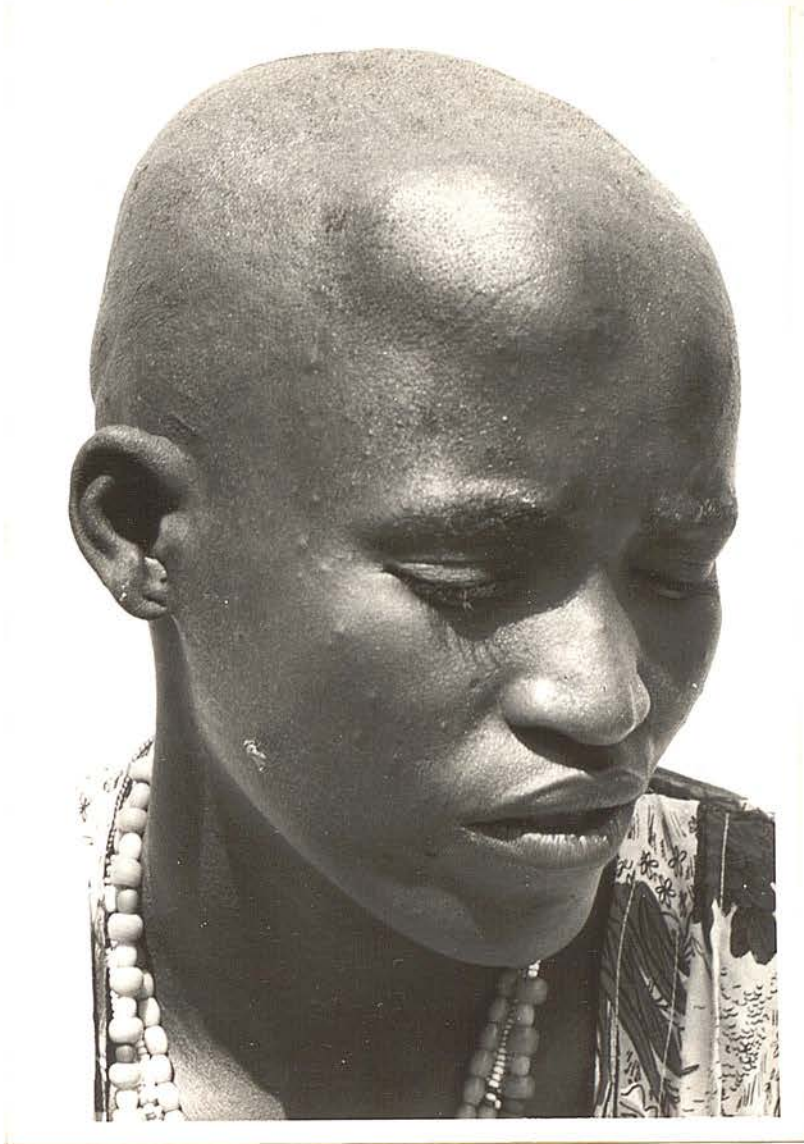


Plate 78.

Swelling of the frontal bone in a young woman following an attack of DICHUCHWA.

See case No. 64.



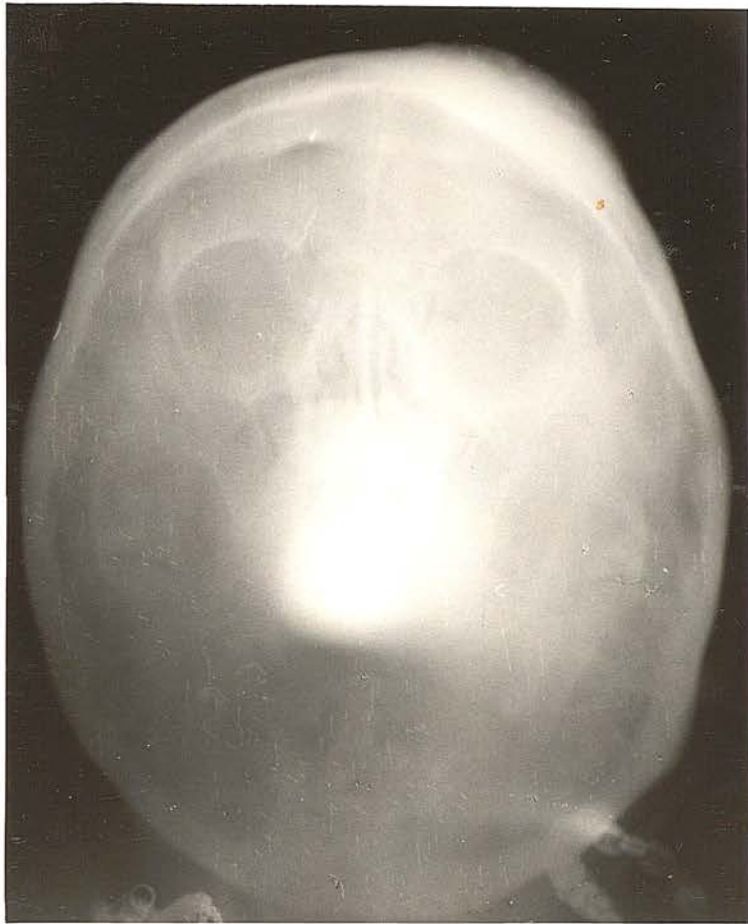


Plate 79.

Radiograph of the frontal bone of the case shown in Plate 78. Note the density and thickening of the cortical bone and the fuzzy appearance at the bone surface. See case No. 64.



Plate 80.

Affection of the forearm bones in a young  
Mokgalagadi boy following an attack of DICHUCHWA.

See case No. 65.

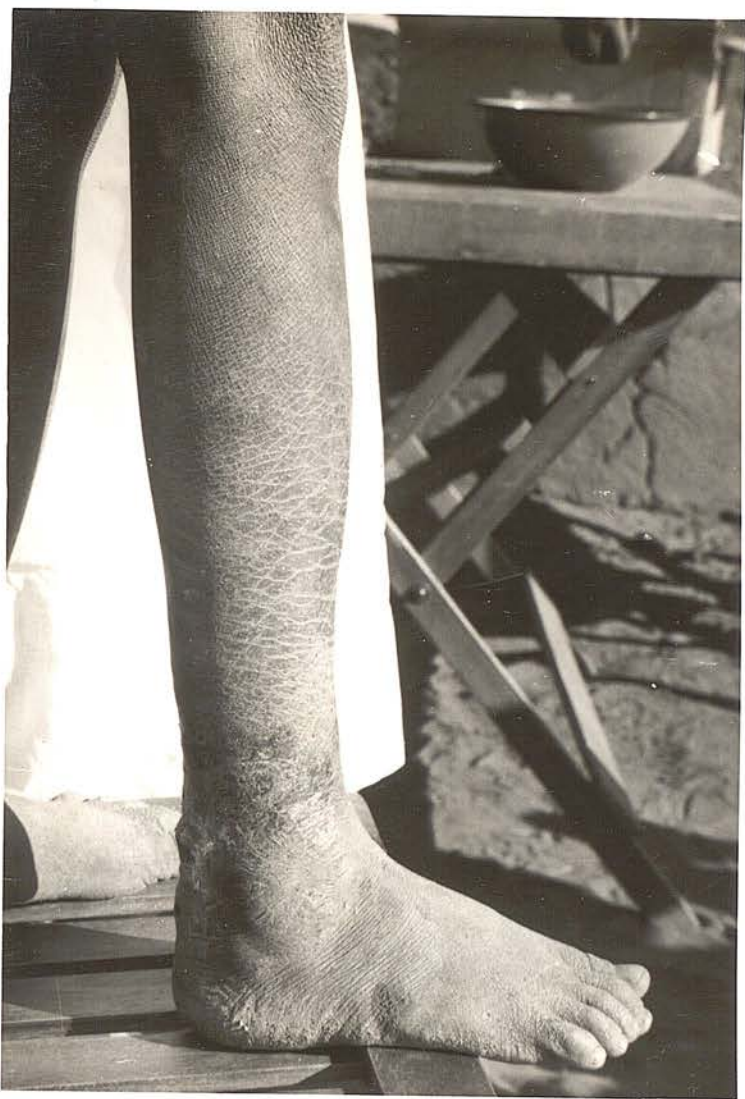


Plate 81.

Affection of the leg bones in the same case as shown in Plate 80. See case No. 65.



Plate 82.

Radiograph of the leg bones in the case shown in the previous plate. Note the bowing of the tibiae and the increased bone density. Case No. 65.



Plate 83.

Gross affection of the bones of the legs  
in a young boy who had an attack of DICHUCHWA when  
young.



Plate 84.

Radiograph of the bones of the legs in the case shown in Plate 83. Note the gross affection of the shafts of both the tibiae and the fibulae.

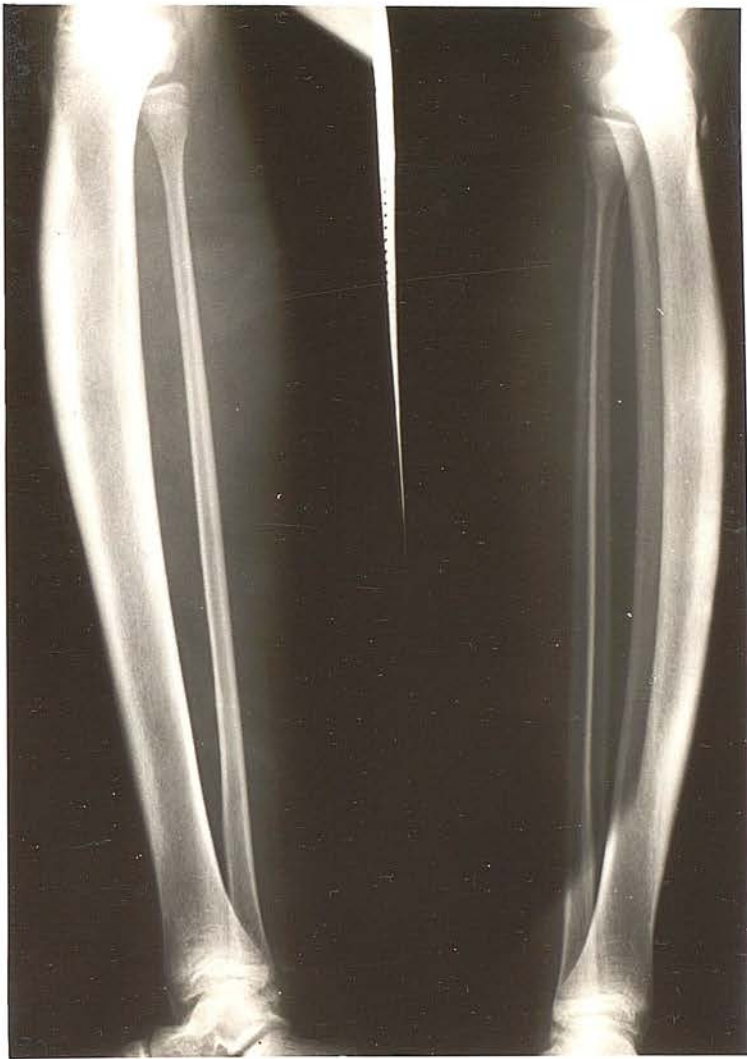


Plate 85.

Radiograph showing the late bone lesions occurring after an attack of DICHUCHWA. This case shows very well the dense cortical sclerosis and thickening that occurs.



Plate 86.

Radiograph showing the bone lesions which occur after an attack of DICHUCHWA. In this case the disease is concentrated mainly on one area of the tibia.





Plate 87.

Radiograph showing the bone lesions which occur after an attack of DICHUCHWA. This case shows very gross old-standing affection of the long bones.



Plate 88.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. In this case the disease has spread right through the medullary cavity.



Plate 89.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. This picture shows particularly well the localised form of lesions which may occur in the shaft of a long bone.



Plate 90.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. Note particularly how the shaft of the fibula has been eaten away.



Plate 91.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. Note the circular areas of rarefaction in the shafts of the long bones.



Plate 92.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. Note the very well marked circular areas of rarefaction in a dense background of sclerosed bone.



Plate 93.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. There is dense sclerosis along the shafts of the tibiae, with a fuzzy appearance at the bone surface due to periosteal new bone formation.



Plate 94.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. In this case there is a well marked localised lesion near the lower end of the humerus.





Plate 95.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. This picture shows clearly new periosteal bone formation near the centre of the shafts of the ulna and radius and there is an area of rarefaction at the diaphysis of the ulna.



Plate 96.

Radiograph showing the bone lesions which occur after an attack of DICHUCHWA. This case shows increased cortical thickening and density along the whole shaft of the bones.



Plate 97.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. There is very gross distortion of the bone with great sclerosis and a possibility of sequestrum formation.

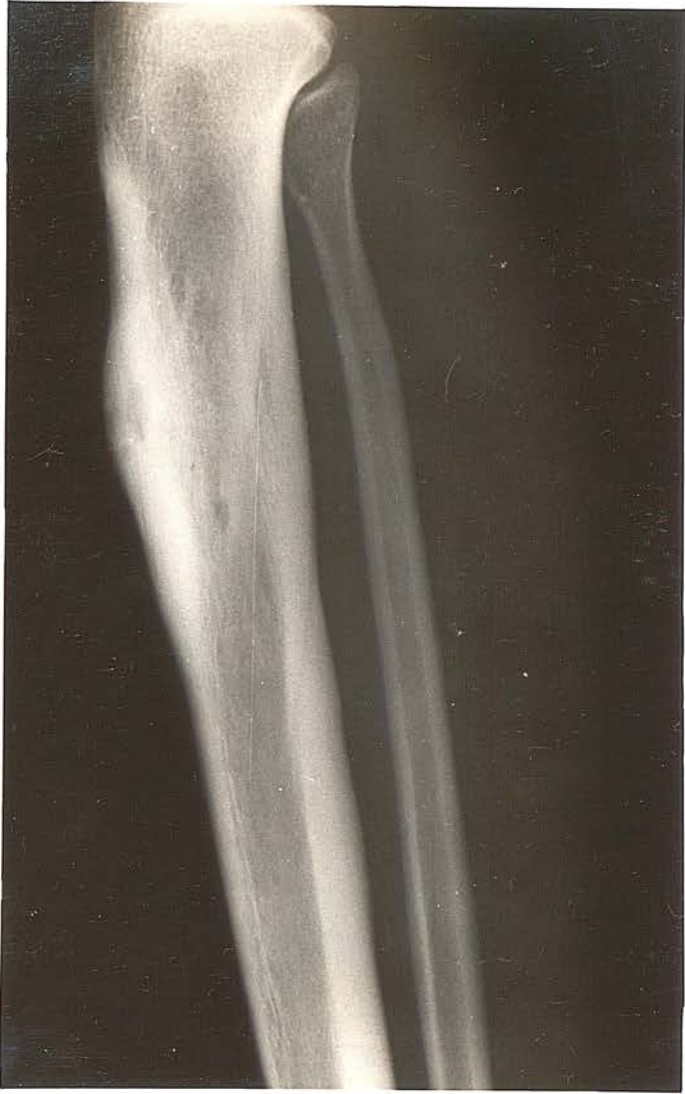


Plate 98.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. There is a localised area of bone sclerosis and increased density in the tibia.



Plate 99.

Radiograph showing the bone lesions that occur after an attack of DICHUCHWA. Note the extensive new bone formation along the shafts of the bones with the well marked areas of new bone formation.



Plate 100.

Radiograph showing affection of the upper end of the ulna with affection also of the articular surface of the elbow joint on the ulna side.

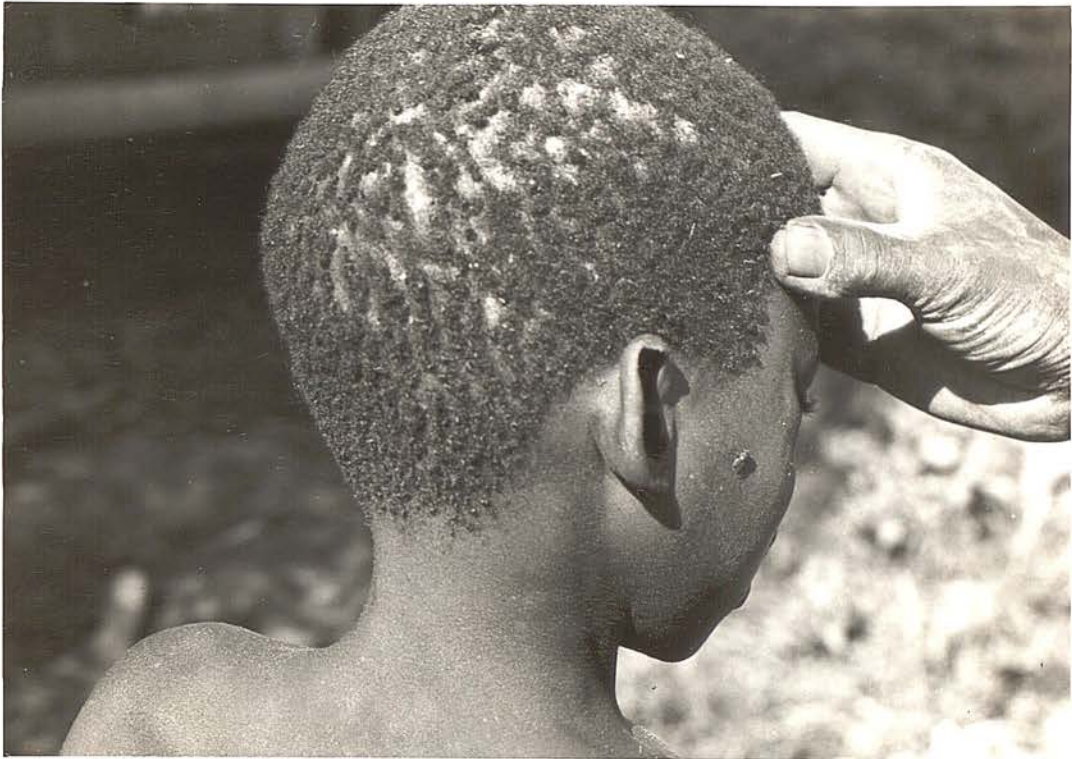


Plate 101.

Early case of Witkop. Note the small white areas on the scalp.



Plate 102.

More advanced case of Witkop. In this case the white areas have extended to cover large areas of the scalp.



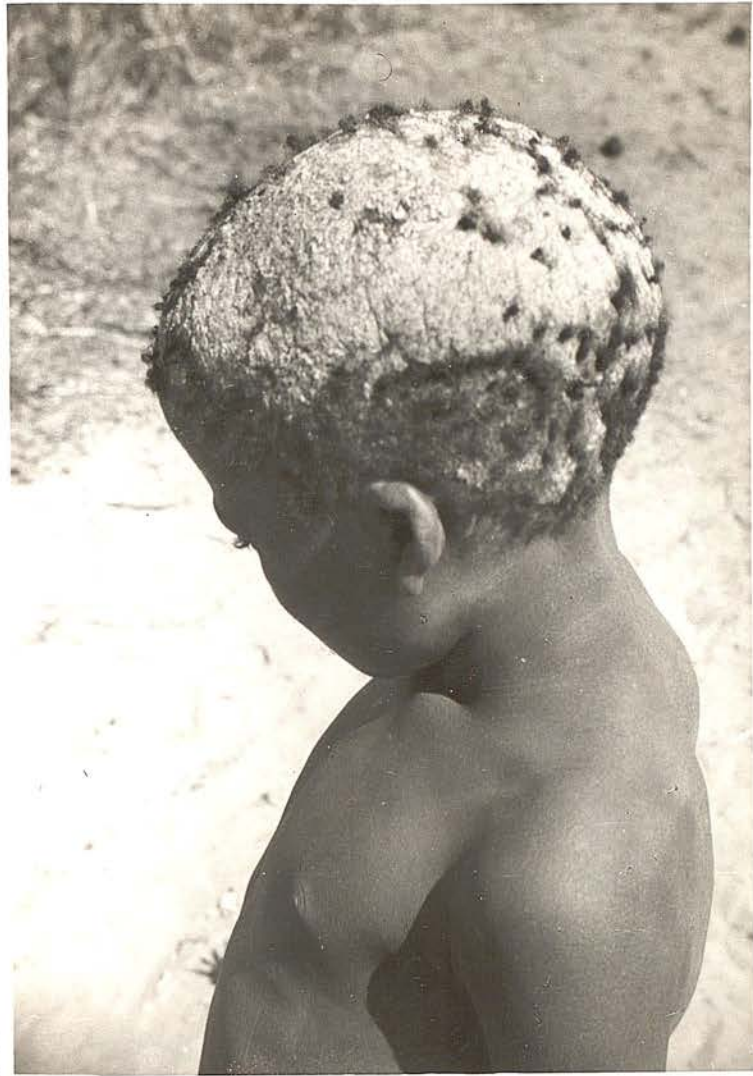


Plate 103.

Advanced case of Witkop. Almost the whole scalp is now covered with the white crusts and much of the hair has fallen out.