AFRICAN DEATHS IN AN URBAN COMMUNITY IN NORTHERN RHODESIA

BY

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EX BIBL. UNIV. EDINBURGEN

N D O L A.

FIG. 1.1.

CHIFUBU
A.H.A.

NON AFRICAN
RESIDENTIAL

KABUSHI
A.H.A.

MAIN
A.H.A.

AIRPORT.

INDUSTRIAL.

MUNICIPAL BOUNDARY.

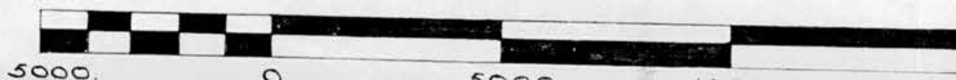
SWAHILI NATIVE RESERVE BOUNDARY.

NON AFRICAN RESIDENTIAL AREAS.

AFRICAN RESIDENTIAL AREAS.

AREAS LIABLE TO FLOODING.

SCALE:- 1/50,000.



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INTRODUCTION

Prior to the establishment of the Federation of Rhodesia and Nyasaland in 1953, Local Authorities in Northern Rhodesia were responsible for construction within their boundaries, of buildings to be used as African clinics, and in respect of such buildings they received a grant of 50% of the costs thereof from the Northern Rhodesia Government. The staffing and operation of the clinics were carried out by the Northern Rhodesia Government at no cost to the Local Authorities.

After the establishment of the Federation, the Federal Ministry of Health took over the responsibilities of the Territorial Government in Northern Rhodesia insofar as African clinics were concerned, but no immediate alterations were made to the existing arrangements. The then Secretary for Health stated in a letter in early 1955 that "a great deal of negotiations will have to be carried out in future before any agreement can be reached with Local Authorities in Northern Rhodesia, in respect of all grants or refunds for health purposes".

On May 18th, 1957, without any prior negotiations or agreement with the Local Authorities concerned, the Federal Ministry of Health issued Circular No. H.D. 31 of 1957 under which:

(a) The arrangements and grants payable in respect of the construction of African clinics remained as before.

(b) All existing African clinics in Local Authority areas in Northern Rhodesia or replacements thereof would continue to be staffed and operated by the Federal Ministry of Health.

(c) All 'new' African clinics in Local Authority areas in Northern Rhodesia would have to be staffed and operated by the Local Authorities themselves, subject to a grant by the Federal Ministry of Health of 50% of the cost of certain items of expenditure.

The issue of this circular caused a storm of protest from the Local Authorities, in particular because it would result in the establishment of two groups of clinics serving identical purposes in the same African Housing Areas, yet under the administrative control of two quite separate authorities.

There can be no doubt that changes in the organisation of clinic services in the African Housing Areas were necessary with the Local Authorities taking a greater share of the responsibilities, but the nature of the changes imposed in such an arbitrary manner by the Federal Ministry of Health did not seem likely to result in a satisfactory reorganisation.

Having regard to the words of Farr (1875) that "the exact determination of evils is the first step towards their remedies", this survey of African Mortality in Ndola was carried out in the first instance that the early steps taken by Local Authorities in the development of African Clinic practise would use to the best advantage the slender professional and financial resources available to them.

At the same time, it was hoped that the results of the survey would exemplify the opinion of Walters and Waterlow (1954) that "each piece of local information contributes to the growth of the science as a whole".

In essence, African clinic practice is based on two fundamentals:

(1) The incidence and causes of mortality.

(2) The incidence and causes of morbidity.

In order to base African clinic practice on a firm foundation, it is obviously desirable to carry out surveys on the incidence and causes of both mortality and morbidity, for it is well known that the two are not synonymous. However, for carrying out any survey Moser (1958) has pointed out that "the sample design is decided upon in the light of what is practically feasible as well as of what is theoretically desirable".

The lack of detailed morbidity records in the existing African clinics, the lack of any special financial assistance, and

the insufficient numbers of suitably trained staff, made a morbidity survey extremely difficult. If such a survey had been carried out it would have had to extend over a number of years, and the information would have been obtained too late to be of any immediate value.

It was decided, therefore, to concentrate upon a mortality survey, particularly in view of the fact that no mortality statistics for Africans were available for the area. Moreover, it was hoped that such a survey might make it possible to obtain information regarding certain of the indicators suggested by the Study Group of the World Health Organisation on Measurement of Levels of Health (1957) and to fulfil in some degree the recommendations of the Expert Committee of the World Health Organisation on Health Statistics (1957). Particular note was taken of the opinion expressed by the Expert Committee of the World Health Organisation on Health Statistics (1952), that "morbidity statistics can provide a picture of the amount of illness, disability and injury within a population, and constitute a valuable source of information needed in connection with a variety of problems. This information is required to amplify that given by mortality statistics as it is well recognised that the main causes of death in any community are far from being the main causes of sickness in it".

The Committee considers that mortality statistics amplify the information given by mortality statistics, from which it is clear that in the minds of members of the Committee, mortality statistics are of more fundamental importance than morbidity statistics.

CHAPTER I

Municipality of Ndola

1.1 Geography

1.1.1. Situation

The Municipality of Ndola is situated in latitude 13° 00' South, longitude 28° 39' East. The altitude of the Meteorological Station at the Airport is 4,163 feet above sea level.

The Municipality is some 200 miles North of Lusaka, the territorial capital, and is on the main line of rail in Northern Rhodesia. It lies on the Eastern edge of the Copperbelt.

1.1.2. Natural Features

1.1.2.1. Dambos

There is no accurate definition of the word 'dambo', but generally it is used to indicate "an area of ground of variable outline within which the water regime is such that the soil is seasonally or permanently wet, or where the water table is seasonally high enough to inhibit tree growth". (Northern Rhodesia: 1956).

The dambos act as sponges which contain large quantities of standing water during and immediately after the rains; a small stream usually runs through the centre of the dambo, and this flows during the wet season and during such part of the dry season as there is sufficient water in the dambo to ensure this flow. The swampy nature of dambos make them an ideal breeding place for insects of many kinds, in particular A. funestus.

The dambos produce a certain amount of fish which is caught by the African population for food. The exact quantity of fish caught in this way cannot be estimated accurately.

1.1.2.2. Soil

The Report of the Land Commission (Northern Rhodesia: 1945) states that the soils of the Copperbelt "are amongst the poorest in the Territory, the relatively good soils occurring in small scattered patches, many of which overlie mineralised areas".

The Department of Agriculture (Northern Rhodesia 1956) states "The soils

are inherently infertile", and further "Farms will have to be small, intensive, highly productive".

1.1.3. Topography

The Municipality area comprises some 13,232 acres and is surrounded on most sides by dambos, which have been drained to varying degrees. There are approximately 1,781 acres of dambo within or immediately adjacent to the Municipal boundaries.

The largest dambo, known as the Itawa Dambo (1,138 acres), has been dammed to provide the town's water supply but is partially drained above the dam wall. It passes through the Municipal Area towards the Southern boundaries and the ground rises from this dambo to the North and South, the highest points being towards the North.

The non-African residential areas lie to the North of this dambo for the most part but there is a small residential area immediately towards the South. African Housing Areas generally lie to the South and North West of the Municipal Area.

The Swahili Native Reserve boundaries lie close to the East, South and South West of the Municipal boundaries and are contiguous with those of the Municipality towards the South East.

The main topographical features of the Municipality are shown on the Map - Figure 1.1.

1.2. Meteorological Conditions

1.2.1. Rainfall

There is only one rainy season in Ndola usually extending from October to April. There is usually a period of about four weeks in January/February where the rains slacken, but there is no clear division of the rainy season into two parts.

Rain falls for the most part as tropical thunderstorms.

Figures of rainfall during 1957/1959 are given in Table 1.1.

1.2.2. Temperature

The highest temperatures are reached during October and November; as soon as the rains become established, the temperature tends to fall.

During the dry season the days are sunny and warm but the nights are cool.

Figures of the mean maximum and minimum temperatures during 1957/1959 are given in Table 1.2.

1.2.3. Relative Humidity

The Relative humidity monthly means for 1957/1959 are given in Table 1.3.

1.3. Economy

Ndola is generally looked upon as the gateway to the Copperbelt.

1.3.1. Industry

A copper mine is situated at Bwana Mkubwa some five miles to the south west of the Municipality on the main road to Lusaka, but the mine has not been worked since the early 1930 ties.

The heavy industries established in the area comprise a large copper and cobalt refinery, two large concrete product manufacturers, a lime works, engineering works, and a sugar refinery which had not been completed by 31st December 1959.

There are a number of light industries of various types established within the area.

In the Ndola Town Planning Scheme 552 acres are zoned for heavy and light industrial use.

1.3.2. Commerce

A large number of commercial concerns have their Copperbelt headquarters in Ndola, and there are a large number of retail businesses catering for all sections of the community: shops catering to the African trade are generally operated by members of the Asiatic community, but there is no clear dividing line between trading areas.

Areas zoned for general business office and warehouse use under the Town Planning Scheme total 163.19 acres.

1.3.3. Administration

The Western Province Headquarters of most Government Departments, whether Federal or Territorial, are situated in Ndola. The civil servants employed in these Departments are an important section of the population, and although individuals may be transferred, the actual numbers remain fairly constant.

1.3.4. General

From the above it will be appreciated that Ndola serves the Copperbelt, and organisations established in the town have few dealings with other areas. The town's economy, therefore, is dependent almost entirely on copper.

The level of the economy is directly dependent on the money spent by the Copper Mining Companies and by their employees, but political and labour unrest affect the amount of such money spent and, therefore, influence the economic development of Ndola.

It is not possible to assess accurately the effect of these various factors but Figure 1.2. shows

(a) the number of man days lost due to strikes during 1957 - 59 (Department of Labour 1958, 1959. Ministry of Labour and Mines 1960)

(b) the price of copper per ton on the first day of each month.

(c) the monthly average value per quarter of all plans passed by the Ndola Municipal Council.

(d) the monthly average value per quarter of non-African residential building plans passed by the Ndola Municipal Council.

It is probably true to say that the major factor affecting development in Ndola during 1957/59 has been political uncertainty and unrest, which it is not possible to portray graphically.

1.4. Demography

1.4.1. European Population

The European population has increased rapidly in recent years as is shown from Table 1.4.

The estimates of population during 1957/59 have been supplied by the Central African Statistical Office (Federation of Rhodesia and Nyasaland: 1960).

The slackening in the rate of increase of European population can probably be attributed to political uncertainties which are also responsible for a slight fall in the number of European births registered in 1959; a fall which also occurred throughout the territory as a whole as is shown in Table 1.5.

1.4.2. Asiatic Population

At the Census in 1956 (Federation of Rhodesia and Nyasaland: 1957) the Asiatic population of the Municipality was given as 949, but this must be considered a considerable underestimate, as 66 Asiatic births were registered during the year, which would give a fantastically high crude birth rate of 69.5 per thousand.

The population figure for this group was probably about 1,300 in 1956 and the numbers have increased steadily to about 1,700 in 1959.

1.4.3. Coloured Population

Again, at the Census in 1956, the population of Coloureds was given as 291. As births registered in 1956 numbered 20, the crude birth rate would have been 68.5 per thousand if the population figure were correct.

It appears the true population figure was about 500 in 1956, and there has probably been a slow increase in population since that date.

1.4.4. African Population

This is considered in Chapter 2.

1.5. Public Services

1.5.1. Water

The water supply is obtained from the Itawa Dambo which has been dammed and partially cleared to form a large shallow lake in one part. The water so obtained is mostly surface water and is heavily polluted as almost the whole of the Catchment area lies within the Swahili Native Reserve.

Modern water purification plant with automatic chlorination has been in operation since 1955, and samples have been taken regularly since that date, but only since 1958 have the number of samples been sufficient to draw valid conclusions. The results of simple presumptive coliform tests on tap water are given in Table 1.6.

The number of samples in 1959 was less than in 1958 owing to new testing arrangements being made.

It is clear from these results that the purity of the water does not comply with the high standards set in the more developed countries, but is nevertheless of a not unreasonable standard.

It has always been recommended by the Municipal Health Department that water from the taps should be boiled before drinking, but it is unlikely that this recommendation is implemented in the African Housing Areas which are supplied from the same sources as the non-African areas.

1.5.2. Power

Electric power is available throughout the non-African areas of the town, but there was virtually no electrical reticulation in the African Housing Areas at 31st December 1959. Plans were complete to provide such reticulation in 1960 and subsequent years.

1.5.3. Roads

Part of the roads have been tarred but the majority are only to gravel standard. Dust becomes a serious problem during the dry season.

No roads in African Housing Areas had been tarred by 31st December 1959 but again plans had been completed for tarring certain of the roads in these Areas in 1960.

1.5.4. Refuse and Sanitary Services

Refuse removal services operate at least twice weekly in all areas.

Sanitary services are not of a high standard. In the non-African areas, water borne sanitation is complete, but disposal has been to septic tanks or conservancy tanks. Sewage disposal works received sewage for the first time in June 1958, and connections to the sewer reticulation commenced at that time and are still continuing.

In the African areas sanitary facilities have ranged from bucket disposal to a full water borne system with septic tank treatment. Fuller details are given in Chapter 2.

Summary

The Municipality is a reasonably well developed town in Central Africa, trying to improve the standards of amenities, but suffering a set back to development during the years in question as a result of political and economic uncertainty.

TABLE 1.1.

METEOROLOGICAL CONDITIONS

RAINFALL

	1957 (inches)	1958 (inches)	1959 (inches)
January	7.31	6.23	2.27
February	9.48	10.34	10.37
March	3.78	4.58	3.49
April	0.76	2.30	2.12
May	1.32	-	0.03
June	-	-	-
July	-	-	-
August	-	-	-
September	-	0.29	-
October	0.90	1.25	0.32
November	0.56	6.35	4.46
December	11.00	7.88	10.83

TABLE 1.2.

METEOROLOGICAL CONDITIONS

TEMPERATURES

	1957		1958		1959	
	Mean maximum temperature. °F	Mean minimum temperature. °F	Mean maximum temperature. °F	Mean minimum temperature. °F	Mean maximum temperature. °F	Mean minimum temperature. °F
January	77.6	62.5	80.6	64.2	81.9	62.8
February	78.0	62.5	80.9	63.7	78.3	63.1
March	79.3	61.9	81.4	60.9	80.1	60.5
April	81.1	56.2	82.7	57.9	81.4	57.7
May	76.8	49.7	79.8	49.4	81.9	50.7
June	76.3	41.5	75.7	45.1	77.1	46.2
July	78.7	44.6	74.8	41.9	77.2	48.3
August	81.5	50.7	79.1	47.5	80.3	49.3
September	87.5	57.7	87.5	57.9	85.9	56.6
October	89.8	61.7	89.4	62.3	90.2	60.1
November	90.0	64.0	87.5	63.2	85.9	63.0
December	81.0	63.7	81.9	63.2	80.8	63.2

TABLE 1.3.

METEOROLOGICAL CONDITIONS

RELATIVE HUMIDITY - MONTHLY MEANS*

	1957	1958	1959
January	83	77	73
February	83	81	81
March	78	76	76
April	71	68	69
May	65	60	61
June	54	58	54
July	46	49	52
August	47	46	46
September	39	45	42
October	42	48	39
November	44	63	57
December	76	78	77

*Relative Humidity Monthly Means are computed from thermograph mean temperature and a mean dewpoint calculated from $\frac{1}{4}$ (0600 + 0800 + 2 x 1400 mean dewpoints).

TABLE 1.4.

EUROPEAN POPULATION

	Municipality of Ndola	Immediate periurban areas
1946 (Census)	1,175	67
1951 (Census)	2,645	262
1956 (Census)	6,790	594
1957 Estimate	8,000	Not available.
1958 Estimate	8,800	Not available.
1959 Estimate	8,900	Not available.

TABLE 1.5.

EUROPEAN BIRTHS REGISTERED

	Municipality of Ndola	Northern Rhodesia
1957	253	2,108
1958	265	2,353
1959	252	2,297

TABLE 1.6.

WATER SUPPLIES

Results of Presumptive Coliform Tests per 100 ml on Tap Water

	Tests carried out	Number showing presence of coliform organisms	Number showing a presumptive coliform count of more than 2	Percentage of samples showing presence of coliform organisms
1958				
1st Quarter	132	50	22	37.9 %
2nd Quarter	152	46	12	30.3 %
3rd Quarter	163	30	4	18.4 %
4th Quarter	161	37	3	23.0 %
1959				
1st Quarter	12	3	1	25.0 %
2nd Quarter	22	9	5	40.9 %
3rd Quarter	20	3	Nil	15.0 %
4th Quarter	19	3	2	15.8 %

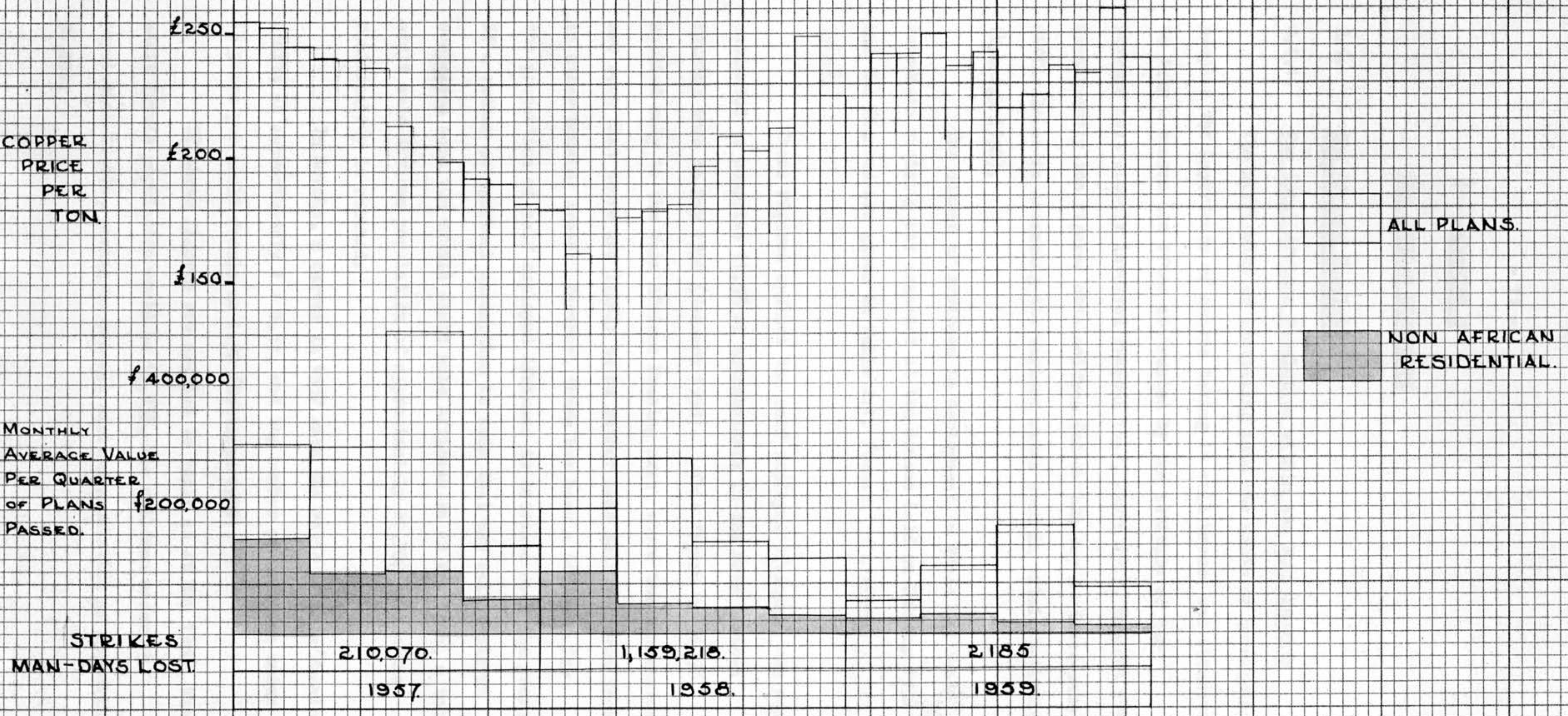
FIGURE 1.2.
FACTORS INFLUENCING DEVELOPMENT.
£250
£200
£150
COPPER PRICE PER TON.
£400,000
£200,000
MONTHLY AVERAGE VALUE PER QUARTER OF PLANS PASSED.
ALL PLANS.
NON AFRICAN RESIDENTIAL.
STRIKES MAN-DAYS LOST
210,070.
1,159,218.
2185
1957.
1958.
1959.

It was noticed in the Lusaka survey that the Child : Adult Female ratio increased in areas where better quality housing was available, and that the percentage of children not with their parents dropped from 13% in 1954 to 7% in 1957.as the standards of housing improved. Children aged 0-14 varied from 28.0 to 47.1% of the population according to sex and the type of housing area. This compares with an estimate that in 1950 45% of males and 41% of females in Northern Rhodesia as a whole were under the age of puberty (Shaul 1955).

The population can also be checked by assessment against the number of houses available. As at 31st December 1956, the houses available in Ndola were:-

Municipal African Housing Areas	7,794
Railway, Police Camp, etc. Housing Areas	654
Other Houses (mostly in unauthorised Housing Areas)	3,082
Housing in Non-African Residential and Business Areas)	1,470
	13,000

It was found in the Lusaka survey that the inhabitants per house varied with the type of housing area, being 4.3 per house in the Municipal Housing Areas, 3.8 in Private Housing Areas and 3.3 in Unauthorised Housing Areas. If these figures are applied at Ndola at 31st December 1956, (assuming a figure of 3.8 persons per house for Housing in Non-African Residential and Business Areas) the total population would have been 51,706. The discrepancy between this figure and the one obtained above can be explained in part by there being a number of unauthorised housing areas outside the Municipal boundaries in December 1956, whose inhabitants worked within the Municipality and were included in the Census figures. In Lusaka Thomson (1954) found that the average household in the Main African Housing Area was 3.75, containing 1.23 Adult Males, but in Chilenje the figures were 4.32 and 1.02 respectively.

At 31st December 1959, almost all the unauthorised housing within or adjacent to the Municipal boundaries had been demolished, and the housing available was:-

Municipal African Housing Areas	12,049
Railway, Police, etc. Housing Areas ..	1,687
Housing in Non African Residential and Business Areas	2,037
	15,773

By applying the same figures for inhabitants as before, the population would be approximately 65,900 at that time.

2.1.2. The Rural Population

The rural African population is impossible to assess with any degree of accuracy. The only figures available are those obtained by the Provincial Administration for tax purposes, which are given in Table 2.2. for the Ndola Rural District for the year 1959. (Northern Rhodesia 1960. b.) ~~(Provincial Administration 1960)~~.

This table shows that approximately two-thirds of the adult males are away from home working.

2.1.3. The Tribal Structure of the Urban Population

A survey of the tribal groupings of the heads of household in the Municipal Housing Areas was carried out in 1960 by the Municipal Department of African Affairs, using the records maintained in the offices of the person living in the particular house. Changes in occupation may not always have been notified to the office, and the figures may not be absolutely accurate, but they will nevertheless give a fair picture of the tribal composition of the urban population which is unlikely to have varied very much over recent years. The results of this survey are given in Table 2.3.

From this table it will be noted that there is little evidence of tribal groupings in any particular Housing Area, with the exception of the Nyanja speaking tribes from the Eastern Province whose numbers in the Chifubu Housing Area are disproportionately high compared with the other Housing Areas.

No information relating to the tribal affiliations of Africans living within the Municipality but outside the Municipal

African Housing Areas, is available.

2.1.4. The Movement of Population

Movement of population is most important to the medical administrator. In areas such as the Copperbelt of Northern Rhodesia, movement of population for a long period may be very important to the non medical administrator, but short term movement into bush areas where the standard of health is low, can be of the most vital importance to the medical administrator. A very short visit to areas within a 20 mile radius of the urban centres can expose the traveller to the risk of malaria, smallpox and diarrhoeal disease to say nothing of the ministrations of indigenous witch doctors, and thus the risk of the introduction of epidemic disease is extremely high.

It was stated in Lusaka (Bettison 1959) that the Municipal Records revealed no large seasonal fluctuations in population and in the Copperbelt as a whole a survey carried out in December 1954 among 2,068 schoolchildren aged 8-14 revealed that from 14.1% to 55.1% of children, the percentage varying with the school, had never visited their home village at any time (Gorman 1955). However, in Ndola in 1951 (Clyde-Mitchell 1954) as high as 58.5% of adult males were classified as Peasant Visitors and Migrant Labourers.

None of this work, however, takes into account short trips into the adjacent rural areas. Many of the children in Gorman's survey had their home villages literally hundreds of miles from the Copperbelt: the fact that they have never visited such villages does not rule out the possibility that they were visiting rural areas nearer the Copperbelt.

Personal impressions are that there is considerable movement between the Municipality and rural areas, particularly among women and children who visit relations in the rural areas very frequently for short periods. Certainly fish traders travel frequently backwards and forwards to the lakes in the North to buy and sell produce. Further, migrant labour tends to return to rural areas to prepare land for planting at the beginning of the rainy season, the

more so because temporary labour is not required for civil works which cease during the rainy season: such labour returns to the towns after the harvest to seek employment during the dry season.

No accurate work has ever been carried out on these short term movements, but during 1955 a large vaccination campaign was carried out in the presence of a smallpox epidemic during the dry season. Houses were visited once monthly to carry out vaccinations, and the number of persons found unvaccinated on second and subsequent visits was so high as to suggest a monthly turnover of about 30% of the population: this figure, however, cannot be substantialed further.

It is probably true to say that there is slight seasonal variation in the overall municipal population, but that constant short term movement is liable to introduce disease into the Municipal area.

2.1.5. The Age Structure of the African Population

No recent specific surveys have been carried out on the age structure of the African population of Ndola. For Northern Rhodesia as a whole it is estimated (Shaul 1955) that in 1950 45% of males and 41% of females are under the age of puberty: and that 2.1% of males and 2.4% of females are under the age of one year.

The results of a sample survey in Ndola in 1951 (Clyde Mitchell 1954) are given in Table 2.4. In this survey 28.3% of males and 38.8% of females were under the age of puberty, but undoubtedly since 1951 more children had come to live with their parents in the urban centres. This was born out in the more recent Lusaka survey (Bettison 1959) where the number of children not living with their parents dropped from 13% in 1954 to 7% in 1957.

The Lusaka survey revealed that in 1957 the age structure of the African population was as in Table 2.5.

The low percentage of males under puberty in this and in the earlier Ndola survey can certainly be accounted for by the inclusion of the large number of adult males living in urban conditions without their wives or families.

In the Lusaka survey the percentage of children under puberty (by sexes) varied from 28.0 to 47.1% depending on the type of Housing Area, 31.0% of families having additional lodgers who would presumably be a working male adult unaccompanied by his family.

2.2. African Housing and Environmental Conditions

Reference to the map (Fig.1.1.) will show that there are two areas set aside for Municipal African Housing within the Municipality, the area to the south of Itawa Dambo being divided into two separate and distinct administrative entities contiguous with one another.

2.2.1. Main African Housing Area

This area is situated to the south of the Itawa Dambo and has been established longer than any other African housing area in Ndola. It contains various types of houses and services which are worthy of some detailed comment:- (The figures for units of accommodation which follow are correct except for minor variations due to demolition and additions which have taken place during the years under review. Where gross changes in numbers have taken place, this has been stated.)

2.2.1.1. Modern Housing I (M.1.)

During the survey there have existed some 380 houses of reasonably modern design built of burnt brick or concrete blocks with impervious floors, wooden doors, and metal door and window frames. House sizes vary but none have less then 2 rooms with a combined floor area of 180 sq.ft. and a small kitchen. Sanitation is water borne to septic tanks and water supply is adequate although in certain places of a communal nature. Road access is good.

2.2.1.2. Modern Housing II (M.2.)

There are 550 houses of this type in the Main African Housing Area which are of similar construction to those mentioned above but differ in that sanitary disposal is by pit latrines, one to each house, and water supply and ablutions are communal but adequate. The soil is not porous, and drainage from ablutions is generally on the surface, leading eventually to the Itawa Dambo. Road access is good.

Both the above types of housing are not unsatisfactory.

2.2.1.3. Kimberley Brick Housing I (K.B.1)

The houses are situated in three groups and are of post war construction. The date of completion has not been ascertained but was before January 1955.

The number of houses was not assessed in December 1956, but in May 1956 was approximately 1,400.

The houses are constructed of Kimberley (sun dried) brick and are semi-detached. The floor area, including kitchens which may be integral with the main structure or separated from it, varies from 151 to 174 square feet, in the vast majority of houses being 160 square feet. Many of these houses had additions made to them by the inhabitants which were often sub-let at exhorbitant rents: these additions were demolished in 1959.

The floor is of beaten earth, and there are no window apertures.

Sanitation was originally by individual pit latrines, usually without roofs; these latrines were of a semi-detached type, the pit being common to two superstructures. The construction of these latrines was extremely bad, and in May 1956, a survey revealed:

Number of Houses		1,400
Houses without latrines	162	
Houses with broken down unusable latrines	143	305
Latrines under repair		42
Houses with latrines		
Depth of Latrine:		
Nil feet	26	
0 - 5'	550	
5'- 10'	324	
Over 10'	153	1,053

By April 1958, with approximately the same number of houses the number of pit latrines capable of use had fallen to 395 and these were deteriorating rapidly.

Temporary pit latrines with metal superstructures were brought into use in early 1959: being temporary, they were on a communal basis. A survey in March 1960 revealed that there were 1,173 houses served by 223 pit latrines in these areas.

Water supply to these houses is virtually non existent: in January 1955 they were served by four stand pipes, and in March 1960 by six; one group of 239 houses had only one stand pipe in March 1960.

Roads are bad and access for refuse removal is difficult.

2.2.1.4. Kimberley Brick Housing II (K.B.2)

These are among the oldest houses in the Main African Housing Area and are structurely the soundest of those of non permanent construction. The floor area varies from 90 to 145 square feet and there is only one room.

Floors are of concrete or beaten earth, and there are one or two unglazed wall openings.

Sanitary facilities were noted in 1955 as being approximately 200 buckets serving 1,033 houses. The buckets were communal, and the structures housing them were delapidated, broken and without fly screening. By May 1958, the number of houses had fallen to 1,002 still served by approximately 200 buckets.

In March 1960, the houses numbered 935 and 222 temporary pit latrines (of the same type as described above) had been introduced.

Water supply in March 1960 was from four kiosks with a total of 20 taps and from a further 13 standpipes.

Roads are poor but not as bad as in the area mentioned above.

2.2.1.5. Rondavels (R)

These were the worst housing available.

They consisted of kimberley brick rondavels with beaten earth floors, thatched roofs, with no window openings or ventilation other than at the eaves.

In May 1955, there were 1,119 houses in this section served by 96 communal buckets housed in broken down indescribably filthy structures, and 6 undrained stand pipes. Road access was

extremely bad. By May 1958, there were 1,103 houses served by 32 buckets and 9 pit latrines capable of use, i.e. 1 latrine point to 27 houses.

All these houses were demolished about May 1959 and the inhabitants rehoused.

2.2.1.6. Other Housing (O.H.)

There are a small number of houses built by Contractors in the Main African Housing Area. The numbers have varied slightly during the period under review being 37 at the end of 1959. These houses are of Kimberley Brick construction and approximate in standards to those of the Kimberley Brick Housing I described above.

2.2.2. Kabushi African Housing Area

This Housing Area is situated adjacent to the Main African Housing Area but separated from it by a small stream and Dambo. Access to the area is through the Main African Housing Area.

2.2.2.1. Permanent Housing (K.1.)

The majority of housing in the area is of permanent construction of burnt brick or conrete blocks. Sanitation varies between pit latrines, aqua privies and full water borne sanitation:- the pit latrines were well constructed, but during 1959 it was found necessary to reconstruct 100 or more which had filled up: the disposal from the water closets is to septic tanks and french drains, but soakage has proved unsatisfactory and during 1959 tankers removed over 4 million gallons of sewage from septic tanks in this area.

Water supplies also vary - those houses served by pit latrines have communal water and ablution facilities which are generally adequate, although surface drainage is the rule. Other houses have individual water supply and ablutions which drain to the septic tanks.

Roads are good and access for refuse vehicles satisfactory.

In Kabushi African Housing Area in January 1957 there were 2,999 permanent housing units which increased to 3,719 in December 1959.

2.2.2.2. Temporary or semi-permanent Housing (K.2)

Part of the Kabushi African Housing Area has also been set aside for non-permanent housing which is constructed by Contractors themselves. The standards vary very considerably, but the unit is generally a single room.

Sanitary and water facilities vary but are invariably on a communal basis and standards are not high.

The numbers of such housing units were 742 in January 1957 and 460 in December 1959.

2.2.3. Chifubu African Housing Area

This area is separate from the other African Housing Areas and lies to the North West of the town. The first permanent housing in this area was occupied in late 1956.

2.2.3.1. Permanent Housing (C.H.1.)

All African Housing in this area is of permanent construction with good road access, each house having its individual water closet and ablution facilities, draining to septic tanks. Drainage from the septic tanks has been unsatisfactory and in 1959 over 3 million gallons of sewage were removed apart from a very large quantity of raw sewage that was passed virtually untreated to a stream on the peumeter of area.

In February 1957 there were 63 units of permanent accommodation in this area which increased to 4,503 in December 1959.

2.2.3.2. Temporary Housing (C.H.2.)

For the original construction in Chifubu, contractors' labour was housed in an area of temporary housing of extremely poor construction and quality. This housing remained on site after the first permanent houses had been occupied: the exact numbers cannot be ascertained, but in May 1957, there were 241 such houses: complete demolition was effected by the end of 1958.

2.2.4. Other African Housing

Housing provided by the Railways and Police is of permanent type and satisfactory. Housing on residential stands outside the African Housing Area is also of a permanent type and satisfactory.

Certain other small contractors' compounds in the immediate vicinity are of poor quality, but the number had been reduced to negligible figures by the end of 1959.

General

The difficulties of getting certain peoples to take an interest in maintaining sanitary facilities in a reasonable hygienic condition has been well described by Shipman et al (1958) who came to the conclusion that there is "no ideal latrine...... for all conditions".

Nevertheless, further explanation of the appalling standards of environmental hygiene in the Main African Housing Area is necessary.

As can be seen from the Census figures given in Chapter I the rapid expansion in Ndola first commenced about 1952-53 and planning authorities were much inclined to the view that the expansion was temporary. All too many persons in authority remembered the days of the depression in the early 1930ties when Copper Mines closed down and it was literally possible to buy a plot and the house that stood on it, complete with furniture and fittings down to the last cup and saucer, for the price of a rail ticket to the Union of South Africa. Such people were fearful of spending money on public utilities - memories of the Black Christmas of 1930 when the Mufulira Mine closed down and notice was given to all staff on Christmas Day were still fresh in many persons' minds.

However, the expansion continued and the view gained ground that the rate of expansion would continue. New public utilities had to be planned, but Power Stations and Water Works could not be produced overnight. In the event such schemes were probably overdesigned for the needs of the community as it now is, but there is no justification to attach blame to anybody: it is only too easy to be wise and criticise in the light of subsequent events.

It must be remembered that electric power in Ndola was only available for about 3 hours a day until December 1954 and no purified water until the completion of water works in November 1955. Insofar as African Housing was concerned, there were over 3,000

shacks in a Contractor's Compound within the Municipality in 1955 which had been reduced to about 1,330 in December 1956, and finally demolished in 1957. This area was devoid of roads, water or sanitary facilities. Further, in May 1956, the number of male Africans in employment within the Municipal area was approximately 20,000, whereas in December 1956 there were only 13,000 units of accommodation - a shortfall of about 35%.

Against such a background, the problem of the Main African Housing Area must be considered.

The author assumed duties as Medical Officer of Health in November 1954. On 5th January 1955, a short report on the sanitary conditions in the area was submitted to the appropriate Committee of Council which resolved to proceed with repairs where possible and to consider further action later.

The arrival of additional Health Inspectorate staff in early 1955, enabled a detailed survey to be carried out, and the full report was placed before Committee on 23rd May 1955. The report took into account the Northern Rhodesia Government Circular No. 16/55 dated 11th May 1955, whereby Government subsidies paid previously in respect of Local Authority African Housing Areas would not be paid after 30th June 1956. This report concluded:-

> " on economic and health grounds no palliative measures will alleviate the existing conditions to any measurable extent. The entire area must be razed to the ground".

The Committee resolved inter alia that the Northern Rhodesia Government should be asked to continue a subsidy "until such time as loan funds additional to normal allocations have been made available and taken up for building permanent houses to replace the existing sub-standard houses".

On 22nd July 1955 the Town Engineer reported at length on the methods to be adopted in completely redeveloping the area. After minor amendments this scheme was forwarded to the Commissioner for Local Government on 15th September 1955 and the request made for formal approval for the redevelopment scheme.

Further correspondence followed and a meeting of interested parties was held on 7th February 1956. No minutes of this meeting are available but the Northern Rhodesia Government's attitude was stated to be one of sympathy towards the scheme if submitted in stages. The Town Engineer now stated it would be put in hand in March 1956.

Up to this point some progress had been made, albeit slow: thereafter the Redevelopment Scheme frittered away to nothing.

A further report on conditions was made by the Medical Officer of Health in May 1956, and in June 1956 the Town Engineer informed the Town Clerk that the preparation of the redevelopment scheme would commence when the aerial survey was available (owing to the survey of the site of the Kariba Dam this aerial survey was delayed and did not become available until much later). It was further decided in August 1956 that provision should be made to include the Redevelopment area in the first part of the Sewerage Scheme then being planned.

In September 1956, the Town Clerk in writing to the Commissioner of Local Government, made reference to the fact that the Redevelopment Scheme should not commence prior to the arrival of the Manager of the newly constituted African Housing Board.

On 5th February 1957, the Manager of the African Housing Board met the African Affairs Committee of Council and advised that no redevelopment scheme should be submitted at present and that the houses should be permitted to fall into disuse.

In June 1957, the fact that the Department of Civil Aviation might be interested in the Redevelopment Scheme became known.

In July 1957, the Medical Officer of Health again reported on conditions to the African Affairs Committee.

On 7th August 1957, the Director of Civil Aviation wrote stating that no houses should be permitted within the airport approach funnel: this funnel covered the majority of the area occupied by the Main African Housing Area and had been scheduled for redevelopment use.

In October 1957, the Redevelopment Scheme for the Main African Housing Area was abandoned due to the area lying within the Airport approach funnel.

Further, in November 1957, the African Affairs Committee formally agreed on the areas within the Main African Housing Area which should be allowed to disintegrate first.

On 17th January 1958, a precis of the conditions in the Main African Housing Area was tabled at a meeting with the then Member for Lands and Local Government: after this meeting the statement was issued to the effect that the Main African Housing Area would be demolished within five years and the people rehoused.

In May 1959, some 1,000 rondavels were demolished and the worst area ceased to exist.

By mid 1961, the evil Kimberley Brick Housing I should have been demolished.

At the time of writing, the future of the Kimberley Brick II types of house is uncertain.

This incredible delay can only be attributed to a lack of sense of urgency on the part of Governments, both Territorial and Local, to the sanitary problems of the less favoured members of the Community.

Such lack of sense of urgency, however, is not confined to Northern Rhodesia. In Glasgow slums in 1951, in a survey of 388 houses, in 15 instances, 8 families were sharing one lavatory and in 46% of the apartments there were 3 persons per room or worse. (Ferguson and Pettigrew 1954). Skone (1957) reported among coloured immigrants in West Bromwich a ratio of 1.77 persons per room, compared with 0.84 per room for the town as a whole.

2.3. Economics of African Life

As it is generally accepted that undernutrition and malnutrition are important factors in mortality in developing countries, it is important to examine the economics of family life among the Africans. The absence of unemployment relief and other social benefits for this section of the community increases the possibility

of genuine starvation conditions which would materially affect the mortality rates. Bennett (1960) found no less than 7% of deaths in Polela directly attributable to the social consequences of a death in the family during the previous year.

2.3.1. <u>Minimum Standards of Living</u>

The generally accepted yardstick by which economic conditions are measured in Southern Africa today is the Poverty Datum Line (P.D.L.) (Batson 1942). This figure, which naturally varies with the size of family, is the absolute minimum income necessary to preserve the particular family unit in health and decency: while taking account of expenditure on food, clothing, fuel, light, tax, etc. the figure given is usually exclusive of rent the payment of which with certain rare exceptions is the responsibility of the employer in Northern Rhodesia: the exceptions are of little importance at this stage but rent payments generally will be discussed later in this chapter.

The P.D.L. is the best figure yet available in social studies of the African, but suffers from two major defects:-

1. The P.D.L. is based on the assumption that the African will buy to his best advantage: it does not make allowances for ignorance, nor does it take into account the actual spending and living habits of the African.

2. The figures used to assess spending on clothing, fuel and light are arbitrary and the assessment of the amounts for these items varies considerably from one investigator to another.

To allow for wastages, a figure known as the Effective Minimum Level (E.M.F.) has also been used: the E.M.F. is usually taken as 150% of the P.D.L.

Bettison (1960) worked out the P.D.L. in Lusaka for the period 1957-59 on the basis of an intake of 3,100 Calories per man unit per day, including 110 Grams. of Protein but this figure differs somewhat from those of Kay (1960) working in the Fort Roseberry urban area in 1959.

Both sets of figures which are exclusive of house rent, are

given in Table 2.6., and the marked differences merely serve to illustrate the difficulties of assessing a P.D.L. satisfactorily.

2.3.2. <u>The Income</u>

2.3.2.1. <u>Income Distribution</u>

In May 1959, a survey was carried out by staff of the Ndola Municipal African Welfare Department of wages of inhabitants in Chifubu and Kabushi African Housing Areas, and in the Modern Housing II area of the Main African Housing Area. The sample comprised 10% of householders, and was carried out primarily to ascertain how much was being spent on fuel and light: from these results it was hoped to assess the charges that should be made if electricity were supplied to the areas.

The gross wages were ascertained but no account was taken of whether

(a) a whole or part of the rent due was paid from this sum

(b) any other income was received.

The figures from this survey, together with those of Bettison (1959) and Kay (1960) for wages and food allowance only are given in Table 2.7.

The much higher levels in income found at Ndola may be attributed to the fact that the Ndola survey did not cover unauthorised housing or the whole of the Main African Housing Area, as it was not intended to supply these areas with electricity: it is in these areas that the majority of low paid workers reside.

2.3.2.2. <u>Average Wage</u>

The average wage received is somewhat of a snare in considering economics in an African Community as it does not indicate the number of wage earners whose wages are below subsistence level. However, as figures for an average wage are available, these are given in Table 2.8.

2.3.2.3. <u>Numbers earning less than £5 per month</u>

Whatever standard is adopted for the P.D.L., the fact remains that any married couple with one child will inevitably be below subsistence level if the money available to them is less than

£5 per month. The percentage of persons earning less than £5 per month is, therefore, a very fair index of the numbers in a community who are forced

(1) into inadequate diet

(2) to supplement their earnings or food supply or both from other legal or illegal sources.

These percentages are given in Table 2.9.

The apparent higher wages paid in Ndola are again noticeable in this table, but as pointed out above, the sample is not fully representative.

2.3.2.4. Guaranteed Minimum Wages

In certain trades and industries, a guaranteed minimum wage is paid. As at 1st January 1960, the minimum monthly wages payable were as follows:-

	£	s.	d.
Copper Mines (less 15s. to 22/6d. housing deduction) (7/1d. per shift)	10	12	6
Hotel Trade	5	6	0
Retail Trade	5	0	0
Building Industry .. .. .. (3/8d. per day)	4	19	0
Local Authorities .. .. .. (3/9d. per day)	5	1	3

In all instances, other than in the case of the Coppermines, the employer paid for the housing.

Clearly such wages with the exception of the Copper Mines are below subsistence level for family life unless supplemented by overtime payments or income from other sources.

2.3.2.5. Ration Money

It has been customary for employers to issue weekly rations to African employees. The African employee, however, is not fond of the system and in almost all instances, the ration issue has been dispensed with and replaced by a cash allowance paid weekly or incorporated in the monthly wages.

Ration Allowance is now paid separately in so few instances that the validity of the above figures is not challenged.

2.3.3. The Expenditure

2.3.3.1. Rents

In Northern Rhodesia there is a statutory obligation on employers of African Labour to provide housing accommodation for their employees: such accommodation may be temporary or permanent, and does not necessarily have to be within the Municipal African Housing Area. In practise very few employers other than contractors with seasonal labour forces, build their own houses for African employees: if they abide by the law, they usually fulfil their obligations by renting Municipal Housing accommodation if available.

Building and other contractors employing large seasonal labour forces have been in the habit of housing their labour in temporary housing areas built by themselves: all too frequently these houses have assumed a permanent nature and turned into a shanty town for squatters and demolition has been effected only with difficulty.

Under certain strict conditions, specific employers may be absolved from their responsibility to provide housing for their employees: such absolution has been given on so few occasions in Ndola during the period under review that it can be ignored in making conclusions.

Not every employer of labour fulfils his legal obligations to provide housing accommodation for his employees, and during the years in question, there have been a number of instances where employers have been prosecuted for failing to comply with the law. Shortage of municipal housing does not make it easy to enforce the law, but the extent to which Africans have been contributing to their own rents was shown in the survey carried out in 1958 (Hancock 1958).

This survey was carried out after riots in protest against rent increases had occurred in the Main African Housing Area and two rioters had been shot. The survey was confined to the Main African Housing Area and was designed specifically to ascertain how much the increase in rents had affected the population. A 10% sample was taken and it was ascertained that of 435 Householders

172, or 39.4%, were paying their own rents, 50 of these (11.5%), were genuine self employed persons, but the remainder were in employment and thus receiving a consolidated wage.

Before the rent increases, 28 or 16.5% of the 172 were paying over 20% of their wages in rent, two householders paying as much as between 65 and 70% of their wages: after the overall rent increases, 62 or 36.5% of the 172 spent more than 20% of their wages on rents.

For this group of 172 self payers, the contribution in rents went up from 15.2% of gross wages to 20.2%.

It is difficult to assess the number of self payers in other areas:- self employed persons have generally tended to congregate in the Main African Housing Area where rents are,lower although some of the Africans in the higher income brackets have moved to areas with better housing.

The number of houses available in all housing areas in each rental category are given in Table 2.10. The effects of the large rent increases in April 1958 are clearly shown in this table.

Nevertheless, Ferguson and Pettigrew (1954) found that in Glasgow slums in 1951 monthly rents payable averaged

1 room apartment	1	4	11
2 " "	1	10	4
3 " "	2	3	4

which figures compare not unfavourably with those in Ndola.

2.3.3.2. Beerhalls

No description of any aspect of African life would be complete without reference to beer. Millet or Kaffir Beer has an important place in African life and has its place in many rituals. In the towns beer drinking tends to lose its social and ritual significance and degenerates into consumption of alcohol under the rigid control of the authorities. Beer brewing by the wife becomes illegal, family beer drinks are discouraged, and the adult males find their way to the Beer Halls. Although the sale of spirits to Africans is prohibited, European type beer and wines are freely available and consumed in large quantities.

The expenditure on Beers and Wines in Ndola from 1957/59 is shown in Table 2.11.

During 1957, the Municipality brewed its own Kaffir beer, but from 1958, supplies were bought from a commercial concern whose product was more to the African taste: this change is reflected in the diminution in moneys spent on European type beer, and the increase in purchases of Kaffir beer. The change is to be welcomed as Kaffir Beer is infinitely more nutritious than European type beer, the analysis of the local product being shown in Table 2.12.

Unfortunately, the beer halls are used chiefly by the adult male, the adult female consuming only small quantities, and the children none at all: further, in towns the children do not have access to the beer residues which traditionally go to them when beer is brewed in rural areas, especially so among the Bemba and related tribes. In towns, for practical purposes, the nutritional benefits of beer drinking accrue only to the adult male who is the person least at risk so far as nutritional disorders are concerned. Such circumstances lend force to the arguments of the F.A.O. 2nd Committee on Calorie Requirements (1957) that in nutritional studies, the calories obtained from alcoholic beverages should be kept separate from those obtained from other sources. Further, although beer drinking in urban areas results in the unequal distribution of calories among members of the family, Tanner (1956) has shown that the use of cereals in beer making is generally wasteful of what calories are available.

A more formidable problem, however, is the percentage of income or wages spent on beer: as stated above, almost all beer is now consumed in Beer Halls, as a result of which home brewing (which is illegal) has virtually ceased: less residues are available for the children and the head of the household requires more money to satisfy his thirst. The importance of expenditure on beer and other alcoholic drinks could be checked in Chifubu and Kabushi African Housing Areas as a result of the fuel and light survey mentioned above.

Chifubu is relatively isolated and the number of visitors is small enough not to spend appreciable sums of money in the Beer Halls. The average total wage of 375 householders for April 1959 was £8 1s. 11d. per month, the number of occupied houses approximately 3,988, and the income in Beer Halls in Chifubu £6,617: thus approximately 20.5% of wages were spent in Beer Halls during that month. In Kabushi African Housing Area the percentage of wages spent was 15.9% but the true figure would be lower as Kabushi African Housing Area receives many more visitors than Chifubu and an unknown percentage of Beer Hall income would be received from such visitors.

These figures serve to emphasise the inadequacy of the P.D.L. as built up by Bettison (1959) where no allowance whatsoever was made for Beer Hall expenditure. The popularity of the commercially produced Kaffir Beer accounts largely for the large amounts spent. Kay (1960) found expenditure on Liquor and Tobacco to be between 4.1% and 7.7% of total expenditure, the highest percentage being in the £5 10s. per month income range: the actual amounts ranged from 1/5.1 to 7/1.2 per month. Thompson (1954) in Lusaka found the amount spent on liquor only to vary between roughly 15/4d. per month in Chilenje (21.9% of average wage) to roughly 10/- per month in Main African Housing Area (25.4% of average wage).

2.3.3.4. <u>Fuel and Light</u>

As far as is known, no surveys of the amount expended on heating and light have been carried out in Northern Rhodesia, other than that carried out in Ndola in April 1959.

The amounts spent varied enormously and seemed to bear only a slight relationship to the total wages. In Chifubu the average amount spent on these items was £1 8s. 2d. per month out of an average monthly wage of £8 1s. 11d. - i.e. 17.4%. In Kabushi the figures were £1 17s. 4d. out of £9 6s. 11d. - i.e. 20.3% and in the small section of the Main African Housing Area £1 5s. 7d. out of £7 15s. 6d. - i.e. 16.4%.

2.3.3.4. <u>Foodstuffs</u>

No assessment is possible of the amounts spent on foodstuffs, and any attempt to ascertain such figures would be fraught

with danger. It can only be said that as in other countries the higher the wage or income, the less the proportion spent on food. Smith (1957) found that retired miners in England with a free house and free coal, in 3 cases out of 4 spent more than 50% of their income on foodstuffs.

2.4. **African Customs Affecting Income and Expenditure**

2.4.1. **Chilumba or Swapping of Wages**

This custom is very well described by Mwewa (1958). It is widespread in Northern Rhodesia, and extends throughout the whole of Southern Africa.

By this custom, a group of wage earners usually numbering about 4 - 6, pool the whole or greater part of their monthly earnings: one member of the group collects this money each month and uses it to buy an item of capital value such as a bicycle or suit of clothes. The remainder of the group live on a mere pittance until it is their turn to collect the 'kitty'.

This custom is liable to have the direst consequences on the remainder of the family, who may well starve in the absence of assured income.

This custom may be associated with the following:

2.4.2. **Ration Money**

In the few circumstances where the employer pays weekly ration money or some other form of allowance, it has become the custom for the wage earner to appropriate the monthly wage entirely to his own use, paying out the ration money or other weekly income to his wife, who is expected to feed both her husband and family and to clothe herself and children with this amount.

Rarely, if ever, does the weekly payment exceed 7/6d. which is completely inadequate for these purposes.

2.4.3. **Gardens**

Very little research into 'gardens' has been carried out in Northern Rhodesia, but their importance for persons living in a state of borderline malnutrition cannot be exaggerated.

These 'gardens' are situated in any unoccupied land in or adjacent to the Municipality: they are situated on road verges, in

open spaces, in parks, in waste land, in fact in any land that can possibly be considered suitable for planting purposes.

It has been pointed out that in and immediately adjacent to Ndola there were 3.5 square miles of 'gardens' in 1947, which increased to 11.5 square miles in 1954. (Northern Rhodesia: ~~Department of Agriculture~~ 1956). The personal experience of the author is that these areas under cultivation have increased steadily year by year. Kay (1960) found that 25% overall of his group kept gardens, the percentage rising to 46% as stability increases. Thomson (1954) found percentages of 56% of households in Main African Housing Area and 71% of those in Chilenje maintained gardens.

There appears to be little attempt made to cultivate intensively the areas of ground belonging to each individual house but the women particularly travel considerable distances on foot in order to cultivate their gardens. At the beginning of the rainy season and particularly if the rains are good, 'planting' rains, many of the houses in the African Housing Areas are deserted during the day and large numbers of women and children can be seen at work in these gardens. For reasons that have not been determined, theft from these gardens appears to be virtually non-existent.

The principle crops grown are maize and cucurbits, with varying amounts of millet, ground nuts and other vegetables. The harvesting of these crops varies but the diagram in Figure 3.1. gives a fair indication of the times of planting and harvesting.

The importance of these gardens in relation to nutrition will be discussed in Chapter 12.

2.5. African Customs

2.5.1. General

It is impossible to assess accurately the importance of customs and taboos in urban African family life today. Some will say they are all important, others will say that education has resulted in such customs being of little importance. The importance has been well discussed by Gluckman (1955) and Bennett (1960) found religious prejudices important in work at Polela. The failure to bury stillbirths in the ordinary cemetry at Ndola ~~[illegible]~~

indicates that tribal customs are still of considerable importance.

Certainly, an examination of current anthropological literature relating to Northern Rhodesia reveals a complete dearth of information of direct value to a medical administrator. In other developing countries work is now proceeding to ascertain the likely reaction of persons to proposed medical schemes based on Western European medical concepts: such work is of the most vital importance as it is essential to know the reaction of the general population before proposed schemes are introduced in order that the difficulties may be overcome in advance or circumvented. Only too often the difficulties are only discovered when the scheme has been introduced.

As indicated, information in these matters for tribes in Northern Rhodesia is virtually non-existent, and will remain non-existent until such time as there is much closer co-operation between the medical profession and the anthropologists - co-operation at present sadly lacking. The work of Foll (1959) in upper Burma is a good example of the type of investigation required elsewhere in the world.

An attempt was made to elucidate the customs relating to pregnancy and childbirth which would be of importance for a medical administrator to know, but co-operation was only forthcoming from members of the Bemba and Lozi tribal groupings. This information could not be checked, but is given here as offering some indication of the importance and manner in which tribal customs can impinge on medical schemes. The notes are necessarily short as it is not intended to discuss in detail the anthropological significance of the customs.

2.5.2. <u>Bemba Customs</u>

2.5.2.1. <u>Pregnancy</u>

As soon as the woman knows she is pregnant, she informs her mother or grandmother before informing her husband. A small string of beads is attached to her wrist to indicate that she is pregnant.

No food taboos operate during pregnancy.

Sexual intercourse with the husband ceases at approximately the sixth month and resumes about one month after delivery.

2.5.2.2. Delivery

Delivery is conducted by a close relative of the woman but not by her mother. After the birth the umbilical cord and placenta are buried in the immediate vicinity of the hut. Great importance is attached to the bad luck that will ensue if anyone other than the midwife sees the cord and placenta after delivery.

2.5.2.3. Early Life of the Child

The baby is strictly segregated after birth until a cleansing ceremony at approximately seven days of age when pieces of roots may be tied round the baby's arm or the baby may be bathed in an infusion of the roots. Second and third ceremonies take place at approximately one month of age and one year of age.

2.5.2.4. Difficulties in Labour

If the labour is difficult the cause lies in adultery by the husband during his wife's pregnancy.

If the woman dies prior to delivery, the cause is undoubtedly the adultery of the husband who is punished by being compelled to remove the child from the mother prior to burial.

If the woman dies during or immediately after the labour but the child lives, the cause is adultery by the woman during pregnancy and the husband or his relatives take no further interest in the child.

2.5.2.5. Stillbirths

The stillbirths are not considered to be due to any misbehaviour by father or mother but is not looked upon as an ordinary birth and special cleansing ceremonies are necessary for the mother about one month after the delivery.

The body of the stillbirth can be buried anywhere but must not under any circumstances be buried in the ordinary cemetery

If the child has lived only for a few seconds it is nevertheless looked upon as a live birth and not treated in the same way as a stillbirth.

2.5.2.6. Ordinary Deaths

No ceremonies of particular significance take place in respect of ordinary deaths, with the slight exception that when either parent of twins dies however long after the birth of the twins such parent must die outside the village. Such person, however, is not abandoned but receives care and attention before the death takes place.

2.5.3. Lozi Customs

2.5.3.1. Pregnancy

The pregnancy is normally kept secret until such time as it begins to become obvious to everybody concerned. At this stage the mother-to-be is visited by an old woman who carries out certain simple ceremonies and gives her instructions in how to conduct herself during pregnancy.

Food taboos are enforced and the woman is not permitted to eat eggs, chickens and certain types of fish.

Sexual intercourse ceases at approximately the sixth month and should not commence until approximately one year after the birth of the child. No "concubines" are provided for the husband during this period.

2.5.3.2. Delivery

Delivery is conducted in the "pantry" to the rear of the living quarters and is conducted by one of the older female relatives. The umbilical cord and placenta are buried under the floor of the "pantry".

2.5.3.3. Early Life of the Child

The umbilical cord is dressed with an ointment of burnt fruit mixed with oil and fat.

The mother and baby are segregated after the birth but may be seen by certain close relatives during the period. This segregation continues for 1-2 weeks at the end of which time another old woman visits the house and gives a name to the child. Thereafter, the woman and her child may mix freely in the community.

2.5.3.4. Difficulties in Labour

If the labour is prolonged there are three possible causes:

(a) Differences between the husband and wife.

(b) Witch-craft.

(c) Adultery by the husband during the pregnancy.

A Witch-doctor must be consulted to determine which cause is operative and to provide the necessary medicines to effect a cure.

If the woman dies in labour before the child is born, again the Witch-doctor must be consulted to determine which of the following three causes is operative.

(a) Adultery by the husband during the pregnancy.

(b) The woman has committed adultery during the pregnancy and has failed to confess during the labour. This is considered to be one of the commonest causes of death during labour and normally every effort is made by the relations to elicite a confession from the mother. Methods used to elicite such a confession may be extremely painful.

(c) Witch-craft.

In the event of the woman dying in labour but the child being born alive, the cause is witch-craft by some old person which in previous days almost certainly resulted in such person being sought out and killed. In present circumstances complaints are laid before the Chief.

2.5.3.5. <u>Stillbirths</u>

These are attributed to misbehaviour by both husband and wife during the course of pregnancy. Misbehaviour may be mere failure by the woman to carry out the instructions given to her during pregnancy or to adultery by either husband or wife.

The stillbirth is not considered a normal child and is removed from the house at night and buried in great secrecy outside the ordinary cemetery with only one or two persons present at the burial.

In the event of the child being born alive but dying before the naming ceremony has taken place it is not considered to be a proper child and the body is disposed of in the same manner as a stillbirth.

2.5.3.6. Ordinary Deaths

No special ceremonies of any importance take place after a death.

2.5.4. Commentary

From the above it will be noted that considerably more importance is attached to witch-craft by the Lozi than by the Bemba. In both instances considerable difficulty would be encountered in overcoming the customs associated with stillbirths and in the case of the Lozi with neonatal deaths.

In both tribes the customs associated with difficulties in labour would tend to make early reference to hospital difficult.

In the case of the Lozi the secrecy attached to early pregnancy would make attendance at a neonatal clinic during this period extremely difficult.

Neither tribe has very strong feelings about providing specimens of blood or excreta for pathological examination.

2.5.5. The Witch Doctor

It is difficult to say how many Africans normally consult the Witch-doctor first in the event of sickness. No studies are available in this problem but certainly African medicine is a highly developed craft in rural areas. The medicines available in the Mankoya district have been well discussed by Symon (1959) and the lethal effects of witch doctors' remedies in South Africa have been reported by Brink et al (1955) and by Grusin (1955). Bennett (1960) has also reported on the effects of religious prejudice against Western Medicine in a rural area in South Africa.

TABLE 2.1.

NUMBER OF AFRICANS IN EMPLOYMENT, NDOLA, MAY 1956

Census of Africans in Employment 1956

	Males			Females
	Adults	Juveniles	Total	
Municipal Area	19,488	696	20,184	237
Peri-urban Area	1,725	45	1,770	29

TABLE 2.2.

AFRICAN POPULATION, NDOLA RURAL DISTRICT, 1959

(Provincial Administration 1960)

	Adults	Children
Male	17,195	10,513
Female	15,355	10,601

Taxable males living at home - 6,429

TABLE 2.3.

TRIBAL COMPOSITION OF HEADS OF HOUSEHOLDS IN NDOLA MUNICIPAL AFRICAN HOUSING AREAS

Language Group	District	African Housing Area				
		Main	Kabushi	Chifubu	Sub Total	Total
Lamba	Ndola					
	Lamba	260	550	300	1,110	
	Sivaka	85	110	200	395	1,505
Bemba	Northern Province					
	Bemba	850	850	780	2,480	
	Bisa-Ua	330	270	370	970	
	Lunda of Kazembe	190	180	200	570	
	Ushi	120	100	250	470	4,490
Mambwe	Northern Province					
	Mambwe/Lungu	50	40	20	110	
	Winamwango/Wiwa	70	80	25	175	285
Tonga	Southern Province					
	Tonga/Ila	48	150	150	348	
	Lenje	95	80	450	625	973
Nyanja	Eastern Province					
	Chewa	120	180	800	1,100	
	Ngoni	35	440	550	1,025	
	Nsenga	184	220	450	854	2,979
Lunda	Western Province					
	Lunda	35	35	50	120	
	Chokwe	30	120	70	220	340

TABLE 2.3. Continued

Lozi	Barotseland Lozi	50	70	150	270	270
Kaonde	Kaonde	55	180	150	385	385
Various	Nyasaland	260	255	265	780	780
Various	Congo Republic (Kasai)	160	65	50	275	275
	TOTAL	3,027	3,975	5,280	12,282	12,282

TABLE 2.4.

SAMPLE - AFRICAN POPULATION IN NDOLA, 1951

(Clyde-Mitchell 1954)

Age	Male		Female		Total	
	Persons	%	Persons	%	Persons	%
0 - 4	107	17.0	107	21.2	214	18.9
5 - 14 -	71	11.3	89	17.6	160	14.1
15 -	451	71.7	309	61.2	760	67.0
TOTAL	629	100.0	505	100.0	1,134	100.0

TABLE 2.5.

AGE STRUCTURE - AFRICAN POPULATION, LUSAKA 1957
(Bettison 1959)

Age	Male		Female		Total	
	Persons	%	Persons	%	Persons	%
0 - 4	4,875	15.8	5,262	23.9	10,137	19.2
5 - 9	2,940	9.6	2,783	12.6	5,723	10.8
10 - 14	1,957	6.4	1,679	7.6	3,636	6.9
Over 14	20,999	68.2	12,325	55.8	33,324	63.1
TOTAL	30,771	100.0	22,049	99.9	52,820	100.0

TABLE 2.6.

POVERTY DATUM LINE

	Bettison (1960) Lusaka			Kay (1960) Fort Roseberry		
Single Person	4	7	5	2	5	4
Married Couple	7	13	$6\frac{1}{2}$	3	16	9
Married Couple + 1 Child (0-4)	9	10	2			
Married Couple + 2 Children (0-4) (5-9)	12	16	$10\frac{1}{2}$	6	11	$11\frac{1}{2}$
Married Couple + 3 Children	14	11	0			
	Food - 13/$6\frac{1}{2}$d. per man unit per week					

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TABLE 2.7.

INCOME LEVELS

	Fort Roseberry Kay (1960)		Lusaka Bettison (1959)			Ndola (1959) Chifubu AHA				Kabushi AHA			Modern II, Main AHA			All Areas	
No. of Households	573		1714				375			326			56			757	
Under £3- 9-11			172			- 3-19-11	8			8			1				
- 4-19-11	208	36.3%	539	711	41.5%	- 4-19-11	68	76	20.3%	21	29	8.9%	10	11	19.7%	116	15.3%
- 6- 9-11			331			- 5-19-11	60			42			12				
						- 6-19-11	59			49			11				
- 7-19-11			180	511	29.8%	- 7-19-11	44	163	43.5%	32	123	37.7%	1	24	42.9%	310	41.0%
- 9- 9-11			110			- 8-19-11	28			35			5				
						- 9-19-11	26			34			3				
- 10-19-11			127	237	13.8%	-10-19-11	26	80	21.3%	26	95	29.1%	4	12	21.4%	187	24.7%
- 12- 9-11			73			-11-19-11	10			7			-				
						-12-19-11	7			22			2				
- 13-19-11			49	122	7.1%	-13-19-11	4	21	5.6%	6	35	10.7%	4	6	10.7%	62	8.2%
- 19-19-11			97		5.7%		20		5.3%	33		10.1%	2		3.5%	55	7.3%
£20 & over			36		2.1%		15		4.0%	11		3.4%	1		1.8%	27	3.5%
	573				100.0%				100.0%			99.9%			100.0%		100.0%

TABLE 2.8.

AVERAGE WAGES

	Average Income including allowances	Average Wage including food allowance	Average Wage for sample
Bettison 1959			
Lusaka			
Better quality Municipal	9 14 11	8 13 10	
Other Municipal	6 7 9	5 19 5	
Private Housing Areas	6 18 5	6 1 0	
Unauthorised Housing	7 2 5	6 13 0	
All Areas	7 19 5	7 2 5	
Ndola 1959			
Chifubu			8 1 11
Kabushi			9 6 11
Main (Modern Housing II)			7 15 6

TABLE 2.9.

FAMILIES WITH AN INCOME LESS THAN £5 PER MONTH

Bettison 1959	
Lusaka	41.5%
Ndola 1959	
Chifubu	20.3%
Kabushi	8.9%
Main (Modern Housing Type II)	19.7%
Combined	15.3%
Kay 1960	
Fort Roseberry	36.3%
Northern Rhodesia 1958 (Excluding Females, Juveniles, Farm, Mine Workers of all Types, Railways and Government Employees)	
Non-Labourers	26.8%
Labourers	62.4%
All	46.6%
Northern Rhodesia 1960. (As Above)	
Non-Labourers	12.4%
Labourers	53.4%
All	30.2%

TABLE 2.10.

AFRICAN HOUSING RENTS
MARRIED ACCOMMODATION

	12/-	15/-	20/-	22/6	27/6	38/6	41/6	42/6	45/-	50/-	52/6	53/-	54/-	56/6	57/6	61/6	64/-	69/-
February, 1957	43	1291	2400			2330			162	16								
January, 1958	26	1255	2399				1006	533	1856	12	240				18			
April, 1958	25			1233	2394					1		1005	817	1856		102	290	18
January, 1959	21			1076	2376							1395	1689	1835		682	380	18
December, 1959	4			67	2370							1425	1911	1835		712	463	18

SINGLE ACCOMMODATION

	23/-	40/-
February, 1957	444	
January, 1958		
April, 1958		444
January, 1959		870
December, 1959		810

TABLE 2.11.

BEER

	Capital Expenditure on Beer Halls	Gross Income from Sale of Kaffir Beer	European Type Beer	Wines	All Types
	£	£	£	£	£
1957	101,791	41,706	108,304	5,403	155,413
1958	15,120	142,720	95,339	3,785	241,845
1959	15,909	218,752	69,366	2,117	290,235

TABLE 2.12.

AFRICAN BEER ANALYSIS

Solids	- 12 - 14 gms per 100 ccs.
Protein	- 1 - 1.2 gms per 100 ccs.
Acidity	- 6.5 cc to 8.5 cc NL solution of NaOH to neutralize 100 ccs Beer
Alcohol	- Average 3% to 3.5%
Reducing Sugars	- 0.8%
Thiamine (X/100g)	- 150
Riboflavin (X/100g)	- 90
Nicotinic Acid (X/100g)	- 500
Ascorbic Acid (mg/100g)	- 0.05

One gallon beer thus constituted gives calorific value of 2,750 calories.

FIG. 1.3.

NDOLA RURAL NORTH.

	Spring-Hot and Dry.		Summer - Rains					Autumn-Dry		Winter-Cold & Dry.		
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.
Kaffir Corn.					In	short	supply		Soft	Dry Ripe		
Maize.				In	short	supply	Green			Dry Ripe		
Millet.										Soft		Dry
Cucurbits.												
Peanuts.												
Beans Fresh.												
Legune Leaves Fresh												
Sweet Potatoes												
Cassava.												

CHAPTER 3

MEDICAL FACILITIES IN NDOLA

3.1. Hospitals

3.1.1. Ndola Hospital

3.1.1.1. General

Throughout the period of this investigation, hospital facilities for Africans have been available at Ndola Hospital. The number of beds available and the in-patient daily average are given in Table 3.1. (Federation of Rhodesia and Nyasaland: 1960 a). The hospital admits all types of case, there being no separate hospital for cases of Infectious Disease, and included in the number of beds in Table 3.1., are 40 beds reserved for cases of Tuberculosis.

The drop in the number of beds available in 1959 is not understood: no radical alterations in accommodation took place during this period.

The hospital is old and in general quite unsatisfactory for its present use. A new hospital has been planned but building had not commenced by the end of 1959.

Prior to October 1958, Ndola Hospital was the only Government Hospital on the Copperbelt and served the needs of all Africans other than the employees of the Copper Mining Companies and their dependents for whom special hospitals were provided and staffed by the Mining Companies. It was usual for Africans other than mining company employees and their dependents to be treated in the Mine Hospitals and for such patients the Federal Government paid an agreed daily charge which included the cost of all investigations and treatment.

3.1.1.2. Staff

The Federal Ministry of Health was constantly short of Medical and Nursing staff but was able to maintain the Ndola Hospital staff fairly well during 1957/59.

The Nursing staff included trained nurses of all races except Asiatics, and there were a number of partially trained African orderlies and dressers of various types.

The Medical staff included one Government Surgical Specialist and a number of full time Government Medical Officers, who normally had been qualified for at least two years and had had previous hospital experience although not necessarily in the tropics. In January 1957, there were two such Government Medical Officers in the hospital and in December 1959, there was an establishment for four, although at the time there were two positions temporarily unfilled.

In addition a Medical Superintendent was appointed in early 1959.

The Government Medical staff had other duties to perform in relation to prisons, civil servants, and the non-African hospital beds, and must not be considered as employed solely in the African Hospital, although the majority of their time was spent there.

In addition, the African Hospital was able to call on the services of consultants in private practise on the Copperbelt. All such consultants held higher qualifications in their chosen field of medicine, and throughout the period of the survey consultants were available in general medicine, orthopaedic surgery, midwifery and gynaecology, anaesthesia and epthalmology: since early 1959 consultants in general surgery and in ear, nose and throat work also became available.

The Government Tuberculosis Officer visited at fairly frequent intervals, to advise on patients suffering from Tuberculosis, and there were also visits from private consultants in chest surgery and plastic surgery.

There was no consultant or specialist pediatrician available during the period.

3.1.1.3. Hospital Facilities

The hospital contains reasonable operating theatre, X-ray and physiotherapy facilities, together with adequate medical stores and dispensary.

Government laboratory services have been lamentable, being provided by two or three unsupervised African microscopists. Work

requiring the services of a trained technologist was usually sent to the larger laboratories in Broken Hill or Lusaka before October 1958, and to Kitwe thereafter, although some use was made of a private laboratory established in the town in late 1957.

3.1.2. Llewellin Hospital, Kitwe

In October 1958, a large modern hospital was opened by the Federal Ministry of Health in Kitwe, about 40 miles from Ndola.

During 1959 the number of beds available for Africans at this hospital totalled 189 (Federation of Rhodesia and Nyasaland: 1960a).

As from the time of opening of this hospital, the mine hospitals only accepted non-mining employees and their dependents in the event of emergency.

The Llewellin Hospital served Kalulushi, Bancroft, Chingola, Kitwe, and the surrounding areas, whereas Ndola Hospital continued to serve Luanshya and Mufulira and district only. After some initial problems the system worked well, and patients were sent to the Llewellin or Ndola hospitals without difficulties.

3.2. African Clinics, Ndola

3.2.1. General

In the Main African Housing Area, there is one clinic operated by the Federal Ministry of Health in a converted house of thoroughly unsatisfactory design.

The total monthly attendances are given in Table 3.2.

In the Kabushi African Housing Area, there is one clinic of modern design built in 1956, and operated by the Federal Ministry of Health.

Monthly attendances at this clinic are given in Table 3.3.

In the Chifubu African Housing Area a clinic has been operated in unconverted African single quarters by the Federal Ministry of Health. This clinic has been described by the Secretary for Health as a first aid post and the refusal by the Federal Ministry of Health to accept any new Council clinic building in this Housing area as being a replacement clinic, led to long arguments and delays in the construction of more suitable premises. In 1959, the Council under duress agreed to construct a clinic and staff and operate it themselves, but the

buildings are unlikely to be complete before Mid 1961.

The monthly attendances at the Chifubu First Aid Post are given in Table 3.4.

In addition, the Federal Ministry of Health operate a small clinic in antiquated premises in a Housing area accommodating Government servants and consisting of approximately 400 houses, all of which are scheduled for demolition. Attendances at this clinic are given in Table 3.5.

There are thus four clinics within the Municipality serving the needs of Africans. Total attendances for the period under review are given in Table 3.6.

There is a further Government clinic in an African township, Twapia, about eight miles outside the Municipal boundaries, as well as clinics in Luanshya and Mufulina.

3.2.2. <u>Clinic Staff</u>

In overall control of the five clinics in Ndola and Twapia, there is one European sister, who is a State Registered Nurse and State Certificated Midwife.

The number of African staff serving the four Ndola clinics only has varied over the period of the survey but in general has consisted of three trained staff (if available), 13 male dressers and five female dressers/midwives.employed as in Table 3.7.

These staff were responsible for dealing with total attendances of 261,586 in 1957, 303,739 in 1958 and 354,834 in 1959. In 1959, assuming a working year of 313 days, this would mean each member of the staff would see 54 patients a day on average.

It is to be emphasised that on not one single occasion during 1957/59 did a qualified medical practitioner attend any clinic to carry out any examination or treatment.

3.3. <u>Private Practitioners</u>

Employees of the Rhodesia Railways and their dependents make use of the Rhodesia Railways surgery where a Railway Medical Officer was in attendance daily to see patients. The service is free.

In the event of such patients requiring hospital admission, they generally but not invariably pass into the care of the Hospital Medical Staff.

General practitioners in private practise established surgeries in Kabushi and Chifubu African Housing Areas, but have not received very strong support: stronger support is given to surgeries established in the town area, and a not inconsiderable number of Africans attend private practitioners particularly after the monthly pay day.

The usual charge made by private practitioners, which charge includes medicines, is 12/6d. to 15/- for the first visit and 7/6d. for subsequent visits. A lesser charge is made if the patient is responsible for obtaining his own medicines from the chemist on prescription.

TABLE 3.1.

NDOLA AFRICAN HOSPITAL

	BEDS	IN-PATIENT DAILY AVERAGE	REFERENCE
1957	219	278.9 *	Page 30
1958	258	270.9 *	Appendix B
1959	156	255.0 *	Appendix B

LLEWELLIN HOSPITAL

	BEDS	IN-PATIENT DAILY AVERAGE	REFERENCE
1959.	189	198.0	Appendix B

* Annual Reports on the Health of the Federation of Rhodesias and Nyasaland 1957 - 1960.
(Federation of Rhodesia and Nyasaland: 1958/1960).

TABLE 3.2.

MAIN AFRICAN HOUSING AREA CLINIC ATTENDANCES

	1957	1958	1959
January	6,730	9,119	9,039
February	6,234	6,943	7,241
March	6,892	6,511	7,365
April	6,409	5,286	7,258
May	6,720	6,023	6,413
June	5,854	4,958	5,596
July	6,431	7,058	5,461
August	9,366	7,786	6,314
September	9,054	6,797	7,066
October	7,107	10,737	6,710
November	8,016	11,445	7,022
December	7,971	11,115	6,829
TOTAL	86,784	93,778	82,314

TABLE 3.3.

KABUSHI AFRICAN HOUSING AREA CLINIC ATTENDANCES

	1957	1958	1959
January	8,189	15,811	8,227
February	6,811	8,883	9,018
March	8,296	8,691	9,678
April	9,584	10,240	8,396
May	10,707	10,188	7,376
June	9,764	5,420	8,152
July	9,960	10,518	7,939
August	12,081	8,776	8,158
September	11,686	9,727	8,826
October	11,042	9,894	7,609
November	10,002	10,189	6,242
December	20,835	6,188	7,561
TOTAL	128,957	114,525	97,183

TABLE 3.4.

CHIFUBU FIRST AID POST ATTENDANCES

	1957	1958	1959
January	-	2,248	6,006
February	-	2,925	7,544
March	-	3,700	9,203
April	-	4,104	11,446
May	-	4,365	13,103
June	1,018	3,649	11,242
July	1,557	3,978	10,083
August	2,255	6,956	8,968
September	2,400	5,208	15,079
October	2,850	5,650	13,971
November	1,786	6,714	10,464
December	1,790	7,173	8,005
TOTAL	13,656	56,670	125,114

TABLE 3.5.

GOVERNMENT SUBURB CLINIC ATTENDANCES

	1957	1958	1959
January	1,844	3,105	3,825
February	2,236	3,891	3,394
March	2,409	4,260	3,284
April	2,780	3,790	3,436
May	2,655	3,185	3,311
June	2,691	809	3,322
July	2,940	3,375	2,763
August	2,870	3,854	4,572
September	2,921	3,263	5,304
October	3,266	2,806	7,503
November	2,667	3,020	5,121
December	2,910	3,408	4,388
TOTAL	32,189	38,766	50,223

TABLE 3.6.

TOTAL CLINIC ATTENDANCES

	MAIN	KABUSHI	CHIFUBU	GOVERNMENT SUBURBS	TOTAL
1957	86,784	128,957	13,656	32,189	261,586
1958	93,778	114,525	56,670	38,766	303,739
1959	82,314	97,183	125,114	50,223	354,834
TOTAL	262,876	340,665	195,440	121,178	920,159

TABLE 3.7.

AFRICAN STAFF DISTRIBUTION

MAIN AFRICAN HOUSING AREA

1	Assistant Dispenser
4	Male Dressers
2	Female Dressers (Midwives)

KABUSHI AFRICAN HOUSING AREA

1	Trained Nurse
1	Male Dresser i/c
5	Male Dressers
2	Female Dressers

CHIFUBU AFRICAN HOUSING AREA

1	Trained Nurse
2	Male Dressers
1	Female Dresser

GOVERNMENT SUBURB

1	Male Dresser

CHAPTER 4

SOURCES AND METHODS

The work on this Survey was commenced in July 1958. In respect of deaths occurring prior to that date, no detailed investigations were possible as the survey was retrospective, but all deaths occurring after that date were investigated as fully as circumstances allowed.

4.1. Records

4.1.1. Burial Register

Under Section 91 of the Public Health Ordinance Cap.126 of the Laws of Northern Rhodesia, it is obligatory to bury the dead in cemeteries where such has been established under the Ordinance, and it is further necessary to comply with any by-laws or rules which have been made by a Local Authority. By-law 90, sub-section 1 of the Ndola Municipal Council ~~further~~ reiterates that no human remains shall be buried except in established cemeteries. Only one such cemetery has been officially established for African burials in Ndola and is situated adjacent to the Main African Housing Area. Four separate sections are available in the cemetery designated General, Roman Catholic, Dutch Reformed and Moslem, in which the bodies are interred in accordance with the religious denomination of the deceased.

Towards the end of 1959, a fifth section for persons belonging to the Free Churches was added, but only one burial took place in this section before the end of 1959, which has been included in the General section for the purposes of this survey.

The first record to be consulted when carrying out this survey was the Burial Register, which is maintained by the Local Authority in respect of all burials in the African cemetery. The information in the Burial Register covers the number of the Burial Permit, the date of burial, the name, age, sex, religious persuasion, residence and place of death of the deceased: such information was on occasions inaccurate or deficient before mid 1958 when control of the register was placed in more responsible hands. Since that time the

accuracy of the entries in the burial register has shown a steady improvement.

4.1.2. <u>Burial Permit</u>

No burial may take place in the cemetery unless a permit has first been obtained from the office of the District Commissioner (Urban). The original permit is filed by the Municipality and the duplicate is filed in the Office of the District Commissioner, together with any additional documents that may have been available to the District Commissioner when issuing the permit. In particular, such documents include the death certificate where one has been issued and any information which may have been made available by the Northern Rhodesia Police. Unfortunately, the information supplied by the Northern Rhodesia Police is usually no more than a statement to the effect that the police are no longer interested in the retention of the body, which may, therefore, be disposed of by burial.

As a result the information relating to sudden deaths or deaths due to violence before mid 1958 is extremely limited. After that date enquiries were made in respect of such deaths and the necessary additional information was usually but not always obtained from the police direct.

In respect of deaths which occur outside hospital, the death is notified to the Superintendent of the African Housing Area in which the death took place, or directly to the Northern Rhodesia Police. In the event of no foul play being suspected, the District Commissioner issues a Burial Permit without a post-mortem examination having been performed.

The informant may state that the deceased was attending one of the African Clinics, but it has not always been easy to check the veracity of such statements.

4.1.3. <u>Hospital Register</u>

Up to the end of June 1959, no separate register was maintained at the hospital of persons dying in the hospital. It was customary, however, to write the word 'died' against the entry of such persons in the Admission Register of the hospital. As will be seen later, this procedure was not always carried out.

Since July 1959, a special register has been kept of all deaths occurring within the hospital, and such register appears to have been maintained in a most satisfactory manner.

The hospital authorities are not responsible for the disposal of the body which is arranged either by the relatives or by the Local Authority in the case of deaths of indigents.

4.1.4. Additional Information

A trained African Social Worker commenced work with the Municipal Health Department in late April 1958, and one of his duties was to investigate all deaths as fully as possible. In particular, he visited the homes of the persons who died, in order to ascertain to the best of his ability the age of the deceased and the nature of the medical attention, if any, received prior to death: it was not possible for this person to visit the homes of the deceased when such homes were outside Ndola.

4.2. Methods of Obtaining Information

The information available from the Burial Register was coded and entered upon the main record form. The information obtained from the Burial Register was then checked against the duplicate copies of the Burial Permit on the District Commissioner's file and any additional information available, was coded and entered upon the record, in particular the cause of death when ascertained was noted.

The hospital register was then checked against the deaths of those persons stated to have died in hospital, and further, any additional persons stated in the hospital register to have died were checked against the entries in the Burial Register and District Commissioner's file.

Finally, any information available from the form supplied by the African Social Worker was then entered.

The cause of death was classified in accordance with the instructions in the Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death, Seventh Revision (1957), and in addition, a code was added to indicate whenever mention was made on the death certificate of certain conditions whether classified as the

cause of death or merely a contributory factor. These conditions were:-

(i) any form or type of Pneumonia

(ii) Enteritis or Diarrhoeal Disease

(iii) Tuberculosis, any type

(iv) Meningitis, any type

(v) Cirrhosis of the liver

(vi) Malnutrition, including undernutrition, starvation, specific deficiency diseases but excluding anaemia.

(vii) Pregnancy.

The information, when complete, was punched onto Hollerith cards and processed as required.

4.3. Nature of the Information Received

4.3.1. Date of Burial

This can usually be accepted as accurate, although there may have been instances where the clerk in charge of the Burial Register entered a burial as having taken place on one particular date, when, in fact, the burial was delayed until the following day. Once the authority for burial has been issued by the Municipality, a small peg is handed over to the informant, but no actual check is made that the burial has actually taken place. The fact that a fee is paid when the grave is allocated, would suggest, however, that the burial does in fact take place.

4.3.2. Sex

This information is generally accurate.

4.3.3. Age

The burial clerk was asked to state the age of the person as accurately as possible up to 15 years.

From this information the deaths were coded in the age groups: '0 to 1 year', '1 to 4 years','5 to 14 years' and 'adult'.

Children whose age at death was given as 1 year were classified in the 1-4 years age group.

Unfortunately, it is the custom among the local Africans for relations or friends of the deceased to make the necessary funeral

arrangements. This is particularly important in respect of deceased children where the information was given to the burial clerk by the relations and not by the parents. Indications are that such relations tend to exaggerate the age of the child often to a remarkable degree. In all such cases when the age was determined by the African Social Worker visiting the parents themselves his figure was preferred to that given by the relations of the deceased. It follows that the age of children dying before April 1958 must be treated with a certain amount of reserve.

The failure of the relatives to provide accurate information as to the age has resulted in certain instances in the age being classified as "child"or "infant".

No attempt was made to assess the age by physical examination. The process would have been too time consuming and difficult, although accurate assessments can be made for medico legal purposes (Manuwa 1957).

4.3.4. Religion

It is not proposed to enter into any discussion at this stage as to the depths to which religion affects the daily life of Africans. It can be stated, however, that none of the churches normally made special arrangements for funeral services for members of their church. It follows that those persons whose relations indicated that they wished them to be buried in the Roman Catholic, Dutch Reformed or Moslem sections of the cemetery, probably had firm religious convictions: those persons belonging to such churches who had not strong religious feelings might well have been buried in the General section.

4.3.5. Place of Residence

The place of residence as stated must be accepted with very considerable reserve. Persons living outside Ndola, often make their way to the town to seek medical attention, and stay with relations or friends for a few days within the Municipality before attending a clinic or hospital. When such persons die, the address given was invariably that within the Municipality at which they were staying sometimes for only a few days prior to obtaining medical attention. Further many of the children of true residents spend periods with relations in the rural areas and may be brought back to their parents in town in the

event of sickness which subsequently proves fatal.

It has not proved possible to draw up any criteria by which to define residence in order to overcome these difficulties.

4.3.6. Place of Death

This is generally fairly accurate, although there may be some discrepancies due to the fact that in the early period of the survey, persons were stated to have died in hospital, when in fact they died while in the process of being conveyed to hospital: such persons would normally be classified as dying 'elsewhere'.

4.3.7. Medical Attention Received

Information received here is again open to some doubt. No information was available at the hospital as to whether the deceased had been attending a local clinic previously, although information was usually available if the deceased had been transferred from a clinic or hospital elsewhere on the Copperbelt.

4.3.8. Duration of Illness

An attempt was made originally to record the duration of the illness, but in view of the gross discrepancies in the information received, it was not considered of any value to continue this part of the investigation. In not a few instances, the duration of illness was stated to be less than the actual duration of the stay in hospital.

4.3.9. Last Attendance Prior to Death

In respect of those persons who attended a clinic or private practioner only the Social Welfare Worker attempted to obtain details of the last attendance from the relations; cross checking with the clinic records has not always been easy, due to the poor quality of the medical records retained in the clinics.

4.3.10. Duration in Hospital

This information can be treated as accurate.

Persons dying on the same day as admission have been classified as spending '0' days in hospital, and no attempt has been made to break down the duration of stay into hours.

Similarly, persons dying on the day following admission, have been classified as spending '1' day in hospital even though the actual

duration of stay in hospital may have been only a few hours.

4.3.11. Police Investigation

This has not been easy to code: When a post mortem examination was carried out at the request of the police or when prolonged police investigation took place, the death has been coded as being subject to police investigation.

Instances where the police investigation was cursory or non existent have not been so coded.

4.3.12. Post Mortem Examination

Whenever a post mortem examination took place for any reason, this information has been recorded. Before July 1958 it was not generally customary for medical practitioners to indicate on a death certificate in deaths due to natural causes whether a post mortem had been carried out; information prior to that date is not reliable therefore.

The hospital register of post-mortem examinations carried out was so inaccurate as to be of no value.

4.3.13 Cause of Death

4.3.13.1. The Death Certificate

The international Form of Medical Certificate of Cause of Death as recommended in the Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death Seventh Revision (1957) is used in Northern Rhodesia.

There is provision on the certificate for the medical practitioner to indicate whether a post mortem examination has been carried out, but no provision to indicate whether death was in any way associated with pregnancy.

4.3.13.2. Medical Practitioner Certifying

On very few occasions indeed is the Death Certificate signed by a Government Specialist or by a Private Consultant. The usual signatory is the Government Medical Officer.

It is to be emphasised, however, that all doctors certifying have had at least two years post graduate experience and some considerably more.

4.3.13.3. Method of Classification

Insofar as is possible, the instructions contained in the Manual of International Statistical Classification of Diseases, Injuries and Causes of Death Seventh Revision (1957) have been carried out. Nevertheless, there has sometimes been considerable difficulty in coding deaths particularly of children. The cause of death of the child which has been admitted to hospital in extremis, suffering from malnutrition, gastro-enteritis and terminal broncho-pneumonia, is very difficult to classify.

Wherever possible the following rules have been used:-

(a) If the cause of death was stated to be gastro-enteritis or malnutrition, the death has been classified accordingly.

(b) Where the cause of death has been stated to be broncho pneumonia with gastro-enteritis or malnutrition as antecedent causes, the death has been classified as gastro-enteritis or malnutrition depending upon which of these two conditions appeared on the death certificate: when both appear, the condition mentioned first on the certificate has been used.

(c) Where the primary cause of death was given as "pneumonia" or "lobar pneumonia", the death has been classified to this cause even though it may have been stated to have been due to gastro-enteritis or malnutrition.

(d) Deaths stated to be due to "Carcinoma of the Liver" have been classified in this survey as being due to Primary Carcinoma of the Liver.

(e) The difficulty in separately classifying deaths under 4 weeks of age due to infections has proved insuperable. Unless the certificate makes mention of the words "of the new born", etc., the deaths have been classified with the adult group.

(f) "Malnutrition" has normally been coded to "Malnutrition unqualified" whatever the age of the child although a

different code should be used for children under 1 year. Among Africans it appears to the author to be unjustifiable to use two codes for "Malnutrition" depending on the age of the child and only one code for Kwashiorkor" irrespective of the age of the child. The tendency of doctors to use Malnutrition and Kwashiorkor synonymously, and the difficulties in determining the age of Africans accurately render such distinctions valueless.

4.4. **Discrepancies and Deficiencies**

In checking the various sources of information against one another, a number of discrepancies come to light. It is considered essential to record these in order to obtain a clear picture of the scope of the survey.

4.4.1. Defective Entries in the Burial Register

As information was collected from the burial register, it becomes apparent that certain entries could not be cross checked against other information available. The names or burial permit numbers were duplicates of other entries, or not stated at all, and other gross discrepancies existed. The numbers of such entries were:-

1957	34
1958	11
1959	Nil

These entries probably reflect the incompetence of the clerk in charge of the burial register, a theory which is born out by the fact that 9 of the 11 instances in 1958 took place before changes in the staff concerned were effected.

These entries are not included in the survey.

4.4.2. Burials Authorised Outside the Municipal Cemetery

There is a place on the Burial Permit indicating in which cemetery the burial is to take place. In certain instances burial was authorised in cemeteries outside the Municipal area, usually in places not far from Ndola itself. The numbers of such entries were:-

1957	14
1958	8
1959	34

these entries are not included in the survey.

4.4.3. Failure to Record Admission or Deaths in Hospital Records

In certain instances the admission of a person to hospital was recorded in the hospital register, but there was no entry against the name as having died. A burial permit had been issued together with a death certificate, and there was also an entry in the burial register. On other occasions there was no entry in the hospital admission book at all, but death can be proved to have occurred in hospital from other evidence. Clearly such instances indicated a failure on the part of the hospital authorities to keep proper records, but it must be pointed out that since a proper death register has been maintained by the hospital, such instances have ceased to occur. The numbers involved were:-

	In hospital admission register	Not in hospital admission register	Total
1957	17	24	41
1958	16	-	16
1959	5	-	5

These entries have been included in the survey.

4.4.4. Occurrence of Death Uncertain

In these instances the only indication that death had occurred was an entry in the hospital registers indicating that the person had died. There was no other entry relating to the particular person either in the District Commissioner's records or in the Burial Register.

The numbers involved were quite large being:-

1957	32
1958	24
1959	26

These entries have not been included in the survey.

4.4.5. Unauthorised Burials

In these instances there is an entry in the District Commissioner records, and also in the hospital registers when the death has occurred in hospital, but there is no entry in the Burial Register.

These instances probably relate to persons who have been buried within the Municipality but not in the authorised cemetery, or who have been removed outside the Municipality for burial without permission. Again the numbers involved are considerable:-

1957	82
1958	24
1959	28

These entries also have not been included in the survey.

4.4.6. Discrepancies in the Register of Burial Permits

As burial permits are serially numbered, it is possible to pick out any missing numbers in the records retained by the District Commissioner. The number of missing entries was considerable, and in certain instances the original Burial Permit had been received by the Municipal Council and an entry in the burial register substantiated the issue of the permit.

	No Duplicate Burial Permit Seen		
	No other information Available	Original Burial Permit retained by Municipality	Total
1957	17	8	25
1958	15	4	19
1959	37	6	43

In many instances, the clerk issuing the permits made a clerical error and destroyed the permit, but no-one can say in exactly how many instances.

Only those entered in the Municipal Burial Register have been included in the survey.

4.4.7. Discussion

The burials authorised to take place outside the Municipality (4.4.2.) and the burials which have taken place although hospital records are defective (4.4.3.) present no difficulty in assessment.

But how is an assessment to be made of those where there is doubt whether death actually occurred? These may be assessed as:

(a) Not having occurred at all, with a defective hospital record: that hospital records are defective has already been proved (4.4.3.).

(b) Having occurred but the bodies buried outside the Municipal Cemetery, either within or without the Municipal Area (4.4.5.).

(c) Having occurred and the bodies buried in the Municipal Cemetery, no entry having been made in the Burial Register or burial permit issued.

Insofar as unauthorised burials are concerned, (b) and (c) above apply.

As stricter control has been exercised, the number of burials authorised outside the Municipality increased greatly in 1959. This would suggest that some of the uncertainties in 1957 and 1958 were in fact buried outside the Municipal Area without formal authority.

The only thing that emerges from all these doubts is the grossly unsatisfactory nature of the administrative control of burials of Africans during the period of the survey.

CHAPTER 5

THE AGE, SEX & RELIGION

5.1. The Age at Burial

5.1.1. General

The total burials arranged in age groups are given in Table 5.1.

In the more developed countries, age specific death rates can be calculated and used in epidemiological studies. Morris (1955) has defined epidemiology as "the study of health and disease of populations in relation to their environment and ways of living" but he has also pointed out that in epidemiology, great stress is laid on the population.at risk. It follows, therefore, that although such rates can be used as very delicate indicators of the effects of numerous factors, social and otherwise, which affect the health of the population, their value is dependent on the accuracy of the estimate of number of deaths and the population at risk. In the less developed countries where not all deaths are notified, where census returns are incomplete, and where notification of births and infectious disease falls far below the accepted standard in more developed countries, the use of any form of rate is so misleading as to be useless in assessing a level of health. Crew (1957) has pointed out that in the under-developed countries of the world no single yardstick can be used to determine the level of health of the population but suggests as one indicator the number of deaths of children under 5 as a percentage of total deaths. Certainly this indicator has much to command it: in countries where ages are uncertain, an estimate of age in early childhood is more likely to be correct than an estimate in old age which would have to be made in order to calculate the percentage of deaths over 50 years of age as has been suggested.

Further, the percentage of deaths under 5 years of age will tend to be underestimated rather than overestimated owing to the failure to notify the deaths of very young children who may not be considered as having anindependent existence by certain populations

An underestimate in these circumstances is probably less deceptive than an overestimate.

5.1.2. Burials Under One Year

The number of burials of persons under the age of 1 year are almost identical for the three years of the survey, although as a percentage of all burials they vary considerably from year to year.

It is of some value to estimate the degree of failure to notify and bury in this age group. In 1959, when more accurate records were available, of the 224 burials taking place, 20 were stated to have come from outside Ndola, and the place of residence of a further 9 was not stated. There were thus 195 burials of children normally resident in Ndola.

If the gross African population is accepted as 65,000 (Chapter 2.1.) a crude birth rate of between 40 and 50 per thousand, would result in between 2,600 and 3,250 births in 1959. If all deaths occurring in this age group were recorded as being buried, the Infant Mortality Rate would have been between 75 and 60 per 1,000 live births - a figure generally considered too low in the light of general knowledge of Infant Mortality Rates (Chapter 20.A). If the Infant Mortality Rate were 100 and the lower figure for the birth rate is accepted, there should have been 260 burials during the year - thus approximately 60 - 70 bodies of young children were 'lost' during the year, which is about a quarter of all deaths in this age group.

In order to investigate more fully the age structure of deaths occurring under the age of 1 year, the exact age of persons buried in the last six months of 1959 was ascertained as accurately as possible. These figures are given in Table 5.2.

Thus 45 (41.7%) of the total of 108 occurred under the age of 28 days of whom 16 were born in hospital and died there without leaving the hospital. This group forms a third of all neonatal deaths. Certainly, nothing like a third of all births takes place in hospital although it could be argued that abnormal labours where the risk of neonatal death is high will form a high proportion of hospital deliveries: however, admission in such cases is more often

delayed to the point where delivery results in a stillbirth rather than a living child.

Vital Statistics of Africans are uncommon in Southern Africa, and particularly in respect of this age group may be distorted due to variations of local custom in notifying very early deaths.

Vital Statistics for other towns in Southern Africa are given in Table 5.3. and for other areas in Table 5.4.

This table shows that the present series compares well with the other areas of comparable size. A higher percentage of deaths under one year is the trend in the Union of South Africa, and this may well be due to better death notification in that country, with a proportionate increase in the percentage of this age group to the total deaths. The Chingola figures appear very good, but full details of how they are obtained is not given in the publication.

5.1.3. Deaths Aged 1 - 5

The percentage of burials in this age group has shown considerable variation during the three years of the review, and the reasons are not understood. The low percentage in 1957 is particularly difficult to understand as no social worker was available during that year to pay home visits, and the tendency of relatives to exaggerate the age when arranging the funeral has been the subject of comment in Chapter 4.

In any event the percentages are very high, compared with 0.4% in England and Wales in 1958, and as has been pointed out by de Haas (1956) "Even more than Infant Mortality, pre school age mortality is a yard stick of socio-hygienic conditions in a country or region".

The comparable figures for elsewhere in Southern Africa are given in Table 5.3. and for Ndola are higher than those found in other areas. Only in Rural Kenya (Grounds 1959) do the figures approximate to those found in Ndola.

5.1.4. Deaths Under the Age of 5

These figures are probably the most reliable bearing in mind the difficulty in assessing accurately the age in early years. From Tables 5.3. it will be seen that the figures for Ndola are very

similar to those obtained in other parts of South Africa but rather higher than for the other countries given in Table 5.4. As compared with the United Kingdom the figures are extremely high.

As will be pointed out later in Chapter 6 if figures for Ndola residents only were taken and the periurban areas excluded the percentage would probably be still higher.

5.1.5. Aged 5 - 14

No comparable figures are available for this age group other than those in Guatemala which approximate to those found in Ndola. For the United Kingdom the figures are very much lower.

5.1.6. Adult Deaths

The figures are given in Table 5.1. It is not felt that any comment is necessary.

5.2. The Sex

The sex ratios for burials by the various age groups are given in Table 5.5.

In 1957 and 1959 the virtual absence of any difference in the sex ratio of burials under the age of 5 is as expected and confirms that the parents make no distinction in the care given to children in this age range on sex grounds.

In the 5 - 14 age group the lower number of female burials is difficult to interpret as few male Africans leave their rural areas to seek work in the towns before attaining 15 years. In any event the total number of burials in this age group is comparatively small (Table 5.1.). Among adults the low female-male ratio reflects the predominance of adult males over adult females in the urban area but it is unwise to draw conclusions from these figures as to the overall ratio of the sexes in the urban population as the burials of persons resident outside the municipal area have been included in the survey.

The sex ratios in 1958 do not follow the pattern of the other two years - for which no explanation is forthcoming.

5.3. Religion

In Table 5.6. the burials are arranged according to the

religious section of the cemetery in which they took place.

The percentages for each religious group have remained remarkably constant over the years which could be interpreted as indicating that there had been few conversions from paganism to the Roman Catholic, Dutch Reformed and Moslem Faiths during the period. It is not possible to use these figures to assess the progress or otherwise of the Anglican and other Protestant faiths as followers of these faiths have no separate part of the cemetery set aside for them and are buried in the "general" section. This means of course that not all persons buried in the general section can be considered pagans, although the majority probably are.

All Christian churches teach that parents have a responsibility before God to use their best endeavours to provide adequate care, including medical care for their children: unfortunately, this responsibility may not receive particular attention from the pulpit. It was thought that there might be some value in ascertaining the ages at death for the various religious groups to see whether adherence to any particular faith made any difference to the number of deaths of young children. The figures are given in Table 5.7.

The numbers in the Dutch Reformed Church and Moslem Sections are so small that no valid conclusions can be drawn. In comparing the General and Roman Catholic sections, however, it will be noted that the percentage of burials under five years is much higher in the latter section although the improvement between 1957/59 was such that in 1959 the percentage was actually lower than in the General section. A higher proportion of children dying under five years can be attributed to larger families with a higher proportion of under fives in the population belonging to that religious faith but among urban Africans at present, methods of birth control are not used to such an extent that family size could be influenced by religious persuasion.

Whether religious teaching has anything to do with this marked improvement in the Roman Catholic section can not be ascertained. It is certainly within the realms of possibility.

The possible effects of religious persuasion on child care will be further discussed in Chapter 12 (Nutritional Diseases).

TABLE 5.1.

AGE AT BURIAL

	0 -		Child or Infant		1 - 4 years		Under 5 years	5 - 14 years		15 years -		Not stated	Total	
1957	224	38.1%	8	1.4%	130	22.1%	61.6%	23	3.9%	201	34.2%	20.3%	588	100.0%
1958	220	26.5%	13	1.6%	291	35.1%	63.2%	42	5.1%	264	31.8%		830	100.1%
1959	224	29.5%	3	0.4%	242	31.9%	61.8%	44	5.8%	245	32.3%		758	99.9%
TOTAL	668	30.7%	24	1.1%	663	30.5%	62.3%	109	5.0%	710	32.6%	2.1%	2176	100.0%

TABLE 5.2.

Age at Burial of Persons Dying under the Age of 1 year - Last 6 Months 1959 Only

	Cause of Death Determined	Cause of Death not Determined	Total
Under 1 day	14	-	14
1 - 6 days	16	2	18
7 - 13 days	6	4	10
14 - 20 days	-	-	-
21 - 27 days	1	2	3
Total under 28 days	37	8	45
28 days -	9	5	14
2 months -	7	1	8
3 months	4	5	9
4 months	-	1	1
5 months	1	3	4
6 months	2	1	3
7 months	-	1	1
8 months	2	3	5
9 months	2	3	5
10 months	1	2	3
11 months	2	8	10
Total	67	41	108

TABLE 5.3.

Percentage of Deaths in Various Age Groups - Africa

		0 -	1 - 4 -	Under 5	Total Deaths
Ndola	1957	38.1	22.1	61.6	588
	1958	26.5	35.1	63.2	830
	1959	29.5	31.9	61.8	758
Luanshya	1953	25.0	22.6	47.6	84
Chingola	1959	19.7	18.9	38.6	127
Rural Kenya (Grounds 1959)		31.8	36.4	68.2	110
Pietermaritzburg	1955	38.1	22.9	61.0	223
	1956	38.6	16.5	55.1	176
	1957	44.1	15.4	59.5	247
	1958	42.4	18.4	60.8	250
Vereeniging	1956	42.7	11.6	54.3	536
	1957	30.8	15.4	46.2	435
	1958	40.2	10.8	51.0	575
Kimberley	1958	26.6	n/s	n/s	530
	1959	29.4	n/s	n/s	615
Benoni (Non mining)	1958	46.9	19.8	66.8	1587
Johannesburg (Griffiths 1954/Kahn 1957)	1950/51	37.8	14.2	52.0	5658

TABLE 5.4

Percentage of Deaths in Various Age Groups - Non-African

	0 -	1 - 4 -	Under 5	5 - 14 -	Total Deaths
Ceylon 1952 (Epid. & Vit.Stat. Report 1953)	25.8	20.5	46.3		95,298
Trinadad and Tobago 1952 (Epid. & Vit.Stat. Report 1953)	25.5	6.6	32.1		7,999
Guatemala 1956/57 (Rural) (Behar & Scrimshaw 1958)	27.0	31.0	58.0	5	353
England and Wales 1958 (Registrar General 1960)	3.2	0.4	3.6	.5	526,843
Scotland 1958 (Registrar General 1960 for Scotland)	4.4	0.5	4.9	.6	62,065

TABLE 5.5.

Female/Male Ratio of Burials by Age Groups

Age		0 -	1 - 4 -	Under 5	5 - 14 -	15 -	Over 5
1957	1 :	.982	1.031	.989	.506	.570	.569
1958	1 :	.788	.796	.788	1.000	.600	.645
1959	1 :	.982	.984	.979	.467	.458	.460
TOTAL	1 :	.914	.905	.903	.652	.540	.555

TABLE 5.6.

Burials by Religious Persuasion of the Deceased

	General		Roman Catholic		Dutch Reformed Church		Moslem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
1957	429	73.0	123	20.9	20	3.4	16	2.7	588	100.0
1958	623	75.1	170	20.5	18	2.2	19	2.3	830	100.1
1959	564	74.4	154	20.3	19	2.5	21	2.8	758	100.0
TOTAL	1,616	74.3	447	20.5	57	2.6	56	2.6	2,176	100.0

TABLE 5.7.

Age at Death/Religion

	0 -		1 - 4 -		Under 5 *		5 - 14 -		15 -		Total	
General												
1957	162	37.8%	83	19.4%	251	58.5%	16	3.7%	160	37.3%	429 ≠	100.0%
1958	165	26.5%	210	33.7%	385	61.8%	31	5.0%	207	33.2%	623	100.0%
1959	167	29.6%	175	31.0%	345	61.2%	33	5.9%	186	33.0%	564	100.0%
	494	30.6%	468	29.0%	981	60.7%	80	5.0%	553	34.2%	1616	100.0%
Roman Catholic												
1957	54	43.9%	35	28.5%	91	74.0%	5	4.1%	27	22.0%	123	100.0%
1958	42	24.7%	73	42.9%	118	69.4%	9	5.3%	43	25.3%	170	100.0%
1959	42	27.3%	50	32.5%	92	59.7%	9	5.8%	53	34.4%	154	100.0%
	138	30.9%	158	35.4%	301	67.4%	23	5.1%	123	27.5%	447	100.0%
Dutch Reformed												
1957	5	25.0%	9	45.0%	14	70.0%	2	10.0%	4	20.0%	20	100.0%
1958	8	44.4%	5	27.8%	13	72.2%	-		5	27.8%	18	100.0%
1959	8	42.1%	9	47.4%	17	89.5%	-		2	10.5%	19	100.0%
	21	36.8%	23	40.4%	44	77.2%	2	3.5%	11	19.3%	57	100.0%
Moslem												
1957	3	23.1%	3	23.1%	6	46.2%	-		7	53.8%	13	100.0%
1958	5	26.3%	3	15.8%	8	42.1%	2	10.5%	9	47.4%	19	100.0%
1959	7	33.3%	8	38.1%	15	71.4%	2	9.5%	4	19.1%	21	100.0%
	15	28.3%	14	26.4%	29	54.7%	4	7.6%	20	37.7%	53	100.0%

* Includes "Child" or "Infant"
≠ Includes Not Stated

CHAPTER 6

SEASONAL INCIDENCE AND RESIDENCE AT TIME OF DEATH

6.1. Seasonal Incidence of Burials

The monthly incidence of burials by age is given in Table 6.1.

To enable more valid comparisons to be made, the numbers have been grouped by quarters, and these are given in Table 6.2. together with the numbers in the age group for the particular quarter expressed as a percentage of all burials in the age group for the particular year.

From these tables, it is apparent that the burials show a seasonal trend, rising during the last quarter of the year, and reaching a peak during the first or second quarter of the year, i.e. towards the end of the rainy season.

The rise in the early part of 1958 is quite phenomenal, no less than 37.4% of all burials for that year occurring within the first quarter. Studying the age grouping of the burials during that year, it will be noted that all age groups showed the highest percentage of burials during the first quarter, but that the seasonal variation was most marked in the 1 - 4 - age group of whom no less than 45.4% were buried during the first quarter of the year. The figures suggest that there was some form of epidemic during later 1957 and early 1958 which affected all ages but particularly the age group 1 - 4 -. No concern was reported from the African population themselves at the time: a study of the causes of admission and death certificates at the African Hospital provided no clues as to the nature of any epidemic, and more detailed investigations of all deaths by members of the Municipal Health Department, which investigations included Post Mortem examinations of certain children dying out of hospital, were entirely negative. If there was any epidemic, its cause is unknown.

The seasonal variations are minimal in the adults where the greatest range was one of 15.9% in 1957 and among the under ones where the greatest range was 13.7% in 1958. The maximum seasonal variation is found in the 1 - 4 - age group, the variations being 23.8% in 1957, 33.7% in 1958 and 28.1% in 1959. The number of burials in the 5 - 14 - age group is too small to make valid comparisons.

For the whole period of the survey, seasonal variation is most

marked in the age group 1 - 4 -, the variations in the other age groups being very small.

Seasonal variations in the number of deaths have been noted elsewhere in tropical countries.

Robertson (1957) found the Infant Mortality Rate in Cape Town to be highest in the late summer months, the seasonal variation being greatest among non-Europeans. Kahn (1957) found deaths from diarrhoeal diseases in Johannesburg to have a peak during December and January - i.e. in mid summer months. Boardman et al (1955) and Bokkenheuser and Richardson (1960) both found the incidence of Shigella infections higher in summer than in winter.

Bennett (1960) and Carr and Gelfand (1957) both noted seasonal variations in the incidence of Kwashiorkor in Southern Africa, and Smith (1943) found a seasonal variation in the number of deaths in Lagos.

Experience in Ndola is, therefore, similar to that found elsewhere in Southern Africa.

6.2. Place of Residence at Time of Death

6.2.1. General

In carrying out this survey it was hoped that it would be possible to obtain information on the importance of environmental hygiene by comparing the number of deaths in the various housing areas. While appreciating the difficulty in obtaining accurate information as to the true place of residence (See Chapter 2) nevertheless the place of residence was recorded whenever possible.

In 1957, before the African Social Worker arrived, the place of residence was not ascertained in 239 instances - 40.6% of all burials. This figure is too high to draw any valid conclusions from the figures.for that year.

The number of instances where the place of residence was not ascertained had fallen in 1958 to 153 (18.4%) and in 1959 to 47 (6.2%). The improvement was undoubtedly due to work of the African Social Worker, and many of the failures in 1958 took place in the early months of that year before his arrival. It is probably not wise to use the figures for 1958 as they stand, but circumstances were such that a better comparison is available.

In April 1959, the demolition of the worst housing in the Main African Housing Area commenced and by the end of May that year about 1,000 of the Rondavels (African Housing Type R Ch. 2) had been demolished. It was possible, therefore, to draw comparisons for the period 1st April 1958 to 31st March 1959, during which these houses were still in occupation.

6.2.2. Residence Not Stated

There were 729 burials during this special period, and in 82 instances (11.2%) the place of residence was not stated.

This group of burials, however, can be compared with other groups as in Table 6.3.

From this table it will be noted that the burials of persons whose address was not recorded approximate very closely to those of persons resident outside the municipality insofar as age at burial and ascertainment of cause of death is concerned. This confirms the author's personal experience that where prolonged enquiries were necessary to ascertain the place of residence it was found to be outside the Municipality in most instances. This conclusion is easy to understand in that failure to record a place of residence means that no relatives were present to make funeral arrangements; such instances would be more common in respect of persons living far away from the cemetery.

It is considered reasonable, therefore, to assume that the majority of burials of persons whose address was not ascertained came from outside Ndola and thus from outside the Municipal African Housing Areas. Conclusions drawn from figures in respect of persons resident within these areas would not be affected by the number where the residence was 'not stated'.

6.2.3. The Other Housing Areas

These areas vary somewhat in type, and the numbers from each Area are small. Some of the areas are outlying and are known to maintain their own illegal private cemeteries; only persons from such areas dying in hospital were likely to be buried in the Municipal Cemetery.

Again the number of houses in these areas are uncertain.

It has not been considered worthwhile, therefore, to examine the influence of place of residence on deaths in this group.

6.2.4. <u>The Municipal African Housing Areas</u>

In the Chifubu and Kabushi African Housing Area it has been decided to differentiate only between temporary and permanent types of accommodation although it is admitted that there are various types of sanitary accommodation serving permanent housing in the Kabushi African Housing Area.

In the Main African Housing Area the differences have been recorded for all types of housing as described in Chapter 2.

During the period under discussion the number of units of housing accommodation available rose from 10,385 in April 1958 to 12,851 in March 1959, this increase being due to the increase in the number of permanent houses available in Kabushi and Chifubu Areas.

By assessing the number of house-months in each type of accommodation available during April 1958 to March 1959, it has been possible to calculate for each type of accommodation a percentage of the total of the house-month units available during the twelve months under review.

These percentages are given in Table 6.4. together with the percentage of total burials and percentage of burials under 5 years of age by place of residence.

This table shows that the burials under 5 and total burials do not show any particular variation by place of residence. Further, the percentage of burials is lower in Chifubu and Kabushi African Housing Areas than one would have expected from the number of houses available, although the figures for Kabushi African Housing Area are somewhat disappointing.

In the Main African Housing Area the percentages are higher overall but the various types of housing show little variation from what would have been expected if all housing had been of a similar type.

Further, it would be argued that persons coming from rural areas to seek hospital attention tend to lodge in the Main, Kabushi and Chifubu African Housing Areas in that order of preference due to the proximity of the hospital. Such persons would inflate the figures

for the Main and Kabushi African Housing Areas. This argument is probably incorrect as such persons would tend to be admitted to hospital to die and would have a cause of death ascertained; perusal of Table 6.3. shows that the percentage of burials where the cause of death was ascertained is lowest for Main African Housing Area residents, and highest for Chifubu African Housing Area residents.

It is reasonable to say, therefore, that the general sanitary state of an area may have some effect on deaths, but individual housing does not. However, the picture changes somewhat when the number of deaths under 5 in each area is expressed as a percentage of all deaths from that area. These figures are also given in Table 6.4. where it will be noted that figures vary in the Main African Housing Area and reach 86.5% in the worst type of environmental sanitary conditions - 45 out of the 52 deaths were in children under 5.

This further emphasises the points made in Chapter 5; insofar as the Municipal Housing Areas of Ndola are concerned between 70-75% of deaths are in children under 5. The lower figures obtained overall are due to dilution with a larger proportion of adults as opposed to children who come from outlying areas to die in Ndola hospital and be buried in Ndola cemetery.

6.2.5. Causes and Factors in Death by Residence

As can be seen from Table 6.3. in not every case was a cause of death ascertained, and in the under 5's in only about a third was a cause of death ascertained. Conclusions must be drawn with the very greatest care.

The figures for four important diseases are given in Table 6.4. from which it is clear that among all ages, the type of residence is of little importance insofar as these four conditions are concerned. Among children enteritis increased as sanitary conditions deteriorated, but surprisingly pneumonia improved.

Greater studies are still necessary in this important field.

TABLE 6.1.

Seasonal Incidence of Burials 1957

	Under 1	Child or Infant	1 - 4	5 - 14	15 -	n/s	Total
January	20	2	12	1	12		47
February	12	1	21	1	15		50
March	21		9	2	8		40
April	11		17	1	19		48
May	20		14	4	13		51
June	28		10	1	11		50
July	11		2	2	8		23
August	12		4	2	28	1	47
September	21		5	4	20	1	51
October	18		12	1	16		47
November	22	4	9	2	19		56
December	28	1	15	2	32		78
TOTAL	224	8	130	23	201	2	588

TABLE 6.1.

Seasonal Incidence of Burials 1958

	Under 1	Child or Infant	1 - 4	5 - 14	15 -	Total
January	22	1	27	6	31	87
February	33	2	45	4	27	111
March	23	2	60	6	21	112
April	12	2	43	5	21	83
May	23	1	26	5	31	86
June	10	1	18	2	13	44
July	19	-	10	3	27	59
August	17	3	12	4	19	55
September	13	1	12	2	20	48
October	13	-	6	3	18	40
November	16	-	12	1	22	51
December	19	-	20	1	14	54
TOTAL	220	13	291	42	264	830

TABLE 6.1.

Seasonal Incidence of Burials - 1959

	Under 1	Child or Infant	1 - 4-	5 - 14-	15 —	Total
January	22	-	24	3	13	62
February	22	-	32	5	23	82
March	10	2	33	3	17	65
April	16	-	38	4	15	73
May	24	1	31	4	29	89
June	22	-	16	1	21	60
July	11	-	11	4	16	42
August	18	-	4	4	24	50
September	16	-	6	2	21	45
October	22	-	12	4	17	55
November	26	-	17	4	20	67
December	16	-	18	6	29	68
TOTAL	224	3	242	44	245	758

TABLE 6.2.

Seasonal Incidence of Burials

		Under 1	%	Child or Infant	1 - 4-	%	Under 5	5 - 14-	%	15 -	%	Over 5	Total	%.
1957	1st Quarter	53	23.7	3	42	32.3	98	4	17.4	35	17.4	39	137	23.3
	2nd	59	26.3	-	41	31.5	100	6	26.1	43	21.4	49	149	25.3
	3rd	44	19.6	-	11	8;5	55	8	34.8	56	27.9	66*	121	20.6
	4th	68	30.4	5	36	27.7	109	5	21.7	67	33.3	72	181	30.8
	Total	224	100.0	8	130	100.0	362	23	100.0	201	100.0	226	588	100.0
1958	1st Quarter	78	35.5	5	132	45.4	215	16	38.1	79	29.9	95	310	37.4
	2nd	45	20.5	4	87	29.9	136	12	28.6	65	24.6	77	213	25.7
	3rd	49	22.3	4	34	11.7	87	9	21.4	66	25.0	75	162	19.5
	4th	48	21.8	-	38	13.1	86	5	11.9	54	20.5	59	145	17.5
	Total	220	100.1	13	291	100.1	524	42	100.0	264	100.0	306	830	100.1
1959	1st Quarter	54	24.1	2	89	36.8	145	11	25.0	53	21.6	64	209	27.6
	2nd	62	27.7	1	85	35.4	148	9	20.5	65	26.5	74	222	29.3
	3rd	45	20.1	-	21	8.7	66	10	22.7	61	24.9	71	137	18.1
	4th	63	28.1	-	47	19.4	110	14	31.8	66	26.9	80	190	25.1
	Total	224	100.0	3	242	100.3	469	44	100.0	245	99.9	289	758	100.1
Total	1st Quarter	185	27.7	10	263	39.7	458	31	28.4	167	23.5	198	656	30.1
	2nd Quarter	166	24.8	5	213	32.1	384	27	24.8	173	24.4	200	584	26.8
	3rd Quarter	138	20.7	4	66	10.0	208	27	24.8	183	25.8	212	420	19.3
	4th Quarter	179	26.7	5	121	18.2	305	24	22.0	187	26.3	211	516	23.7
	Total	678	99.9	24	663	100.0	1355	109	100.0	710	100.0	821	2176	99.9

*Includes 2, where age was not stated

TABLE 6.3.

Residence at Time of Death - 1958-59

Residence	Under 1		1 - 4 -		Under 5 (including child)		5 - 14 -		15 -		Over 5		Total	
Age at Burial		%		%		%		%		%		%		%.
Main African Housing Area	73	30.0	105	43.2	180	74.1	8	3.3	55	22.6	63	25.9	243	100.0
Kabushi African Housing Area	43	28.3	62	40.8	108	71.1	9	5.9	35	23.0	44	28.9	152	100.0
Chifubu African Housing Area	31	34.4	33	36.7	65	72.2	5	5.6	20	22.2	25	27.8	90	100.0
Other Housing Areas	38	39.2	26	26.8	65	67.0	9	9.3	23	23.7	32	33.0	97	100.0
Sub Total	185	31.8	226	38.9	418	71.8	31	5.3	133	22.9	164	28.2	582	100.0
Outside Ndola	8	12.3	9	13.8	17	26.1	4	6.2	44	67.7	48	73.9	65	100.0
Not Stated	3	3.7	13	15.9	19	23.2	2	2.4	61	74.4	63	76.8	82	100.0
Cause of Death Ascertained (Percentage of deaths in the age group of the area)														
Main African Housing Area	18	24.7	18	17.1	36	20.0	1	12.5	37	67.3	38	60.3	74	30.5
Kabushi African Housing Area	15	34.9	15	24.2	32	29.6	1	11.1	22	62.9	23	52.3	55	36.2
Chifubu African Housing Area	10	32.3	19	57.6	30	46.3	2	40.0	17	85.0	19	76.0	44	54.4
Other Housing Areas	15	39.5	8	30.8	23	35.4	4	44.4	16	69.6	20	62.5	43	44.3
Sub Total	58	31.3	60	26.6	121	28;9	8	25.8	92	69.2	100	61.0	216	37.1
Outside Ndola	7	87.5	9	100.0	16	94.1	3	75.0	40	90.9	43	89.6	59	90.8
Not Stated	3	100.0	10	76.9	16	84.2	2	100.0	58	95.1	60	95.2	76	92.7

TABLE 6.4.

Percentage of Deaths by Type of Accommodation
April 1958 - March 1959

	Chifubu			Kabushi			Main						
	Permanent	Temporary	Total	Permanent	Temporary	Total	Modern 1	Modern 2	Kimberley Brick 1	Kimberley Brick 2	Rondavels	Others	Total
House Months	26.10%	2.49%	28.59%	27.51%	6.68%	34.19%	3.15%	4.50%	11.20%	8.16%	9.28%	0.93%	37.22%
Percentage Burials	18.4%	.2%	18.6%	29.7%	1.6%	31.3%	3.1%	6.8%	15.9%	12.6%	10.7%	0.8%	49.9%
Percentage Burials Under 5	18.1%	0.3%	18.4%	28.6%	1.9%	30.5%	3.1%	5.4%	17.8%	10.8%	12.8%	1.1%	51.0%
Burials under 5 as percentage of all burials in the particular housing area.	71.9%	100%	72.2%	70.1%	87.5%	71.1%	73.3%	57.6%	81.8%	62.3%	86.5%	80%	74.4%

All Municipal Housing Areas
72.8%

TABLE 6.5.

Causes or Factors in Death by Type of Accommodation

	Chifubu			Kabushi			Main							
	Permanent	Temporary	Total	Permanent	Temporary	Total	Modern 1	Modern 2	Kimberley Brick 1	Kimberley Brick 2	Rondavels	Others	Total	Grand Total
All Ages														
Cause of death ascertained	49	-	49	53	2	55	11	16	16	18	11	2	74	178
All Ages														
Enteritis	9	-	9 18.4%	10	-	10 18.2%	2	3	4	5	-	-	14 18.9%	33 18.5%
Pneumonia	18	-	18 36.7%	18	1	19 34.5%	6	4	3	4	3	1	21 28.4%	58 32.6%
Tuberculosis	4	-	4 8.2%	2	1	3 5.5%	-	2	-	1	3	-	6 8.1%	13 7.3%
Malnutrition	12	-	12 24.5%	10	1	11 20.0%	-	3	6	2	4	1	16 21.6%	39 21.9%
Under 5 Years														
Cause of death ascertained	30	-	30	31	1	32	8	6	11	6	4	1	36	98
Enteritis	7	-	7 23.3%	9	-	9 28.1%	2	3	3	4	-	1	13 36.1%	31 31.6%
Pneumonia	14	-	14 46.7%	12	1	13 40.6%	4	2	2	2	2	1	13 36.1%	38 38.8%
Tuberculosis	1	-	1 3.3%	-	-	- -	-	-	-	-	-	-	- -	1 1.0%
Malnutrition	9	-	9 30.0%	5	1	6 18.8%	-	3	5	1	2	-	11 30.6%	26 26.[illegible]

CHAPTER 7

PLACE OF DEATH AND MEDICAL ATTENTION RECEIVED

7.1. Place of Death

The places where death occurred are given in Table 7.1. It will be noted that approximately half the deaths during this period took place at home and approximately half in hospital, there being few deaths occurring other than in these two places. When the age distribution is considered, however, it will be noted that in the 1 - 4 - age group about 75% of deaths took place in the home, and for children under the age of five years, the percentage was approximately 66%. For deaths of persons over the age of five, only 25% took place at home. This is a fair reflection on the standard of medical care which is obtained by the persons in the particular age groups concerned.

The total number of deaths occurring in African Hospitals in Northern Rhodesia is given in Table 7.2. which shows the marked increase in hospital deaths over the years. Annual Reports on the Public Health 1958/60).

7.1.1. Place of Death - Cause of Death Determined

These figures are given in Tables 7.2.A., 7.2.B., 7.2.C., and 7.2.D. It will be noted from Table 7.2.A. that where death occurred at home the cause of death was determined in very few instances - in approximately 4%. Such instances are due in the main to police investigations having been carried out or to the few occasions where a letter has been received from a general practitioner who was attending the case.

Insofar as deaths in hospital are concerned, the cause of death is ascertained in over 90% of the cases, and in the few cases where no cause has been ascertained, this can be attributed to death occurring immediately after arrival at the hospital, but before any investigations have been carried out.

In such instances where the doctor stated that he was of the opinion that death was due to natural causes, this had been accepted by the magistrate, and no further investigation had been carried out.

Where the death occurred other than the residence or in hospital a fairly high proportion of the cases have had the cause of death ascertained. This is particularly noticeable in the older age groups and is understandable in view of the fact that the majority of such deaths are due to violence resulting in post-mortem examinations being carried out subsequent to police investigations.

7.2. Type of Medical Attention Received

In Table 7.3. the type of medical attention received has been given for the years 1958 and 1959 only. Such investigations could not be carried out prior to the arrival of the African Social Worker and it will be noted that during 1958 there were a comparatively large number (48.4%) where the type of medical attention received was not ascertained.

It is interesting to note the very few instances where the only medical attention received was from private practitioners - an infinitesimal number - which clearly shows that this type of medical attention is not being used by the majority of the Africans to any great extent.

In this table "other medical attention" is usually a combination of private practice and clinic or hospital attention prior to discharge to clinic services. It will be noted that in approximately 10 - 15% of cases no medical attention whatsoever was received and in Table 7.4. these have been broken down to indicate where the cause of death is due to violence or other causes. As will be noted from this table, in the majority of the older groups in 1959 death was due to violence where no medical attention was received. In the younger age groups, however, violence is not a common cause of such deaths, suggesting a lack of willingness on the part of the parents to seek medical advice.

7.2.1. Clinic Attendance

In Tables 7.5.A., 7.5.B., and 7.5.C. a note has been made of the last attendance at a particular clinic with a view to ascertaining the time elapsing between such attendance and death taking place. The figures are comparatively small and in a number of instances have not been ascertained, but it will be generally noted that the last

attendance in the majority of instances was within two days of death. In cases where the last attendance at the clinic was more than 28 days, this has not been accepted as a clinic attendance.

In Tables 7.6.A. and 7.6.B. where cases have been referred to hospital from the Main and Kabushi African Housing Area clinics, the duration of stay in hospital prior to death has alsobeen noted. The figures again are small but indicate clearly that death again usually occurred within two days of admission to hospital after referral from clinic.

7.2.2. Duration in Hospital Prior to Death

In Tables 7.7.A., 7.7.B. and 7.7.C. the duration in hospital prior to death in days has been noted. As indicated earlier in Chapter 4 no attempt has been made to detail the number of hours spent in hospital and where death occurred on the same day as admission, this has been noted as "0" days. In practice this means, therefore, that any person dying on the same day as admission may have been in hospital for almost 24 hours, and persons dying after one day in hospital may have been in hospital almost 48 hours, etc.

From these tables it will be noted that the vast majority of deaths took place within two days of admission to hospital, and in the under-five age range over half the deaths occur within this period. In persons over the age of five the percentage is less, being approximately 30%.

7.3. Discussion

These figures generally indicate that the African is prepared to accept medical attention, but only at a comparatively late stage in the disease. It is reasonable to suppose that any child under the age of five years who dies within 48 hours of admission to hospital has entered hospital in such a condition that death would have been inevitable whatever standard of medical attention was available. Similarly, insofar as clinic attendances are concerned, the death occurring so rapidly after the last clinic attendance would suggest that the parents have refused admission to hospital for the child previously and death has been virtually inevitable. Nevertheless,

the increase in the number of deaths of children within the first 72 hours after admission to hospital, together with the fact that the percentage of persons under 5 dying in hospital has increased from 38.7% in 1957 to 42.0% in 1959, does indicate that more medical attention is being sought, however late. It is reasonable to hope, therefore, that as time progresses, more use will be made of the services and cases will be brought to hospital earlier.

TABLE 7.1.

Place of Death

		Under 1		Child or Infant	1 - 4 -		5 - 14 -		15 - ~~Adult~~		Not Stated	Total	
1957	Residence	119	53.1%	-	98	75.4%	16	69.6%	48	24.0%	-	281	47.8%
	Hospital	97	43.3%	7	26	20.0%	6	26.1%	134	62.0%	2	272	46.3%
	Elsewhere	3	-	1	4	-	1	-	10	-	-	19	-
	Not Stated	5	-	-	2	-	-	-	9	-	-	16	-
	TOTAL	224	100.0%	8	130	100.0%	23	100.0%	201	100.0%	2	588	100.0%
1958	Residence	137	62.3%	3	212	72.9%	24	57.1%	51	19.3%	-	427	51.4%
	Hospital	74	33.7%	10	69	23.7%	16	38.1%	183	69.3%	-	352	42.4%
	Elsewhere	8	-	-	6	-	2	-	23	-	-	39	-
	Not Stated	2	-	-	4	-	-	-	6	-	-	12	-
	TOTAL	220	100.0%	13	291	100.0%	42	100.0%	264	100.0%	-	830	100.0%
1959	Residence	116	51.8%	-	143	59.1%	27	61.4%	48	19.6%	-	334	44.1%
	Hospital	103	46.0%	3	91	37.6%	12	27.3%	172	70.2%	-	381	50.3%
	Elsewhere	4	-	-	8	-	4	-	24	-	-	40	-
	Not Stated	1	-	-	-	-	1	-	1	-	-	3	-
	TOTAL	224	100.0%	3	242	100.0%	44	100.0%	245	100.0%	-	758	100.0%
TOTAL	Residence	372	55.6%	3	453	68.3%	67	66.8%	147	20.7%	-	1042	47.9%
	Hospital	274	41.0%	20	186	28.1%	34	31.2%	489	69.0%	2	1005	46.2%
	Elsewhere	15	-	1	18	-	7	-	57	-	-	98	-
	Not Stated	8	-	-	6	-	1	-	16	-	-	31	-
	TOTAL	669	100.0%	24	663	100.0%	109	100.0%	709	100.0%	2	2176	100.0%

TABLE 7.1.

AFRICAN DEATHS IN NORTHERN RHODESIA

	Federal Hospitals		Rural Hospitals	Mission Hospitals	Total Hospital Deaths
	Ndola	Total			
1959	464	2963	383	1655	5001
1958	339	2548	582	1318	4448
1957	291	2054	411	1358	3823
1956	182	1756	415	1040	3211

TOTAL Ndola 1957-59 1094

TABLE 7.2.A.

PLACE OF DEATH/CAUSE OF DEATH ASCERTAINED

Place of Death - Residential Accommodation

		Under 1	Child or Infant	1 - 4-	5 - 14-	15 -	Not Stated	Total
1957	Total Deaths	119	-	98	16	48	-	281
	Cause determined	-	-	-	-	2	-	2
1958	Total Deaths	137	3	212	24	51	-	427
	Cause determined	2	-	2	2	10	-	16
1959	Total Deaths	116	-	143	27	48	-	334
	Cause determined	5	-	8	3	10	-	26
TOTAL	Total Deaths	372	3	453	67	147	-	1042
	Cause determined	7	-	10	5	22	-	44

TABLE 7.2.B.

Place of Death/Cause of Death Ascertained

Place of Death - Hospital

		Under 1	Child or Infant	1 - 4 -	5 - 14 -	15 -	Not Stated	Total
1957	Total Deaths	97	7	26	6	134	2	272
	Cause determined	91	5	26	5	129	-	256
1958	Total Deaths	74	10	69	16	183	-	352
	Cause determined	74	9	65	16	175	-	339
1959	Total Deaths	103	3	91	12	172	-	381
	Cause determined	101	3	87	12	171	-	374
Series	Total Deaths	274	20	186	34	489	2	1005
	Cause determined	266	17	178	33	475	-	969

TABLE 7.2.C.

PLACE OF DEATH/CAUSE OF DEATH ASCERTAINED

Place of Death - Elsewhere

		Under 1	Child or Infant	1 - 4-	5 - 14-	15 -	Not Stated	Total
1957	Total Deaths	3	1	4	1	10	-	19
	Cause Ascertained	-	1	1	1	6	-	9
1958	Total Deaths	8	-	6	2	23	-	39
	Cause Ascertained	3	-	1	2	20	-	26
1959	Total Deaths	4	-	8	4	24	-	40
	Cause Ascertained	2	-	2	4	22	-	30
Series	Total Deaths	15	1	18	7	57	-	98
	Cause Ascertained	5	1	4	7	48	-	65

TABLE 7.2.D.

PLACE OF DEATH/CAUSE OF DEATH ASCERTAINED

Place of Death - Not Known

		Under 1	Child or Infant	1 - 4	5 - 14	15 -	Not Stated	Total
1957	Total Deaths	5	-	2	-	9	-	16
	Cause Ascertained	-	-	-	-	2	-	2
1958	Total Deaths	2	-	4	-	6	-	12
	Cause Ascertained	-	-	-	-	1	-	1
1959	Total Deaths	1	-	-	1	1	-	3
	Cause Ascertained	-	-	-	-	-	-	-
Series	Total Deaths	8	-	6	1	16	-	31
	Cause Ascertained	-	-	-	-	3	-	3

TABLE 7.3.

TYPE OF ATTENTION RECEIVED

		Under 1	Child or Infant	1 - 4 -	5 - 14 -	15 -	Not Stated	Total
None	1958	26	-	24	1	14	-	65
	1959	34	-	33	13	45	-	125
Clinic Only	1958	37	2	76	6	7	-	128
	1959	64	-	94	14	14	-	186
Private Practise Only	1958	-	-	2	1	-	-	3
	1959	4	-	2	-	-	-	6
Clinic or Private Practise plus Hospital	1958	16	2	16	4	36	-	74
	1959	24	1	31	6	48	-	110
Not Stated	1958	108	6	139	23	126	-	402
	1959	13	-	23	5	13	-	54
Hospital Only	1958	32	3	29	5	79	-	148
	1959	81	2	58	6	123	-	270
Other Medical Attention	1958	2	-	5	2	1	-	10
	1959	4	-	1	-	2	-	7
TOTAL	1958	221	13	291	42	263	-	830
	1959	224	3	242	44	245	-	758

TABLE 7.4.

DEATHS DUE TO VIOLENCE
NO ATTENTION RECEIVED

		Under 1	Child or Infant	1 - 4-	5 - 14-	15 -	Total
1958	No medical attention received	26	-	24	1	14	65
	Death due to violence	1	-	-	-	-	-
	Death due to other causes	-	-	-	-	1	1
1959	No medical attention received	34	-	33	13	45	125
	Death due to violence	2	-	1	4	22	29
	Death due to other causes	2	-	1	-	2	5

TABLE 7.5.A.

DURATION OF MEDICAL ATTENTION RECEIVED

Main African Housing Area Clinic

	Under 1		Child or Infant		1 - 4-		5 - 14-		15 -.		Total	
Death Occurring After	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959
0 days	1	1	-	-	3	-	-	-	-	-	4	1
1 "	9	8	1	-	17	6	-	1	1	-	28	15
2 "	3	11	-	-	6	9	1	3	-	-	10	23
3 "	3	9	-	-	3	7	-	2	1	-	7	18
4 "	2	1	-	-	1	1	-	1	-	1	3	4
5 "	1	1	-	-	3	2	-	-	-	2	4	5
Over 5	-	2	-	-	2	3	-	-	-	-	2	5
Not ascertained	6	4	1	-	12	10	-	1	2	6	21	21
TOTAL	25	33	2	-	47	38	1	8	4	9	79	92

TABLE 7.5.B.

DURATION OF MEDICAL ATTENTION RECEIVED

Kabushi African Housing Area Clinic

Death occurring after	Under 1		Child or Infant		1 - 4-		5 - 14-		15 -		Total	
	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959
0 days	1	-	-	-	3	1	-	-	-	-	4	1
1 "	4	2	-	-	12	7	1	1	1	-	18	10
2 "	1	6	-	-	3	15	-	1	-	1	4	23
3 "	-	4	-	-	-	7	-	-	-	1	-	12
4 "	-	-	-	-	-	1	1	-	-	-	1	1
5 "	-	-	-	-	-	-	-	-	-	-	-	-
Over 5	-	-	-	-	-	-	1	-	-	1	1	1
Not ascertained	1	3	-	-	8	7	1	1	2	2	12	13
TOTAL	7	15	-	-	26	38	4	3	3	5	40	61

TABLE 7.5.C.

DURATION OF MEDICAL ATTENTION RECEIVED

Chifubu African Housing Area Clinic

Death occurring after	Under 1		Child or Infant		1 - 4-		5 - 14-		15 - ~~Adult~~		Total	
	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959
0 days	1	-	-	-	-	-	-	-	-	-	1	-
1 "	3	5	-	-	-	7	1	-	-	-	4	12
2 "	-	2	-	-	2	3	-	-	-	-	2	5
3 "	-	2	-	-	-	1	-	1	-	-	-	4
4 "	-	2	-	-	-	-	-	1	-	-	-	3
5 "	-	-	-	-	-	-	-	-	-	-	-	-
Over 5	-	-	-	-	-	1	-	-	-	-	-	1
Not ascertained	1	-	-	-	-	1	-	1	-	-	1	2
TOTAL	5	11	-	-	2	13	1	3	-	-	8	27

TABLE 7.6.A.

DURATION OF MEDICAL ATTENTION RECEIVED

Main African Housing Area Clinic and Hospital.

Death after days in hospital.	Under 1		Child or Infant		1 - 4-		5 - 14-		15 -		Total	
	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959
0	-	3	-	-	-	-	-	1	-	-	-	4
1	2	1	-	-	1	1	-	-	1	-	4	2
2	2	-	-	-	2	2	-	-	1	-	5	2
3	1	-	-	-	-	-	-	-	-	-	1	-
4	-	1	-	-	-	2	-	-	-	-	-	3
5	-	-	-	-	1	-	-	-	-	-	1	-
6	1	-	-	-	-	-	-	-	-	-	1	-
7	-	-	-	-	-	-	-	-	-	-	-	-
Over 7	-	-	1	-	1	2	-	-	1	1	3	3
Not ascertained	-	-	-	-	-	-	-	-	1	-	1	-
TOTAL	6	5	1	-	5	7	-	1	4	1	16	14

TABLE 7.6.B.

DURATION OF MEDICAL ATTENTION RECEIVED

Kabushi African Housing Area Clinic and Hospital

Death after days in hospital	Under 1		Child or Infant		1 - 4-		5 - 14 -		15 -		Total	
	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959	1958	1959
0	1	-	1	-	-	2	-	-	-	-	2	2
1	2	-	-	-	1	2	-	-	-	-	3	2
2	1	1	-	-	1	-	-	-	1	-	3	1
3	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	2	-	-	-	2
7	-	-	-	-	-	-	-	-	-	-	-	-
Over 7	-	1	-	-	1	-	-	-	3	1	4	2
Not ascertained	-	-	-	-	-	-	-	-	1	1	1	1
TOTAL	4	2	1	-	3	4	-	2	5	2	13	10

TABLE 7.7.A.

DURATION IN HOSPITAL 1957

Days	Under 1	Child or Infant	1 - 4 -	Under 5	5 - 14 -	15 -	Not Stated	Over 5	Total
0	20	-	2	22	2	9	1	12	34
1	18	-	9	27	1	24	-	25	52
2	8	2	2	12	1	15	-	16	28
3	10	-	-	10	-	10	-	10	20
4	6	-	2	8	-	7	-	7	15
5	4	1	1	6	-	1	-	1	7
6	3	-	1	4	-	3	-	3	7
7	3	1	-	4	-	4	-	4	8
8 - 14	1	1	3	5	-	24	-	24	29
15 -	4	-	-	4	1	3	4	4	8
22 -	-	-	-	-	-	-	-	-	-
29 -									
35 -									
43 -									
50 -									
100 -									
Duration not ascertained	16	2	5	23	1	11	1	13	36
Total deaths in hospital	97	7	26	130	6	134	2	142	272

TABLE 7.7.B.

DURATION IN HOSPITAL 1958

Days	Under 1	Child or Infant	1 - 4	Under 5	5 - 14	15 - ~~Adult~~	Over 5	Total
0	5	1	2	8	-	6	6	14
1	23	6	19	48	4	35	39	87
2	17	1	17	35	-	17	17	52
3	5	2	5	12	3	17	20	32
4	3	-	3	6	-	2	2	8
5	4	-	2	6	2	5	7	13
6	2	-	3	5	1	5	6	11
7	3	-	1	4	2	5	7	11
8 - 14	6	-	9	15	2	28	30	45
15 -	-	-	1	1	1	13	14	15
22 -	1	-	-	1	-	7	7	8
29 -	1	-	-	1	-	7	7	8
36 -	-	-	-	-	-	2	2	2
43 -	1	-	-	1	1	5	6	7
50 -	1	-	1	2	-	12	12	14
100 -	-	-	-	-	-	6	6	6
Duration not ascertained	2	-	6	8	-	11	11	19
Total Deaths in hospital	74	10	69	153	16	183	199	352

TABLE 7.7.C.

DURATION IN HOSPITAL 1959

Days	Under 1	Child or Infant	1 - 4-	Under 5	5 - 14-	15 -	Over 5	Total
0	37	1	25	63	3	25	28	91
1	28	1	22	51	1	17	18	69
2	12	1	11	24	2	10	12	36
3	10	-	2	12	-	11	11	23
4	3	-	5	8	1	12	13	21
5	2	-	6	8	1	9	10	18
6	2	-	1	3	2	5	7	10
7	1	-	2	3	2	5	7	10
8 - 14	3	-	11	14	-	25	25	39
15 -	2	-	1	3	-	19	19	22
22 -	1	-	1	2	-	9	9	11
29 -	-	-	-	-	-	3	3	3
36 -	-	-	-	-	-	2	2	2
43 -	-	-	-	-	-	3	3	3
50 -	-	-	-	-	-	6	6	6
100 -	-	-	-	-	-	9	9	9
Duration not ascertained	2	-	4	6	-	2	2	8
Total deaths in hospital	103	3	91	197	12	172	184	381

CHAPTER 8

CAUSE OF DEATH

8.1. Ascertainment of Cause of Death

8.1.1. General

As can be imagined, in not every case of death was a cause of death determined. A cause of death has only been considered as ascertained when (a) a death certificate has been issued, (b) the results of an inquest are known, or (c) a statement has been received from a qualified medical practitioner who was in attendance on the patient. Further explanation is necessary concerning (c) above. In certain cases where the deceased was attending either the hospital out-patient department or a private practitioner, death may have occurred at home and a letter has been sent by the medical practitioner in charge of the case stating what the cause of death was considered to be. Such occurrences have been very rare but have been accepted as determining the cause of death.

The fact that no cause of death has been ascertained does not necessarily mean that the deceased have received no medical attention (Chapter 7) but in cases where attention has been received at clinics where no medical practitioner has been in attendance, statements from the other staff have not been accepted as causes of death.

Details of the type of medical attention received prior to death were discussed further in Chapter 7.

8.1.2. Number of Causes of Death Ascertained

The number of instances where the cause of death has been ascertained is shown in Table 8.1. From this table it will be seen that there has been very slight but steady improvement over the three years in question, but generally the results are poor in the younger age groups. As indicated above, this does not necessarily mean that there is a lack of care for the children, but that the medical attention is received in clinics rather than in hospital.

One of the features to be noted is the higher incidence of determination of causes of death in children under the age of one year as compared with children in the age group 1 - 4. Of the 67 children under the age of one year who died in hospital during the latter half

of 1959, only 16 had been born in hospital and died there before discharge, the remainder having been brought to the hospital to receive attention. This might suggest that the parents give more attention to the young child than to the 1 - 4 year old child but experience in the clinics suggests another reason. Parents are unwilling to permit their children to be admitted to hospital unless the mother can remain in the hospital or its immediate vicinity to look after the child. In a family with a young baby, if the child of 1 - 4 is to be admitted, the mother will have great difficulty in arranging for the care of the baby during the elder child's stay in hospital, and admission may be refused. If, however, the baby requires admission to hospital it is much easier to arrange for care for a 1 - 4 year old and the admission will be accepted.

8.2. Accuracy of the Cause of Death

A considerable amount of work has been done in other countries on the accuracy of causes of death as stated on medical certificates, quite apart from the difficulty in determining the specific cause of death in persons who may be suffering from multiple diseases. It is known that the inaccuracies are more marked in the younger age groups, and particularly in the new-born child. The very high proportion of deaths in this series which occur in young children means that for the series as a whole, the accuracy of the cause of death is open to far greater doubts than it would be in more developed countries.

However, Erhart et al (1959) and James et al (1955) have pointed out that in America, although the results of post mortem examination indicate a change in the stated cause of death in an appreciable number of instances, nevertheless the majority of changes are of a comparatively minor nature. Gordon (1955) has drawn attention to the variation between individual doctors in certifying death from coronary disease.

The accuracy of the information given on death certificates has been the subject of further comment by the Committee on Medical Certification of Causes of Death (1958) and by the World Health Organisation (Amplification of Medical Certification of Cause of Death 1953

8.3. Post-Mortem Examinations

It is clear that in those cases where a post-mortem examination was carried out the cause of death will be more accurately determined, but the pressure of work on the hospital doctors has been such that few post-mortems have been carried out except at the instigation of the police.

Table 8.2. gives details of post-mortem examinations carried out showing also whether death was due to violent or non-violent causes. The figures for 1957 are incomplete, owing to the poor nature of the information available.

This table shows the improvements which have taken place during the period and also the marked increase of post-mortem examinations in non-violent cases of death during the year 1958. The sole reason for this is the interest shown by one particular Government Medical Officer in carrying out post mortem examinations: his departure resulted in a fall in the number of post-mortem examinations carried out in 1959.

TABLE 8.1.

CAUSE OF DEATH DETERMINED

		Under 1		Child or Infant		1 - 4-		5 - 14-		15 -		Not Stated	Total	
1957	Cause determined	91	40.6%	6	75.0%	27	20.8%	6	26.1%	139	69.2%	-	269	45.8%
	Cause not determined	133		2		103		17		62		2	319	
	Total	224		8		130		23		201		2	588	
1958	Cause determined	79	35.9%	9	69.2%	68	23.4%	20	47.6%	206	78.0%	-	382	46.0%
	Cause not determined	141		4		223		22		58		-	448	
	Total	220		13		291		42		264		-	830	
1959	Cause determined	108	48.2%	3	100.0%	97	40.1%	19	43.2%	203	82.9%	-	430	56.7%
	Cause not determined	116		-		145		25		42		-	328	
	Total	224		3		242		44		245		-	758	
Series	Cause determined	278	41.6%	18	75.0%	192	29.0%	45	41.3%	548	77.2%	-	1081	49.7%
	Cause not determined	390		6		471		64		162		2	1095	
	Total	668		24		663		109		710		2	2176	

TABLE 8.2.

POST-MORTEM EXAMINATIONS CARRIED OUT

Year		Under 1	Child or Infant	1 - 4-	5 - 14-	15 - ~~Adult~~	Not Stated	Total
1959	Death due to violence	4	-	1	4	33	-	42
	Death not due to violence	4	-	11	6	41	-	62
	Cause of death not stated	1	-	2	2	5	-	10
	Total Post Mortem Examinations	9	-	14	12	79	-	114
1958	Death due to violence	1	-	-	2	32	-	35
	Death not due to violence	38	2	37	8	93	-	178
	Cause of death not stated	3	-	5	-	9	-	17
	Total Post Mortem Examinations	42	2	42	10	134	-	230
1957	Death due to violence	-	-	1	1	8	1	11
	Death not due to violence	-	-	-	-	-	-	-
	Cause of death not stated	1	-	1	-	6	-	8
	Total Post Mortem Examinations	1	-	2	1	14	1	19

PART II

THE CAUSES OF DEATH

In the remainder of this thesis the four figure code of the cause of death where it appears is that of the list of three digit categories (detailed list) as given in the Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death, Seventh Revision, 1955.

Where applicable the "A" and "B" codes are those contained in the same publication.

In "A" or "B" codes*indicates that the code figure is a composite one and deaths from the disease in question will be included with deaths due to other disease in the particular code number.

The figures obtained relate to those deaths where the cause of death has, in fact, been ascertained. To avoid unnecessary repetition these are referred to subsequently as "deaths" rather than as "deaths where the cause of death has been ascertained".

CHAPTER 9

INFECTIVE AND PARASITIC DISEASES

001 - 138

"A" Code 1 - 43

"B" Code 1 - 17

9.1. Infective and Parasitic Disease Generally

The number of deaths from infective and parasitic diseases in this series is given in Table 9.1. Figures for certain other countries and for the City of Bulawayo are given in Table 9.2.

The Ndola figures do not vary very much from year to year and the highest percentage of deaths due to infective and parasitic disease occurs surprisingly enough in the adult age group. This is probably due to the greater incidence of death from Tuberculosis among adults and to the necessity to code deaths from non-specific diarrhoeal disorders to No 571 (B36). This difficulty in coding undoubtedly reduces the number of deaths attributable to infective diseases resulting in an underestimation of the importance of these diseases particularly in young children. For this reason the suggestion of Crew (1957) and others that the percentage of deaths due to infective and parasitic diseases might be used as an assessment of the level of health in developing countries in open is serious criticism.

9.2. Tuberculosis

(001 - 019)
(A1 - A5)
(B1 - B2)

9.2.1. Total Deaths from Tuberculosis

The total deaths from pulmonary and non-pulmonary tuberculosis are given in Table 9.3. Included in the table are figures from other towns in the Federation of Rhodesia and Nyasaland taken from the Annual Reports of the respective Medical Officers of Health and for Ceylon and Trinidad and Tobago (Epidemiological and Vital Statistics Reports 1954b). It will be noted that all forms of tuberculosis have comprised 7.3% of deaths in Ndola in the period under review, falling from 10.4% in 1957 to 5.3% in 1959. The figures are very similar to those found in Broken Hill and in Bulawayo. The fall in percentage of deaths due to tuberculosis in Ndola is probably not a true reduction in incidence but has been caused by an increasing number of causes of death being

ascertained in the younger age groups consequent on the improvement in registration in these groups. The Annual Report on the Public Health 1959 (Federation of Rhodesia and Nyasaland, 1960 b.) indicates that the number of deaths from pulmonary tuberculosis among Africans in Northern Rhodesia has increased from 85 in 1957 to 166 in 1959. These figures are based on notifications of death received and the local experience has been that not all deaths are, in fact, formally notified.

9.2.2. Age Distribution of Deaths from Tuberculosis

The age distribution of deaths from pulmonary and non-pulmonary tuberculosis in this series is given in Table 9.4. From this table it will be noted that only seven (8.9%) out of a total of 79 deaths attributed to tuberculosis occurred in persons under the age of 15 years. The numbers, however, are small and it is unwise to draw too many conclusions from them. Nevertheless in the younger age groups the percentage of deaths due to tuberculosis, all forms, was under 1% in the under one age group, 1.6% in the 1 - 4 year old age group and 6.7% in the 5 - 14 year old age group. These figures are low compared with the findings in other parts of the world, which are given in Tables 9.5. and 9.6.

Among adults tuberculosis comprises 69.9% of all deaths due to infective or parasitic causes and 13.1% of total deaths in this age group. Over all, tuberculosis was responsible for 7.3% of all deaths in this series.

9.2.3. Deaths from Non-pulmonary Tuberculosis

No work has been carried out to ascertain the nature of the organism responsible for pulmonary and non-pulmonary tuberculosis in Central Africa and of necessity we must rely on the generally accepted statement that pulmonary tuberculosis is due to the human strain and non-pulmonary tuberculosis due to the bovine strain of the organism. Martinaglia (1957) has drawn attention to what he considers to be the first case of bovine pulmonary tuberculosis reported in South Africa which occurred in a European in Durban.

In this series deaths due to non-pulmonary tuberculosis were 25.1% of all deaths due to tuberculosis, ranging from 25% in 1957 to 17.4% in 1959, (see Table 9.3.)

In the age group under 14 years of age, deaths from non-pulmonary tuberculosis comprised 28.6% of the deaths from tuberculosis but the numbers are small. Among adults the percentage was 20.8%

In Northern Rhodesia as a whole, the Annual Report on the Public Health 1959 (Federation of Rhodesia and Nyasaland. 1960b.) indicates that the notifications of deaths from non-pulmonary tuberculosis were 9.3% and 13.1% of all deaths from tuberculosis in 1958 and 1959 respectively. Percentages for other countries are given in Table 9.7.

It is difficult to draw conclusions from the significance of the types of non-pulmonary tuberculosis which are given in Table 9.8. owing to the smallness of the numbers but it is noted that two deaths out of 17 were due to genito-urinary tuberculosis. Muller (1957) has pointed out that among Africans in South Africa under 1% of gynaecological admissions to the Groote Schuur Hospital in Capetown were due to tuberculosis of the female genital tract.

The proportion of tuberculosis deaths due to non-pulmonary disease is dependent upon the environmental conditions in the particular part of the world under discussion. The very rapid fall in this proportion seen in Bulawayo over the years 1954 - 1959 (Table 9.3.) is probably due to the general increase in pulmonary tuberculosis due to socio-economic conditions. The high incidence of non-pulmonary tuberculosis in the earlier years could be attributed to the fact that the tribe in that vicinity, the Matabele, are an off-shoot of the Zulu nation, and as such keep cattle and drink milk there-from in large quantities. The physical condition of such cattle is not good and if the cattle suffer from tuberculosis there is considerable danger that the consumption of their milk will give rise to non-pulmonary tuberculosis.

The proportion of non-pulmonary tuberculosis deaths will inevitably fall in the event of an increase of pulmonary tuberculosis due to socio-economic factors but will rise where the socio-economic factors improve, but proportionately less attention is paid to animal husbandry.

9.2.4. Tuberculosis as a Factor

In ten instances, as detailed in Table 9.9. tuberculosis was noted as a contributory factor to death on the death certificate but was not coded as the actual cause of death. The ages of these cases and

the actual cause of death are also given in the table. It should be emphasised that where any form of tuberculosis appeared on the certificate, the death has been included in this table: it does not follow necessarily that the deaths attributed to bronchio-pneumonia and pneumonia N.O.S. were suffering from the pulmonary form of tuberculosis.

A point of significance in this table is the death stated to be due to meningitis: this person had been in hospital suffering from tuberculosis of the lungs for over 100 days and it seems not unlikely that the meningitis was of tuberculous origin, although this was not stated on the death certificate.

9.2.5. Duration in Hospital

The duration in hospital of persons dying from all types of tuberculosis is given in Table 9.10. From this it will be seen that 66.1% of all deaths from tuberculosis occurred within 21 days of admission to hospital. It is not unreasonable to think that the majority of these cases were virtually moribund on admission and that no treatment, even with the most effective drugs, would have had any influence on the outcome. This table does not take into account the well known fact that the use of the new drugs in cases of tuberculosis among Africans has resulted in a comparatively high discharge rate against medical advice. Persons suffering from the disease often feel very much better after a short course of drugs and take their own discharge. They inevitably deteriorate rapidly after leaving hospital and are fearful to return again until they are in the final stages of the disease. Goodall (1955) noted in Nyasaland that out of 176 cases of pulmonary tuberculosis admitted to the hospital, 21 took their own discharge before treatment had been completed.

9.2.6. Place of Residence of Persons Dying from Tuberculosis

These figures, which are given in Table 10.7. are of academic interest only due to the large number of instances where the normal place of residence was not stated.

9.2.7. Discussion

In Table 9.5. and 9.6. the age groupings of the persons dying from tuberculosis in various countries are given together with the surveys carried out, usually among hospital admissions in other parts of Africa.

The figures show considerable variation but the most interesting point in Table 9.6. is the approximate similarity of the percentage of deaths in the younger age groups due to tuberculosis in African surveys.

The difficulty of ascertaining the source of the infection in children has been well emphasised in the United Kingdom and Ireland by Briggs et al (1955), Walker (1955), Breathnach (1959) and Huston and Edwards (1959). Further, the difficulties of diagnosis of tuberculosis in the older people in the United Kingdom has also been emphasised by Treip and Meyers (1959). The difficulties in tracing sources of infection in developing countries is much greater than in the United Kingdom, and in addition many cases are infectious when just seeking treatment - 85% in the series in Nyasaland (Goodall 1955). It appears likely that the incidence of Tuberculosis in childhood will rise in Northern Rhodesia.

The size of the problem of the control of tuberculosis is difficult to estimate in developing countries. It is sufficient to draw attention to the statistics in the Annual Report on the Public Health 1959 (1960) which shows clearly the vast increase in notifications of deaths from this disease in the Federation of Rhodesia and Nyasaland, even though the facilities for the diagnosis of the disease are considerably behind those available in the more developed countries.

The size of the problem can, however, be judged from Dormer (1960) who pointed out that the expenditure on tuberculosis by the Department of Health in the Union of South Africa rose from 16.8% of their total expenditure on health matters in 1947-48 to 41.5% in 1959-60.

The essence of the problem lies in the careful thought that must be given to the type of control most suited to the human, environmental and socio-economic aspects of the disease (Bruce-Singleton 1957), and to the administrative action to follow (Wilcocks 1960).

The deaths from all other infective and parasitic diseases are shown in Table 9.12.

9.3. **Syphilis and Sequelae**

(020 - 029)
(A6 - A10)
(B3)

There were four deaths in adults due to late syphilis over the

period of the survey. Three of these were due to cardio vascular syphilis and one to other syphilis.

It will be noted that there were no deaths in young children due to congenital syphilis nor were there any deaths due to general paralysis of the insane or to tabes dorsalis.

These figures compare with a total of 48 out of 3,823 deaths in Bulawayo for the period 1954/59 (Bulawayo 1955/59).

From this it will be appreciated that syphilis in its late effects is not an important cause of death among Africans at the present stage of development.

9.4. **Gonococcal Infection and Other Venereal Diseases**

(030 - 039)
(A11 & A43*)
(B17*)

There were no deaths due to gonococcal infections and only one death due to lymphogranuloma venereum. The address of this person was not determined and it has not been possible to ascertain where he may have contracted the infection.

9.5. **Infectious Diseases of the Intestinal Tract**

(040 - 049)
(A12 - A16 A43*)
(B4 - B6 B17*)

The accurate diagnosis of this group of diseases is dependent upon suitable and satisfactory laboratory facilities. In the event of such facilities being not available, the natural tendency of the medical practitioner certifying death is to attribute such deaths to enteritis: such deaths would then be coded No. 571 or 573 except in the cases of diarrhoea of the newborn. In the circumstances it is considered that no useful purpose will be served by discussing this particular section of diseases in isolation from those attributed to Groups 571 or 573 and a full discussion of the intestinal infections will be given under that section.

9.6. **Other Bacterial Diseases**

(050 - 064)
(A17 - A27. A43*)
(B7 - B11. B17*)

9.6.1. Scarlet Fever, Streptococcal Sore Throat and Erysipelas

(050 - 052)
(A17 - A19)
(B7 - B17*)

There were no deaths due to these conditions, which are generally not very common among Africans.

9.6.2. Septicaemia, Pyaemia and Bacterial Toxaemia

(053 - 054)
(A20. A43*)
(B.17*)

Only two deaths were attributable to this condition, both occurring in adults, one in 1958 and one in 1959. In neither instance was the cause of the original infection determined, nor the nature of the infecting organism.

9.6.3. Diphtheria

(055)
(A21)
(B8)

Three deaths were attributable to diphtheria, all occurring in children under the age of five years. All occurred in 1957 and in no instance did the person reside within the municipality.

The figures for deaths due to diphtheria will naturally vary considerably in the light of the epidemic conditions which may obtain at the time. The figures given above compare with 19 cases in Bulawayo in 1954/59, out of a total of 3,823 deaths (Bulawayo 1955/59).

The Epidemiological and Vital Statistics Report (1958e) indicates that diphtheria is not a very common cause of death in Africa south of the Sahara, although there are rather more cases in the Union of South Africa than elsewhere. Much naturally depends upon the efficacy of the laboratory services available but confusion is most likely to arise with cases of streptococcal sore throat and as has already been pointed out there were no deaths in this series due to that condition either.

The disease was the ninth commonest cause of death in the 1 - 4 age group in Ceylon during 1954/56 (Epidemiological and Vital Statistics Report 1959d) but was still only responsible for 0.8% of deaths in this particular age group.

Inspite of the African's unwillingness to attend hospital until comparatively late in the disease, Dubb (1955) found the case mortality rate to be 12.3% among non-Europeans in Johannesburg.

9.6.4. Whooping Cough

(056)
(A22)
(B9)

There were eight deaths attributable to this condition in this series, all occurring in persons under the age of five years. There were four deaths in 1958 and four deaths in 1959. The duration in hospital was under three days in five instances and in the other three instances the duration in hospital extended up to 24 days.

In Bulawayo in 1954/59 there were 27 deaths attributable to this condition (Bulawayo 1955/59).

As is well known, the condition is not one of easy diagnosis and is not generally a common cause of death among Africans in the published series. Nevertheless, if laboratory facilities were better, it is not unlikely that an increased incidence would be noted.

Davies (1948a) attributed death to whooping cough in 5 out of 38 deaths in the age range 21 days to one year, but there was no evidence of death being due to whooping cough in the 100 deaths in the age range 1 - 10 years.

9.6.5. Meningococcal Infections

(057)
(A23)
(B10)

There were no deaths attributable to this condition in the present series but the incidence of meningococcal infections of the central nervous system will be discussed further under meningitis 373.

9.6.6. Plague

(058)
(A4)
(B11)

There were no deaths due to plague in this series, although the disease has been known to occur in Northern Rhodesia and in South Africa at rare intervals.

9.6.7. Leprosy

(060)
(A25)
(B17*)

No cases of leprosy died in hospital during the period of the survey. This is probably due to the fact that leprosy is not usually

treated in general hospitals in Northern Rhodesia and cases of leprosy, once diagnosed, are normally transferred to special leprosaria.

9.6.8. Tetanus

(061)
(A26)
(B17*)

There were three deaths due to tetanus during the period of the survey, all classified as tetanus neonatorum. In no instance did the duration in hospital exceed two days.

Most cases of tetanus occur in infants in Africa: the disease in South Africa has been reviewed by Klenerman and Scragg (1955). It is estimated in South Africa that 57% of all tetanus deaths between 1946 and 1950 occurred in infants under the age of one month. (South African Medical Journal 1956).

The use of tribal remedies by the witch doctor, particularly where methods in inunction are used, can give rise to tetanus and Brink et al (1955) have reported on a series of 25 Africans treated by this method by a witch doctor, of whom 10 developed tetanus as a result of the treatment and two died.

Thomas (1957) has pointed out that puerperal tetanus is not rare in Nyasaland but no cases were reported in this series.

In Western Nigeria, McGregor (1958) drew attention to the fact that tetanus in neonates was responsible for 58 deaths out of a total of 488 deaths in 1956 at Adeoyo Hospital with a case mortality rate of 61%.

The existing conditions in Africa bear comparison with those in St. Kilda between 1863 and 1899 (Ferguson 1958).

9.6.9. Other Bacterial Diseases

(062 - 064)
(A27. A43*)
(B17*)

There were no deaths due to any of these conditions.

9.7. Spirochaetal Diseases Except Syphilis

(070 - 074)
(A43*)
(B17*)

There were no deaths due to these conditions which appear to be uncommon in Africa. Cases have been reported by Gear et al (1958) in the Union of South Africa but reference to the Epidemiological

and Vital Statistics Report (1958b) reveals very few deaths from these diseases taking place in Africa south of the Sahara.

The absence of yaws in this series is perhaps worthy of ~~comment~~ note.

9.8. **Diseases Attributable to Viruses**

(080 - 096)
(A28 - A35. A43*)
(B12 - B14. B17*)

9.8.1. **Acute Poliomyelitis**

(080)
(A28)
(B12)

There was only one death attributable to poliomyelitis, which occurred in 1957 in a child aged 1 - 4. There are some grounds for considering that the diagnosis in this case was not correct.

The disease appears to be uncommon still among Africans in Northern Rhodesia but improved sanitary conditions would suggest that the disease is now becoming more prevalent in Southern Rhodesia where Blair (1958) found that in 1957 the number of African cases in Southern Rhodesia exceeded the non-African cases for the first time, although 86% of the African cases occurred in persons under the age of five years.

Harries and Lawes (1958) found that 94.8% of the African cases in Nairobi were under the age of five years.

9.8.2. **Smallpox**

(084)
(A31)
(B13)

There were six deaths in this series attributed to smallpox, all occurring in persons under the age of one year, with one exception - an adult.

The disease can be considered to be endemic in Northern Rhodesia where there was a very large outbreak in 1955. The present cases may be considered hangovers from this particular outbreak.

Insofar as the actual municipal area was concerned, there were 18 notifications of this disease in 1957, seven notifications in 1958 and eight notifications in 1959. Almost all these notifications were persons suffering from a mild form of the disease but it is not intended in this article to enter into discussion as to whether alastrim is, in fact, a separate disease entity as compared with smallpox.

9.8.3. **Measles**

(085)
(A32)
(B14)

There were six deaths attributable to measles during the period of the survey, four of which occurred during 1959. In every instance the age at death was under five years.

9.8.4. **Infectious Hepatitis**

(092)
(A43*)
(B17*)

There was one death in the 5 - 14 year old age group due to infectious hepatitis.occurring during 1958.

9.8.5. **Rabies**

(094)
(A35)
(B17*)

There were no deaths attributed to rabies in this series but mention is made of the condition in view of the fact that rabies is enzootic in Northern Rhodesia.

The commonest animal involved in Central Africa has been shown by Christie (1956) to be the dog and this is certainly the experience in Ndola and district. The number of dogs proved to have been suffering from rabies was five in 1957, nought in 1958 and two in 1959. There is considerable difficulty in controlling dogs in the vicinity but the success is reflected in the absence of deaths due to this condition.

9.9. **Malaria**

(110 - 117)
(A37)
(B16)

The number of deaths attributable to malaria in this series was 11. In no instance was the exact nature of the plasmodium stated but the vast majority of malaria in the vicinity is due to P. Falciparum and there is no reason to believe that the deaths were due to any other type of the disease.

The age grouping of these deaths was as shown in Table 9.12.

The place of residence was not stated on three occasions and of the remaining eight, the address was given as within the municipal area in only three instances.

It may be thought that the incidence of the disease has been considerably under-estimated on the death certificates, but wherever possible, a blood slide is taken on all persons on entry into the African Hospital, irrespective of the disease from which they are thought to be suffering. Such slides are reported upon by the hospital laboratory, the standard of which has been referred to in Chapter 3. Nevertheless, even if there are grounds for suspecting that the disease has been under-diagnosed, it still does not appear to be an important cause of death.

In Table 9.13, the cases of malaria expressed as a percentage of the total admissions to the various hospitals in Northern Rhodesia are given. From this it will be noticed that in the African Hospitals the rate is approximately 10%. In Ndola Hospital, the admission rate has been under 4% during the past four years and under 3% during the three years to which the survey relates.

Surveys in 1957 among African school children within the Municipality gave a malaria rate of approximately 3.2% but in the younger age groups of children attending community centres the rate was approximately 8% out of 1,698 examined.

The diagnoses in these surveys were established by the African microscopist working on one thick blood film.

The method of control of malaria in the area is by residual spraying of houses with benzene hexachloride; little attention is paid to drainage works and drug control is non-existent.

The high birth rate for Africans in Northern Rhodesia suggests that basically malaria may not be so great a problem as has been suspected. The Chronicle of the World Health Organisation (1955) has pointed out that when malaria is controlled the birth rate may rise although this is not an invariable feature. Certainly in Mauritius the crude birth rate after malaria was controlled rose to 48.1 per thousand and it is reasonable to suspect that this figure has already been reached in Northern Rhodesia.

The main vector of this disease in the area is A. Gambiae, which is responsible for epidemics of the disease which is maintained at a low rate of endemicity throughout the rest of the area by A. Funestus.

The Report of the Malaria Conference in Equatorial Africa (1951) has pointed out that A. Gambiae flies over four miles from its breeding place in the prevailing winds in Northern Rhodesia and that A. Funestus can fly normally five miles. The Report points out that the parasite rate declines rapidly between the ages of 2 to 5.and thereafter more slowly. This factor should be borne in mind in considering the rates obtained in the surveys in the Ndola schools.

9.10. Other Infective and Parasitic Diseases

(120 - 138)
(A38 - A42. A43*)
(B17*)

9.10.1. Trypanosomias

(121)
(A43*)
(B17*)

There were three deaths, all in adults, due to this condition. In all instances the normal place of residence was outside the municipal area. Transmission of this disease does not normally take place in the Copper-belt, although areas infested by the tsetse fly are fairly close and persons from these areas would tend to gravitate to Copper-belt hospitals to obtain treatment.

9.10.2. Schistosomiasis

(123)
(A38)
(B17*)

This disease is known to be extremely common throughout the Rhodesias, the predominant form being S. Haematobium, although there are areas which are heavily infested with S. Mansoni. Surveys carried out among African school children within the municipal area during 1957 on 1,571 school children, examining one specimen of urine and faeces only without any form of concentration method revealed 284 infected with S. Haematobium and 24 infected with S. Mansoni.

The incidence of the disease varies very considerably from place to place within the Federation - as was found by Annecke (1955) in the Transvaal - and the rate of infection in closely contiguous areas may vary very considerably.

Wydell (1958) and Nelson (1958) have both pointed out that in persons suffering from long-standing infection with S. Mansoni there is

a tendency for enlargement of the spleen, which may lead to confusion in the diagnosis of malaria.

In spite of the serious incidence of this disease in the Copperbelt it was very rarely noted on any death certificates as being a contributory factor in the cause of death, although records of the number of occasions on which the disease was mentioned have not been kept. Personal perusal of the death certificates permits this statement to be made without fear of contradiction.

The relationship between schistosomiasis and cancer of the bladder will be discussed under Cancer of the Bladder.

9.10.3. Ascariasis

(130)
(A43*)
(B17*)

Ascariasis is not a common condition in the Copper-belt area, there being only seven cases discovered out of 1,570 children examined in the survey in 1957 referred to above.

The experience of the medical staff in the hospital is that the disease rarely causes sufficient symptoms to warrant admission to hospital. There was one death from the condition in a child in the 1 - 4 age group, death being due to collapse following operation for obstruction due to ascariasis. There have been no other instances of the disease causing death.

It would appear, therefore, that marasmus is unlikely to be caused by ascariasis in the present series (De Mello 1958).

TABLE 9.1.

INFECTIVE AND PARASITIC DISEASE

Year		Under 1		Child or Infant	1 - 4-		Under 5		5 - 14-		15 -		Over 5		Total	
1957	Infective and Parasitic Disease	8	8.8%	-	3	11.1%	11	8.9%	1		37	26.6%	28	26.2%	49	18.2%
	Total Deaths	91		6	27		124		6		139		145		269	
1958	Infective and Parasitic Disease	6	7.6%	-	7	10.3%	13	8.3%	2		34	16.5%	36	15.9%	49	12.7%
	Total Deaths	79		9	68		156		20		206		226		382	
1959	Infective and Parasitic Disease	9	8.3%	-	14	14.4%	23	11.1%	2		32	15.3%	34	15.3%	57	13.3%
	Total Deaths	108		3	97		208		19		203		222		430	
Total	Infective and Parasitic Disease	23	8.3%	-	24	12.5%	47	9.7%	5	11.1%	103	19.2%	108	18.2%	155	14.3%
	Total Deaths	278		18	192		488		45		548		593		1081	

TABLE 9.2.

INFECTIVE & PARASITIC DISEASES (B1 - 17) AS PERCENTAGE OF TOTAL DEATHS *

	1950	1955	
Nicaragua	39.2%	27.6%	
Union of South Africa Coloured	24.7%	15.7%	
Ceylon	14.3%	10.2%	
Japan	18.6%	9.6%	
New Zealand - Maori	21.4%	9.1%	
Mauritius	13.5%	4.4%	
United States - Negro	8.1%	3.9%	
Union of South Africa White	5.5%	2.8%	
	1954/55	1958/59	1954/59
Bulawayo †	14.6%	9.4%	11.9%

* Epidemiological & Vital Statistics Reports (1957).

† Annual Reports of the Medical Officer of Health (1955-59)

TABLE 9.3.

TOTAL DEATHS

	Total Deaths	All Tuberculosis		Pulmonary Tuberculosis		Non-Pulmonary Tuberculosis	Non-Pulmonary Tuberculosis as % of all Tuberculosis
Ndola 1957	269	28	10.4%	21		7	25.0%
1958	382	28	7.3%	22		6	21.4%
1959	430	23	5.3%	19		4	17.4%
1957/59	1,081	79	7.3%	62		17	21.5%
Broken Hill							
1955	295	23	7.8%	17		6	26.1%
Bulawayo							
1954/5	597	56	9.4%	31		25	44.6%
1955/6	767	53	6.9%	25		28	52.8%
1956/7	786	56	7.1%	45		11	19.7%
1957/8	863	54	6.3%	45		9	16.7%
1958/9	810	41	5.1%	38		3	7.3%
1954/59	3,823	260	6.8%	184		76	29.2%
Ceylon 1952	95,298	3,046	2.9%	2,808		238	7.8%
Trinidad Tobago							
1952	7,999			330	4.1%		

TABLE 9.4.

TUBERCULOSIS
Age Distribution of Deaths

Cause of Death		Under 1	Child or Infant	1 - 4-	5 - 14-	15 -	Total
1957	Pulmonary	-	-	-	1	20	21
	Non Pulmonary	-	-	-	-	7	7
	Total Infective and Parasitic	8	-	3	1	37	49
	Total	91	6	27	6	139	269
1958	Pulmonary	-	-	2	-	20	22
	Non Pulmonary	-	-	-	-	6	6
	Total Infective and Parasitic	6	-	7	2	34	49
	Total	79	9	68	20	206	382
1959	Pulmonary	1	-	-	1	17	19
	Non Pulmonary	-	-	1	1	2	4
	Total Infective and Parasitic	9	-	14	2	32	57
	Total	108	3	97	19	203	430
Total	Pulmonary	1	-	2	2	57	62
	Non Pulmonary	-	-	1	1	15	17
	Total Infective and Parasitic	23	-	24	5	103	155
	Total	278	18	192	45	548	1081

TABLE 9.5.

TUBERCULOSIS

Percentage of Deaths at Various Ages

		Age	Total Deaths	Pulmonary Tuberculosis	Other Tuberculosis	All Tuberculosis	Percentage of all Tuberculosis
Broken Hill (Annual Report of the Health Dept. 1956)	1955	"Adults and Children"	162	13	5	18	
		"Infants"	133	4	1	5	
(Epidemiological and Vital Statistics Report 1952)							
Union of S.A.	1948	Deaths from Tuberculosis		621	128	749	
		<1		5	12	17	13.9%
		1 - 4		8	49	57	
		5 - 15		8	22	30	
	1950	Deaths from Tuberculosis		494	116	610	
		<1		3	13	16	11.3%
		1 - 4		3	32	35	
		5 - 15		2	16	18	
Chile	1950	Deaths from Tuberculosis		7,829	1,401	9,230	
		<1		124	87	211	16.9%
		1 - 4		339	335	674	
		5 - 15		367	311	678	
Ceylon	1950	Deaths from Tuberculosis		3,694	328	4,022	
		<1		13	19	32	6.3%
		1 - 4		56	54	110	
		5 - 15		73	37	110	

Cont........

TABLE 9.5. (CONT.)

		Age	Total Deaths	Pulmonary Tuberculosis	Other Tuberculosis	All Tuberculosis	Percentage of all Tuberculosis
Spain	1950	Deaths from Tuberculosis		23,084	6,208	29,292	
		< 1		254	587	841	
		1 - 4		567	1,348	1,915	15.2%
		5 - 15		532	1,175	1,707	
Portugal	1951	Deaths from Tuberculosis		9,271	2,010	11,281	
		< 1		151	265	416	
		1 - 4		338	634	972	17.7%
		5 - 15		243	365	608	

TABLE 9.6.

DEATHS FROM TUBERCULOSIS AS PERCENTAGE OF ALL DEATHS

		Total Deaths	Deaths due to Tuberculosis	Deaths from Tuberculosis as Percentage of total deaths
Ndola 1957/59	Under 5	488	4	.82%
Belgian Congo 1938/43 Autopsies (Janssens 1955)	1 - 5 - years	679	52	7.6%
	"School children"	162		9.9%
Western Nigeria 1956 Hospital only (McGregor 1958)	Children	488	33	8.5%
Lagos Autopsies (Smith 1943)	0 - 6/12	181	9	5.0%
	7 - 12/12	112	6	5.4%
	1 year -	137	12	8.8%
	2 years -	70	5	7.1%
	Total	500	32	6.4%
East Africa (Davies 1948)a).	Under 1 year	64	2	3.1%
	1 - 10 years	100	13	13.0%
	Total	164	15	9.1%
Polela, South Africa (Bennett 1960)	1 - 5 years	66	6	9.1%
U.S. Non-white 1954/56	1 - 4 - years			3.1%
	5 - 14 years			1.4%
Ceylon 1954/56 (Epidemiological and Vital Statistics Report 1959d)	1 - 4 - years			0.4%
	5 - 14 years			1.5%

TABLE 9.7.

TUBERCULOSIS DEATHS

*Non-pulmonary tuberculosis as percentage of all tuberculosis

Country	Year	Total Deaths from Tuberculosis	%
United States (Negro)	1950	9,823	11.1%
	1951	8,492	11.8%
	1952	6,910	12.5%
	1954	4,254	12.2%
Chile	1952	6,795	14.8%
Ireland	1952	1,595	22.9%
New Zealand Maori	1951	168	23.2%
	1952	149	25.5%
	1955	75	18.7%
	1957	70	10.0%
Mauritius	1955	134	6.0%
	1957	156	10.9%
Ceylon	1950	4,022	8.2%
	1952	3,046	7.8%
	1955	1,874	11.1%
	1956	1,698	19.2%
Union of S.A. (White)	1948	749	17.1%
	1950	610	19.0%
	1952	404	20.5%
	1954	262	23.3%
Asiatic	1954	128	32.1%
	1956	100	29.0%
Coloured	1954	2,618	18.8%
	1956	1,758	18.9%
Chile	1950	9,230	15.2%
Spain	1950	29,292	21.2%
Portugal	1951	11,281	17.8%

*Epidemiological and Vital Statistics Reports 1954, 1957b and 1958d.

TABLE 9.8.

TUBERCULOSIS

Types of Non Pulmonary Tuberculosis
Sex and Age

		Under 1		Child or Infant		1 - 4 -		5 - 14 -		15 - ~~Adult~~		Total	
		M	F	M	F	M	F	M	F	M	F	M	F
010	Meningeal Tuberculosis	-	-	-	-	-	1	-	-	2	2	2	3
011	Abdominal Tuberculosis	-	-	-	-	-	-	-	1	2	1	2	2
012	Bone and Joint Tuberculosis	-	-	-	-	-	-	-	-	2	1	2	1
016	Genito Urinary Tuberculosis	-	-	-	-	-	-	-	-	1	1	1	1
019	Diseminated Tuberculosis	-	-	-	-	-	-	-	-	1	2	-	-
	Total	-	-	-	-	-	1	-	1	8	7	8	9
	Pulmonary Tuberculosis	1	-	-	-	-	2	1	1	34	23	36	26
	Tuberculosis a factor	1	-	-	-	1	-	2	-	3	3	7	3
	Total Parasitic and Infective	13	10	-	-	10	14	2	3	64	39	89	66
	TOTAL	147	131	10	8	96	96	27	18	368	180	648	433

TABLE 9.9.

TUBERCULOSIS A FACTOR

Actual Cause of Death

		Under 1	1 - 4-	5 - 14-	15 -	Total
286.5	Malnutrition	-	-	1	-	1
340.3	Meningitis	-	-	-	1	1
410.0	Mitral Valvular disease	-	-	-	1	1
490.0	Lobar pneumonia	-	-	1	-	1
491.0	Broncho-pneumonia	-	-	-	1	1
493.0	Pneumonia N.O.S.	-	1	-	1	2
570.0	Intussusception	1	-	-	-	1
585.0	Cholecystitis	-	-	-	1	1
672.0	Post partum haemorrhage	-	-	-	1	1
						10

TABLE 9.10

TUBERCULOSIS

Duration in Hospital

Pulmonary Tuberculosis	Under 1	1 - 4-	5 - 14-	15 -	Total	
- 7 days	1	1	2	20	24	
- 14 days	-	-	-	12	12	
- 21 days	-	-	-	4	4	
- 28 days	-	-	-	4	4	
- 56 days	-	-	-	5	5	
- 84 days	-	-	-	2	2	
- 112 days	-	1	-	3	4	
Over 112 days	-	-	-	4	4	
Not Stated	-	-	-	3	3	62
Non-pulmonary Tuberculosis						
- 7 days	-	-	-	5	5	
- 14 days	-	1	1	6	8	
- 21 days	-	-	-	-	-	
- 28 days	-	-	-	-	-	
- 56 days	-	-	-	2	2	
- 84 days	-	-	-	1	1	
- 112 days	-	-	-	-	-	
Over 112 days	-	-	-	-	-	
Not Stated	-	-	-	1	1	17

TABLE 9.11

TUBERCULOSIS - PLACE OF RESIDENCE

	Pulmonary	Non Pulmonary	Total
Main African Housing Area	7	2	9
Kabushi African Housing Area	6	2	8
Chifubu African Housing Area	4	1	5
Other Areas	4	1	5
Outside Ndola	7	2	9
Not Stated	34	9	43

TABLE 9.12

DEATHS FROM INFECTIVE & PARASITIC DISEASES OTHER THAN TUBERCULOSIS

	Under 1	Child	1 - 4-	5 - 14-	16 –
0220 Aneurysm of Aorta	-	-	-	-	2
0230 Other C.V. Sy.	-	-	-	-	1
0260 Other Syphilis	-	-	-	-	1
0370 Lymphogranuloma Venereum	-	-	-	-	1
0400 Typhoid Fever	-	-	-	-	2
0454 Bacillary Dysentery NOS.	1	-	-	-	-
0460 Amoebic Dysentery	-	-	-	-	5
0461 Amoebic Dysentery with liver damage	-	-	-	-	2
0480 Dysentery N.O.S.	3	-	3	-	4
0490 Staphylococcal Food Poisoning	-	-	1	-	-
0534 Septicaemia	-	-	-	-	2
0550 Diphtheria	1	-	2	-	-
0561 Whooping Cough	2	-	6	-	-
0610 Tetanus	3	-	-	-	-
0803 Poliomyelitis	-	-	1	-	-
0840 Smallpox	6	-	-	-	1
0851 Measles	2	-	4	-	-
0920 Infectious depatitis	-	-	-	1	-
1160 Malaria	4	-	3	-	4
1212 Trypanosomiasis	-	-	-	-	3
1230 Schistosomiasis	-	-	-	1	3
1300 Ascariasis	-	-	1	-	-
	22	-	21	2	29

TABLE 9.13

MALARIA (BLACKWATER)
(Northern Rhodesia)

	NON AFRICAN			AFRICAN		
	Admission	Rate %	Deaths	Admission	Rate %	Deaths
1959 Non African	618	5.4	2	7,945	9.7	113
1958 European	519	4.4	3	7,514	10.7	123
1957 European	493	4.9	1	6,086	9.3	87
1956 European	550	6.4	5	5,717	9.9	89
1955 European	632	7.6	6	4,400	7.0	52
1954 European	715	-	6	4,859	-	59

CHAPTER 10

NEOPLASMS, ALL FORMS

140 - 239

A44 - 60

B18 - 19

10.1. General

The number of deaths attributable to neoplasms of all types is shown in Table 10.1.

10.1.1. Age at Death

It will be noted that only one death was attributable to these causes in children under the age of 5 years. A similar very low incidence of deaths in children due to neoplasms was found by Janssens (1955) in the Belgian Congo, Davies (1948b) in East Africa, Smith (1943) in Lagos, Kahn et al (1958) in Johannesburg, and Bennett (1960) at Polela.

10.1.2. Frequency of Cause of Death

Overall, this group of diseases was responsible for 6.2% of all deaths compared with Steiners' (1954) figure of 17.3% among 35,293 autopsies in Los Angeles, and the figures of between 15 and 18% for European Countries (Epidemiological and Vital Statistics Report (1957c). The figures for Africans in Durban (Durban 1958) of 1.59% and in Bulawayo (1955/59) of 4.4% are lower but better notification of death in younger age groups may have been the cause thereof. In 1952 malignant neoplasms were responsible for 5.2% of deaths in Trinidad and Tobago and 1.2% in Ceylon (Epidemiological and Vital Statistics Report 1953).

In the annual average for 1954/56 in Ceylon malignant neoplasms were the seventh commonest cause of death in all age groups, causing 1.7% of all deaths. In the same period among U.S. non-whites malignant neoplasms were the third commonest cause of death being responsible for 11.5% of all deaths; but they were fifth in the 1 - 4 age group (3.4%) and second in the 5 - 14 group (7.7%). (Epidemiological & Vital Statistics Report 1959d).

In this series, malignant neoplasms were the fifth commonest cause of death overall, but if Categories B17 and 18 are combined, the position is fourth, preceded by pneumonia, enteritis and malnutrition (A64) in that order. Among adults, malignant neoplasms are the second commonest

cause of death being preceded only by pneumonia; but if Categories B18 and 19 are combined they equal the figure for pneumonia.

10.2. Malignant Neoplasms

10.2.1. Malignant Neoplasm of the Digestive Organs and Peritoneum

(150 - 159)
(A45 - 48. A57*)
(B18*)

This group of neoplasms contains 30 out of the 59 deaths due to malignant neoplasms - i.e. 51.9%, overall, being 58.7% of male and 23.1% of female deaths in this category.

10.2.1.1. Oesophagus

(150.0)
(A45)
(B18*)

There were three deaths, all in adult males, attributable to oesophageal neoplasms, 4.3% of deaths due to malignant neoplasms; This compares fairly with the figure of 6.0% in Durban in 1957 (Durban 1958) but is much lower than the overall figure of 14.7% found in the inpatient register for the Frere Hospital, East London (Burrell 1957). The latter has made out a case for the particular drinking habits being associated with the high incidence of oesophageal neoplasm in that area, but similar habits are not found in Northern Rhodesia.

10.2.1.2. Stomach

(151.0)
(A46)
(B18*)

Again there were 3 deaths all in adult males attributable to neoplasm of the stomach. This equal ratio of neoplasm of the oesphagus and stomach does not compare with Burrell's (1957) finding that in 1955 the incidence of carcinoma of the oesophagus was 4.8 times that of neoplasms of the stomach among urban Bantu, but is the same as that of Durban in 1957 (Durban 1958) where deaths due to neoplasms of the oesophagus and stomach were equal.

10.2.1.3. Liver

(156.0)
(A57*)
(B18*)

Deaths due to neoplasm of the liver formed a very high proportion of deaths due to neoplasms in males, but a much smaller proportion in females.

The percentages were:-

	Male	Female	Persons
Percentage of gastro-intestinal neoplasms	59.2%	66.7%	60.0%
All neoplasms (B18)	34.0%	14.3%	29.5%

In Durban in 1957, neoplasm of the liver was responsible for 19.4% of deaths due to malignant neoplasms (Durban 1958). Davies et al (1958) in Kampala found neoplasm in the liver to have a high incidence in males, but an average incidence in females.

The high incidence of primary neoplasm of the liver among the Bantu races is well reviewed by Berman (1951) who found the condition comprising 50.9% of all carcinomata in the Bantu in South Africa, compared with 15.3% in West Africa. A marked variation in incidence was found between the tribes, the highest incidence being among those from Mozambique. The difference in sex incidence was also noted in Johannesburg by the same author, where primary neoplasm of the liver comprised 31.9% of all neoplasms in males but only 5.1% in females. Steiner (1954), however, found that among negroes coming to autopsy in Los Angeles, carcinoma of the liver comprised only 1.4% of tumours: the fact that such negroes originated in West Africa was not overlooked.

Chatgidakis (1960) found primary carcinoma of the liver responsible for 72% of malignant neoplasms in 1,620 autopsies on African male gold miners.

The disease affects all ages, and Benson (1958) has reported a case in a Coloured in South Africa aged 4 months old.

Neoplasm of the liver cannot be considered without some reference to the role of cirrhosis in pathogenesis. Opinions vary on whether cirrhosis of the liver is purely due to dietary deficiency (Walters and Waterlow 1954: Berman 1955), although insufficient work has probably been carried out to determine the exact nature of the cirrhosis involved: nine forms of liver cirrhosis were reported by the Central African Journal of Medicine (1959). Certainly the high incidence of neoplasm of the liver, malnutrition and cirrhosis of the liver occurring in the same group of people would suggest a connection, but no definite proof has so far been advanced.

10.2.1.4. Pancreas

(157)
(A57*)
(B17*)

There were three deaths due to this condition in the series, two in males and one in a female. The incidence is thus 4.9% of all deaths due to malignant neoplasms similar to the figure of 4.5% in Durban in 1957 (Durban 1958).

10.2.2. Malignant Neoplasm of the Respiratory System

(160 - 165)
(A.49 - 50. 57*)
(B18*)

The three deaths due to these conditions comprised 4.9% of all deaths due to malignant neoplasms compared with 4.8% in Ceylon and 6.1% in Japan in 1953, and with up to 20% in European countries (males only) (Epidemiological and Vital Statistics Reports 1955b).

10.2.2.1. Malignant Neoplasm of the Nasal Cavities, etc.

(160)
(A57*)
(B18*)

There were two deaths in this series both due to neoplasm of the maxillary sinuses in adults - comprising 3.3% of all malignant neoplasms.

Shapiro et al (1955) found this condition comprised about 6% of all Bantu neoplasms referred for radiation therapy in Johannesburg, being nine times more common than neoplasm of the lung. They raised the question whether this high incidence was not in some way connected with the habit of snuff taking common among the Bantu in those areas. The incidence of snuff taking has not been determined in Northern Rhodesia but certainly indigenously produced snuff of various types is always available at African markets in Ndola.

10.2.2.2. Neoplasm of the Lung

(162.1)
(A50)
(B17*)

Only one death was attributed to this disease in the series. It appears to be a somewhat uncommon cause of death among Africans, Chatgidakis (1960) finding it constituted only 4% of malignancies in 1,620 autopsies on gold miners.

In Durban, however, the condition comprised 11.9% of all deaths due to malignancy in 1957, and 15.2% in 1958 (Durban 1958 : 1959).

In Southern Rhodesia Osburn (1957) found malignancy to be the cause of death in 36 of 242 autopsies, and in 14 of these (38.9%) the origin was the bronchus. This series appears to show the highest incidence of carcinoma of lung yet recorded among Africans.

In East Africa the disease appears to be rare, Wilkinson (1958) reporting on one case in an African adult male in Kenya and finding 10 other cases reported from East Africa.

10.2.3. Malignant Neoplasm of Breast and Genito-urinary Organs

(170 - 181)
(A51 - 54. 57*)
(B17*)

10.2.3.1. Breast and Genital Organs

This group of neoplasms accounted for only three adult female deaths, 21.4% of the 14 female deaths due to malignant neoplasms.

There were no deaths in males due to malignancy of the penis, although Charters (1957) reported that in Ngora, Uganda, carcinoma of the penis was responsible for 0.3% of admissions in 1954 and 0.16% in 1955.

The figures are too small to draw comparisons between cancer of the cervix and cancer of the body of the uterus, but Louw (1956a) in the Union of South Africa found a cervix : body ratio of 10 : 1 among coloureds.

The absence of any deaths due to malignant neoplasm of the breast is noticeable; although none were found in Durban in 1957 (Durban 1958) when carcinoma of the uterus was responsible for 17.9% of malignancies in both sexes.

Generally, among non-white races, malignant neoplasms of the breast range from 3 - 10% of all female neoplasms and genital neoplasms (including uterus) from 20 - 30% (Epidemiological and Vital Statistics Report 1957a). Among American negroes, however, the annual averages for 1952/56 were for breast 15.5% and for uterus (all types) 33.9% of all female neoplasms whereas the figures for Ceylon were 8.5% and 8.9% respectively. (Epidemiological and Vital Statistics Report 1959a).

10.2.3.2. Malignant Neoplasm of the Bladder

(181.0)
(A57*)
(B18*)

In this series there were five deaths due to this condition, all in males, comprising 10.6% of male neoplasms and 8.2% of all neoplasms.

Osburn (1957) found the condition responsible for 8.3% of all neoplasms and Davies et al (1958) remarked on the high incidence of carcinoma of kidney and bladder among males in Kampala. Among American negroes from 1952/56 the condition was responsible for 2.8% of male and 2.0% of female neoplasms: for both series the percentage was 2.4% (Epidemiological and Vital Statistics Report 1959e).

Joubert (1955) noted the higher incidence of neoplasm of the bladder in South Africa but considered Bilharziasis one of the "other rarer causes"of the condition. Marks (1956) does not consider Bilharziasis precancerous, and Gelfand (1950) considers that the presumption of association between Bilharziasis and neoplasm of the bladder requires revision. The strongest expression of opinion came from the African Conference on Bilharziasis (1957) who could find no valid evidence in Africa south of Sahara of any relationship between carcinoma of bladder and infection with S. Haematobium.

If these opinions are accepted an explanation must still be sought for the high incidence of neoplasm of the bladder among Africans.

10.2.4. Malignant Neoplasm of other and Unspecified Sites

(190 - 199)
(A55. 56. 57*)
(B18*)

10.2.4.1. Malignant Neoplasm of Thyroid

(194)
(A57*)
(B18*)

There were five deaths in the series due to this condition, a comparatively high incidence of 8.2% of all neoplasms.

Generally goitre is not a common condition among Africans in Northern Rhodesia although the condition is recognised by the Africans themselves who connect it with residence in particular areas.

No full investigation has been carried out in Northern Rhodesia and this condition must therefore remain uninvestigated at present.

10.2.4.2. Malignant Neoplasm of Bone and Connective Tissue

(196 - 197)
(A56)
(B18*)

There were two deaths (3.3% of all neoplasms) due to this condition. The general review of these conditions in Epidemiological and Vital Statistics Report (1959a) shows these conditions accounting for between 0.5 and 2% of all neoplasms.

The absence of deaths due to Kaposi's disease is noteworthy the disease being not uncommon among Africans (Keen et al 1957).

10.2.4.3. Carcinomatosis

(199)
(A57*)
(B18*)

There were 10 deaths in respect of which no further information was available other than that death was due to carcinomatosis, the site of the primary tumour remaining undisclosed.

These 10 deaths include the two deaths in the 5 - 14 age group so that no details are available for the few instances where deaths due to malignant neoplasms occurred other than in adults.

10.3. Neoplasms of Lymphatic and Haemopoietic Tissue

(200 - 205)
(A58 - 59)
(B18*)

There were only two deaths from this group of neoplasms due to lymphosarcoma and Hodgkin's Disease; both were in adult males.

The absence of deaths due to leukaemia in the younger age groups is noticeable, but understandable in the light of laboratory facilities available.

10.3.1. Benign Neoplasms

(210 - 229)
(A60*)
(B19*)

There were three deaths in this group - two in adult females due to fibroids of the uterus and one in a child under 1 year due to haemangioma.

10.3.2. Neoplasms of Unspecified Nature

(230 - 239)
(A60*)
(B19*)

There were three deaths due to these conditions, the information

on the death certificate being insufficient to state whether the neoplasm was malignant or benign. The number is comparatively small compared with the numbers of those deaths due to neoplasms, and are insufficient to vitiate the conclusions already drawn.

10.4. Duration in Hospital

The duration in hospital of all persons dying from neoplastic disease is given in Table 10.2.

The large number of instances where the duration was not ascertained render it impossible to draw any conclusions from the information.

TABLE 10.1.

NEOPLASMS

		Under 1		5 - 14 -		15 -	
		M	F	M	F	M	F
150.0	Oesophagus	-	-	-	-	3	-
151.0	Stomach	-	-	-	-	3	-
153.8	Large Intestine	-	-	-	-	1	-
153.9	Intestine N.O.S.	-	-	-	-	1	-
154.0	Rectum	-	-	-	-	1	-
156.0	Liver (Unspecified)	-	-	-	-	16	2
157.0	Pancreas	-	-	-	-	2	1
160.2	Maxillary Sinus	-	-	-	-	1	1
162.1	Lung	-	-	-	-	1	-
171.0	Cervix Uteri	-	-	-	-	-	1
173.0	Chononepithelima	-	-	-	-	-	1
174.0	Uterus N.O.S.	-	-	-	-	-	1
181.0	Bladder	-	-	-	-	5	-
194.0	Thyroid	-	-	-	-	2	3
190.9	Melanoma	-	-	-	-	-	1
196.0	Bones of Face	-	-	-	-	1	-
196.7	Bones of lower Limb	-	-	-	-	1	-
199.0	Carcinomatosis	-	-	1	1	6	2
200.1	Lymphosarcoma	-	-	-	-	1	-
201.0	Hodgkin's Disease	-	-	-	-	1	-
Total B.18		-	-	1	1	46	13
214.0	Fibroids	-	-	-	-	-	2
228.0	Haemangioma	1	-	-	-	-	-
238.0	Unspecified Neoplasm of skin	-	-	-	-	1	-
234.0	Neoplasm of Ovary	-	-	-	-	-	1
239.0	Neoplasms of other sites	-	-	-	-	1	-
Total B.19		1	-	-	-	2	3
GRAND TOTAL		1	-	1	1	48	16

NEOPLASMS

Duration in Hospital

Days	5 - 14 -		15 —	
	M	F	M	F
- 7	-	-	9	6
- 14	-	-	10	1
- 21	-	1	8	4
- 28	-	-	3	1
- 56	-	-	7	1
- 84	-	-	2	-
- 112	-	-	3	-
Over 112	-	-	-	-
Not Stated	1	-	-	-
Total	1	1	42	13

CHAPTER 11

ALLERGIC ENDOCRINE, METABOLIC AND NUTRITIONAL DISEASES

(240 - 277, 287 & 289)
(A61, 63, 66*)
(B20, 46*)

DISEASES OF THE BLOOD AND BLOOD FORMING ORGANS

(290 - 299)
(A65, 66*)
(B21, 46*)

MENTAL, PSYCHO-NEUROTIC AND PERSONALITY DISORDERS

(300 - 326)
(A67 - 69)
(B46*)

In view of the very small number of deaths attributable to these conditions, they have been grouped in this chapter, with the exception of those deaths due to nutritional disorders (280 - 286) which are considered in the next chapter.

11.1. General

The number of deaths due to these conditions is given in Table 11.1. from which it will be noticed that there are very few deaths indeed attributable to these conditions.

11.2. Diabetes Mellitus

(260)
(A63)
(B20)

Two deaths only were attributable to this condition, both occurring in adults. The relative importance of this condition in Africans in Central Africa has not been reviewed but in Bulawayo the disease was responsible for only three out of 3,823 deaths between 1954 and 1959 (Bulawayo 1955/59).

11.3. Sickle-cell Anaemia

(292.6)
(A65)
(B21)

There were three deaths attributable to this condition, one in a baby under the age of one year and two in adults. Budtz-Olsen and Burgers (1955) have pointed out the relative infrequency of this condition in South Africa and the distribution of the disease in Central and East Africa is very variable.

11.4. Purpura

(296)
(A66*)
(B46*)

There were four deaths due to this condition in adults, all of which were marked on the death certificates as being due to 'onyalai'. The generally accepted theory at the present moment is that this condition is nutritional in origin but in view of the uncertainty which still exists as to the actual cause of this disease it has not been classed as a nutritional condition insofar as this study is concerned.

Kahn et al (1958) found the disease rare among children at Baragwanath Hospital.

11.5 Anaemias Generally

No deaths were specifically attributed to anaemias of any type. Foy and Kondi (1956) have pointed out that there are three basic anaemias present in Africans in East and Central Africa.

Beet (1956) has also pointed out that in Northern Nigeria anaemia is one of the causes of cardiac failure, quoting a series of 19 cases where the mean haemoglobin value was only 2.4 grammes per cent.

The relationship between anaemia and hookworm disease is not fully understood although it is generally considered that hookworm disease plays only a small part in the production of iron-deficiency anaemia (Foy et al 1958).

Pernicious anaemia itself has been reported in Africans by Metz et al (1958) and by Adams (1957).

Whether any form of anaemia, irrespective of type, has contributed to the deaths in this series has not been ascertained and no records have been kept of the occasions when 'anaemia' has appeared upon the death certificate although not as the actual cause of death. The possibility of the anaemia in such cases being of nutritional origin cannot be ruled out but in view of the numerous other factors which may contribute to the anaemia, it has not been considered justifiable to include such anaemias as of nutritional origin.

10.6. Mental, Psycho-neurotic and Personality Disorders

No deaths were attributed to these conditions, possibly due to the fact that there are no mental wards available in the Ndola

Hospital except for very short-term cases. Persons suffering from serious mental disorders are invariably transferred as soon as possible to other hospitals.

No deaths were attributed to Mongolism, although this condition is now well recognised among Africans (Eberlie 1955, Kaplan 1955, Leather and Leather 1957, Lötter 1955, Luder and Musoke 1955).

TABLE 11.1.

ALLERGIC, BLOOD DISEASE, MENTAL DISEASE

		Under 1		15 –	
		M	F	M	F
260.0	Diabetes Mellitus.	-	-	1	1
292.6	Sickle Cell anaemia.	1	-	2	-
296.0	Purpura (Onyalai)	-	-	-	4

CHAPTER 12

NUTRITIONAL DISORDERS

(280 - 286)
(A.64)
(B46*)

General

Of the factors of importance in determining the general state of nutrition among Africans, some were discussed in Chapter 3. In this chapter a more detailed study of nutritional factors will be carried out, together with an analysis of the ultimate effects of faulty nutrition.

12.1. Diet

12.1.1. Cereals

12.1.1.1. Type of Cereal

In the areas served by the Ndola Hospital the staple cereal is Indian corn or maize, the growing of millet and sorghums being confined to the quantities required for the making of African beer. The above statement may not be true for areas North of the Copperbelt but is true for those areas from which virtually all admissions to the African Hospital come.

12.1.1.2. Source of the Cereal

Green maize is usually sown between September to October and harvested in February. This crop is usually a small one and has little bearing on the nutritional status of the inhabitants, but it does serve to fill in the period known as the hunger season before the harvesting of the main maize crop. The main maize crop is harvested in May to July and dependent on the nature of the harvest is usually sufficient to last approximately six to nine months.

Among rural residents, home production is responsible for virtually all the maize consumed. The grain from these sources is turned into flour by pounding in the traditional type of "mill" consisting of a hollowed tree trunk and a long wooden "pestle": the resultant flour is coarse and unpopular among the Africans who prefer the more highly refined commercial product.

How much the urban inhabitants depend on 'gardens' for their supply of maize is not known, but the amount produced by such gardens cannot be inconsiderable.

12.1.1.3. Ntrutional Value of the Cereal

The various types of maize flour available are detailed in the FAO Nutritional Study on Maize and Maize Diets (1953); generally speaking the flour available for purchase in Northern Rhodesia is a roller meal from which the bran has been removed: the bran is not normally available for sale to the African population. The FAO Nutritional Study on Protein Requirements (1957) indicates that although the maize diet provides protein in fair quantity, such protein is of inferior quality and even if supplemented by Navy beans provides a diet basically deficient in tryptophane and methionine.

12.1.1.4. Cereals in Beer Making

As has been pointed out in Chapter 3, beer drinking in towns is confined to the beer halls.

In the rural areas of the Copperbelt, the women still brew their own beer, growing cereals for this purpose. Tanner (1956) found that in the Sukama diet in Tanganyika, beer making is wasteful of cereals and Platt (1955) while accepting the place of beer in rural African Social life, considered that no less than one sixth of the cereal harvest in rural areas might be diverted to beer making.

12.1.2. Protein

Meat is appreciated as a relish and after purchase it is often aired in the sun to obtain some degree of preservation: its consumption may be spread out over several days. It is usually cooked by stewing for a long period without the addition of any vegetables or spices.

Dried fish is also highly esteemed as a relish but is normally very expensive, being brought down by carriers in a dried state from the Great Lakes North of the area. Fishing locally is limited to the dambos mentioned in Chapter 3 and the exact amount of fish caught cannot be estimated. In normal times the fishing is carried out by the children but in times of drought when the fish become concentrated in pools, all Africans irrespective of age or sex, join in the attempts to obtain fresh fish. Such small streams as there are within the vicinity usually have a large number of fish traps of various types immediately available.

The majority of Africans consider themselves hunters but game has been virtually exterminated in the area and little meat is available from this source.

As has been shown by White (1959) caterpillars are also used in relishes and at one period a glut of a particularly attractive caterpillar normally residing in the top of trees resulted in areas of forest in the vicinity being completely chopped down to gain easy access to these insects.

12.2. Dietary Habits of the Africans

A few Africans in the higher social and economic groupings may consume what is virtually a European style of diet, but insofar as the vast majority are concerned, they follow the traditional methods of eating, irrespective of the problems created by the nature of their employment.

The main meal, which is prepared by the wife, is provided in the evening after the husband's return from work and consists of a thick maize porridge, cooked in an iron pot, and eaten with the various types of " relish". The relish may consist of any form of vegetable, meat, etc., and the thickened porridge is formed into a ball or cylinder and dipped in the relish before being eaten. Insofar as the Africans are concerned the relish is important, possibly more so as a lubricant for the porridge; more important still is the feeling of satisfaction at the end of the meal which is attributable to the porridge rather than to the relish.

It is customary for the husband to eat first and he often consumes the majority of the relish. The wife and children usually follow in that order so that little or no relish may be left for the children.

No further meal is taken in the evening and the man goes to work the following morning without having had any form of breakfast, although if sufficient porridge is left over from the evening meal he may consume it or take it with him to work.

Generally speaking, no meals are provided by the employers during working hours and if free time is available the worker will patronise the

numerous tea stalls which are available, selling for the most part mineral waters and buns of various descriptions.

As will be seen from the above, the nutritional value of the food is directly related to the type of "relish" which is available and this in turn varies considerably with the economic status of the family, being generally the most expensive part of the meal. The vegetable relishes are by far the commonest and beans of various types are probably the commonest form of relish available.

12.3. The General State of Nutrition

The exact intake of foodstuffs has not been calculated in the area.

Beet (1951) found that although the rural inhabitants near Serenje consumed a diet deficient in protein, and vitamin B, nevertheless there were no signs of gross deficiency disease among the schoolchildren in the area.

Colson (1959) working among the plateau Tonga before 1950 found that meal, fish and milk were all consumed by the inhabitants regularly although food taboos were well developed often on an individual basis.

Trowell (1955) reviewing the work on non-rationed groups of adult African males found the calory intake to be between 2,200 and 2,400 a day, and of this, between 7.8 and 9.1% came from protein, chiefly of vegetable origin: among rationed groups the calory intake was higher, being between 2,800 and 3,000 a day with 9.0 to 13.3% derived from proteins. He recommended a daily intake of between 2,800 and 3,000 calories with 10% derived from proteins.

Ferro-Luzzi (1958) in a very detailed report on Libya found that with an average calorie intake of between 1,880 and 1,990 a day, malnutrition was very frequent.

In Bechmanaland, Squires (1956) in the 8 - 15 year age group in the larger settlements found an incidence of malnutrition of 20-30% rising to 90% in times of drought.

Among mental patients, Smartt (1956) showed that the addition of 4 ounces of dried milk per day to a standard diet resulted in a gain in weight of 5¼ lbs. as compared with 1½ lbs. in persons not receiving

the supplement.

In Northern Rhodesia, Thomson (1954) estimated that 10% of the inhabitants of the Main African Housing Area in Lusaka received less than the standard requirement of calories compared with none in the more rural Chilenje African Housing Area.

Bettison (1960) used a diet with 110 grams of protein yeilding 3,100 calories per man unit as his standard in assessing the Poverty Datum Line in Lusaka.

More information is required on the nature of the food intake in Northern Rhodesia, and also on the effects of cooking and storage on the constituents of the diet, particularly proteins. Dean (1955) has drawn attention to the deliterous effects of storage on biological values of protein fractions in the diet.

12.4. The Effects of Malnutrition

The role of malnutrition in the pathogenèsis of other diseases has been reviewed by Williams (1957) and Platt (1958).

Galfand (1956) found that persons in the 1 - 5 year age group suffering from malnutrition have a higher incidence of malaria, hookworm, bilharzia and ascariasis.

Coetzee and Pretorius (1956) found that 23.3% of 106 cases of kwashiorkor suffered from infections of the bowel, compared with 21.7% of 69 controls. McKenzie (1940) showed that a bad diet was frequently associated with a chronic bacillary type of dysentery. Ferro-Luzzi (1958) in the malnourished people of Libya found diarrhoea only partly infectious in origin.

The relationship between malnutrition and infection has been discussed by the Joint F.A.O./WHO Expert Committee on Nutrition (1958) and more fully by Scrimshaw et al (1959).

The relationship between kwashiorkor and cirrhosis of the liver is still uncertain, although such relationship has been discussed fully by the Joint FAO/WHO Expert Committee on Nutrition (1950) by Brock and Autret (1952), by Walters and Waterlow (1954) and by Waterlow and Scrimshaw (1957).

The Joint FAO/WHO Expert Committee on Nutrition (1953) stressed the dangers of maternal malnutrition on the newly born child, and the Committee of the Royal College of Obstetricians and Gynaecologists and the British Paediatric Association (Neonatal Mortality & Morbidity 1949) considered that improvements in socio-economic circumstances with raised nutritional standards would further reduce stillbirth and neonatal death rates.

The Joint FAO/WHO Expert Committee on Nutrition (1950) stated "in many tropical areas deficiency diseases of unknown aetiology are responsible for a high percentage of the deaths of infants and children". The Second Report of the same Committee (1951) expressed the opinion that the chief causes of malnutrition were poverty and ignorance, both of which conditions are rife in the under-developed countries: it further stated that in the age group 1 - 5 although respiratory and alimentary infections were the main causes of death, nevertheless "malnutrition is an important contributory factor". The Third Report of the same Committee (1953) stressed the widespread effects of malnutrition, pointing out that malnutrition in the mother may have serious effects upon the child at birth and further drew attention to the difficulties in distinguishing between marasmus and malnutrition in young children. They further stressed that "in the tropics the vicious circle of malnutrition and parasitism is very evident". Their Fifth Report (1958) states that "the nutritional state of the pre-school child is one of the most serious problems confronting maternal and child health workers at the present time".

Bearing in mind the nutritional problems of Central Africa as surveyed by Baker-Jones (1956) and the views of Davies (1948)a) that figures from death certificates of young children probably do not reflect the true incidence of the poor state of nutrition of the inhabitants of these areas, there is justification to consider that there are few deaths among children between 1 - 5 in this survey in which faulty nutrition did not play some part.

12.5. Deaths due to Nutritional Disorders

The number of persons dying of nutritional disorders is given in Table 12.1.

12.5.1. Beri-beri

(280.0)
(A64*)
(B46*)

There were three deaths attributable to this condition in varying age groups. The incidence of the condition is not known but experience at the hospital indicates that a form of wet beri-beri associated with heart failure may not be uncommon. The failure to treat cases of cardiac failure with pericardial effusion with vitamin B complex has often resulted in fatal consequences and certainly the improvement of such cases under such therapy has been quite striking.

12.5.2. Pellagra

(281.0)
(A64*)
(B46*)

There were two deaths due to this condition which is not unknown in Central Africa. Miller-Cranko and Gelfand (1958) reported 22 cases out of 54 adult Africans suffering from nutritional disorders in Salisbury. Haynes (1958) has drawn attention to the fact that pellagra may be produced in persons suffering from tuberculosis under treatment with Isoniazid.

In 'Maize and Maize Diets' (1953) the relationship between maize diets, tryptophane and pellagra has been discussed.

12.5.3. Other Specific Deficiency Diseases

There were no other specific deficiency diseases noted. Miller-Cranko and Gelfand (1958) in their 54 cases found 13 suffering from vitamin A deficiency but only one case of pure scurvy. The low incidence of scurvy is possibly contrary to the general opinion, but it should be remembered that Barnes et al (1953) found that as little as 10 milligrammes of vitamin C per day was sufficient to cure the manifestations of scurvy in volunteers.

12.5.4. Malnutrition and Kwashiorkor

(286.5 and 286.6)
(A64*)
(B46*)

12.5.4.1. Incidence

Reference has already been made to the idiosyncrasies of medical practitioners certifying causes of death whereby the terms malnutrition

and kwashiorkor may be used synonymously. From the figures given in Table 12.1. it will be noted that the majority of deaths have been attributed to malnutrition rather than to kwashiorkor.

The importance of malnutrition as a cause of death is not easy to assess from the official statistics available in under-developed countries, owing to the fact that such countries generally classify their deaths according to the abbreviated list of 50 Causes of Mortality ('B' Code) under which deaths due to malnutrition are grouped in the miscellaneous section (B46). Any information, therefore, must be obtained from the surveys carried out in the countries themselves.

More detailed information concerning deaths due to Nutritional Disorders in the present series is given in Table 12.2. which includes deaths due to nutritional disorders of any type and also those deaths where nutritional disorders have appeared upon the death certificates as contributory factors to the deaths. During 1957 and 1958 it will be noted that instances where nutritional disorders were a factor in the death, are approximately double the number of cases where the nutritional disorders were stated to be the actual cause of death. During 1959, however, the position was almost reversed. The reason for this lies almost entirely in the arrival of a new medical practitioner at the hospital during 1959. This practitioner had very considerable experience of nutritional disorders among Africans and was probably less afraid of attributing deaths to nutritional disorder than the previous practitioners whose experience being gained outside Africa might have led them to attribute the death to those disorders with which they had had greater experience in their previous appointments. In particular, less experienced practitioners may attribute deaths to enteritis, when in fact the diarrhoea is of nutritional origin (Waterlow and Scrimshaw 1957).

The percentage of deaths in which nutritional deficiency appeared either as the cause or the factor in death is given in Table 12.3. from which it will be noted that there is a general tendency for the percentage to rise between 1957 and 1959 in the age group 1 - 4.

In the age group under one year, the findings are varied but are low for 1959 due almost certainly to the larger number of deaths in this age group being registered during this year. The figures for persons over the age of five years show a fair degree of variation during each year being lowest among adults as might be expected.

Davies(1948b) surveyed the deaths of 164 children under the age of 10 in East Africa and found 15.4% (4 out of 26) aged 0 - 28 days died of marasmus, 7.9% (3 out of 38) aged 1 - 12 months of malnutrition, and 20% (20 out of 100) aged 1 - 10 years, although malnutrition provided the background in most of the deaths over 28 days old.

Davies(1955) found 32 out of 246 deaths of children under 10 years at Mulago Hospital to be due to kwashiorkor.

At Broken Hill (Annual Report of the Health Department 1956) 10.5% (14 out of 133) of infant deaths were attributed to malnutrition and only 1.8% (3 out of 162) of deaths in adults and children. Unfortunately, the criteria for assessing a person as an infant or child were not stated.

Smith (1943) in 500 post-mortem examinations of children under the age of 3 in Lagos attributed death to malnutrition in only 2.8% (14) cases.

In Guatemala, Behar and Scrimshaw (1958) found only one death out of 96 under the age of one year due to nutritional disorder and 40 deaths out of 109 in the 1 - 4 age group, 38 of which were specifically stated as being due to kwashiorkor. In the 5 - 14 age group, 2 deaths out of 17 were attributed to kwashiorkor.

12.5.4.2. General Incidence and Mortality

Lawrie (1955) quoted an incidence of 51.5% for nutritional disorders on the Kenya Coast during 1927 and Kahn et al (1958) found these conditions to be the second commonest cause of admission to Baragwanath Hospital in 1956, being responsible for 711 out of a total of just over 5,000 admissions. Lewis (1959) found nutritional disorders responsible for 17.5% of 1,193 cases diagnosed in out-patient practice in Durban.

12.5.4.3. <u>Age Incidence</u>

The actual age at death where nutritional disorder was the cause or factor in death for persons dying during the last six months of 1959 is given in Table 12.4. From this it will be noted that out of a total of 18 deaths, seven occurred under the age of one year. A more detailed breakdown of the group under the age of one year reveals that four of the seven occurred under the age of three months and one in the age range 3 - 6 months. The deaths under 6 months are more likely to be due to undernutrition than malnutrition but the two deaths occurring between the ages of 9 months and a year might or might not have been due to malnutrition.

Griffiths (1960) attributed an infant mortality rate of 1.67 per thousand among Africans at Baragwanath Hospital to nutritional disorders.

Wellbourn (1957) in Uganda found no cases in 73 deaths in the 6 - 12 month age group in 1950 and only one death out of 317 in a similar age group in 1955. Davies (1955) found no kwashiorkor under the age of 6 months among 2,649 admissions to Mulayo Hospital, and Pretorius et al (1956) in investigating kwashiorkor assessed the minimum age to be 6 months and found 12.7% (26 out of 205) occurred below the age of one year the peak incidence being in the 1 - 2 age group. Behar and Scrimshaw (1958) in Guatemala attributed only one death under the age of one year to nutritional deficiency but Kahn et al (1958) working at Baragwanath Hospital found no less than 6% of cases of protein malnutrition occurring in children under the age of six months and 26% in the 6-12 months age group. The age range indicated here is somewhat lower when compared with the world review of this condition carried out by Waterlow and Scrimshaw (1957). Bennett (1960) working among rural Africans in South Africa found no deaths in 1953 due to nutritional deficiency under the age of one month where the cause of death was known and 10 due to marasnus and 3 due to kwashiorkor out of 41 where the cause of death was ascertained in the age range 1-12 months.

12.5.4.4. Seasonal Incidence of Malnutrition

The quarterly figures for all forms of malnutrition either as a cause or factor in death are given in Table 12.5. Taking the age group of under five years as the main criterion it will be noticed that the incidence of malnutrition is at its highest during the first quarter of the year falling during the second and third quarters and then beginning to rise again in the fourth quarter. Numbers in the age group 1 - 4 - are rather small and the pattern in this age group is slightly different, the peak occurring during the second quarter of the year and falling during the third and fourth quarters of the year. The age variations in seasonal incidence are minor and it is quite clear that there is a seasonal incidence for this condition with its peak during the first and second quarters of the year. Bearing in mind what has been said about the times of harvest, this figure is not unexpected.

Carr and Galfand (1957) also noticed the seasonal incidence in Salisbury with the peak incidence for admissions to hospital in February. In their series 5 out of 142 (3.5%) had not been weaned.

Bennett (1960) also noticed a seasonal incidence in South Africa attributing this seasonal variation to the period when the mothers were working, the seasonal nature of such work and a seasonal shortage of cows' milk.

12.5.4.5. Duration in Hospital

The duration in hospital for persons dying where malnutrition was a cause or factor of death is given in Table 12.6. From it, it will be noticed that in the under five group, 50.7% died within two days of admission. Ten adults, however, had been in hospital for over 14 days before death took place which suggests that the poor nutritional state was possibly secondary to the underlying cause of death.

12.5.4.6. Place of Residence

For the years 1958-59 only the place of residence of the persons dying from malnutrition is given in Table 12.7. together with the total number of deaths at these places of residence in the 1-4 age group. The high incidence among children coming from outside Ndola is noticable,

the figures for the various housing areas within the town not showing any particular difference between the areas.

12.5.4.7. Religion

The deaths associated with nutritional disorders are given in Table 12.7. classified according to the religious persuasion of the deceased.

The numbers involved in the Moslem and Dutch Reformed Church are too small for comment. As between the Roman Catholic and General groups, the differences are extremely small and unable to be explained on religious grounds.

12.6. Overcoming Malnutrition

The overcoming of malnutrition is not a simple problem. The standards by which nutritional status is to be judged require clear definition, and an attempt must be made to ascertain the numerous underlying factors. A dietary survey is an essential prerequisite to any attempt to improve nutrition (Latzky 1955, Lancet 1955b).

The dangers of introducing a new type of diet among uneducated persons must be recognised (Brock and Autret 1952) and the protein rich foodstuffs available locally must be investigated and their production stimulated (Dean 1953: Joint FAO/WHO Expert Committee on Nutrition 1958).

Staff must be trained in nutrition work, and the other Government Departments brought to a realisation that the fundamental causes of malnutrition are poverty and ignorance (Joint FAO/WHO Expert Committee on Nutrition 1951).

TABLE 12.1

CAUSE OF DEATH

		Under 1	Child	1-4-	5-14-	15 -	Total
280.0	Beri Beri	-	-	1	1	1	3
281.0	Pellagra	-	-	1	1	-	2.
286.5	Malnutrition	10	3	26	4	12	55.
286.6	Kwashiorkor	4	1	11	-	-	16.

TABLE 12.2

MALNUTRITION CAUSE AND FACTOR

		Under 1	Child	1-4 -	Under 5	5-14 -	15 over	Over 5	Total
1957	Cause	4	1	3	8	-	1	1	9
	Factor	8	-	4	12	1	4	5	17
	Total	12	1	7	20	1	5	6	26
1958	Cause	5	2	11	18	3	6	9	27
	Factor	14	1	16	31	2	16	18	49
	Total	19	3	27	49	5	22	27	76
1959	Cause	5	1	25	31	3	6	9	40
	Factor	5	-	17	22	1	6	7	29
	Total	10	1	42	53	4	12	16	69
Series	Cause	14	4	39	57	6	13	19	76
	Factor	27	1	37	65	4	26	30	95
	Total	41	5	76	122	10	39	49	171

TABLE 12.3

MALNUTRITION - CAUSE AND FACTOR

		Under 1		Child	1-4-		Under 5		5-14-		15 -		Over 5		Total	
1957	Cause or Factor	12	13.2%	1	7	25.9%	20	16.1%	1	16.7%	5	3.6%	6	4.1%	26	9.7%
	Total Deaths	91		6	27		124		6		139		145		269	
1958	Cause or Factor	19	24.1%	3	27	39.7%	49	31.4%	5	25.0%	22	10.5%	27	11.9%	76	19.9%
	Total Deaths	79		9	68		156		20		206		226		383	
1959	Cause or Factor	10	9.3%	1	42	43.3%	53	25.5%	4	21.2%	12	5.9%	16	7.2%	69	16.0%
	Total Deaths	108		3	97		208		19		203		222		430	
Series	Cause or Factor	41	14.8%	5	76	39.6%	122	25.0%	10	22.2%	39	7.1%	49	8.3%	171	15.8%
	Total Deaths	278		18	192		488		45		548		593		1081	

TABLE 12.4

MALNUTRITION A FACTOR

Age - Last 6/12 1959 Only

Age	
Under 1 Month	1
1 - 2 Months	3
3 - Months	1
6 - Months	-
9 - Months	2
Total Under 1 year	7
1 year -	6
2 years -	3
3 years -	1
4 years -	-

Also 1 aged 10 years

TABLE 12.5

MALNUTRITION (CAUSE OR FACTOR)

		Under 1		Child		1-4		Under 5		5-14		15 -		Over 5		Total	
1ST Quarter	1957	2		-		3		5		-		-		-		5	
	Total Cause	21		1		14		36		2		24		26		62	
	1958	12		1		9		22		-		3		3		25	
	Total Cause	24		4		20		48		8		55		63		111	
	1959	1		-		16		17		1		1		2		19	
	Total Cause	14		2		32		48		2		41		43		91	
Series	Cases	15	25.4%	1	14.3%	28	42.4%	44	33.3%	1	8.3%	4	3.3%	5	3.8%	49	26.4%
	Total Cause	59		7		66		132		12		120		132		264	

TABLE 12.5 (Cont.)

MALNUTRITION

		Under 1	Child	1-4	Under 5	5-14 -	15 -	Over 5	Total
1957	2nd Quarter	2	-	4	6	1	2	3	9
	Total Cause	25	-	11	36	3	25	28	64
1958	Cause	1	1	14	16	2	7	9	25
	Total	19	2	26	47	4	56	60	107
1959	Cause	2	1	16	19	1	1	2	21
	Total	27	1	34	62	4	59	63	125
Series	Cause	5 7.0%	2 66.7%	34 47.9%	41 28.3%	4 36.4%	10 7.1%	14 9.4%	55 18.6%
	Total	71	3	71	145	11	140	151	296

TABLE 12.5 (Cont.)

MALNUTRITION (CAUSE OR FACTOR)

		Under 1	Child	1-4-	Under 5	5-14-	15-	Over 5	Total
1957	Third Quarter	4	-	-	4	-	-	-	4
	Total	18	-	1	19	1	39	40	59
1958	Cause	2	1	3	6	2	9	11	17
	Total	19	3	15	37	5	49	54	91
1959	Cause	2	-	3	5	2	7	9	14
	Total	26	-	7	33	4	48	52	85
Series	Cause	8 12.7%	1 33.3%	6 26.1%	15 16.9%	4 40%	16 11.8%	20 13.7%	35 14.9%
	Total	63	3	23	89	10	136	146	235

TABLE 12.5 (Cont.)

MALNUTRITION (Cause or Factor)

		Under 1		Child		1-4 -		Under 5		5-14 -		15 -		Over 5		Total	
1957	Fourth Quarter	4		1		-		5		-		3		3		8	
	Total	27		5		1		33		-		51		51		84	
1958	Cause	4		-		1		5		1		3		4		9	
	Total	17		-		7		24		3		46		49		73	
1959	Cases	5		-		7		12		-		3		3		15	
	Total	41		-		24		65		9		55		64		129	
Series	Cause	13	15.3%	1	20%	8	25.0%	22	18.0%	1	8.3%	9	5.9%	10	6.1%	32	11.2%
	Total	85		5		32		122		12		152		164		286	

TABLE 12.6

DURATION IN HOSPITAL

MALNUTRITION

	Under 1	Child	1-4-	Under 5	5-14-	15 -	Over 5	Total
0	10	1	8	19	2	3	5	24
1	5	2	17	24	1	6	7	31
2	7	-	12	19	1	1	2	21
3	1	1	3	5	2	3	5	10
4	4	-	4	8	-	-	-	8
5	2	-	7	9	2	3	5	14
6	2	-	2	4	1	3	4	8
7	2	-	1	3	-	2	2	5
8	-	-	2	2	1	1	2	4
9	1	-	2	3	-	2	2	5
10	-	1	1	2	-	1	1	3
11	1	-	3	4	-	2	2	6
12	1	-	3	4	-	1	1	5
13	-	-	2	2	-	-	-	2
14	-	-	2	2	-	-	-	2
Over 14	2	-	2	4	-	10	10	14
Not Stated	2	-	2	4	-	-	-	-
Total	40	5	73	118	10	38	48	166
Died outside hospital	1	-	3	4	-	1	1	5

TABLE 12.7

MALNUTRITION (RESIDENCE)

1958 & 59 Only

		Under 1		Child		1-4-		Under 5		5-14-		15 —		Over 5		Total	
Main	Modern 1.	-	5		-	-	6	-	11	-		-	5	-	5	-	16
	Kimberley Brick 1	3	14		-	4	8	7	22	-		2	12	2	12	9	34
	Rondavels.	1	3		-	1	1	2	4	1	1	1	7	2	8	4	12
	Kimberley Brick 2	1	12		-	2	4	3	16	1	1	1	28	2	29	5	45
	Modern 2.	-	4		-	4	6	4	10	1	1	1	19	2	20	6	30
	Other Housing.	-	2		-	1	1	1	3	-	1	-	1	-	2	1	5
Kabushi	1 Permanent.	4	26		2	7	22	11	50	1	7	5	43	6	50	17	100
	2 Temporary	1	2		-	1	2	2	4	-	-	-	3	-	3	2	7
Chifubu	1 Permanent.	3	31		1	14	36	17	68	2	7	3	37	5	44	22	112
	2 Temporary.	-	-		-	-	-	-	-	-	1	-	-	-	1	-	1
Other Cpds.		3	34		1	13	32	16	67	2	9	3	39	5	48	21	115
Outside Ndola		4	24	1	1	14	26	18	51	-	7	8	96	8	103	26	154
Not Stated		9	30	3	7	8	22	20	59	1	4	10	117	11	121	31	180

TABLE 12.8

MALNUTRITION - RELIGION

General

		Under 1	Child or Infant	1 - 4 -	5 - 14 -	15 —	Total
1957	Malnutrition	8	1	4	-	3	16
	Total	63	6	18	5	111	203
1958	Malnutrition	14	2	20	3	15	54
	Total	58	7	53	16	168	302
1959	Malnutrition	9	1	33	4	9	56
	Total	86	3	75	16	158	338
Total	Malnutrition	31	4	57	7	27	126
	Total	207	16	146	37	437	843
	Malnutrition %	15.0%	25.0%	39.0%	18.9%	6.2%	14.9%
	" under 5		24.9%				

TABLE 12.8 (CONT.)

MALNUTRITION - RELIGION

Roman Catholic

		Under1	Child or Infant	1 - 4 -	5 - 14 -	15 —	Total
1957	Malnutrition	3	-	1	1	2	7
	Total	24	-	6	1	18	49
1958	Malnutrition	2	1	6	1	6	16
	Total	14	2	14	3	26	59
1959	Malnutrition	1	-	5	-	2	8
	Total	18	-	16	2	41	77
Total	Malnutrition	6	1	12	2	10	31
	Total	56	2	36	6	85	185
	Malnutrition %	10.7%	50.0%	33.3%	33.3%	11.8%	16.8%
	" under 5		20.2%				

TABLE 12.8 (CONT.)

MALNUTRITION - RELIGION

	Moslem	Under 1	Child or Infant	1 - 4 -	5 - 14 -	15 —	Total
1957/59	Malnutrition	-	-	3	1	2	6
	Total	2	-	4	12	17	25
	Malnutrition %						24.0%
	Dutch Reformed Church						
1957/59	Malnutrition	4	-	4	-	-	8
	Total	13	-	6	-	9	28
	Malnutrition%						23.6%

CHAPTER 13

DISEASES OF THE NERVOUS SYSTEM AND SENSE ORGANS

(330 - 398)
(A70 - 77)
(B22, 23 46*)

Deaths from diseases of the nervous system and sense organs are given in Table 13.1

13.1 Vascular Lesions affecting the Central Nervous System

(330 - 334)
(A70)
(B22)

The number of deaths due to this group of conditions was small, totalling 12 adults. There was in addition, one death in a child of under 1 year of age who was stated to have died from cerebral haemorrhage. As the age was not stated and as the death certificate made no reference to cerebral haemorrhage in the newborn, there was no option but to classify the death in this group. It appears not unlikely, however, that the death was due to birth injury.

Shaper and Shaper (1958) reviewed deaths in the medical wards in Mulago Hospital of persons over the age of 6 years. Deaths of persons suffering from this group of diseases numbered only 8 out of a total of no less than 2,466 admissions of all types. The Annual Reports of the Medical Officer of Health of Bulawayo (Bulawayo 1955/59) attributes only 49 deaths out of a total of 3,823 to this condition during the years 1954-1959.

However, the Epidemiological and Vital Statistics Report (1959e). indicates that these diseases were the second commonest cause of death among the non-white population in the United States during the years 1954-1956.

13.2 Inflammatory Diseases of the Central Nervous System

(340 - 345)
(A71, 72. A78*)
(B23, 46*)

The majority of deaths in this group were due to "Meningitis NOS". Out of a total of 36 deaths attributed to meningitis other than meningococcal and tuberculous, in only two instances was the responsible organism identified. In both cases it was due to the pneumoccus and both cases occurred during 1959. The identification of the organism was almost

certainly due to improved laboratory facilities becoming available during this year.

As was stated in Chapter 4 records were kept of deaths where meningitis was entered on the death certificate although it was not, in fact, classified as the cause of death. This occurred in only one instance in the case of an adult male, who died during 1959.

Shaper and Shaper (1958) found meningitis to be responsible for 65 deaths out of their group of 2,466 admission at Mulago Hospital among persons over the age of 6, being by far the commonest cause of death of diseases of the central nervous system. The Annual Reports of the Medical Officer of Health of Bulawayo (Bulawayo 1955/59) attributed death to this cause in only 25 out of the 3,823 deaths between 1954 and 1959, which is a comparatively low figure. The Epidemiological and Vital Statistics Reports (1959b) for the years 1954 - 1956 make it the seventh commonest cause of death among the non-white population of the United States in the age groups 0-1 and 1-4, being responsible for 0.9 and 2.3% of deaths respectively. In Ceylon during the period it was responsible for 0.3% of the deaths in the 1-4 age group and 0.4% in the 5-14 age group.

Smith (1943) in Lagos found meningitis to be responsible for 3.6% of the deaths in 500 post-mortems carried out in children under the age of 3, and of the total of 18, 15 were due to the pneumococcus.

Davies (1948a) found one death out of 26 in the age group of under 28 days due to meningitis, 5 out of 38 in the age group of under 1 year and 5 out of 100 in the age group over 1 year. Four of the 5 in the age group under 1 year were due to the pneumococcus and 3 in the age group 1 - 10 years. Davies (1955) found 13 of the 246 hospital deaths in Mulago Hospital to be due to meningitis.

Edge (1959) reviewed the causes of aseptic meningitis and Gear et al (1956) have indicated the comparative frequency with which this condition is caused by the Coxsackie group of viruses in Johannesburg. In another outbreak of aseptic meningitis in an institution in Johannesburg Malherbe et al (1957) found 10 of 18 to be due to the Echo Type 4 virus. Wilkins et al (1955) reported on 5 cases of meningoencephalitis due to Coxsackie B virus in Southern Rhodesia.

Hutton (1956) reviewed the figures at Mulago Hospital from 1947 to 1952 and found meningitis to be responsible for 200 out of 28,139

admissions. A further review in the same hospital was carried out by Shaper and Shaper (1958). Singh (1957) reviewed 54 cases of meningitis at Mbale Hospital during 1956-57 and Zilberg (1958) also reviewed the organisms responsible for non-meningococcal meningitis in South Africa. Kahn et al (1958) and Geefhuysen and Rosen (1960) examined the figures at Baragwanath Hospital and McKendrick (1954) reviewed the position in England. The comparative figures from these reviews are shown in Table 13.2.

13.2.2. Duration in Hospital - Meningitis

The duration in hospital of cases in this series dying from meningitis is given in Table 13.3, from which it will be seen that the vast majority died within five days of admission, which is a shorter duration than that found by Singh (1957).

One adult female was in hospital for 105 days before death, but it has not been possible to ascertain in this case whether death was due to an acute meningitis superimposed upon another disease for which treatment had been sought, or whether, in fact, the meningitis was the original reason for entering hospital: if the latter is the case the meningitis may well have been of tuberculous origin.

13.2.3. Residence - Meningitis

The residence of the cases of meningitis is shown in Table 13.4. The numbers are too small to draw any valid conclusions.

13.2.4. Other Inflammatory Diseases of the Central Nervous System

Two deaths were attributed to phlebitis of the sinuses, two to brain abscess and one to encephalitis. No information is available as to the origin of the brain abscess, which may have been secondary to pneumonia and lung abscess.

13.3. All Other Diseases of the Central Nervous System and Sense Organs
(350 - 398)
(A73,-77. 78*)
(B46*)

One death was attributed to otitis media in 1959 and the only point to notice is that three deaths were attributed to status epilepticus, all occurring during 1959. This is somewhat remarkable and may, in fact, be due to the personal idiosyncrasies of the medical officer certifying death.

It is not possible to draw conclusions from these figures as to the actual incidence of epilepsy among the African population in the area.

TABLE 13.1

DISEASES OF THE NERVOUS SYSTEM & SENSE ORGANS

		Under 1	1-5	5-14	15 –	TOTAL.
330.1	Subarachnoid Haemorrhage	-	-	-	2	2.
331.0	Cerebral Haemorrhage	1	-	-	2	3
332.0	Cerebral Thrombosis	-	-	-	6	6
334.0	Vascular Lesions of C.N.S.	-	-	-	2	2
340.1	Pneumococcal Meningitis	-	-	-	2	2
340.3	Meningitis N.O.S.	11	2	2	19	34.
341.0	Phlebitis of Sinuses	-	-	-	2	2
342.0	Brain Abscess	-	-	-	2	2
343.0	Encephalitis	-	-	-	1	1.
353.2	Status Epilepticus	Child 1	1	-	1	3
357.0	Disease of Spinal Cord	-	-	-	1	1
392.0	Otitis Media	-	-	-	1	1.

TABLE 13.2

Meningitis

	McKendrick 1954 Main Green Hospital		Hutton 1956 Mulago Hospital		Singh 1957 Mbale Hospital		Shaper & Shaper 1958 Mulago Hospital	Zilberg 1958 South Africa	Kahn et al 1958 Baragwanath Hosp.		Geefhuysen & Rosen 1960 Baragwanath Hosp.
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Deaths	Non Meningococcal Cases	Cases	Deaths	Purulent Meningitis Cases
Meningococcal	49	-	25	8	1	1	-	-	19	6	49
Presumed			15	14							
Pneumococcal	30	2	103	78	29	13	43	22	14	6	54
Presumed "			18	18							
Haemophilus	17	1	9	-	5	1		9	12	3	32
H. Para Influenza								10			
Staphylococcal	6	2									
Streptococcal	1	1									
Salmonella									4	3	
E. Coli									2	2	
B. Proteins	1										
T.B.			17	17			6				
Mixed Infection	1	1									
Miscellaneous			15	10			1				6
Unknown	3				19	8	15	11	11	-	63

TABLE 13.3

MENINGITIS - DURATION IN HOSPITAL

Days	Under 1	1 - 4	5 - 14	15 -	Total
0	1	1	1	4	7
1	1	-	-	2	3
2	4	1	-	4	9
3	-	-	1	4	5
4	1	-	-	2	3
5	2	-	-	2	4
6	-	-	-	-	-
7	-	-	-	-	-
8	-	-	-	-	-
9	-	-	-	1	1
10	-	-	-	-	-
11	-	-	-	-	-
12	-	-	-	-	-
13	-	-	-	1	1
14	-	-	-	-	-
Over 14	-	-	-	1 (105 days)	1
Not Stated	2	-	-	-	2
Total	11	2	2	21	36

TABLE 13.4

MENINGITIS - RESIDENCE 1958 AND 1959 Only

	Under 1	1-4	5-14 -	15 —	Total
Main African Housing Area	2	1	-	3	6
Kabushi African Housing Area	-	-	1	1	2
Chifubu African Housing Area	1	-	-	-	1
Other Housing Areas	-	-	-	2	2
Outside Ndola	-	-	-	3	3
Not Stated	2	-	1	5	8

CHAPTER 14

DISEASES OF THE CIRCULATORY SYSTEM

(400 - 468)
(A79 - 86)
(B24 - 29. B.46*)

The number of deaths due to diseases of the circulatory system is given in Table 14.1.

14.1 Rheumatic Fever

(400 - 402)
(A79)
(B24)

There were no deaths due to this condition which is surprising in view of the known incidence of deaths due to chronic rheumatic heart disease (see below). Kahn et al (1958) found this group of diseases to be responsible for only 56 out of 5,051 admissions to the paediatric wards at Baragwanath Hospital, 42 of the 56 being for rheumatic fever as such. The Annual Reports of the Medical Officer of Health of Bulawayo (Bulawayo 1958/59) attribute only 3 out of 3,823 deaths to this condition.

14.2 Chronic Rheumatic Heart Disease

(410 - 416)
(A80)
(B25)

There were 11 deaths due to this condition, all occurring in adults, five in males and six in females. All were attributed to disease of the mitral valve and not to any other form of rheumatic heart disease.

In Bulawayo (Bulawayo 1955/59) chronic rheumatic heart disease was responsible for 25 out of 3,823 deaths.

Cole (1959) in reviewing 54 cases of death from heart disease on whom post-mortem examinations were carried out, found eight to have died from aortic valvular disease and aneurisms and three from other valvular disease. Shaper and Shaper (1958) out of 55 deaths due to cardiovascular disease attributed 10 to chronic rheumatic heart disease, and a further 7 were possibly due to that condition.

Baldachin (1959) reviewed 150 cases of heart disease in Bulawayo and found 60 (40%) to be of rheumatic origin but only 19 (12.7%) of syphilitic origin.

The figures serve to show that rheumatic heart disease is of importance as a cause of death among Africans.

14.3 Arteriosclerotic and Degenerative Heart Disease

(420 - 422)
(A81)
(B26)

In this series there were two deaths attributed directly to coronary heart disease, both in adults, and there were three deaths in adult females attributable to myocardial degeneration. The figures are small compared with those normally found in European communities but the literature relating to myocardial disease among Africans is somewhat contradictory.

Schrire (1958, 1959) had reviewed the incidence of abnormal electro-cardiograms among the various races in Cape Town and differs from Singer (1959) who found no racial difference in the pattern for coronary heart disease among the different races. The Lancet (1955c) summarised the evidence relating to the racial incidence of coronary arterial disease. That coronary heart disease does occur in Africans is well documented and individual cases have been reported by Davies (1948b) Cole (1959), Singh (1959) and by Trowell and Singh (1956). In the Annual Report of the Medical Officer of Health of the City of Durban (Durban 1959) nine out of 3, 516 African deaths were attributed to coronary thrombosis as opposed to 240 out of 1,460 European deaths: in Bulawayo (Bulawayo 1955/59) 24 deaths out of a total of 3,823 were placed in the category B26.

Keys (1955) reported that among the Africans in South Africa, fat constituted only 15% of the calories obtained. He pointed out that when fat contributed 30-35% of calories "coronary heart disease tends to become the first cause of deaths for all ages over 40" and he further pointed out that when the dietary fat rises to 40% or more of calories coronary heart disease becomes a veritable plague. The amount of calories received from dietary fat among Africans in Northern Rhodesia is not high, palm oil not being a standard item of diet: it is doubtful whether the figure does, in fact, reach 15%.

14.4 Other Diseases of the Heart

(430 - 434)
(A82)
(B27)

No deaths in this series were attributed to bacterial endocarditis although Cole (1959) found nine cases of this condition in his series

of 54 deaths and it was responsible for three of the 55 deaths in the Shaper and Shaper (1958) series at Mulago.

Congestive heart failure (434.1) was responsible for no less than 11 deaths, one occurring in a child under the age of one year, the others being in adults. That this is a common cause of death is shown by the figures of Baldachin (1959), where 90 of the 150 cases reviewed presented as congestive cardiac failure. Davies (1948b) in a series of 229 post-mortems on Africans dying of congestive cardiac failure found the underlying cause to be syphilitic in 48 instances and renal disease with or without urinary infection in a further 71 cases. Bennett (1960) in Polela attributed 44 out of 421 deaths where the cause was known to congestive cardiac failure.

Pericarditis is very common among Africans (Schrire 1959) but the underlying cause is not known: the possibility of it arising from a deficiency of the Vitamin B complex has been discussed in Chapter 12.

In Bulawayo (Bulawayo 1955/59) 53 out of 3,823 deaths were classified in the B27 category.

14.5 Hypertensive Heart Disease

(440 - 443)
(A83)
(B28)

Only two deaths were attributable to this cause in the series, both occurring in adult females. The incidence of hypertensive disease in Africans is again argumentative but Schrire (1959) in a series of 260 examinations found 62 persons suffering from raised blood pressure and a further 52 suffering from active hypertensive disease.

Baldachin (1959) found 23 (15.3%) of his cases to be suffering from raised blood pressure and Cole (1959) of his 54 cases found 15 suffering from hypertension associated with renal disease. Davies (1948) in his series of 229 autopsies found hypertension associated with renal disease in 71 instances. Shaper and Shaper (1958), however, found only two deaths out of 55 due to cardiovascular disease attributable to essential hypertension.

In Bulawayo (Bulawayo 1955/59) only 23 out of the 3,823 deaths were placed in Category B28.

14.6. **Other Hypertensive Diseases**
(444 - 447)
(A84)
(B29)

There were no deaths attributable to this group of diseases in this series.

14.7. **Diseases of Arteries**
(450 - 456)
(A85)
(B46*)

There were three deaths due to this condition in the series,all occurring in adult males, two of the three being due to aneurysms, although whether of syphilitic origin or not was not stated. This incidence is low compared with that found by Cole (1959) and is not in accordance with the general views of Schrire (1959).

14.8. **Diseases of the Veins and Other Diseases of the Circulatory System**
(460 - 468)
(A86)
(B46*)

There were no deaths attributed to this group of conditions.

14.9. **Discussion**

Deaths due to heart conditions among Africans require further investigation. Endomyocardial fibrosis, congenital cardiac fibroelastosis and other "new" diseases must be assessed as to their importance (Joint Seminar of Departments of Pathology and Medicine:Witswatersrand 1957), and the role of syphilis in cardiovascular disease must be elucidated. The effects of malnutrition on the heart are not well understood, and the incidence of acute rheumatic disease is low compared with the incidence of chronic rheumatic valvular disease of the heart.

TABLE 14.1

Code	Cause	Under 1	1 - 4-	5 - 14-	15 —	
		Female			Male	Female
410.0	Disease of Mitral Valve				5	6
420.1	Coronary Heart Disease				1	1
422.2	Other Myocardial Degeneration					3
434.1	Congestive Cardiac Failure	1			8	2
434.2	L. Ventricular Failure				1	
434.3	Pericarditis				2	1
434.4	Unspecified Disease of Heart				1	
443.0	Other Hypertensive Heart Disease					2
450.0	General Arteriosclerosis				1	
451.0	Aortic Aneurysm				1	
452.0	Other Aneurysm				1	

CHAPTER 15

DISEASES OF THE RESPIRATORY SYSTEM

(470 - 527)
(A.87 - 97)
(B30 - 32. B46*)

The deaths due to diseases of the respiratory system are given in Table 15.1

15.1 Acute Upper Respiratory Infections

(470 - 475)
(A87)
(B46*)

There were five deaths attributable to this group of conditions, all occurring in persons under the age of five years. In four instances the duration in hospital prior to death did not exceed one day and in the fifth instance the duration of the stay in hospital was not ascertained.

The dangers of death from neglected acute upper respiratory tract infections have been stressed on a number of occasions and Stewart (1957) has stressed the importance of bronchiolitis as a cause of sudden death in young children.

15.2 Influenza

(480 - 483)
(A88)
(B30)

No deaths were attributed to influenza in spite of the outbreak of Asiatic influenza which affected the population during August 1957.

15.3 Pneumonia

(490 - 493)
(A89 - A91)
(B31)

15.3.1. Incidence of Pneumonia

The number of instances where pneumonia was given as the cause of death are shown in Table 15.1: in Table 15.2 these deaths are expressed as percentages of the total deaths in the various age groups. It will be noticed that the percentage is highest in children under the age of five years pneumonia being responsible for 25% of such deaths during the period under review: in persons over five pneumonia was the cause in only 12.1% of all deaths. If the persons classified as child or infant are included in the under 1 group, the ratio of deaths from pneumonia in the under 1 age group to those in the 1 - 4 - age group is 1.32:1. The Epidemiological and Vital

Statistics Report (1956e) which also includes deaths in Classification No.763, gives a ratio of 3.25:1 among South African Europeans in 1953, 5.59:1 among Negroes in the United States in 1953 and 3.28:1 among the Maoris in New Zealand in 1952. This low ratio in the present series is not understood.

In Bulawayo (Bulawayo 1955/59) pneumonia (B31) was the commonest cause of death between 1954 and 1959 being responsible for 696 deaths (18.2%) out of a total of 3,823. The age breakdown is not available in this series.

The Epidemiological and Vital Statistics Report (1959e) lists pneumonia (B31) as the fifth commonest cause of death among all United States non-whites during the period 1954-1956, but it is the second most common cause of death in the under 1 age group and in the 1 - 4 age group, and the third commonest cause of death in the 5 - 14 age group, being responsible for 4.4%, 11.5%, 18.6% and 6.5% of deaths respectively. The Ndola figures are in every instance considerably higher than these.

In Ceylon during this period pneumonia (B31) was the commonest cause of death for the total population being the commonest cause of death in the age groups under 1 and 1 - 4 and the second commonest cause in the 5 - 14 age group. The percentages were 6.7%, 6.0%, 12.5% and 9.8% of deaths in these age groups respectively. Again the Ndola figures were considerably higher.

Janssens (1955) found pneumonia responsible for 52.5% of 679 deaths coming to post-mortem examination in the Belgian Congo of children under the age of 6 between 1938 and 1943.

Davis (1948a) found pneumonia responsible for 11 out of 64 deaths (17.2%) of persons under the age of 1 year (excluding deaths attributed to whooping cough) and for 12 out of 100 deaths (12%) of persons in the 1 - 10 year age group.

Smith (1943) in Lagos among children under the age of 3 dying without a medical certificate of cause of death being issued, found pneumonia responsible for no less than 60.4% of the deaths, broncho-pneumonia being a contributory factor in every case.

Behar and Scrimshaw (1958) in Guatemala found diseases of the respiratory system responsible for 23 out of 96 deaths in the under 1 age group (23.9%) 15 out of 109 in the 1 - 4 age group (13.8%) and 4 out of 17 in the 5 - 14 age group (23.5%).

Davies (1955) found diseases of the respiratory system (excluding tuberculosis) caused 21.6% of 246 deaths among children under 10 in Mulago

hospital during 1951/52.

Bennett (1960) found pneumonia responsible for only 20 (4.75%) of 421 deaths in Polela.

15.3.2. Sex Ratio

In Table 15.2. the percentage of deaths in each age group by sexes is also shown for the whole period. It will be noted that the variations are generally slight but in the under 1 age group the differences between the sexes is statistically significant (difference 17.2%: standard error of the difference 5.1%), but not if the 'child' figures are included in the 'under 1' group. In the over 5 age group, however, the difference is just not significant. (difference 5.3%: standard error of the difference 2.7%).

15.3.3. Types of Pneumonia

The different types of pneumonia are shown in Table 15.3, from which it will be noticed that the number of cases of "Pneumonia other" (Category 493) was very high in 1957 but fell subsequently. This is entirely due to the method of certification adopted by one medical officer, who left the district during early 1958.

In Table 15.4 the percentage of the various types of pneumonia entered on the certificates for each year is shown. It will be noted that lobar pneumonia remained fairly constant at around 20% of all deaths due to pneumonia, but broncho-pneumonia and 'pneumonia other' both fell during the period under review.

The Epidemiological and Vital Statistics Report (1956c) shows that in most developed countries, lobar pneumonia constitutes between 10 and 20% of all cases of death due to pneumonia, and Martin (1957b) found the standardised death rate in England and Wales during 1955 for lobar pneumonia to be about one quarter that for broncho-pneumonia.

Kahn et al 1958 found broncho-pneumonia seven times more common than lobar pneumonia in the paediatric wards at Baragwanath Hospital.

Young (1959) in Somaliland found lobar pneumonia much commoner in adults and broncho-pneumonia much commoner in children: pneumonia generally was responsible for 7% of hospital admissions and 13% of deaths in a five year period. Shaper and Shaper (1958) found lobar pneumonia responsible for 11% of all admissions to the adult medical wards in Mulago Hospital.

McDougall and Beecher (1954) found almost equal proportions of lobar and broncho-pneumonias in children under 9 years of age in Nairobi.

15.3.4. Duration in Hospital

The duration in hospital of cases dying from pneumonia is given in Table 15.5 from which it will be noted that the vast majority died within four days of admission.

15.3.5. Mortality Rate

McGregor (1958) found a mortality rate of 36% for pneumonia in Western Nigeria, but McDougall and Beecher (1959) had a mortality rate of only 9.7% in Nairobi.

15.3.6. Pneumonia as a Cause or Factor in Death

In Table 15.6 are shown those instances where pneumonia was given as the cause of death together with the occasions when it appeared on the death certificate although not classified as the actual cause of death.

15.3.7. Residence

The residence of persons dying from pneumonia in 1958 and 1959 only is given in Table 15.7. More important are the figures given in Table 15.8 where are listed the number of deaths due to pneumonia during the special period between 1958 and 1959 when fuller records are available for the place of residence of persons dying (see above Chapter 6). From these figures it will be noted that there is very little difference in the deaths due to pneumonia in the various types of housing areas, suggesting that housing is not an important factor in deaths due to pneumonia: this fact is in keeping with the conclusions of Smith (1934) who reviewed the effects of housing on respiratory infections in Glasgow during 1928-29, and came to the conclusion that although there was a greater incidence of pneumonia in persons living in old houses it was unwise to draw conclusions in respect of all types of respiratory disease.

15.4 Other Respiratory Infections

(500 - 527)
(A92 - A97)
(B32 B46)

Deaths due to this other group of conditions are shown in Table 15.1 from which it will be noted that the majority occurred in adults, although the numbers are comparatively few. It is perhaps only necessary to draw attention to the fact that deaths due to empyema and abscess of the lung may, in fact, have had their origin in some form of pneumonia.

It will be noted that in only four instances was death attributed to chronic disease of the lung - i.e. chronic bronchitis, emphysema and bronchiectasis.

TABLE 15.1

Deaths from Diseases of the Respiratory System

Code	Cause	Under 1		Child		1 - 4 -		5 - 14 -		15 -		Total
		M	F	M	F	M	F	M	F	M	F	
473.0	Acute Tonsillitis					1						1
474.0	Acute Laryngitis	1					1					2
475.0	Acute U.R.T. Infection	1	1									2
490.0	Lobar Pneumonia	7	3	-	-	1	6	3	1	18	3	42
491.0	Broncho Pneumonia	14	25	2	-	22	16	3	1	17	3	103
492.0	Atypical Pneumonia	1	1	1	-	-	-	-	-	3	1	7
493.0	Pneumonia other	1	14	1	1	5	4	-	-	11	8	45
	Subtotal - 'Pneumonia'	(23)	(43)	(4)	(1)	(28)	(26)	(6)	(2)	(49)	(15)	197
500.0	Acute Bronchitis						1					1
502.1	Chronic Bronchitis										1	1
517.0	Other Diseases of U.R.T.										1	1
518.0	Empyema					1						1
520.0	Spontaneous Pneumothorax						1					1
521.0	Abscess of Lung									1	2	3
522.0	Pulmonary Congestion										1	1
526.0	Bronchiectasis									1		1
527.1	Emphysema									2		2
	Total	25	44	4	1	30	29	6	2	53	20	214

TABLE 15.2

Pneumonia as a Percentage of Total Deaths

	Under 1	Child	1 – 4 –	Under 5	5 – 14 –	15 –	Over 5	Total
1957	29.7%	16.7%	18.5%	26.6%	16.7%	14.4%	14.5%	20.1%
1958	25.3%	33.3%	32.4%	28.8%	25.0%	13.6%	14.6%	20.4%
1959	17.6%	33.3%	27.8%	22.6%	10.5%	7.9%	8.1%	15.1%
Total	23.7%	27.8%	28.1%	25.6%	17.8%	11.7%	12.1%	18.23%

	Under 1 M	Under 1 F	Child M	Child F	1 – 4 M	1 – 4 F	Under 5 M	Under 5 F	5 – 14 M	5 – 14 F	15 – M	15 – F	Over 5 M	Over 5 F	Total M	Total F
Total	15.6%	32.8%	40.0%	12.5%	29.2%	27.1%	21.7%	29.8%	22.2%	11.1%	13.3%	8.3%	13.9%	8.6%	16.98%	20.09%

TABLE 15.3

Types of Pneumonia

		Under 1	Child	1 - 4 -	5 - 14 -	[illegible] 15 —	Total	
Lobar Pneumonia	1957	7	-	1	1	2	11	
	1958	2	-	4	2	11	19	
	1959	1	-	2	1	8	12	42
Broncho Pneumonia	1957	7	-	2	-	3	12	
	1958	16	1	16	3	13	49	
	1959	16	1	20	1	4	42	103
Atypical Pneumonia	1957	1	-	-	-	4	5	
	1958	1	1	-	-	-	2	
	1959	-	-	-	-	-	-	7
Pneumonia - other	1957	12	1	2	-	11	26	
	1958	1	1	2	-	4	8	
	1959	2	-	5	-	4	11	45

TABLE 15.4

Types of Pneumonia

Percentage by years

	Cases	Lobar Pneumonia	Broncho Pneumonia	Atypical Pneumonia	Pneumonia - other
1957	54	20.4%	22.2%	9.3%	48.1%
1958	78	24.4%	62.8%	2.6%	10.3%
1959	65	18.5%	64.6%	0.0%	16.9%
Total	197	21.3%	52.3%	3.6%	22.8%

TABLE 15.5

Pneumonia - Cause of Death

Duration in Hospital

Days	Under 1	Child	1 - 4 -	5 - 14 -	15 -	Total
0	9	-	1	-	1	11
1	20	3	22	2	18	65
2	12	1	9	1	9	32
3	6	1	5	1	4	17
4	4	-	1	-	3	8
5	2	-	3	-	3	8
6	3	-	1	-	3	7
7	1	-	1	1	1	4
8	-	-	-	-	2	2
9	-	-	-	1	2	3
10	-	-	-	-	1	1
Over 10	5	-	5	1	14	25
Not ascertained	3	-	3	-	2	8
Died outside hospital	1	-	3	1	1	6
Total - Pneumonia	66	5	54	8	64	

TABLE 15.6

Pneumonia

Cause or Factor in death

		Under 1	Child	1 - 4 -	5 - 14 -	15 -
1957	Cause	27	1	5	1	20
	Factor	15	1	4	-	12
1958	Cause	20	3	22	5	28
	Factor	15	1	6	3	12
1959	Cause	19	1	27	2	16
	Factor	7	-	15	1	17
Total	Cause	66	5	54	8	64
	Factor	37	2	25	4	41
		103	7	79	12	105
Total deaths		278	18	192	45	548

TABLE 15.7

Pneumonia

Place of Residence (1958 and 1959 only)

		Under 1	Child	1 - 4 -	5 - 14 -	15 -
Main	Modern 1	-	-	3	-	1
	Kimberley Brick 1	1	-	1	-	1
	Rondavels	-	-	-	-	-
	Kimberley Brick 2	-	-	2	-	2
	Modern 2	1	-	1	-	3
	Other Housing	-	-	-	-	-
Kabushi	Permanent	6	-	9	-	7
	Temporary	-	-	1	-	1
Chifubu	Permanent	7	1	11	2	3
	Temporary	-	-	-	-	-
Other Housing		11	1	9	2	3
Outside Ndola		6	-	6	3	8
Not Stated		7	2	6	-	15
Total		39	4	49	7	44

TABLE 15.8

Pneumonia

1958/59 Special Period

		Percentage Housing		Percentage Deaths, Pneumonia Under 5 (40)		Percentage all Deaths, Pneumonia (58)	
Main	Modern 1	3.2%		10		10.3	
	Kimberley Brick 1	11.2%		5		5.2	
	Rondavels	9.3%		5		5.2	
	Kimberley Brick 2	8.2%		5		6.9	
	Modern 2	4.5%		5		6.9	
	Other Housing	.9%	37.4%	2.5	32.5%	1.7	36.2%
Kabushi	Permanent	27.5%		30		31.0	
	Temporary	6.7%	34.2%	2.5	32.5%	1.7	32.7%
Chifubu	Permanent	26.1%		35		31.0	
	Temporary	2.5%	28.6%	-	35.0%	-	31.0%

CHAPTER 16

DISEASES OF THE DIGESTIVE SYSTEM

(530 - 587)
(A.98 - 107)
(B.33 - B.37. B46*)

The number of deaths from diseases of the digestive system is given in Table 16.1.

16.1. Diseases of the Buccal Cavity and Oesophagus

(530 - 539)
(A.98. A.107*)
(B.46*)

There was one death attributed to this disease in a person in the 1 - 4 age group, the cause of death was "other diseases of the buccal cavity". The absence of deaths due to cancrum oris is noteworthy.

16.2 Diseases of Stomach and Duodenum

(540 - 545)
(A.99 - 101. A.107*)
(B.33. B.46*)

There were only two deaths due to these conditions, both occurring in adults, one due to ulcer of the stomach and one due to ulcer of the duodenum. The low incidence of deaths from these conditions is in keeping with the findings at Bulawayo (Bulawayo 1955/59) where only 4 deaths out of 3,823 were attributed to these conditions.

Allbrook (1955) found peptic ulceration common in Africans at Makerere in Uganda, and Raper (1958) reviewing autopsy material in the same district found an overall incidence of peptic ulcer of 15.3% in males varying between 5.4% and 20.6% according to tribal groups. Among females, however, the incidence was only 4.5%.

Khan (1958) noted that duodenal ulcer was increasing among Africans in Nairobi affecting all economic and social groups.

McKenzie (1957) found a low incidence of peptic ulceration among Africans in Durban.

The racial incidence of peptic ulceration was reviewed by Watson Smith (1955).

16.3 Appendicitis

(550 - 553)
(A.102)
(B.34)

There were three deaths due to this condition all complicated by

peritonitis occurring in persons over the age of one year.

In Bulawayo (Bulawayo 1955/59) only four deaths were due to this condition out of the total of 3,823.

16.4 Hernia of Abdominal Cavity and Intestinal Obstruction

(560 - 561. 570)
(A.103)
(B.35)

16.4.1. Hernia of Abdominal Cavity

(560 - 561.)
(A.103*)
(B.35*)

There were four deaths due to this condition in the series. Two of the deaths occurred in adults and two in children suffering from umbilical hernia. Coding is such that it is not possible to distinguish between deaths due to congenital exomphalos, and those due to true umbilical hernia. It is well known that umbilical hernia is extremely common among African children but only when complications develop is it customary to carry out operation: in the majority of cases the hernia gradually reduces in size as age progresses.

16.4.2. Intestinal Obstruction

(570)
(A.103*)
(B.35)

There were 5 deaths due to this group of disease, one attributable to intussusception.

It is necessary to pass some comment upon the two deaths stated to be due to paralytic ileus, both of which occurred in adult females. These comments apply equally to the deaths from peritonitis N.O.S. referred to later.

In the majority of patients under her supervision the Consultant Obstetrician was in the habit of signing death certificates herself and frequently in the earlier years of the survey, the cause of death was stated simply as "paralytic ileus", "peritonitis", Pelvic Cellulitis or "Caesarian Section". Further information was sought in these cases and where it was possible to prove from the records that these conditions followed operative procedures carried out on women in childbirth the death was so classified. In certain other instances, however, no definite proof of this sequence of events could be ascertained and it became necessary thereby to classify the deaths under Code Numbers 5701 and 5760.

Of the total of seven deaths attributed to Paralytic Ileus and Peritonitis no less than six occurred in adult females, which is highly suggestive of an underlying cause associated with childbirth but which could not be proved satisfactorily.

16.5 Other Diseases of Intestines and Peritoneum

(571 - 578)
(A.104. A.107*)
(B.36. B.46*)

16.5.1. Gastroenteritis and Colitis
Aged 4 Weeks and Over.
(571 - 572)
(A.104)
(B.36*)

No deaths were attributable to gastroenteritis and duodenitis (543) and the figures under classification B.36 include only deaths coded to numbers 571 and 572.

16.5.1.1. Nature of Infection

In the absence of suitable laboratory facilities it is often extremely difficult to ascertain accurately the exact bacterial cause if any of the bowel infection, and there is in addition the difficulty due to the method of certifying the cause of death by individual practicioners.

In Table 16.2 the number of deaths due to gastroenteritis and the specific bowel diseases is given together with the number of instances where diseases of a diarrhoeal nature are entered as a factor on the death certificate. It will be noted that in 1958 only three out of 60 deaths due to diarrhoeal disease were attributed to a specific organism whereas in 1959 the figure was 12 out of 43. This difference can be attributed to the personal idiosyncrasies of the medical practitioners certifying death and to the improved laboratory facilities which became available during 1959.

In Table 16.3 the deaths due to diarrhoeal disease are shown from which it will be noted that in children under the age of five years 112 out of 120 deaths were attributed to gastroenteritis,etc. whereas in adults only 23 out of 36. From this table it will be noted that seven deaths were attributed to amoebic dysentery 4 of which occurred in 1957 and 2 in 1958. As all these deaths were certified by one particular medical practitioner, relying entirely upon clinical judgement, the accuracy of these statements of cause of death is open to severe challenge, it having been pointed out by Elsdon-Dew (1953) that

in diagnosing Amoebic Dysentery "the enthusiasm of the uninitiated is only to be matched by the scepticism and caution of the expert".

In this series the ratio of deaths from amoebic dysentery to bacillary dysentery and dysentery N.O.S. is 7:11 (0.64:1). Epidemiological and Vital Statistics Reports (1958a) report the number of deaths from these two types of dysentery in the various other parts of Africa and the ratios obtained were as follows:-

Angola	1952/56	117 : 20	5.85:1
Belgian Congo	1952/56	1186 : 689	1.72:1
Kenya	1952/56	137 : 609	0.23:1
Uganda	1952/55	22 : 99	0.22:1

In comparing the incidence of diarrhoeal disease attributed to specific and non-specific organisms various investigations have been carried out in other parts of Africa. Stein (1955) at Baragwanath Hospital reviewed 241 admissions during 1954 and 1955 in which the major cause of complaint was diarrhoea; of these 25 (10.4%) were due to Salmonella and 46 (19.1%) to Shigella; of these 27 died, a case mortality rate of 38.0% compared with a 20.6% mortality rate among the remaining 170 for whom no specific organismal cause for the diarrhoea was ascertained.

Boardman et al (1955) reviewing routine patients under the age of 9 years attending Baragwanath Hospital found 6 out of 100 to be infected with specific organisms during winter and 23 out of 100 during the summer months.

Bokkenheuser and Richardson (1960) reviewed 75 children between the age of 6 and 16 in a rural area of South Africa over a period of one year and found 44.0% became infected during the period with Salmonella and 29.3% with Shigella organisms. The incidence of Salmonella infections showed a peak during the early summer months but there was no peak for infections with Shigella organisms.

Mackey (1955) investigated 5,900 human hosts in East Africa and found 586 (10%) excreting Salmonella organisms of whom 204 were excreting S.Typhi and 8 S.Paratyphi.

Khan (1957) reviewing summer diarrhoea in Johannesburg found among 600 cases of diarrhoea that 94 suffered from Shigella infections 33 from Salmonella infections and 9 from both: the seasonal incidence was highest in the mid-summer months.

Hughes (1955) in Accra found 56 (10.8%) of 516 persons under the age of three excreting Shigella organisms, compared with 58 (3.5%) of 1,654 persons over the age of three. Shigella organisms were thus three times as common in persons under the age of three compared with persons over that age.

Robertson et al (1960) found Salmonella and Shigella organisms in 37.5% of gastro-intestinal infections in persons under the age of three in Cape Town.

Floyd et al (1956) carried out a survey in an Egyptian village during the period 1951 - 54 and found that over a period of 32 weeks 73.9 - 96.1% of persons in various age groups over the age of six months became infected with Shigella organisms. Over the whole age range there was an average of 1.7 episodes of diarrhoea per child over the period of 32 weeks, the episodes being commonest in the younger age groups, 36.7% of which episodes were attributable to Shigella organisms. They found Shigella infections uncommon in the under six month age group.

The presence of kwashiorkor may confuse the issue still further: Waterlow and Scrimshaw (1957) found diarrhoea often associated with and nearly always present in cases of kwashiorkor. The Joint F.A.O./W.H.O. Expert Committee on Nutrition in its Third Report (1953) considered that severe kwashiorkor was usually but not always associated with diarrhoea, and Ferro Luzzi (1958) was of the opinion that the diarrhoea in cases of malnutrition was only partly infectious. Pretorius et al (1956) found 72 of 180 cases of kwashiorkor suffering from diarrhoea, from 13 (18.1%) of which organisms of the Shigella or Salmonella group were isolated, and Coetzee and Pretorius (1956) found pathogenic bowel organisms in 28.4% of 106 cases of kwashiorkor, compared with 21.7% of 69 controls. McKenzie (1940) suggested that a chronic bacillary type of dysentery might result from a prolonged bad diet.

Such factors may cause medical practitioners particularly if inexperienced in malnutrition to attribute death to enteritis rather than to the underlying malnutrition.

16.5.1.2. Age Incidence

In this series, 120 out of 156 deaths, 76.9%, occurred under the age of 5, and 62, 39.8%, in the under 1 and 'child or infant' groups.

The Epidemiological and Vital Statistics Reports (1956) give the following

figures for other countries:-

	Total	Under 5 years	
Egypt 1953	82,470	80,929	98.1%
Union of South Africa 1953 (white)	506	391	77.3%
Maori (including diarrhoea of the newborn) 1952	79	77	97.5%
Ceylon 1954	4,382	2,641	60.3%

In Table 16.4 the actual age at death of cases where enteritis was a cause or factor in death for persons dying during the last six months of 1959 are given. The peak incidence is under the age of one year, and the second peak develops in the 2 year age group.

Truswell (1957) found the peak age incidence of gastroenteritis in non Europeans in South Africa occurred at the age of 3 months. The figures available in the present series are insufficient to draw any serious conclusions.

16.5.1.3. Duration in Hospital

The duration in hospital prior to death is given in Table 16.5. From this it will be noted that in the under 5 age group, 61.8% died within two days of admission to hospital compared with only 39.5% of persons over the age of five years.

16.5.1.4. Seasonal Incidence

The seasonal incidence of deaths where enteritis was either the cause or a factor of death is given in Table 16.6. From this it will be seen that in the under five age group the incidence rose to a maximum in the first quarter of the year during which 35.2% of deaths associated with this condition took place, and fell to a minimum in the 3rd quarter of the year with 9.9%. For age group over 5 years the figures are more variable and although the minimal incidence was in the 3rd quarter the maximum incidence was in the 4th quarter.

Kahn (1957) noted the seasonal variations in Johannesburg the peak there being from December to March and particularly during December and January.

16.5.1.5. Place of Residence

The place of residence of deaths where enteritis was either the cause or factor in death for the years 1958 and 1959 only are given in Table 16.7. The comparatively large number of cases where the place of residence was not stated makes it difficult for any valid conclusions to be drawn from this table.

In Table 16.8, however, the place of residence of deaths where enteritis was a cause or factor in death are given for a particular period only as detailed in Chapter 4.

The percentage of deaths occurring in the various African housing areas are given by age groups and also the percentage of housing availability during this period. There is a tendency for the percentage to be higher in the older Main African housing areas but the figures are too small for comment.

16.5.1.6. The importance of diarrhoeal disease

Diarrhoeal diseases were the second most common cause of death in this series being second only to penumonia.

The position as a cause of death, and the percentage of deaths due to this cause in this series and in other countries are given in Table 16.9. The Ndola figures all ages are not dissimilar to those of Bulawayo.

Kahn et al (1958) found dirrhoeal disease the single commonest cause of admission to Baragwanath pediatric wards, and McGregor (1958) in Adeoyo Hospital in Western Nigeria found it to be second to pneumonia as a cause of death, being responsible for 15.2% of deaths. On the other hand, Smith (1943) found alimentary diseases the cause of death in only 4% on post mortems on children under the age of three carried out in Lagos and of the 20 deaths due to this condition 9 only were attributed to colitis and 3 to amoebic dysentery (diagnosis of this condition was confirmed in each incidence by section)

Bennett (1960) found deaths from intestinal infections second to Tuberculosis as a cause of death, being responsible for 20.0% of deaths where the cause was ascertained.

16.5.2. Peritonitis
(5760)
(A.107*)
(B.46*)

There were six deaths attributable to this condition, four of which occurred in adult females. The comments in Chapter 16.4.2. apply.

16.6. Disorders of the Liver Gall Bladder and Pancreas
(580 - 587)
(A.105 - 106, 107*)
(B.37. B.46*)

16.6.1. Cirrhosis of the Liver
(581)
(A.105)
(B.37)

There were 21 deaths due to this condition 19 of which occurred in

adults. The relationship between this disease and primary carcinoma of the liver has been discussed in Chapter 10.

The relationship between malnutrition and this condition is more generally recognised by the Joint F.A.O./W.H.O. Expert Committee on Nutrition (1950) and by Brock and Autret (1952), although Walters and Waterlow (1954) have stressed the fact that there are different forms of cirrhosis of the liver which may have different aetiologies.

In this series, cirrhosis of the liver was responsible for 1.9% of deaths, similar to the figure of 1.3% in Bulawayo (Bulawayo 1955/59).

TABLE 16.1

Diseases of the Digestive System

		Under 1	Child	1 - 4	5 - 14-	15 —
5380	Other Diseases of Buccal Cavity			1		
5400	Ulcer of Stomach					1
5410	Ulcer of Duodenum					1
550.1	Appendix with Peritonitis			1	1	1
560.2	Umbilical Hernia	2				
5610	Strangulated Inguinal Hernia					1
5615	Hernia N.O.S.					1
5700	Intussusception	1				
5701	Paralytic Ileus					2
5703	Volvulus					1
5705	Other obstruction					1
5710	Enteritis	55	3	54	9	14
5760	Peritonitis N.O.S.				1	5
5780	Yellowatrophy of Liver			1		
5810	Cirrhosis of Liver	1		1		19
5830	Other Diseases of Liver				1	6
5840	Cholelithiasis					1
5850	Cholecystitis					1

TABLE 16.2

Diarrhoeal Disease - Cause or Factor

		Under 1		Child		1 - 4 -		Under 5		5 - 14 -		15 - (Adult crossed out)		Over 5		Total		Grand Total
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F.	
1957.	Enteritis	18	9	-	-	7	5	22	14	1	1	1	5	2	6	24	20	44
	Dysentery & Food Poisoning	-	-	-	-	-	-	-	-	-	-	2	4	2	4	2	4	6
	Diarrhoeal Disease a Factor	1	-	-	-	1	1	2	1	-	-	1	-	1	-	3	1	4
1958.	Enteritis	11	10	2	1	16	7	29	18	1	3	4	2	5	5	34	23	57
	Dysentery & Food Poisoning	1	-	-	-	-	-	1	-	-	-	1	1	1	1	2	1	3
	Diarrhoeal Disease a Factor	3	2	2	-	5	2	10	4	-	1	4	-	4	1	14	5	19
1959.	Enteritis	5	2	-	-	9	10	14	12	3	-	2	-	5	-	19	12	31
	Dysentery & Food Poisoning	2	1	-	-	2	2	4	3	-	-	4	1	4	1	8	4	12
	Diarrhoeal Disease a Factor	1	2	-	-	1	1	2	3	-	-	1	-	1	-	3	3	6

TABLE 16.3

Bowel Infections

	Under 1	Child	1 - 4 -	Under 5	5 - 14 -	15 -	Over 5	Total
0400. Typhoid Fever	-	-	-	-	-	2	2	2
0454. Bacillary Dysentery NOS.	1	-	-	1	-	-	-	1
0460. Amoebic Dysentery	-	-	-	-	-	5	5	5
0461. Amoebic Dysentery Liver Damage	-	-	-	-	-	2	2	2
0480. Dysentery N.O.S.	3	-	3	6	-	4	4	10
0490. Staphylococcal Food Poisoning	-	-	1	1	-	-	-	1
5710. Enteritis	55	3	54	112	9	14	23	135
Total	59	3	58	120	9	27	36	156
Enteritis a Factor	3	-	2	5	-	1	1	6
Total Deaths	278	18	192	488	45	548	593	1081

TABLE 16.4

Enteritis

Age at death - last 6/12 of 1959 only

Age		Age	
Under 1 day	-	One year	3
1 - 6 days	-	2	6
7 - 13 days	-	3	1
14 - 20 days	-	4	-
21 - 27 days	1	5	1
28 days - 2 months	1	6	-
2 months -	1	7	-
3 months -	2	8	-
4 months -	-	9	-
5 months -	-	10	-
6 months	1	11	-
7 months	-	12	-
8 months	1	13	1
9 months	2	14	-
10 months	1	15	-
11 months	-		
Total	10		12

TABLE 16.5

Enteritis - Cause or Factor

Duration in Hospital

Days	Under 1	Child	1 - 4 -	5 - 14 -	15 —
0	11	-	11	2	2
1	15	3	21	3	4
2	12	1	15	-	6
3	6	1	3	1	4
4	6	-	3	-	2
5	1	-	1	1	-
6	2	-	2	1	2
7	2	-	-	1	-
8	-	-	1	-	3
9	1	-	2	-	-
10	-	-	-	-	-
Over 10	5	-	5	-	8
Died outside	2	-	-	1	1
Not stated	5	-	5	-	1
Total	68	5	69	10	33

TABLE 16.6

Enteritis - Cause or Factor

Seasonal Incidence

		Under 1	Child	1 - 4-	Under 5		5 - 14-	15 -	Over 5	
1957.	1st Quarter	5	-	9	14		1	1	2	
	2nd Quarter	12	-	5	17		1	3	4	
	3rd Quarter	3	-	-	3		-	1	1	
	4th Quarter	8	-	-	8		-	8	8	
	Total	28	-	14	42		2	13	15	
1958.	1st Quarter	10	4	11	25		4	5	9	
	2nd Quarter	10	1	11	22		1	6	7	
	3rd Quarter	3	-	4	7		-	1	1	
	4th Quarter	4	-	4	8		-	-	-	
	Total	27	5	30	62		5	12	17	
1959.	1st Quarter	3	-	8	11		1	-	1	
	2nd Quarter	-	-	6	6		-	2	2	
	3rd Quarter	2	-	2	4		-	1	1	
	4th Quarter	8	-	9	17		2	5	7	
	Total	13	-	25	38		3	8	11	
Total.	1st Quarter	18	4	28	50	35.2%	6	6	12	27.9%
	2nd Quarter	22	1	22	45	31.7%	2	11	13	30.2%
	3rd Quarter	8	-	6	14	9.9%	-	3	3	6.9%
	4th Quarter	20	-	13	33	23.2%	2	13	15	34.9%
	Total	68	5	69	142	100.0%	10	33	43	99.9%

TABLE 16.7

Enteritis - Place of Residence (1958 and 1959 only)

	A.H.A.	Under 1	Child or Infant	1 - 4 -	5 - 14 -	15 -
Main	1	1	-	2	1 *	-
	2	3	-	2	-	2
	3	-	-	-	-	-
	4	4	-	2	-	2
	5	2	1	3	-	-
	6	-	-	1	-	-
Main A.H.A. Sub Total		10	1	10	1	4
Kabushi	1	2	-	9	3	2
	2	1	-	-	-	-
Kabushi A.H.A. Sub Total		3	-	9	3	2
Chifubu	1	5	-	10	2	-
	2	-	-	-	-	-
Chifubu A.H.A. Sub Total		5	-	10	2	-
Other Housing in Ndola		7	-	9	-	-
Outside Ndola		6	-	6	-	5
Not Stated		9	4	11	2	9
Total		40	5	55	8	20

* Main only.

TABLE 16.8

Enteritis - Place of Residence

April 1958/March 1959

*	Under 1	1 - 4-	Under 5	5 - 14 -	15 -	Over 5	Total	Housing Availability
Main A.H.A.	8	5	13 (44.7%)	-	2	2	15 (44.1%)	37.4%
Kabushi A.H.A.	1	8	9 (31.0%)	-	1	1	10 (29.4%)	34.2%
Chifubu A.H.A.	2	5	7 (24.2%)	2	-	2	9 (26.5%)	28.6%
Total	11	18	29 (99.9%)	2	3	5	34 (100.0%)	100.2%

* No deaths occurred in the "Child or Infant" group.

TABLE 16.9

Enteritis as a Cause of Death

	Under 1		*	1 - 4-		Under 5		5 - 14-		15 –		Over 5		Total	
	Position.	%tage.		Position.	%tage.	Position.	%tage.	Position.	%tage.	Position.	%tage.	Position.	%tage.	Position.	%tage
This Series Enteritis (B.36)	2nd.	19.8%		1st.equal	28.1%	2nd.	23.0%	1st.	20%	12th.	2.6%	6th equal.	3.9%	2nd.	12.5%
Diarrhoeal disorders (as per Table 16.3.)	2nd.	21.2%		1st.	30.2%	2nd.	24.6%	1st.	20%	7th.	5.0%	5th.	6.1%	2nd.	14.4%
+U.S.Non White 1954/56. (B.36)	5th.	5.3%		4th.	4.7%			Under 10th.						Under 10th.	
+Ceylon 1954/56 (B.36)	2nd.	4.0%		2nd.	9.8%			3rd.	6.2%					2nd.	5.0%
≠Bulawayo 1954/59 (B.36)														2nd.	17.7%

* No deaths occurred in the "Child or Infant" group.

\+ Epidemiological and Vital Statistics Report 1959e

≠ Bulawayo (1955 - 1959).

CHAPTER 17.

DISEASES OF THE GENITO-URINARY SYSTEM

(590 - 637)
(A.108. 114)
(B.38 - 39. 46*)

The number of deaths due to diseases of the genito-urinary system is given in Table 17.1.

17.1. Nephritis and Nephrosis

(590 - 594)
(A.108 - 109.)
(B.38)

There were 12 deaths altogether due to these conditions, all with one exception occurring in adults.

In Bulawayo (Bulawayo 1955/59) 53 out of 3,823 deaths (1.4%) were due to these conditions, and Davies (1948) attributed 4 out of 100 deaths in the 1 - 10 year age group to nephritis.

Furman (1955) pointed out that type 1 nephritis was commonest in Africans in his experience occurring at all ages. Four out of 150 cases of this type of nephritis died in his series and seven out of 70 type 2 nephritis

The Epidemiological and Vital Statistics Report (1959e). places this disease among the ten commonest causes of death among U.S.non-whites and the inhabitants of Ceylon during 1954 - 56. Among U.S. non-whites it was the ninth commonest cause of death among all ages being responsible for 2.1% of all deaths, and in Ceylon it was the seventh commonest cause of death in the 1 - 4 age group (0.8%) and the fifth commonest cause in the 5 - 14 age group (2.0%).

Shaper and Shaper (1958) in Mulago found chronic nephritis to be by far the commonest cause of death from genito-urinary and renal diseases.

17.2. Other Diseases of the Urinary System

(600 - 609)
(A.110 - 111, 114*)
(B.46*)

There were six deaths due to these conditions in this series all occurring in adults. Of the two deaths due to "Other diseases of the bladder" (6060) both were occasioned by operation for fistula of the genital region. Louw (1956b). reviewing 21 cases of this type of condition among Africans found 20 due to the after effects of unsatisfactorily conducted labour, the basic causes being sloughing due to prolonged labour or trauma as a result of interference by unqualified persons.

The small number of deaths attributed to infections of the kidneys (3) and to hydro nephrosis (1) is perhaps somewhat surprising in view of the comparatively large number of Africans suffering from high blood pressure attributable to infections of the kidney (see Chapter 14).

17.3 Diseases of the Male Genital Organs

(610 - 617)
(A.112. 114*)
(B.39. 46*)

There were four deaths in adult males attributable to enlarged prostate. This figure is somewhat higher than that found in Bulawayo where only one death out of 3,823 was attributed to this condition.

17.4 Diseases of the Breast, Ovary, Fallopian Tube and Parametria

(620 - 626)
(A.113, 114*)
(B.46*)

There were three deaths attributed to these conditions. The two attributable to pelvic cellulitis having already been commented upon above in Chapter 16.

17.5 Diseases of the Uterus and Other Female Genital Organs

(630 - 637)
(A.114*)
(B.46*)

There were no deaths attributable to these conditions in this series.

TABLE 17.1

Genito Urinary Systems

		Under 1		15 —	
		M	F	M	F
5910	Subacute Nephritis			3	
5920	Chronic Nephritis			3	1
5930	Nephritis N.O.S.	1		3	1
6000	Infection of kidney			2	1
6010	Hydro nephrosis			1	
6060	Other diseases of bladder				2
6100	Enlarged prostate			4	
6240	Salpingitis				1
6260	Pelvic Cellulitis				2

CHAPTER 18.

DELIVERIES AND COMPLICATIONS OF PREGNANCY, CHILDBIRTH AND THE PUERPERIUM

(640 - 689)
(A.115 - 120)
(B.40)

The number of deaths resulting from the above-named conditions are given in Table 18.1.

18.1. Complications of Pregnancy

(640 - 649)
(A.115*, 116*, 117*, 120*)
(B.40*)

Two deaths were attributable to raised blood pressure during pregnancy, one categorised as eclampsia of pregnancy and the other as toxaemia N.O.S. of pregnancy. This condition is not unknown among Africans but Nixon et al (1956) estimated an incidence as low as .08% among Africans in Luanshya and Montgomery (1955) considered the condition rare. Foley (1957) has pointed out that toxaemia of pregnancy is not rare in Nairobi district having noted 17 cases among 1,000 patients during 1956 at Pumwani: Weir (1956) reported a case of post partum eclampsia in an African woman of 30 years of age in Nyasaland.

18.2. Abortion

(650 - 652)
(A.116*, 118 - 119)
(B.40*)

There were three deaths attributable to abortion in this particular series.

18.3. Delivery

(660 - 678)
(A.117*, A.120*)
(B.40*)

There were a considerable number of deaths attributable to complications of delivery in this series. Three were attributed to delivery only without mention of the complication; five were associated with haemorrhage, four to malposition of the child, one to obstructed labour, three to other injury to the mother and one to other conditions of childbirth. These figures are high.

The Report of Confidential Enquiries into Maternal Deaths in England and Wales 1952 - 54 (1957) attributed only 18 out of 1,094 deaths to complications of caesarean section. Louw (1955) reviewing delivery of women of all races during 1952 - 53 in Capetown found that caesarean section had been carried out on 648 (4.58%) of 14,151 women delivered; of these 279 were carried out for disproportion, 78 for placenta praevia and 77 for toxaemia. Harris and Angawa (1951) in Kikuya Hospital found 33 instances of ruptured uterus for which no

cause could be found, 11 instances being due to late entry of the patient: in the remaining 22 instances 13 were due to foetal or maternal causes, two to previous caesarean sections and seven occurred spontaneously in vertex presentations. Montgomery (1955) in a series of 3275 deliveries reported 45 cases of craniotomy or similar operation, 11 instances of ruptured uterus of whom seven died, and 91 instances were caesarean section was necessary: he stated that the incidence of caesarean section was rising.

In this series it has not been possible to assess the incidence of Caesarian Section but it is known to be high among hospital patients, often admitted in a dying condition as a result of prolonged obstructed labour

18.4. Complications of the Puerperium
(680 - 689)
(A.115*, 116*, 120*)
(B.40*)

Puerperal sepsis was responsible for only one death in this series.

18.5. Conditions associated with Pregnancy

In Table 18.1 are also shown the cases where the cause of death was not attributed directly to pregnancy in childbirth but where the woman was pregnant or puerperal at the time of death.

Attention must be drawn to the four instances where death could only be attributed to therapeutic misadventure. In all these instances the death certificates simply bore the statement that the cause of death was due to a caesarean section and further enquiries did not reveal the reason for such a section having been carried out.

Further, in Chapter 16 attention has been drawn to the fact that deaths in this series attributed to paralytic ileus and pelvic cellulitis might have their original cause in pregnancy or the puerperium. It is difficult therefore to assess accurately the percentage of deaths attributable to pregnancy among the adult females in this series. The probable and possible percentages are given in Table 18.2.

Where the actual cause of death was not given owing to the patient dying outside hospital without medical attention reference was sometimes made to the fact that the woman was, in fact, pregnant and when the African Social Worker commenced work he made specific enquiries on this particular problem. In Table 18.3 are given the number of deaths of adult females where the cause was not ascertained, together with a number of instances where the woman was stated

to have been pregnant or puerperal. The figures must be accepted as minimal and it is not unlikely that further numbers were, in fact, pregnant although no mention thereof was made on the documents available.

Figures of the number of deaths attributed to Category B.40 in other countries are given in Table 18.4.

18.6. Causes of Maternal Mortality

Llewellyn Jones (1958) in Malaya stressed the importance of ante-natal care in preventing maternal mortality. He pointed out that among those mothers who received ante-natal care the maternal mortality was 2.04 per 1,000 compared with 15.40 per 1,000 among those receiving no ante-natal care. He further pointed out (1957) that maternal mortality was highest in multipara. In this connection Fraser Ross (1955) pointed out that in his experience in Central Africa no women over the age of 28 years were bearing their first child and with three exceptions in 2,307 cases no woman over the age of 40 bore any child.

High fertility of African women in Nyasaland has been the subject of comment by Bettison (1958) and among African women on the Copper Belt by Clyde Mitchell (1953).

Although Maternity Services on the Copper Belt may be as yet inadequate, nevertheless education will be required to overcome tribal customs before an improvement in maternal mortality can be effected.

TABLE 18.1

Pregnancy, Childbirth and the Puerperium

			Adult Females		
			1957	1958	1959
642.3	Eclampsia of pregnancy		1		
642.5	Toxaemia N.O.S. of pregnancy		1		
650.0	Abortion		1		1
651.0	Septic Abortion		1		
660	Delivery without mention of complication			3	
671	Retained placenta		1		2
672	Post partum haemorrhage		1	1	
674	Malposition of foetus		1		3
675	Obstructed labour				1
677	Other trauma to mother			1	2
678	Other conditions of childbirth				1
681	Puerperal sepsis			1	
			7	6	10
Factor	Onyalai	296.0			1
	Therapeutic misadventure	950.0	2	2	
	Other diseases of heart	434.3		1	
Possible Factor	Paralytic Ileus	5701		2	
	Peritonitis N.O.S.	5760	2	1	1
	Pelvic Cellulitis	626.0		2	
Total Adult Female Deaths, cause known			55	64	61

TABLE 18.2

Pregnancy, Childbirth and the Puerperium

Percentage of total Adult Female Deaths

	1957		1958		1959		Total	
Total Adult Female Deaths Cause Known.	55		64		61		180	
Cause of death classified B40.	7	12.7%	6	9.4%	10	16.4%	23	12.5%
Associated with pregnancy	9	16.4%	9	14.1%	11	18.0%	29	16.1%
Possibly associated with pregnancy	11	20.2%	14	21.9%	12	19.7%	37	20.5%

TABLE 18.3

Pregnancy

Cause of Death not known

	1957	1958	1959	Total
Cause not known	18	35	16	69
Pregnancy	0	3	4	7
Percentage	0.0%	8.7%	25.0%	10.1%

TABLE 18.4

Deaths (B.40) as percentage of Deaths

in females aged 15 - 49

This Series		12.3%	Certain
		20.5%	Possible
Ceylon	1952	20.3%	*
Costa Rica	1953/55	18.9%	≠
Columbia	1953/55	14.4%	≠
Chile	1953/54 (Provisional)	11.1%	≠
Egypt	1952/54	8.1%	≠
Union of South Africa (White)	1952/54	4.8%	≠
Maori	1950	6.3%	*
Portugal	1952	5.8%	*
Western European Countries		6% or less	

* Epidemiological and Vital Statistics Report 1954.a.

≠ Epidemiological and Vital Statistics Report 1957.e.

CHAPTER 19

DISEASES OF THE SKIN AND CELLULAR TISSUE

DISEASES OF THE BONES AND ORGANS OF MOVEMENT

Skin and Cellular Tissue

(690 - 716)
(A.121. A.126)
(B.46)

Diseases of the Bones and Organs of Movement

(720 - 749)
(A.122, 123, 124, 125, 126)
(B.46)

The number of deaths attributed to these groups of diseases is given in Table 19.1.

As will be noted, very few deaths occurred due to these conditions although it is not unlikely that certain of the deaths attributable to septicaemia (Chapter 9) may have had their original attacks of infection in the skin.

In view of the known poor living conditions and poor nutritional state it is surprising that not more deaths have resulted from skin conditions.

TABLE 19.1

Diseases of the Skin and Cellular Tissue

Diseases of the Bones and Organs of Movement

	Under 1	Child	1 - 4 -	5 - 14 -	15 —
692.6. Abscess	1	-	-	-	-
698.0. Skin Infections	-	1	-	-	-
7041. Other Pemphigus	-	-	1	-	-
7150. Skin Ulcer	-	-	1	-	-

CHAPTER 20

INFANT DEATHS

Congenital Malformations
(750 - 759)
(A.127, 128, 129*)
(B.41)

Certain Diseases of Early Infancy
(760 - 776)
(A.130 - 135)
(B.42 - 44)

Deaths attributable to Congenital Malformations and certain diseases of early infancy are given in Table 20.1. It is appreciated that deaths due to Congenital Malformations may occur at any age, but in this series all deaths due to Congenital Malformations occurred in persons under the age of 1 year, and it is considered justifiable therefore to include such deaths in the chapter concerned with infant deaths.

20.1. Congenital Malformations

(750 - 759)
(A.127, 128, 129*)
(B.41).

Somewhat remarkably, only four deaths were attributed to these conditions out of the total of no less than 278 children dying under the age of one year - 1.44%.

MacDonald (1956), out of 180 neo-natal deaths among non-Europeans in Capetown, found Congenital Malformations to be responsible for 14 (7.78%) of the deaths.

Levy (1959) found congenital abnormalities in 76 of 6,144 live births in Harari Hospital in 1958 of which 16 were fatal. Van Dongen (1956) found 10.9% of neonatal deaths in Johannesburg due to gross congenital abnormalities. Davies (1948a) found 1 out of 56 deaths of children under 1 year due to Congenital Malformations, and the same author (1955) found only 1 out of 246 deaths under the age of 10 years attributable to congenital deformities. Smith (1943) found 8 out of 500 children under 3 in Lagos died from congenital causes, 2 of whom died from Congenital Syphilis. Bennett (1960) out of 421 deaths of all ages where the cause was ascertained attributed only 2 to congenital conditions.

In Guatemala, however, Behar and Scrimshaw (1958) attributed 43 out of 44 deaths under the age of one month to Congenital Malformations, but only 4 out of 52 in the 1 - 11 month age range. Thus 47 out of 96 deaths under the age of 1 year were attributed to Congenital Malformations.

Camilleri (1957) found Congenital Malformations responsible for 5.9% of deaths of children under the age of one year in Malta in 1953.

Bound et al (1956) reviewed the causes of neonatal deaths and stillbirths at the University College Hospital in London and found the incidence of Congenital Malformations to be 14.7% which was similar to that found in other surveys.

The Report of a Joint Committee of the Royal College of Obstetricians and Gynaecologists and the British Pediatric Association on Neonatal Mortality and Morbidity (1949) reviewed the literature and came to the conclusion that Congenital Malformations were responsible for between 2.9 and 7.3 deaths per 1000 live births, the summary estimate being about 5 per 1000. This compares with a range of 2 to 6 per 1000 live born given in the Epidemiological and Vital Statistics Reports (1956)1).

In this series the deaths due to Congenital Malformations are very few indeed, and the absence of deaths due to the obvious Congenital Malformations such as Spina Bifida, Anencephaly etc. is noticeable.

The two deaths due to cleft palate occurred after operative procedures had been undertaken.

The absence of deaths attributed to congenital pyloric stenosis is worthy of comment as this disease has been reported in Africans by Hamilton (1957), Menezes and Thothravusamy (1957), Scragg (1958), Shepherd-Wilson and Gelfand (1955)

20.2. Birth Injuries, Asphyxia and Infections of the Newborn
(760 - 769)
(A.130, 131, 132, 134*)
(B.42, 43, 44*)

In dealing with this group of conditions it should be pointed out that there was no consistency on the death certificates indicating whether the child was also immature: therefore, the number of cases in which immaturity is mentioned should not be considered as reflecting necessarily the true state of affairs. Approximately the same number of deaths were attributed to intracranial birth injury and to post-natal asphyxia.

Pneumonia of the newborn represents those instances in which it was specifically mentioned that the disease occurred in the newborn: it is always possible that pneumonia had occurred in this age group but because of lack of information on the death certificate such deaths have been classified with the ordinary pneumonias.

The number of instances of death from sepsis of the newborn is comparatively high which is understandable in view of the conditions in which many of the patients are living.

McDonald (1956),out of 180 neonatal deaths among non Europeans in Cape Town attributed 21 to Intracranial Haemorrhage, 32 to Infections (all forms) and 26 to failure to start respiration.

Camilleri (1957) in Malta attributed 14.9% of the Infant Mortality Rate in 1953 to Asphyxia and Atelectasis and 6.4% to Birth Injuries.

20.3. Other Diseases Peculiar to Early Infancy
(770 - 776)
(A.133, 134*, 135*)
(B.44*)

It is perhaps necessary to comment on the fact that one death was classified to nutritional maladjustment with immaturity. The death certificate here specifically stated that death was due to a failure to feed in a child under the age of one month and it appeared that such a condition could not be classified with malnutrition as such.

It will be noted that in this series, 32 deaths of children under 1 year were attributed to immaturity N.O.S., 11.5% of all deaths occurring in this age group. This compares with the figure of 30.2% given by Camilleri (1957) and 28.9% among neonates found by McDonald (1956).

The percentage of deaths in this series classified in B.41 - B44 are given in Table 20.2 together with the comparative figures from Bulawayo (Bulawayo 1955/59), Ceylon, and U.S. Non White (Annual Average 1954/56)(Epidemiological and Vital Statistics Reports 1959c).

TABLE 20.1

Congenital Malformations.

	Under 1 M.	Under 1 F.	Child M.	Child F.
754.5. Heart Malformation	-	1	-	-
755.5. Cleft Palate	1	1	-	-
759.3. Other Malformations	-	1	-	-

Certain Diseases of Early Infancy.

	Under 1 M.	Under 1 F.	Child M.	Child F.
760.0. Intracranial Birth Injury	7	3	-	-
761.5. Other birth injury with immaturity	1	- *	-	-
762.0. Post natal asphyxia	7	5	-	-
762.5. Post natal asphyxia with immaturity	1	0 *	-	-
763.5. Pneumonia of newborn with immaturity	3	6 *	-	-
7670. Umbilical Sepsis	4	1	-	-
7680. Other sepsis of newborn	-	-	-	-
768.5. Other sepsis of newborn with immaturity	-	1 *	1	-
771.0. Haemorrhagic disease of newborn	1	1	-	-
771.5. Haemorrhagic disease of newborn with immaturity	1	- *	-	-
772.5. Nutritional malajustment with immaturity	-	1 *	-	-
773.5. Ill defined disease and immaturity	-	1 *	-	-
774.0. Immaturity and other condition.	4	1 *	-	-
776. Immaturity N.O.S.	18	14 *	1	-

* Deaths associated with immaturity.

TABLE 20.2

Infants - Deaths as a percentage

		This Series		Bulawayo 1954/59	Ceylon		U.S. Non White	
		Under 1 year.	Total.	Total.	Under 1.	Total.	Under 1.	Total.
B.41.	Congenital Malformations	1.44%	.37%	.89%	.7%	< 1.1%	7.0%	< 1.4%
B.42.	Birth Injuries, Asphyxia and Atelectasis	8.63%	2.22%	4.53%	3.0%	< 1.1%	21.1%	3.0%
B.43.	Infections of New-born	5.39%	1.48%	.73%	3.0%	< 1.1%	5.9%	< 1.4%
B.44.	Other diseases peculiar to infancy etc.	15.10%	3.98%	14.94%	Not stated		Not stated	

CHAPTER 20A.

INFANT MORTALITY

20A.1. Infant Mortality Rate

The difficulties of obtaining a satisfactory estimate of the Infant Mortality Rate have been discussed in Chapter 5.1. and it is not intended to attempt to make any estimate in respect of the figures obtained in this survey.

Other authors have reported on Infant Mortality Rates in other parts of Africa, but the only estimate for Northern Rhodesia was that of Shaul (1955) who estimated the Infant Mortality Rate in Northern Rhodesia in 1950 at 259. Grounds (1959) estimated an Infant Mortality Rate of 147 among Africans in rural Kenya.

Phillips (1957) estimated the African Infant Mortality Rate in Capetown at over 200, compared with Robertson's (1957) figure of 102.9 for Non Europeans in Capetown in 1956. Griffiths (1960) estimated the Infant Mortality Rate among Africans in Johannesburg at 132.4 in 1958.

Ferro-Luzzi (1958) estimates the mortality rate between birth and 2 years at 350 - 500 per 1000 live births in Libya.

Abhayaratne (1958) has drawn attention to the effects on the Infant Mortality Rate of the introduction of legislation affecting the registration of births and deaths.

20A.2. Neonatal and Post Neonatal Mortality Rates

The proportions of the Infant Mortality Rate due to Neonatal deaths and post neonatal deaths varies considerably from time to time and from country to country. Generally speaking, the proportion due to Post Neonatal deaths decreases as improvement in environmental hygiene and social conditions reduces the number of deaths from transmissible disease. Improved maternity services and registration of early deaths may however result in an increase in the proportion of neonatal deaths recorded.

The percentage of infant deaths in the neonatal and postneonatal periods for various areas are given in Table 20A.1., but insofar as the underdeveloped areas are concerned, there is little doubt that the figures suffer from the failure to report deaths occurring during the early hours or days of life. The figures nevertheless give some indication of the high proportion of post neonatal deaths occurring in underdeveloped countries.

20A.3. The Causes of Infant Mortality

20A.3.1. The Medical Causes

The medical causes of Infant Mortality in various series are given in Table 20A.2. from which the high propostion of deaths due to infections of the gastrointestinal tract in less developed countries will be noted.

20A.3.2. The Social and Environmental Causes

Foll (1958) in Upper Burma found the Infant Mortality lower in the younger age groups which agrees with the findings of Bound et al (1956) and Heady et al (1955) in England.

Dabb (1959) in Nyasaland found the foetal loss in all pregnancies higher among the uneducated than the educated, which is in agreement with Morris and Heady (1955) who noted the retention of the differentiation in infant mortality between social classes in England and Wales in spite of the overall drop in infant mortality.

Woolf and Waterhouse (1945) stressed the importance of social conditions such as poverty and unemployment on Infant Mortality in County Boroughs in England and Wales, although their statistical analysis was criticised by Buckatzsch (1947).

Kark and Chesler (1956) in a most interesting study of the effects of environment on infant mortality among various groups of Non Europeans in South Africa came to the conclusion that environment alone was insufficient to account for the variations between the Hindu and Bantu groups in the survey.

TABLE 20A.1.

Neonatal and Postneonatal Deaths

	Total Infant Deaths	Infant Mortality Rate	Percentage Neonatal Deaths Under 1 week.	1 week - 1 month.	Total.	Percentage Postneonatal Deaths
Ndola. Last 6 months 1959.	108		29.6%	12.0%	41.6%	58.4%
Johannesburg 1950/51. Griffiths (1954).	2140		26.63%	14.86%	41.49%	58.50%
Johannesburg 1958. Griffiths (1960).		132.39	26.92%	11.38%	38.30%	61.70%
Cape Town. Phillips (1957)					25 - 33%	
Ceylon 1937/39. Abhayaratne (1958)		161.8	41.2%	18.5%	59.8%	40.2%
Ceylon 1951. Epidemiological & Vital Statistics Report (1955b).		81.9			58.5%	41.5%
Ceylon 1953. Epidemiological & Vital Statistics Report (1956b).	22869				59.8%	40.2%
Ceylon 1957. Epidemiological & Vital Statistics Report (1959b)		67.5			58.1%	41.9%
England and Wales 1958. Epidemiological & Vital Statistics Report (1959c).		22.6			71.7%	28.3%

TABLE 20A.2.

Medical Causes of Infant Mortality

	Cape Town * Non Europeans McDonald (1956)	Cape Town 1956 Non Europeans Robertson (1957)	Johannesburg Africans Kahn (1957)	Malta 1953 Camilleri (1957)	England Bound et al (1956)
Infections (all forms)	17.8%				
Prematurity N.O.S.	28.9%				
Congenital Malformations	7.8%			5.9%	14.7%
Intracranial Haemorrhage	11.7%				
Failure to start Respiration	14.4%			14.9%	
Unknown	12.2%				
Others	7.2%				
Diarrhoea		41.0%	38.7%	28.6%	
Birth Injuries				6.4%	
Prematurity etc.				30.2%	
Total Deaths	180		2140		225

* Neonatal Deaths only

CHAPTER 21

SYMPTOMS, SENILITY AND ILL DEFINED CONDITIONS

(780 - 795)
(A.136. 137)
(B.45)

Deaths due to these conditions are given in Table 21.1.

It will be noted the number of deaths is comparatively few, the majority occurring in 1958 as is shown in Table 21.2.

It is difficult to ascertain accurately the cause of death in certain persons arriving at the hospital in a moribund condition and it is unfair to expect that post mortem examination should be carried out on all such instances in view of the heavy demand being made upon the time of the medical staff.

A more detailed grouping of Deaths in Categories B45 and 46 which includes deaths due to malnutrition is given in Table 21.3.

The Epidemiological and Vital Statistics Report (1958c) gives the number of deaths attributable to Categories B.45 and B.46 in the various countries and these are shown in Table 21.4. together with the figures for Bulawayo (1954 - 59) and for the present series. The value of these figures is not particularly high.

TABLE 21.1.

Symptoms, senility and ill defined conditions

780 - 795

	Under 1	15 —	
	M	M	F
782.4. Collapse		1	1
782.6. Oedema			1
785.2. Jaundice		1	
788.8. Pyrexia		1	
792.0. Uraemia		1	
794.0. Senility		1	
795.2. Sudden death - no cause		3	
795.3. Found dead	1	1	1
	1	9	3

TABLE 21.2.

Year of Death	
1957	Nil
1958	10
1959	3

TABLE 21.3.

	Under 1	Child	1 - 4 -	Under 5	5 - 14 -	15—	Over 5	Total
B.45.	1	-	-	1	-	12	12	13
B.46.	18	6	48	72	8	59	67	139
Total.	19	6	48	73	8	71	79	152
Total deaths, cause known.	278	18	192	488	45	548	593	1081
B.45 and B.46 as percentage of deaths.	6.8%	33.3%	25.0%	15.0%	17.8%	13.0%	13.3%	14.1%

TABLE 21.4.

Cause of Death

Categories B.45 and B.46 combined as percentage of all

1954 - 1956.

Ceylon	40 - 45%
Columbia	30 - 35%
Union of South Africa	
White	15%
Asiatic	15%
Coloured	12%
United States	
Non White	10%
New Zealand (all)	10%
Canada	9%
England and Wales	9%

1954 - 1959.

Bulawayo	9.4%
This Series	14.1%

CHAPTER 22.

ACCIDENTS, POISONING AND VIOLENCE
(E.800 - 999)
(AE.138 - 150)
(BE.47 - 50)

22. The deaths due to external violence of all types have been classified in accordance with the "E" Code (external cause of injury) as this is the more informative and useful code in Public Health practice. The exact nature of the injury causing death is not without Public Health value, but records were not sufficiently adequate in this survey to justify additional classification in accordance with the "N" Code.

In Table 22.1. are given details of the number of post-mortem investigations carried out on persons dying violent deaths. The figures for 1957 are somewhat suspect but from this Table it will be noted that not in every such death was a post-mortem examination performed. Such instances usually occurred when the cause of death was obvious and no police action was required, as in those due to "Caesarian Section", and when the patient had been transferred to the Ndola Hospital from a considerable distance and the holding of an inquest would cause considerable administrative expense, time, and difficulty. One has in mind particularly a person who fell from a tree some two hundred miles from Ndola and received a fractured spine and paraplegia, from which he died some 6 months after the receipt of injury. The vigour with which such cases are investigated depends largely upon the attitude of the magistrates qua coroners, who changed frequently during the period of the survey. Generally speaking all persons dying as a result of motor traffic accidents, suicide, or murder were the subject of post mortem examinations.

Violence as a whole was responsible for 122 deaths - 11.3% compared with 11.9% in Luanshya (Luanshya 1956) and 6.49% in Bulawayo (Bulawayo 1955/58).

22.1. Transport Accidents
(E.800 - 866)
(AE.138 - 139)
(BE.47, 48*)

As was pointed out in Chapter 4, considerable difficulty was encountered before the middle of 1958 in assessing the exact nature of the transport accident in which death occurred. This difficulty is reflected in the comparatively large number of deaths attributed to "Motor Traffic Accidents Unspecified" as shown in Table 22.2.

In so far as motor transport accidents are concerned, it is difficult to effect satisfactory comparisons with other countries as there are such marked geographical variations in the types of roads and number of vehicles which determine to some extent the degree to which the population is 'at risk' to death from motor transport accidents.

22.1.1. Railway Accidents
(E.800 - 802)
(AE.139*)
(BE.47*)

There were four deaths due to railway accidents. In view of the known habit of the local Africans of all ages of using railway tracks as public highways, it is surprising that not more deaths occur as a result of railway accidents. Elmes (1957) found 14 (3.6%) out of 391 accidental deaths in and around Kampala during 1950 - 54 due to railway accidents, compared with 4.3% in the present series.

22.1.2. Road Vehicle Accidents
(E.810 - 845)
(AE.138 - 139*)
(BE.47 - 48*)

Owing to the difficulties of classification of transport accidents noted above, it was considered wisest to group these deaths together.

The most marked feature of this group of deaths is the high proportion of pedestrians and pedal cyclists killed. Of the 37 persons killed, at least 9 were pedestrians and 6 pedal cyclists.

As far as age is concerned only one child was in the 1 - 4 age range, and only 4 in the 5 - 14- age range.

The Report of the Working Party on Child Cyclists (Ministry of Transport and Civil Aviation 1958) stressed the need for testing child cyclists in the United Kingdom, and such a scheme (if extended to all cyclists) might well have an application in Northern Rhodesia where the financial circumstances of the African render it unlikely that many persons use a bicyle for the first time before adulthood.

Road Vehicle accidents comprise 40.7% of all accidental deaths in this series, and 5.8% of deaths from all causes in adult males.

22.1.3. Other Transport Accidents
(E.850 - 866)
(AE.139*)
(BE.48*)

There were no deaths due to accidents involving other types of transport.

22.2. Non-Transport Accidents
(E.870 - 936)
(AE.140, 141, 142, 143, 144, 145, 146, 147*)
(BE.48*)

No attempt has been made to use the fourth digit classification for non-transport accidents and poisonings owing to the scanty information available. The number of deaths are shown in Table 22.3.

22.2.1. Accidental Poisoning
(E.870 - 895)
(AE.140)
(BE.48*)

Only one death was attributed to accidental poisoning - a person in the 1 - 4- age group who died from carbon monoxide poisoning. The comparatively high night temperatures during winter on the Copperbelt probably reduce the number of occasions when the small portable charcoal fire is taken into the house and the ventilation openings sealed up to ensure adequate warmth. In the colder parts of Southern Africa this habit causes a number of deaths every year from carbon monoxide poisoning.

22.2.2. Accidental Falls
(E.900 - 904)
(AE.141)
(BE.48*)

Only 2 deaths from falls were recorded in this series, which agrees with the low figure of 10 out of 391 accidental deaths reported by Elmes (1957).

22.2.3. Other Accidents
(E.910 - 936)
(AE.142, 143, 144, 145, 146, 147*)
(BE.48)

The figures for this group of deaths do not altogether bear out the conclusions of Swaroop et al (1956) that the death rate for 'other accidents' is low in underdeveloped countries.

In this group attention is drawn to the following causes of death:-

22.2.3.1. Burns N.O.S.
(E.917)
(AE.144*)
(BE.48*)

There were 8 deaths due to burns, of which no less than five were in children under the age of 5 years. The age pattern appears not dissimilar to that noted by Martin (1957a) in England and Wales where most deaths were occurring under the age of 1 year.

Burns are a very common cause of morbidity, particularly in young

children, who are unsteady on their feet and frequently blunder into the fire which by tradition is made on the ground, and over which the cooking arrangements take place. Such burns are treated at the clinics rather than in the hospital, but even so constitute a more serious menace in Ndola than is reported by McGregor (1958) in Western Nigeria where only 7 out of 488 deaths were attributed to Trauma, chiefly burns and scalds. Davies (1948a) found only 1 death out of 100 in the 1 - 10 age group due to burns - the only accidental death reported in the series.

Elmes (1957) however, found 25 out of 391 accidental deaths due to burns.

22.2.3.2. Cave-In
(E.925)
(AE.147*)
(BE.48*)

Four adult males died as a result of cave-ins, 2 in trench excavations and 2 in quarry accidents.

22.2.3.3. Snake Bite
(E.927)
(AE.147*)
(BE.48*)

Only one person died from snake-bite which is not a serious hazard to life in Northern Rhodesia.

22.2.3.4. Drowning
(E.929)
(AE.146)
(BE.48*)

Six deaths were due to drowning, 6.5% of accidental deaths occurring for the most part in the wet season when there is sufficient depth of standing water all over the area to constitute a danger to the life of young persons.

In addition the greater flow on the watercourses causes danger to older persons who may be accustomed to crossing such places when the flow is slight or non-existent, and do not make the necessary allowances for changed circumstances.

While important as a cause of death, drowning does not appear of such importance as reported in Ceylon in Accidents in Childhood (1957), and Epidemiological and Vital Statistics Report (1956a), but approximated to the figure of 5.1% of accidental deaths found by Elmes (1957).

22.2.3.5. Lightning
(E.935)
(AE.147*)
(BE.48*)

Eight persons died as a result of being struck by lightning which is greatly feared locally by the African population. The lightning which accompanies the thunderstorms always causes a certain number of deaths every year.

22.2.3.6. Complications of Operation
(E.950)
(AE.147*)
(BE.48*)

These five adult females died following Caesarian Section which was the only cause of death noted on the certificate. All occurred at the beginning of 1958 and should be included in deaths associated with pregnancy - see Chapter 18.

22.3. Suicide and self inflicted injury
(E.970 - 979)
(AE.148)
(BE.49)

There were 6 deaths caused by suicide; in four instances the method used was hanging, and in two instances the method was unspecified. See Table 22.4.

Elmes (1957) found hanging the method in 13 out of 20 instances of suicide among Africans at Kampala.

22.4. Homicide
(E.980 - 985)
(AE.149)
(BE.50*)

There were 21 deaths due to murder, all occurring in adults except for one young child who was murdered by his parent by having his head struck against the wall of the house.

Of the twenty adult deaths, three were caused by poison and seventeen by assault with a weapon, usually a club but not infrequently an axe or spear. Elmes (1957) found clubs used in 114 our of 272 homicides in Kampala compared with 84 instances where the weapon used was a knife or spear.

In addition 2 adult males died in 1958 as a result of police action when shots were fired during riots.

It is reported in the Epidemiological and Vital Statistics Report (1959e) that homicide was the seventh commonest cause of death on average among United States Non Whites between 1954 and 1956, being responsible for 2.3% of all deaths. In this series homicide was most unlikely to be included in any

case where the cause of death was not determined: it is therefore reasonable to assume that there were 22 homicides out of the overall total of 710 adult deaths - a percentage of 3.1%. For all deaths homicide was responsible for only 1.06% compared with a figure of 0.63% in Bulawayo (Bulawayo 1955/59).

TABLE 22.1

Post Mortem Examinations on Persons dying Violent Deaths

		Under 1	Child	1 - 4-	5 - 14-	15 —	Total
1957.	Deaths due to Violence	1	1	2	1	20	25
	Post Mortems carried out	-	-	1	1	8	10
1958.	Deaths due to Violence	3	-	2	4	40	49
	Post Mortems carried out	1	-	-	2	32	35
1959.	Deaths due to Violence	6	-	3	4	35	48
	Post Mortems carried out	4	-	1	4	33	42

TABLE 22.2

Deaths due to Transport Accidents

		Under 1 M	Under 1 F.	Child M	Child F.	1 - 4 - M	1 - 4 - F	5 - 14 - M	5 - 14 - F	15+ M.	15+ F.
802.0.	Railway accident									3	1
812.0.	Motor vehicle accident to pedestrian							2		6	
813.0.	Motor vehicle accident to cyclist							1		4	
816.0.	Two motor vehicles									1	
824.0.	Non collision traffic accident									1	
825.0.	Motor traffic accident unspecified								1	11	
830.0.	Non traffic accident to pedestrian									1	
835.0.	Motor vehicle non traffic accident						1			6	
843.0.	Pedal cyclist - no motor vehicle									1	
845.0.	Other non motor vehicle accident									1	
							1	3	1	35	1

TABLE 22.3

Deaths due to Non transport accidents

	Under 1		Child		1 - 4 -		5 - 14 -		15 -		
	M	F.	M	F	M	F	M	F	M	F	
892.0. Carbon Monoxide Poisoning					1						
902.0. Falls at one level									1		
904.0. Falls N.O.S.					1						
910.0. Blow from object									1		
913.0. Accident by cutting instrument									1		
916.0. Accident by explosion						1			1	1	
917.0. Burns N.O.S.	2	2			1				2	1	
924.0. Suffocation in bed	2	1									
925.0. Cave in									4		
926.0. Lack of care		1									
927.0. Snake bite					1						
929. Drowning	1			1			2	1	2		
935. Lightning					1		1	1	4	1	
936. Accidents N.O.S.									6	1	
950.0. Complications of operation										5	
	5	4	-	1	5	1	3	2	22	9	52

TABLE 22.4

Deaths due to Suicide

	Under 1 M	Under 1 F	Child M	Child F	1 - 4 - M	1 - 4 - F	5 - 14 - M	5 - 14 - F	15 — M	15 — F
974.0. Suicide - Hanging									2	2
979.6. Suicide - Unspecified									2	-
									4	2

Deaths due to Homicide

	Under 1 M	Under 1 F	Child M	Child F	1 - 4 - M	1 - 4 - F	5 - 14 - M	5 - 14 - F	15 — M	15 — F
980.0. Homicide - poisoning									2	1
982.0. Assault Homicide - cutting and piercing									5	1
983.0. Assault Homicide - other means		1							9	2
984.0. Police Action									2	-
									18	4

CONCLUSIONS

On humanitarian as well as on economic grounds the immense wastage of human life in developing countries must be brought under control as rapidly as possible. It is desirable to make some suggestions on the methods to be adopted with particular reference to Northern Rhodesia.

The present poverty of developing countries renders it certain that health and other services can be inaugurated and developed only on the basis of financial help from the Government in power: in turn, the political complexion of such Government will play a major part in determining the exact form of the resultant services. The political concepts may well over-rule the traditions of the past.

Nevertheless, to obtain the best results from the money to be expended, preliminary surveys of morbidity and mortality are necessary. The results of such surveys should be assessed objectively without reference to traditional ideas and such objective assessment may require a radical re-orientation of thought (Davey 1959). Brockington (1958) has pointed out that what is good in the United Kingdom and the United States of America is not necessarily good in the developing countries: more valuable information can be obtained from the experiences of other countries in the similar stages of development rather than from the more highly developed and wealthier countries.

In order to make the best use of the available professional and technical knowledge the first essential is the integration of services (Kershaw 1958, Adeniyi-Jones 1958) without disproportionate stress being placed upon medical services alone. The South African Medical Journal (1955) points out that "The remedy for the bad health conditions obtaining amongst South African non Europeans is social-economic uplift" - sentiments echoed by Luke (1955) when quoting the Gluckman Commission that the main causes of ill-health among such people are poverty and ignorance. This point has been further stressed by Davey (1954) when he stated "Poverty and ignorance are the basic causes of many important diseases in the tropics and though medicine may alleviate the symptoms, only administrative action on a wide front will provide a sound and lasting cure".

Any programme must take into account the available resources both of the country itself and the more developed countries which are willing to offer assistance: in particular if locally trained staff are not available, the type of service may be governed to some extent by the type of expatriate

professional man available for service. For instance Jelliffe (1955b) has pointed out the deficiencies of the present training in pediatrics when applied to developing countries.

In order to obtain the co-operation of the indigenous people it is probably necessary to base the services on hospitals resulting in comparatively greater stress being laid on health services in urban areas rather than in rural areas (Adeniyi- Jones 1958). Nevertheless, the fairly steady movement of persons to and from urban centres which will increase as communications improve, will ensure that the knowledge is disseminated throughout the country. In Northern Rhodesia in particular, the development of clinics in urban African townships, with easy access to the major urban hospitals, would probably provide the most satisfactory and efficient method of initial development. Sachs (1959) has given a detailed assessment of an experiment in integrated curative services indicating how the use of clinics reduces the pressure upon more expensive hospital services: this idea has been further emphasised by Zwart (undated).

At the same time as clinic development takes place, improvement in conditions which do not require the particular co-operation of the indigenous population, can be effected. Hennessey (1955) has emphasised that "An adequate standard of housing is one of the primary essentials of health", but it has been pointed out by Fendall (1959) and Stroud (1959) that the standard of house required varies in different social localities. In addition to housing, Baity (1958) has stressed the need for improved environmental hygiene in developing countries.

In so far as the medical services themselves are concerned, Platt (1954) and Williams (1955 a) have both stressed the place of women in the development of services and their influence on the economics of the home and the food supply. It is through Maternity and Child Welfare Services that the main attack on malnutrition can be developed (Jelliffe 1955d) and for this purpose more detailed knowledge of all aspects of local conditions are necessary (Thompson 1955, Lancet 1955h) In combating malnutrition the closest co-operation is necessary between many departments and the Joint F.A.O./W.H.O. Expert Committee on Nutrition, (1950) has stated "Almost every practical programme of nutrition has aspects which fall within the fields of interest of both F.A.O. and W.H.O. Collaboration must, therefore, be flexible and no sharp dividing lines of responsibility can be drawn".

Williams (1955 b) and Keeny (1955) may speculate on the manner in which to approach these problems, but mortality and morbidity surveys, with a keen assessment of the results obtained, provide the basic essentials upon which services must be inaugurated or developed. It is hoped that this survey may have contributed something to the basic knowledge required for the improvement of services and the prevention of unnecessary misery suffering and death.

....

CAUSE OF DEATH

B		Under 1	Child	1 - 4 -	Under 5	5 - 14 -	15 —	5+	Total
1	Tuberculosis of respiratory system	1	-	2	3	2	57	59	62
2	Tuberculosis, other forms	-	-	1	1	1	15	16	17
3	Syphilis and its sequelae	-	-	-	-	-	4	4	4
4	Typhoid fever	-	-	-	-	-	2	2	2
6	Dysentery, all forms	4	-	3	7	-	11	11	18
8	Diphtheria	1	-	2	3	-	-	-	3
9	Whooping Cough	2	-	6	8	-	-	-	8
12	Acute poliomyelitis	-	-	1	1	-	-	-	1
13	Smallpox	6	-	-	6	-	1	1	7
14	Measles	2	-	4	6	-	-	-	6
16	Malaria	4	-	3	7	-	4	4	11
17	All other infective and parasitic diseases	3	-	2	5	2	9	11	16
18	Malignant neoplasms	-	-	-	-	2	59	61	61
19	Benign neoplasms	1	-	-	1	-	5	5	6
20	Diabetes mellitus	-	-	-	-	-	2	2	2
21	Anaemias	1	-	-	1	-	2	2	3
22	Vascular lesions affecting C.N.S.	1	-	-	1	-	12	12	13
23	Non-meningococcal meningitis	11	-	2	13	2	21	23	36
25	Chronic rheumatic heart disease	-	-	-	-	-	11	11	11
26	Arteriosclerotic and degenerative heart disease	-	-	-	-	-	5	5	5
27	Other diseases of heart	1	-	-	1	-	15	15	16
28	Hypertension with heart disease	-	-	-	-	-	2	2	2
31	Pneumonia	66	5	54	125	8	64	72	197
32	Bronchitis	-	-	1	1	-	1	1	2
33	Ulcer of stomach and duodenum	-	-	-	-	-	2	2	2
34	Appendicitis	-	-	1	1	1	1	2	3

(continued)

CAUSE OF DEATH

B		Under 1	Child	1 - 4—	Under 5	5 - 14—	15—	5+	Total
35	Intestinal obstruction and hernia	3	-	-	3	-	6	6	9
36	Enteritis etc.	55	3	54	112	9	14	23	135
37	Cirrhosis of liver	1	-	1	2	-	19	19	21
38	Nephritis and nephrosis	1	1	-	2	1	11	12	14
39	Hyperplasia of prostate	-	-	-	-	-	4	4	4
40	Pregnancy etc.	-	-	-	-	-	23	23	23
41	Congenital malformations	4	-	-	4	-	-	-	4
42	Birth injuries etc.	24	-	-	24	-	-	-	24
43	Infections of the newborn	15	1	-	16	-	-	-	16
44	Other diseases of early infancy etc.	42	1	-	43	-	-	-	43
45	Senility etc.	1	-	-	1	-	12	12	13
46	All other diseases	18	6	48	72	8	59	67	139
47	Motor vehicle accidents	-	-	1	1	4	30	34	35
48	All other accidents	9	1	6	16	5	37	42	58
49	Suicide etc.	-	-	-	-	-	6	6	6
50	Homicide etc.	1	-	-	1	-	22	22	23
Total		278	18	192	488	45	548	593	1081

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