Department of Public Health

The Nutrition and Health of South African Bantu School children

A Somatometrical and Clinical Study

FIELD WORK AND REPORT OF FINDINGS

by S. L. Kark and H. le Riche

SECTION A

Introduction

CHAPTER I

The Aims, Objects and Methods of the Survey

THE knowledge which results from an adequate system of recording vital statistics, is essential for the application of preventive medicine. While such knowledge is fairly adequate for the European section of South Africa, figures for the Bantu are lacking. There is no system of compulsory notification of births and deaths among the rural Bantu, who are by far in the majority. Even if such compulsion were general the records would still be inadequate in view of the limited medical facilities available. The cause of death would thus often remain undetermined. There is, however, considerable evidence to the effect that as a group of people, the Bantu are very commonly afflicted with preventable diseases, such as tuberculosis, syphilis, malaria, bilharzia, and those resulting directly from food deficiencies. Much of the evidence is that of workers whose impressions are the results of many years of contact with the Bantu. There is in addition a growing mass of more accurate information following surveys and intensive studies of particular problems. This information, while of the utmost value, fails to convey the extent to which the people are influenced by these diseases, and the relative importance of various causes of ill-health. Most medical

Departement van Volksgesondheid.

Voeding en Gesondheid van Suid-Afrikaanse Bantoeskoolkinders

'n Somatometriese en Kliniese Studie

VELDWERK EN VERSLAG VAN BEVINDINGS

deur S. L. Kark en H. le Riche.

AFDELING A

Inleiding.

HOOFSTUK I

Die doelstellings en metodes van die opname

DIE kennis wat opgedoen word met die toepassing van 'n toereikende stelsel van optekening van bevolkingstatistiek, is noodsaaklik by die aanwending van die voorkomende geneeskunde. Waar kennis van hierdie aard taamlik toereikend is ten opsigte van die blanke deel van Suid-Afrika se bevolking, is daar 'n gebrek aan hierdie inligting vir sover dit die Bantoe raak. Daar is onder die landelike Bantoes, wat verreweg die meerderheid uitmaak, geen stelsel van verpligte opgawe van geboortes en sterfgevalle nie, en al sou daar ook so'n verpligting wees, sou die opgawes nogtans ontoereikend wees met die oog op die beperkte mediese fasiliteite wat beskikbaar is. Die oorsaak van sterfte sou dus dikwels onbepaald bly. Daar is egter heelwat gegewens wat daarop wys dat die Bantoe, as mensegroep, baie algemeen geteister word deur voorkombare siektes soos tuberkulose, sifilis, malaria, bilharzia, en siektes wat regstreeks uit voedingsgebreke ontstaan. 'n Groot deel van hierdie gegewens kom van werkers wie se indrukke die gevolg is van jarelange aanraking met die Bantoe. Daarbenewens is daar 'n toenemende massa meer akkurate inligting verkrygbaar uit opnames en intensiewe studies van besondere probleme. Hoewel hierdie inligting uiters waardevol is, bring dit nog nie die omvang van die uitwerking van hierdie siektes op die mense en die betreklike belangrikheid van verskillende oorsake van ongesondheid aan die lig nie. Die meeste mediese praktisyns met ondervinding van die Bantoe getuig daarvan dat dit baie dikwels gebeur dat 'n

practitioners, with experience of the Bantu, testify to the fact that it is very common to find a patient whose illness cannot be explained by a single pathological entity. The concept of a group of signs and symptoms resulting from one single cause would lead to grave misdiagnosis in a considerable number of cases. In areas where so-called tropical diseases are common one would expect to find several diseases in one person. It is, however, less commonly realised that in South Africa's temperate regions the Bantu are often found to be affected by several disease processes. A patient with tuberculosis will very commonly have associated intestinal parasitic infestation, syphilis, bilharzia, specific food deficiency disease, such as pellagra, and so on.

It was the realization of this important fact that decided the scope of this survey. The main aim was to assess the extent of malnutrition resulting from diet deficiency, but in view of the preceding remarks it was decided that the examination should include an analysis of other disease processes which occurred together with such deficiencies. It would have been extremely unfortunate to lose the opportunity of carrying out a general health survey, for our knowledge of various detrimental factors is very limited. The importance of thus widening the scope of the survey is further discussed in the introductory remarks to the clinical section of the report (Section C).

The survey was conducted under the direction of the Union Health Department. Dr. H. S. Gear, Deputy Chief Health Officer, was responsible for the direction of the survey. His guidance and personal interest were of extreme value. Had it not been for his absence on military service he would have directed this report as well. It is needless to say that his advice and direction have been sorely missed by the authors of this report. The field work was carried out by a team, including a medical officer (S. L. Kark) and an anthropologist (H. le Riche). One Bantu assistant (J. L. Sibanyoni) was associated with the team throughout the survey and an additional assistant was employed in each area. This constituted the basic team unit, but the survey would have been very limited were we unable to obtain the co-operation of various institutions. The South African Institute for Medical Research, Johannesburg, co-operated wholeheartedly and in addition to carrying out routine faeces, blood-smears and Wasserman reactions, agglutination reaction tests for the enteric fever group, typhus and undulant fevers, and throat swabs forwarded by the field workers,

pasiënt se siektes nie in terme van 'n enkele patologiese entiteit verklaar kan word nie. Die begrip van 'n groep siektetekens en simptome wat uit een enkele oorsaak voortvloei, sou in 'n aansienlike aantal gevalle tot ernstige wandiagnose lei. In streke waar sogenaamde tropiese siektes algemeen voorkom, sou 'n mens verwag om verskillende siektes by een persoon aanwesig te vind. Wat egter minder algemeen besef word, is dat die Bantoe dikwels selfs in Suid-Afrika se gematigde streke deur verskillende siekteprosesse aangetas word. 'n Pasiënt met tuberkulose blyk baie dikwels ook die slagoffer te wees van parasitêre ingewandsbesmetting, sifilis, bilharzia, spesifieke voedingsgebreksiektes soos pellagra, ens.

Dit was die besef van hierdie belangrike feit wat die omvang van hierdie opname bepaal het. Die hoofdoel was om die omvang van ondervoeding wat uit diëetgebreke voortvloei, vas te stel, dog op grond van bostaande opmerkings is besluit dat die ondersoek ook 'n ontleding van ander siekteprosesse wat tesame met sodanige gebreke aangetref word, moes insluit. Dit sou uiters jammer gewees het om die geleentheid te mis om 'n algemene gesondheidsopname te doen, aangesien ons kennis van verskeie nadelige faktore baie beperk is. Die belangrikheid van hierdie uitbreiding van die trefwydte van die opname word verder bespreek in die inleiding tot die kliniese afdeling van hierdie verslag (Afdeling C).

Die opname is onder toesig van die Unie-departement van Volksgesondheid gedoen en is deurgevoer onder leiding van dr. H. S. Gear, Adjunkhoofgeneeskundige. Sy leiding en persoonlike belangstelling was besonder waardevol, en dit is slegs sy afwesigheid in militêre diens wat verhoed het dat ook die verslag onder sy leiding opgestel kon word. Die skrywers van hierdie verslag het in hulle taak sy raad en leiding diep gemis. Die veldwerk is uitgevoer deur 'n span werkers, waaronder 'n mediese beampte (S. L. Kark) en 'n antropoloog (H. le Riche). Een Bantoe-assistent (J. L. Sibanyoni) was vir die duur van die opname in verbinding met die span, en in elke gebied is van 'n addisionele assistent gebruik gemaak. Hierdie personeel het die basiese spaneenheid uitgemaak, dog die opname sou baie beperk gewees het indien ons nie daarin geslaag het om die medewerking van verskeie inrigtings te erlang nie. Die Suid-Afrikaanse Instituut vir Mediese Navorsing, Johannesburg, het ons sy volle medewerking gegee en het nie alleen die roetine-ondersoek van fekalië, bloedsmere en Wassermanreaksies onderneem nie, maar ook agglutinasiereaksietoetse vir die ingewandskoorsgroep, tifus- en wederkerende koorssiektes uitgevoer en

were also examined. These latter investigations are not included in this report. The Senior Malaria Officer of the Tzaneen Malaria Research Station, assisted considerably in the Northern Transvaal areas of Letaba and Bochem. In addition to attaching members of his staff to assist in our work, he also made arrangements for the team in these areas. The University of the Witwatersrand was kind enough to lend the medical officer various laboratory essentials. The Census Department co-operated in the tabulation of many of the figures.

The districts to be visited were decided upon in consultation with officials of the Native Affairs Department. It could not be hoped to visit all areas of the country, but it was felt that the inclusion of several districts in each province would give a fairly representative picture. In all, three urban and six rural areas were visited, namely:—

Transvaal.—Pretoria, Bochem and Letaba.

Orange Free State.—Bloemfontein and Witzieshoek.

Natal.—Pietermaritzburg and Nqutu.

Cape Province (Transkei).—Qumbu and Kentani.

The areas were visted in the following order:—

Pretoria: October-November, 1938.
Witzieshoek: November-December, 1938.
Bloemfontein: December, 1938-January, 1939.
Qumbu: February-March, 1939.
Kentani: March-April, 1939.
Pietermaritzburg: May, 1939.
Nqutu: June, 1939.
Letaba: July-August, 1939.
Bochem: September, 1939.

Approximately 800 children were examined in each of these districts, making a total of over 7,000 examined. Each child had a physical examination, including various body measurements and a clinical inspection and investigation. In addition, laboratory examinations were carried out in a certain number of cases. These were conducted both in the field and at the South African Institute for Medical Research. More details of the various methods employed and examinations undertaken are given in the following sections of the report.

The report is divided into three sections:—

Section A.—Including the present chapter and a discussion on methods of sampling.

keelswabbers wat deur die veldwerkers ingestuur is, ondersoek. Laasgenoemde ondersoeke maak nie deel van hierdie verslag uit nie. Die Senior Malariabeampte van die Malarianavorsingstasie, Tzaneen, het heelwat hulp verleen in die Noord-Transvaalse streke Letaba en Bochem. Nie alleen het hy lede van sy personeel afgestaan om ons met ons werk te help nie, maar hy het ook reëlings vir die span in daardie gebiede getref. Die Universiteit van die Witwatersrand het goedgunstiglik verskeie essensiële laboratoriumbenodigdhede aan die geneeskundige beampte geleen. Die Departement van Sensus het met die tabellering van baie van die syfers meegewerk.

Die distrikte wat besoek moes word, is gekies in oorleg met amptenare van die Departement van Naturellesake. Dit was meer as wat verwag kon word om alle gebiede in die land te besoek, dog daar is gevoel dat 'n taamlik verteenwoordigende beeld verkry sou word deur verskeie distrikte uit elke provinsie in te sluit. Altesame is drie stedelike en ses landelike gebiede besoek, nl.:— .

Transvaal.—Pretoria, Bochem en Letaba.

Oranje-Vrystaat.—Bloemfontein en Witzieshoek.

Natal.—Pietermaritzburg en Nqutu.

Kaapprovinsie (Transkei).—Qumbu en Kentani.

Die gebiede is in onderstaande volgorde besoek:—

Pretoria: Oktober-November 1938.
Witzieshoek: November-Desember 1938.
Bloemfontein: Desember 1938-Januarie 1939.
Qumbu: Februarie-Maart 1939.
Kentani: Maart-April 1939.
Pietermaritzburg: Mei 1939.
Nqutu: Junie 1939.
Letaba: Julie-Augustus 1939.
Bochem: September 1939.

In elkeen van hierdie streke is ongeveer 800 kinders ondersoek, d.w.s. 'n totaal van meer as 7,000. Elke kind is liggaamlik ondersoek, en elke ondersoek het bestaan uit die neem van verskeie liggaamsmetings en 'n kliniese ondersoek en inspeksie. Daarbenewens is laboratoriumondersoeke in 'n sekere aantal gevalle uitgevoer, sowel in die veld as by die Suid-Afrikaanse Instituut vir Mediese Navorsing. Meer besonderhede in verband met die verskillende metodes wat aangewend en ondersoeke wat onderneem is, verskyn in onderstaande drie afdelings waarin die verslag onderverdeel is:—

Afdeling A.—Die huidige hoofstuk en 'n bespreking van die metodes van monsterneming.

Section B.—Includes the results of the somatometric examinations.

Section C.—Is a report of the clinical and relevant laboratory findings.

No recommendations of a sociological or health nature are made, for the aim of the survey was to assess the state of health and nutrition of the children examined and to indicate as far as was possible the causes of any ill health or malnutrition which was found. The terms of reference of the team did not include a critical evaluation of existing services, nor a determination of the socio-economic status of the children. While much private work was undertaken in regard to these influences it is felt that the results should not be included in this report.

It is not possible to name all those who co-operated in our work. The magistrates, native commissioners, district surgeons, various missionary bodies, and a considerable number of European and Bantu teachers in every district, not only welcomed the team but assisted in every way possible. The smooth working of the survey depended to a considerable extent on their valuable assistance.

CHAPTER II.

Discussion on Schools as Reservoirs from which Samples are drawn.

AS far as White children are concerned it is easy to draw a representative sample from the schools in view of the high rate of enrolment, especially in the age group 8 to 13. This was shown in the study on Pretoria White school children (le Riche 1940). The following figures taken from the Bulletin of Educational Statistics, 1940, Union Education Department, Pretoria, bear out these observations:—

TABLE 1.—THE PERCENTAGE OF TOTAL NUMBERS OF WHITES IN VARIOUS AGE GROUPS RECEIVING EDUCATION IN THE UNION (1939).

Age.	*Percentage Receiving Education.*
8	96·86
9	98·49
10	98·18
11	98·12
12	98·45
13	97·87
14	91·27
15	74·73

For the Whites then, if a random example be taken from the schools in the age group 8 to 13, this sample can be assumed to be representative of the whole child population. This is not the case with the Bantu. It has not been possible to find a similar

Afdeling B.—Die resultate van die somatometriese ondersoeke.

Afdeling C.—'n Verslag van die kliniese en desbetreffende laboratoriumbevindings.

Geen aanbevelings van sosiologiese of gesondheidkundige aard word gedoen nie, omdat die opname toegespits was op die bepaling van die gesondheids- en voedingstoestand van die kinders wat ondersoek is en dit die doel is om, vir sover moontlik, die oorsake van ongesondheid of wanvoeding (waar dit voorkom) aan te dui. Die opdrag van die span het nie 'n kritiese opname van bestaande dienste, of 'n bepaling van die maatskaplik-ekonomiese status van die kinders behels nie. Hoewel daar veel private werk in verband met hierdie invloede onderneem is, voel die werkers dat die resultate daarvan nie in hierdie verslag ingesluit behoort te word nie.

Dit is onmoontlik om elkeen wat ons in ons werk bygestaan het by name te noem. Die magistrate, naturellekomissarisse, distriksgeneeshere, verskeie sendingliggame en 'n aansienlike aantal blanke en Bantoe-onderwysers in elke distrik het die span nie net verwelkom nie, maar op elke moontlike wyse bygestaan. Die vlotte verloop van die opname het in groot mate van hulle gewaardeerde hulp afgehang.

HOOFSTUK II

Bespreking van skole as bronne waaruit monsters vir die ondersoek getrek kon word.

VIR sover dit blanke kinders betref, is dit, met die oog op die groot aantal skoolgaande kinders, maklik om uit die skole 'n verteenwoordigende monster te trek, veral in die leeftydsgroep 8 tot 13. Dit het geblyk uit die studie met blanke skoolkinders in Pretoria (le Riche, 1940). Onderstaande syfers uit die Bulletin van Onderwysstatistiek, 1940, Unie-Departement van Onderwys, Pretoria, staaf hierdie waarnemings:—

TABEL 1.—PERSENTASIE VAN TOTALE GETALLE BLANKES, IN VERSKEIE LEEFTYDSGROEPE, WAT IN DIE UNIE ONDERWYS ONTVANG, (1939).

Leeftyd.	*Persentasie wat onderwys ontvang.*
8	96·86
9	98·49
10	98·18
11	98·12
12	98·45
13	97·87
14	91·27
15	74·73

Vir blankes kan hierdie monster dus beskou word as verteenwoordigend van die hele kinderbevolking, indien 'n voorbeeld lukraak uit die skole in die leeftydsgroep 8 tot 13 geneem word. Dit is nie die geval met die Bantoe nie, dog hoewel dit onmoontlik geblyk het om 'n soortgelyke tabel

table as that given above for this section of the populaiton, but there is another approach to the problem.

In the next tables the ratio of enrolment in each standard is shown for Whites and for Bantu. In each case the numbers in Standard 1 are taken as 100.

vir hierdie seksie van die bevolking te vind, kan die vraagstuk op 'n ander wyse benader word.

In die volgende tabelle word die verhouding van die getal skoolgaande kinders in elke standerd ten opsigte van blankes en Bantoes weerspieël. In elke geval word die getal in Standerd I op 100 gestel.

TABLE. 2.—RATIO OF ENROLMENT IN EACH STANDARD WITH STANDARD I AS 100 (FIGURES FOR WHITE CHILDREN).
TABEL 2.—VERHOUDING VAN GETALLE SKOOLGAANDE KINDERS IN ELKE STANDERD MET STANDERD I AS 100. (BLANKE KINDERS.)

Std. I	*Std.* II	*Std.* III	*Std.* IV	*Std.* V	*Std.* VI	*Std.* VII	*Std.* VIII	*Std.* IX	*Std.* X
100	100·59	107·60	102·65	98·74	90·18	59·95	42·22	24·32	19·43

It will be noticed that the schools hold a very large proportion of White children up to Standard VI, up to which standard education is compulsory, i.e., up to the age of about 13. This table is in marked contrast to the next table for Bantu, also taken from the Bulletin of Educational Statistics 1940.

Daar sal opgelet word dat 'n baie groot persentasie blanke kinders die skole besoek tot by Standerd VI, d.w.s., die perk van verpligte onderwys. Die hoogste ouderdom is ongeveer 13 jaar. Hierdie tabel bied 'n skerp teenstelling met die volgende tabel, ten opsigte van die Bantoe, wat ook uit die Bulletin van Onderwysstatistiek, 1940, geneem is.

TABLE 3.—RATIO OF ENROLMENT IN EACH STANDARD WITH STANDARD I AS 100 FIGURES FOR BANTU IN EACH PROVINCE 1939.
TABEL 3.—VERHOUDING VAN GETALLE SKOOLGAANDE KINDERS, IN ELKE STANDERD, MET STANDERD I AS 100. (BANTOEKINDERS IN ELKE PROVINSIE, 1939).

Province. Province.	Std. I	Std. II	Std. III	Std. IV	Std. V	Std. VI	Std. VII	Std. VIII	Std. XI	Std. X
Cape—Kaapland.....	100	71·12	58·13	37·46	25·67	17·76	3·75	1·82	0·36	0·30
Natal.....	100	65·11	49·70	35·84	24·23	16·03	12·26	2·61	1·65	0·65
Transvaal.....	100	68·48	58·63	31·12	20·68	15·94	2·85	0·72	0·11	0·13
O.F.S.—O.V.S.....	100	67·54	48·02	31·84	20·19	16·25	2·60	0·83	0·06	—

What this table shows is the very low holding power of Bantu schools. Bantu education is not compulsory, and compared with the education of Whites a negligible sum is spent by the State in this field. While the ratio of enrolment for Whites is 90.18 in Standard VI, for Natives it is 17.76 (Cape) 16.03 (Natal), 15.94 (Transvaal) and 16.25 (Orange Free State). Assuming that Bantu children are the same ages in the standards (in fact they are older), it is clear that it would be impossible to draw a representative sample in the age group 8 to 13 from the school population.

The next table, also from the Bulletin, 1940, shows numbers of people receiving education, Bantu and Whites.

Uit hierdie tabel blyk die uiters klein behouvermoë van die Bantoeskole. Bantoe-onderwys is nie verpligtend nie en in vergelyking met die onderwys van blankes bestee die Staat op hierdie gebied 'n onbeduidende som. Waar die syfer vir skoolgaande kinders onder blankes 90.18 in Standerd VI is, is dit vir naturelle 17.76 (Kaap), 16.03 (Natal), 15.94 (Transvaal) en 16.25 (Oranje-Vrystaat). Op die veronderstelling dat Bantoekinders van dieselfde ouderdomme as blankes in die verskillende standerds is (in werklikheid is hulle ouer), is dit duidelik dat dit onmoontlik sou wees om uit die skoolbevolking 'n verteenwoordigende monster in die leeftydsgroep 8 tot 13 te vind.

In die volgende tabel, ook uit die Bulletin, 1940, word die getalle van sowel Bantoes as blankes wat onderwys ontvang, weergegee.

TABLE 4.—TO SHOW NUMBER OF POPULATION RECEIVING EDUCATION— BANTU AND WHITE.
TABEL 4.—AANTAL PERSONE WAT ONDERWYS ONTVANG—BANTOES EN BLANKES.

Year. Jaar.	Population. Bevolking.	Total Number Receiving Education. Totale getal wat onderwys ontvang.	Percentage of Total Population Receiving Education. Persentasie van totale bevolking wat onderwys ontvang.	Race. Ras.
1939	2,116,500	417,000 *	19·7 *	White. Blankes.
1939	6,997,500	453,648 *	6·5 *	Bantu. Bantoes

* Estimate. * Skatting.

The figures given in this table speak for themselves and need no further comment.

Numbers of Children in the Magisterial Districts Visited.

Two graphs have been drawn showing the relationship of the sample surveyed to the 1936 census population of children in the same age groups in the magisterial districts visited. In Graph I the figures for boys are shown and in Graph 2 the figures for girls are given. The census figures give information in the age groups 6 to 15 inclusive, this being the group surveyed.

The following conclusions may be reached from a study of the graphs which have been drawn on arithlog (semi-logarithmic, ratio) paper.

1. For both boys and girls the census figures show great variations in age groups. There can be no doubt that this is due to inaccurate statement of ages in the census enumeration. The ages 8, 10, 12 and

Die syfers van hierdie tabel is vanselfsprekend; geen kommentaar is nodig nie.

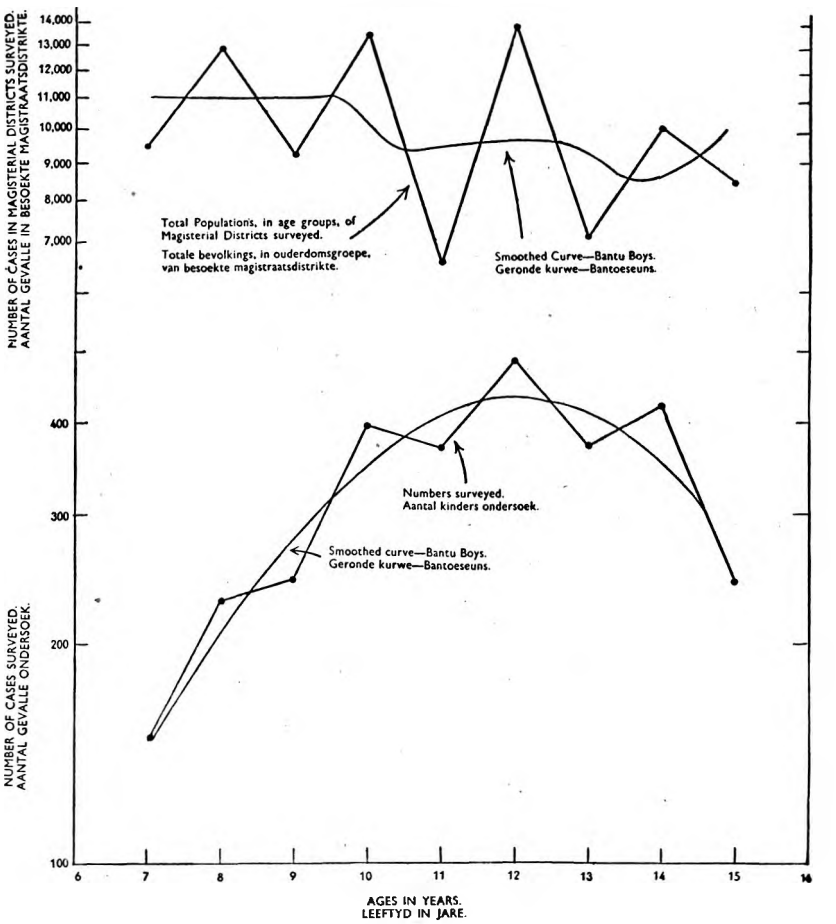
Aantal kinders in die magistraatsdistrikte wat besoek is

Daar is twee grafieke geteken waarin die verhouding tussen die betrokke monster en die sensusbevolking van kinders (1936) in dieselfde leeftydsgroepe in die besoekte magistraatsdistrikte weerspieël word. In grafiek 1 verskyn die syfers ten opsigte van seuns en in grafiek 2 dié vir meisies. Die sensussyfers gee inligting rakende die leeftydsgroepe 6 tot en met 15, aangesien dit die groepe insluit wat deur die opname gedek word.

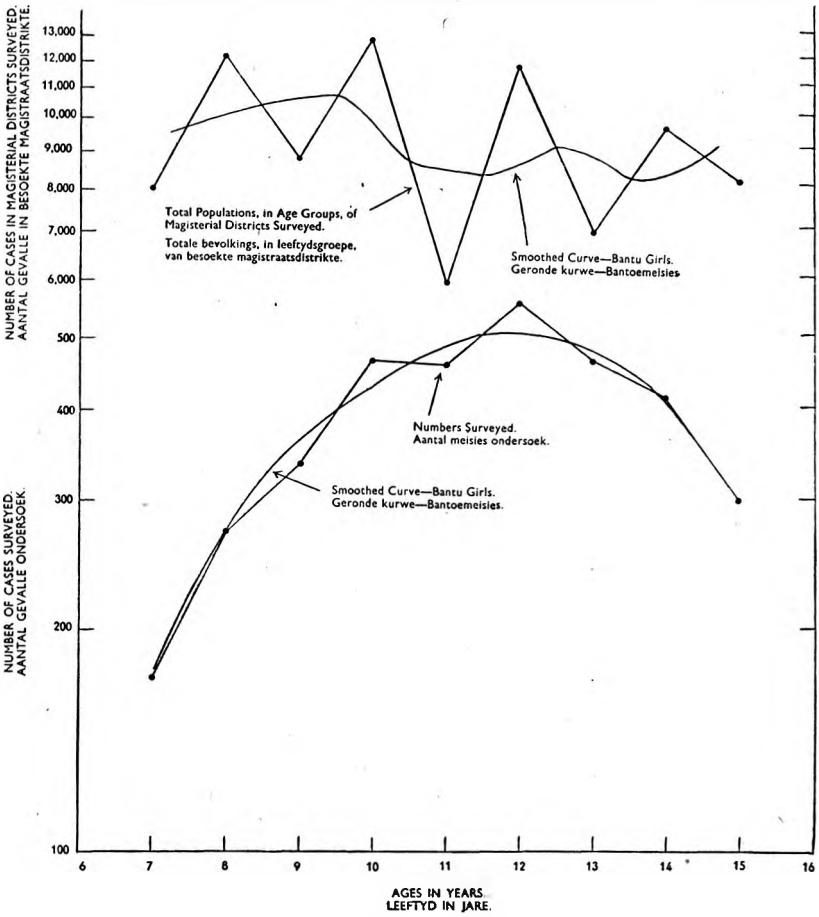
'n Studie van die grafieke wat op arithlogpapier (half-logaritme-papier) geteken is, lei tot onderstaande gevolgtrekkings:—

1. Vir sowel seuns as meisies toon die sensussyfers groot skommelings in leeftydsgroepe. Sonder twyfel moet dit toegeskryf word aan onjuiste opgawe van ouderdomme vir sensusdoeleindes. Die geliefkoosde ouderdomme skyn dié van 8, 10, 12 en 14 te wees. Met

***Graph* 1.—To illustrate sampling of Bantu Boys in Magisterial districts surveyed.**
***Grafiek* 1.—Ter toeligting van monsterneming onder Bantoeseuns in besoekte magistraatsdistrikte.**



Graph 2.—To illustrate sampling of Bantu Girls in Magisterial districts surveyed.
Grafiek 2.—Ter toeligting van monsterneming onder Bantoemeisies in besoekte magistraatsdistrikte.



14 appear to be the favourites. Taking the general trends of population the decrease in the case of boys is from 11,000 at 7 years to about, 9,000. In the case of girls the figures are about 10,500 to 8,500.

2. Had the sampling been representative of the total child population in the age groups studied the survey curves would have been more or less parallel to the population curves. This is very far from being the case as the numbers in the lower and higher age groups are very low and the survey curve forms a parabola in both cases instead of a straight line. The sample studied is probably representative of the school population. It is emphasised that there are powerful economic and social influences which keep Bantu children away from schools.

What one wishes to point out is that the school-going children are the cream of the Bantu child population because their parents can afford

inagneming van die algemene bevolkingsneigings, is die vermindering in die geval van seuns van 11,000 op 7-jarige leeftyd tot omtrent 9,000. In die geval van meisies is die syfers ongeveer 10,500 tot 8,500.

2. As die monsters verteenwoordigend van die totale kinderbevolking in die bestudeerde leeftydsgroepe was, sou die opnamekurwes naasteby ewewydig met die bevolkingskurwes geloop het. Dit is egter hoegenaamd nie die geval nie, aangesien die getalle in die laer en hoër leeftydsgroepe baie klein is en die opname se kurwe die vorm van 'n parabool aanneem in stede van 'n reguit lyn. Die bestudeerde monster is waarskynlik verteenwoordigend van die skoolbevolking. Dit moet beklemtoon word dat daar baie sterk ekonomiese en maatskaplike invloede is wat Bantoekinders van die skole af weghou.

'n Punt waarop ons graag sou wys is dat die skoolgaande kinders die room van die Bantoekinderbevolking uitmaak, omdat hulle afkomstig is van ouers wat skoolgeld kan betaal. Onder

schooling. Health conditions in the non-school population are therefore probably much worse than in the school-going children.

The Accuracy of ages of the Bantu children.

While there is no compulsory registration of births and deaths in native areas the ages of Bantu children are not as accurate as in the case of White South Africans. Every effort, however, was made to obtain as accurate as possible a statement of age from teachers and others. It is considered that the ages of these Bantu children are moderately accurate and more accurate than those given in the census data.

Numbers of Children Examined.

As the numbers of children examined in the somatometric and clinical groups differ slightly in various respects, separate tables will be found in the appendices of Section B and C which follow.

die nie-skoolgaande bevolking is gesondheidstoestande derhalwe waarskynlik baie erger as onder die skoolgaande kinders.

Die juistheid van Bantoekinders se ouderdomme

Aangesien die registrasie van geboortes (en sterfgevalle) in naturellegebiede nie verpligtend is nie, word die ouderdomme van Bantoekinders nie so akkuraat opgegee as in die geval van blanke kinders nie. Alle pogings is egter aangewend om die opgawes met behulp van onderwysers en ander so akkuraat moontlik te kry. Dit is ons mening dat die ouderdomme van hierdie Bantoekinders redelik akkuraat is en akkurater as dié wat in die sensusgegewens verskyn.

Aantal kinders ondersoek.

Aangesien daar in verskeie opsigte klein verskille is tussen die getalle kinders wat in die somatometriese en kliniese groepe ondersoek is, verskyn daar afsonderlike tabelle in die aanhangsels by Afdelings B en C.

SECTION B.

A Somatometric Study of South African Bantu School children

by Harding le Riche.

CHAPTER I.

A *Comparison between Somatometric Data from Bantu and White Children in South Africa.*

Description of Technique in taking Measurements—The Measurements under Discussion for Boys and Girls—Weight—Standing Height—Chest Circumference—Relaxed Upper Arm Circumference—Bi-illiac Width—Discussion.

1. *Description of Technique in taking Measurements.*

The technique used in taking measurements of Bantu children was the same as for the Pretoria Survey of White children (le Riche 1940), the only exception being that the Bantu boys were all weighed in the nude. The girls were weighed clad in cotton bloomers in some cases, while a fairly large number were also weighed without clothing. In contrast with the normal chest circumference, which was discussed in the White children, the contracted chest circumference is discussed in the case of the Bantu children.

2. *The Measurements under Discussion.*

The measurements to be considered are the following:—

(*a*) Weight shown in Table 1 and Graph 3 for males. For the females the relevant information is supplied in Table 3 and Graph 4.

AFDELING B

Somatometriese Studie van Suid-Afrikaanse Bantoeskoolkinders

deur Harding le Riche.

HOOFSTUK I

Vergelyking van somatometriese gegewens verkry van Bantoe- en blanke kinders in Suid-Afrika.

Beskrywing van meet-tegniek.—Die betrokke metings ten opsigte van seuns en meisies—Gewig—Lengte, staande—Borsomvang—Omvang van ontspanne bo-arm—Heupwydte—Bespreking.

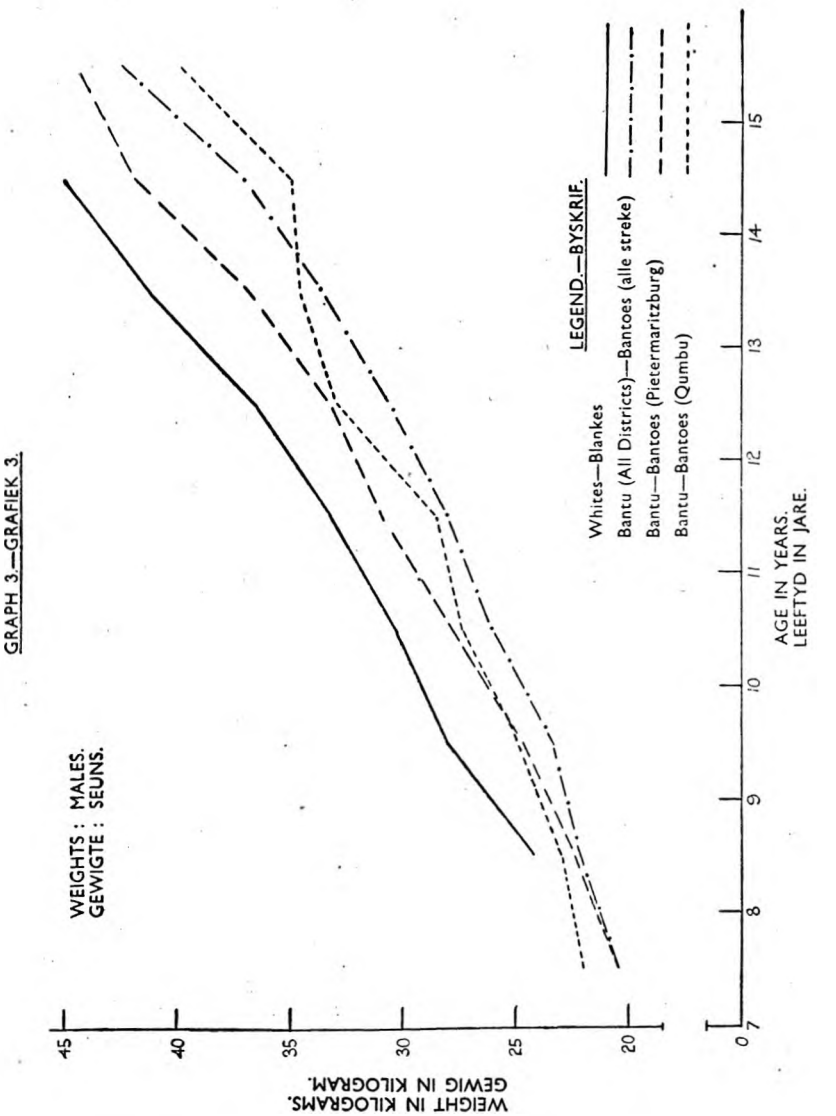
1. *Beskrywing van meet-tegniek*

Die tegniek waarvan gebruik gemaak is by die neem van metings van Bantoekinders was dieselfde as in die geval van die opname van blanke kinders te Pretoria (le Riche, 1940), met die één uitsondering dat die Bantoeseuns almal nakend geweeg is. Die Bantoemeisies is in sommige gevalle geweeg met katoenbroekies aan en 'n groot aantal is ook sonder klere geweeg. In teenstelling met die normale borsomvang wat in die geval van die blanke kinders bespreek kon word, word die bespreking hier in die geval van die Bantoekinders gewy aan borsomvang na uitaseming.

2. *Die metings*

Onderstaande metings moet bespreek word:—

(*a*) Gewig aangedui in tabel 1 en grafiek 3 vir seuns. Vir die meisies verskyn die betrokke inligting in tabel 3, grafiek 4.



(*b*) Standing Height, shown for males in Table 5 and Graph 5. For the females the relevant information is given in Table 7 and Graph 6.

(*c*) Chest Circumference (contracted) for males, shown in Table 9 and Graph 7. For the females these data are shown in Table 10 and Graph 8.

(*d*) Relaxed Upper Arm Girth for males shown in Table 11 and Graph 9. For the females these data are shown in Table 13 and Graph 10.

(*b*) Lengte, staande, van seuns verskyn in tabel 5 en grafiek 5. Ten opsigte van meisies verskyn hierdie inligting in tabel 7 en grafiek 6.

(*c*) Borsomvang (na uitaseming) van seuns verskyn in tabel 9 en grafiek 7. Ten opsigte van meisies verskyn hierdie gegewens in tabel 10 en grafiek 8.

(*d*) Omvang van ontspanne boarm, seuns, verskyn in tabel 11 en grafiek 9. Ten opsigte van meisies verskyn hierdie gegewens in tabel 13 en grafiek 10.

(*e*) Bi-iliac width for males is given in Table 15 and Graph 11. In the case of the females this information is given in Table 17 and Graph 12.

(*f*) The Bantu children are compared in regard to certain measurements with figures for Pretoria White Children (le Riche 1940), in the twelve-year old age group.

(*e*) Heupwydte, seuns, verskyn in tabel 15 en grafiek 11. Heupwydte, meisies, verskyn in tabel 17 en grafiek 12.

(*f*) Die Bantoekinders word met betrekking tot sekere metings vergelyk met blanke kinders van Pretoria (le Riche, 1940), in die leeftydsgroep van 12 jaar.

3. *Weight.*

3. *Gewig*

Boys.

Seuns.

TABLE 1.—WEIGHT IN KILOGRAMS OF TOTAL NUMBER OF BANTU BOYS ACCORDING TO AGE.
TABEL 1.—GEWIG IN KILOGRAM VAN TOTALE AANTAL BANTOESEUNS OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Getal in groep....	80	145	229	238	391	367	483	371	419	238
Mean Gemiddelde.....	19·16	20·45	22·20	23·51	26·13	28·15	30·61	33·72	37·24	42·53
S.D. S.A.....	2·16	2·85	3·02	5·26	3·31	4·90	4·92	5·05	6·20	7·40
S.E. S.F.....	·10	·25	·20	·34	·17	·26	·22	·26	·30	·48
Coeff. of Var. Afwykingskoëffisiënt.....	11·27	14·93	13·62	22·36	12·74	17·4	16·06	14·96	16·63	17·4
Range * Grense *.....	13·5–22·5	16·5–28·5	16·5–34·5	13·5–37·5	16·5–40·5	19·5–46·5	19·5–55·5	22·5–52·5	22·5–61·5	19·5–67·5
Unspecified Ongespesifiseerd..	—	—	—	7	4	3	2	—	2	4

Total Number of Cases: 2,961 Totale aantal gevalle: 2,961.
* Range given as midpoints of intervals inwhich maximum and minimum figurese fall.
* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimum en die maksimum syfers val.

It will be noted from the table that the numbers of boys examined in the age-groups 6, 7, 8 and 9 are relatively small, suggesting biassed sampling. See Section A for a discussion of sampling in the present survey.

In the following table one has compared the differences in weight between Bantu and Pretoria White boys in various age groups.

Daar sal opgelet word dat die getal ondersoekte seuns uit die leeftydsgroepe 6, 7, 8 en 9 betreklik klein is, wat die skyn gee dat die monsterneming nie eweredig was nie. Sien Afdeling A vir 'n bespreking van monsterneming gedurende die huidige opname.

In onderstaande tabel word die verskille in gewig tussen Bantoekinders en blanke seuns te Pretoria in verskillende leeftydsgroepe weergegee.

TABLE 2.—COMPARISON BETWEEN WEIGHTS OF BANTU AND WHITE BOYS.
TABEL 2.—VERGELYKING VAN GEWIGTE VAN BANTOESEUNS EN BLANKE SEUNS.

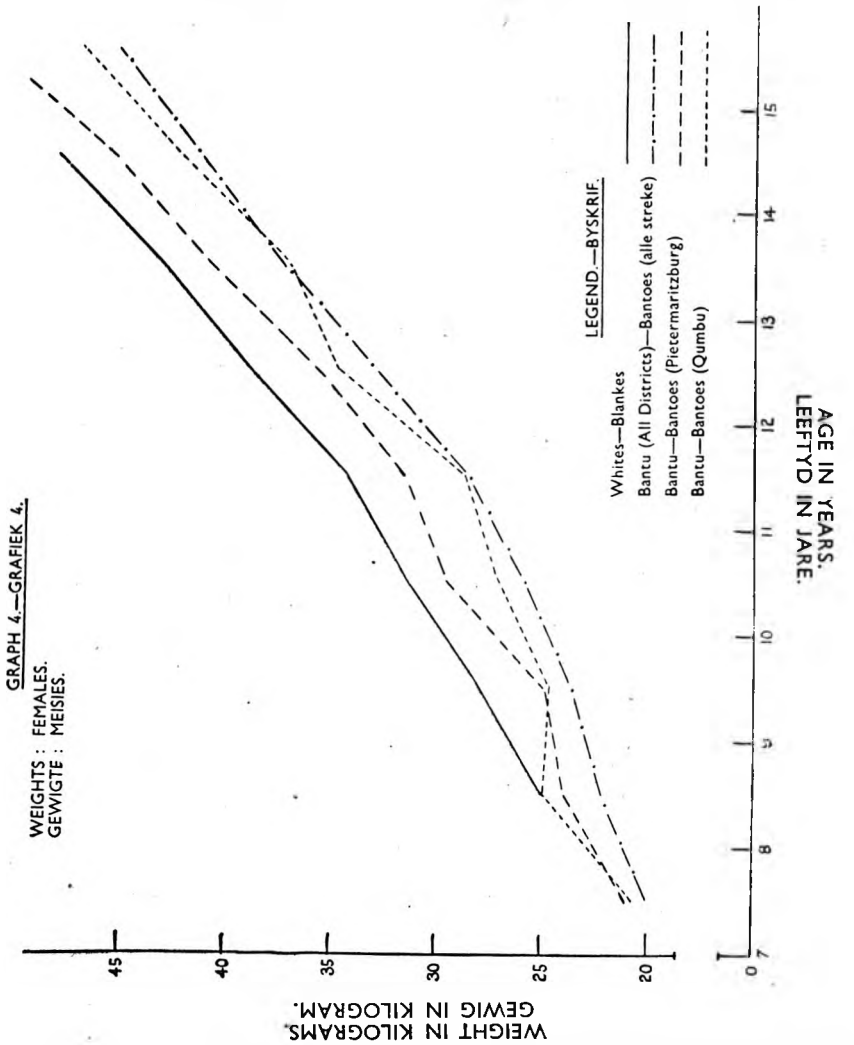
Age. Leeftyd.	Differences Between Means in Kg. Verskil tussen gemiddeldes in Kg.	S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	2·09 S/B	·31	9·41
9–	4·56 S/B	·34	19·40
10–	4·17 S/B	·41	15·96
11–	5·11 S/B	·43	18·00
12–	5·91 S/B	·40	19·30
13–	7·50 S/B	·61	22·24
14–	7·90 S/B	1·14	21·20

In all cases the difference between the means of the two groups compared, is expressed as a percentage of the mean measurement in the Bantu group. The S.E. of differences between the means of the measurements has been calculated. The difference has been held to be significant where it is

In alle gevalle word die verskil tussen die gemiddeldes van die twee teenoormekaargestelde groepe uitgedruk as 'n persentasie van die gemiddelde metings in die Bantoegroep. Die standaardfout van verskille tussen die gemiddeldes van die metings is bereken. Daar is bepaal dat die verskil betekenisvol is waar dit meer as drie-

greater than three times its S.E. The letter "S" behind the figure showing the difference between the measurements, indicates that it is significant according to this criterion.

maal so groot as sy S.F. is. Die letter „B" na die syfer wat die verskil tussen die metings weergee, dui aan dat die verskil, ooreenkomstig hierdie maatstaf, betekenisvol is.



The following conclusions may be drawn from Table 2 and Graph 3:—

(1) In all the age-groups studied, 8 to 14 years inclusive, the Whites are significantly heavier than the Bantu.

(2) The divergences increase irregularly with age, the White boys being roughly 20 per cent. heavier than the Bantu boys in six out of the seven older age-groups.

(3) The superiority of White boys in weight is clearly shown in Graph 3, with a difference of 2.09 kilos at 8 years and a difference of 7.90 kilos at 14 years. In the graph the findings for Pietermaritzburg and Qumbu separately have been included. The Pietermaritzburg

Uit tabel 2 en grafiek 3 kan onderstaande gevolgtrekkings gemaak word:—

(1) In al die bestudeerde leeftydsgroepe, d.w.s. 8 tot en met 14 jaar, is die blankes betekenisvol swaarder as die Bantoekinders.

(2) Die afwykings neem onreëlmatiglik toe met die leeftyd en blanke seuns is in 6 uit die 7 ouer groepe 20 persent swaarder as die Bantoeseuns.

(3) Die meerderwaardigheid van blanke seuns ten opsigte van hulle liggaamsgewig blyk duidelik uit grafiek 3 waar die verskil op die leeftyd van 8 jaar 2.09 Kg. en op 14 jaar 7.90 Kg. is. In die grafiek is die bevindings vir Pietermaritzburg en Qumbu afsonderlik ingesluit. Die seuns van Pietermaritzburg is groter as die gemiddelde

boys are bigger than the Bantu average, about half-way between White and Bantu averages.

Bantoeseun, en staan sowat halfpad tussen die gemiddeldes vir blankes en Bantoes.

Girls.

Meisies.

TABLE 3.—WEIGHT IN KILOGRAMS OF TOTAL NUMBER OF BANTU GIRLS ACCORDING TO AGE.
TABEL 3.—GEWIG IN KILOGRAM VAN TOTALE AANTAL BANTOEMEISIES OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Getal in groep....	88	172	271	334	464	457	554	462	413	295
Mean Gemiddelde.....	18·42	20·16	22·30	23·79	25·91	28·58	32·80	37·35	41·04	54·16
S.D. S.A.....	2·74	3·08	2·92	3·70	4·64	4·45	5·46	6·50	6·13	7·02
S.E. S.F.....	·29	·24	·18	·20	·29	·21	·24	·30	·90	·41
Coëff. of Var. Afwykingskoëffisiënt.....	14·89	15·29	12·53	15·61	17·92	15·58	16·83	17·39	14·72	15·53
Range * Grense *.....	13·5–28·5	13·5–31·5	13·5–61·5	16·5–37·5	13·5–58·5	16·5–58·5	19·5–58·5	19·5–64·5	19·5–61·5	24·5–67·5
Unspecified Ongespesifiseerd*.	—	2	1	4	5	3	1	—	—	1

Total Number of Cases: } 3,510.
Totale aantal gevalle: }

* The range is given as the midpoints of the intervals in wich the minimum and maximum values fall.

* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimum en die maksimum syfers val.

It will be noticed that numbers are low in the six and seven year old groups. The following table shows the differences in weight between Bantu and White girls in the various age-groups.

Daar sal opgelet word dat die getalle klein is in die groepe van 6 en 7 jaar. In onderstaande tabel word die verskille in gewig tussen Bantoemeisies en blanke meisies in die verskillende leeftydsgroepe weergegee.

TABLE 4.—A COMPARISON BETWEEN WEIGHTS OF BANTU AND WHITE GIRLS.
TABEL 4.—'N VERGELYKING VAN DIE GEWIGTE VAN BANTOEMEISIES EN BLANKE MEISIES.

Age. Leeftyd.	Differences Between Means in Kg. Verskil tussen gemiddeldes in Kg.	S.E. of Difference. S.F. van verskil.	Percentage Differences Between Means. Persentasieverskil tussen gemiddeldes.
8–	2·87 S/B	·33	12·87
9–	4·34 S/B	·34	18·67
10–	5·49 S/B	·45	21·19
11–	5·74 S/B	·47	20·08
12–	5·93 S/B	·58	18·08
13–	4·55 S/B	·69	12·18
14–	6·71 S/B	1·08	16·30

The following conclusions may be drawn from Table 4 and Graph 4:—

(1) In all the age-groups studied, 8 to 14 years inclusive, the Whites are significantly heavier than the Bantu girls.

(2) The divergences increase irregularly with age, the biggest difference being at 10 years when the White girls are 21.19 per cent. heavier than the Bantu.

(3) The superiority of White girls in weight is clearly shown in Graph 4 showing a difference of 2.87 kilos at 8 years, and one of 6.71 kilos at 14 years.

The findings for Pietermaritzburg and Qumbu have been included. The Pietermaritzburg Bantu girls are

Uit tabel 4 en grafiek 4 kan onderstaande gevolgtrekkings gemaak word:—

(1) In al die bestudeerde leeftydsgroepe, d.w.s. 8 tot en met 14 jaar, is die blanke meisies betekenisvol swaarder as die Bantoemeisies.

(2) Die uiteenlopendheid neem onreëlmatiglik toe met die leeftyd, en die grootste verskil word gevind in die leeftydsgroep 10 jaar, waarin die blanke meisies 21.19 persent swaarder as die Bantoes is.

(3) Die meerderwaardigheid van blanke meisies ten opsigte van gewig blyk duidelik in grafiek 4 waar die verskil op die leeftyd 8 jaar 2.87 Kg. en op 14 jaar 6.71 Kg. is.

Die bevindings vir Pietermaritzburg en Qumbu is hierby ingesluit. Die Bantoemeisies van Pietermaritzburg is

heavier than the average for the Bantu, and they approach nearer to the figures for Pretoria White girls, than do the Pietermaritzburg Bantu boys to the White boys.

swaarder as die gemiddelde vir Bantoemeisies en hulle gewig staan nader aan dié van blanke meisies te Pretoria as die Pietermaritzburgse Bantoeseuns se gewig aan dié van die blanke seuns.

4. *Standing Height.*

Boys.

4. *Lengte, staande.*

Seuns.

TABLE 5.—STANDING HEIGHT IN CENTIMETRES OF TOTAL NUMBER OF BANTU BOYS ACCORDING TO AGE.
TABEL 5.—LENGTE, STAANDE, IN CENTIMETERS, VAN TOTALE AANTAL BANTOESEUNS OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Getal in groep....	80	145	229	238	391	365	483	369	417	235
Mean Gemiddelde.....	111·52	116·76	121·45	124·47	129·53	133·07	137·64	142·91	147·86	154·32
S.D. S.A.....	5·87	4·85	5·53	5·26	6·55	6·47	6·59	7·11	8·02	7·90
S.E. S.F.....	·66	·40	·37	·34	·33	·34	·30	·38	·39	·52
Coeff. of Var. Afwykingskoëffisient.....	5·27	4·15	4·55	4·26	5·06	4·36	4·80	4·98	5·43	5·12
Range * Grense *.....	98–122	102–130	106–146	114–142	116–154	112–154	122–154	126–174	130–182	134–182
Unspecified Ongespsifiseerd...	—	—	—	7	4	5	2	2	4	7

Total Number of Cases: / Totale aantal gevalle: } 2,952.

* The range is given as the midpoints of the intervals in which the minimu mvalues fall.
* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimum en die maksimum syfers val.

The following table shows the differences in standing height between Bantu and White boys in the various age-groups:—

Uit onderstaande tabel blyk die verskil in lengte, staande, tussen Bantoeseuns en blanke seuns in verskillende leeftydsgroepe.

TABLE 6.—A COMPARISON BETWEEN STANDING HEIGHT OF BANTU AND WHITE BOYS.
TABLE 6.—'N VERGELYKING TUSSEN DIE LENGTE, STAANDE, VAN BANTOESEUNS EN BLANKE SEUNS.

Age. Leeftyd.	Difference Between Means in cm. Verskil tussen gemiddeldes in cm.	S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	7·71 S/B	·54	6·35
9–	8·25 S/B	·54	6·53
10–	8·53 S/B	·54	6·74
11–	8·31 S/B	·58	6·24
12–	9·56 S/B	·57	6·98
13–	11·67 S/B	·65	8·17
14–	10·96 S/B	·96	7·42

The following inferences may be made from a study of Table 6 and Graph 5 in regard to stature of Bantu boys compared with that of White boys:—

(1) In all age groups the White boys are significantly taller than the Bantu boys.

(2) Percentage differences are somewhere about 6 per cent. in most age groups, the White boys being taller.

(3) At 8 years the White boys are taller by 7.71 cm. while at 14 years they are taller by 10.96 cm.

The Pietermaritzburg Bantu boys are taller than the average, but the difference is less pronounced than in the case of weight. Qumbu Bantu boys are more or less as tall as the average for the total group examined.

Uit 'n studie van tabel 6 en grafiek 5 kan onderstaande gevolgtrekkings gemaak word ten opsigte van die liggaamslengte van Bantoeseuns en blanke seuns:—

(1) In alle leeftydsgroepe is die blanke seuns betekenisvol langer as die Bantoeseuns.

(2) Persentasieverskille kom op ongeveer 6 persent te staan in die meeste leeftydsgroepe. Die blanke seuns is langer as die ander.

(3) Op die leeftyd 8 jaar is die blanke seuns 7.71 cm. en op 14 jaar 10.96 cm. langer as die Bantoeseuns.

Die Bantoeseuns van Pietermaritzburg is langer as die gemiddelde vir Bantoeseuns, dog die verskil is minder opvallend as in die geval van hulle gewig. Die Bantoeseuns van Qumbu is min of meer net so lank as die gemiddelde vir die totale groep wat ondersoek is.

TABLE 7.—STANDING HEIGHT IN CENTIMETRES OF TOTAL NUMBER OF BANTU GIRLS ACCORDING TO AGE.

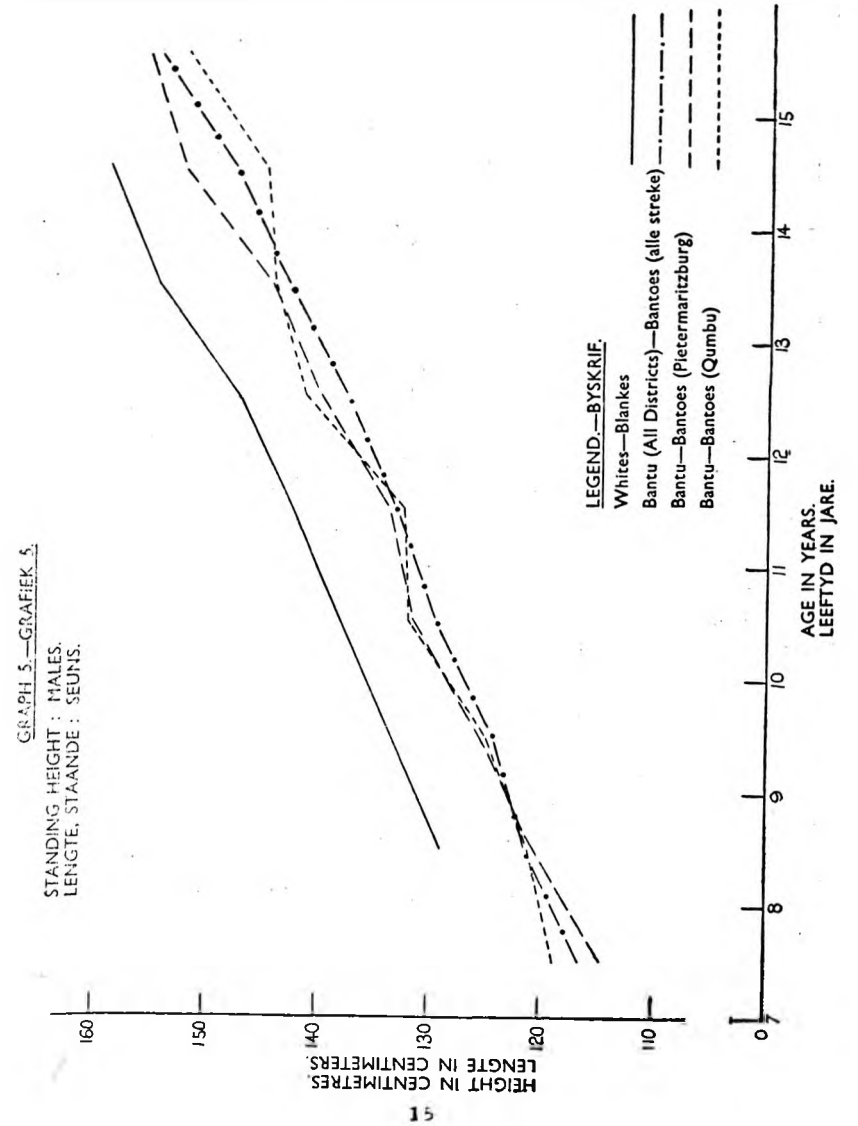
TABEL 7.—LENGTE, STAANDE, IN CENTIMETERS, VAN TOTALE AANTAL BANTOEMEISIES OOREENKOMSTIG LEEFTYD.

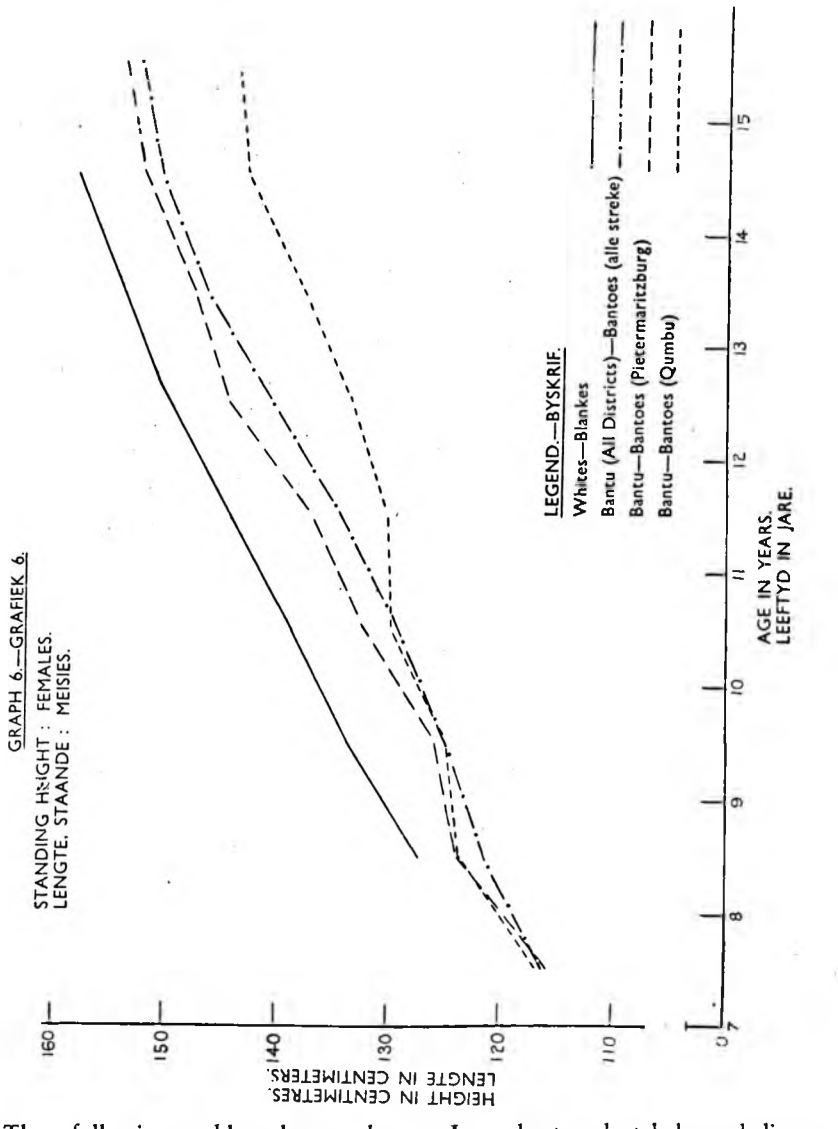
Age. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Getal in groep....	88	172	269	334	462	434	553	461	412	294
Mean Gemiddelde.....	111·59	116·13	121·72	124·98	129·13	134·03	140·42	146·45	150·31	152·14
S.D. S.A.....	5·84	5·88	5·74	6·83	6·38	6·40	7·01	7·05	6·15	6·10
S.E. S.F.....	·63	·45	·35	·37	·37	·30	·30	·33	·30	·36
Coeff. of Var. Afwykingskoëffisiënt.....	5·24	5·06	5·06	5·47	4·94	4·78	4·06	4·81	4·10	4·01
Range * Grense *.....	102–134	102–142	102–146	110–146	106–150	118–150	122–170	122–162	126–170	122–166
Unspecified Ongespesifiseerd..	—	2	3	4	5	6	2	1	1	2

Total Number of Cases: 3,499.
Totale aantal gevalle:

* The range is given as the midpoints of the class intervals in which the maximum and minimum values fall.

* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimum en die maksimum syfers val.





The following table shows the differences in stature between Bantu and White Girls in the various age-groups:—

In onderstaande tabel word die verskille in liggaamslengte tussen Bantoemeisies en blanke meisies in die verskillende leeftydsgroepe weergegee.

TABLE 8.—A COMPARISON BETWEEN STANDING HEIGHT OF BANTU AND WHITE GIRLS.
TABEL 8.—'N VERGELYKING TUSSEN DIE LENGTE, STAANDE, VAN BANTOEMEISIES EN BLANKE MEISIES.

Age. Leeftyd.	Differences Between Means in Cm. Verskille tussen gemiddeldes in cm.	S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	5·60 S/B	·56	4·60
9–	8·59 S/B	·56	6·87
10–	9·56 S/B	·58	7·40
11–	9·94 S/B	·59	7·26
12–	9·25 S/B	·62	6·59
13–	7·29 S/B	·68	4·29
14–	7·39 S/B	·65	5·58

The following deductions may be made from a study of Table 8 and Graph 6 in regard to stature of Bantu

'n Studie van tabel 8 en grafiek 6 met betrekking tot die liggaamslengte van Bantoemeisies vergeleke met die

females compared with that of White females:—

(1) The Whites are significantly taller at all ages from 8 to 14.

(2) The percentage differences are biggest at 10 years (7.40 per cent). At 14 years the difference is 5.58 per cent.

(3) In the eight-year group the difference in centimetres is 5.60 while in the fourteen-year old group the difference comes to 7.39.

The Pietermaritzburg girls are taller than the Bantu average, but it is interesting to note that from ten years onwards the Qumbu girls are considerably shorter than the average Bantu girls.

van blanke meisies lei tot onderstaande gevolgtrekkings:—

(1) Die blanke meisies is op alle leeftye van 8 tot 14 jaar betekenisvol langer.

(2) Die grootste persentasieverskille kom in die leeftydsgroep 10 jaar voor (7.40 persent). Op 14 jaar is die verskil 5.58 persent.

(3) In die 8-jaar-groep is die verskil 5.60 cm. en in die 14-jaargroep 7.39.

Die Bantoemeisies van Pietermaritzburg is langer as die gemiddelde vir Bantoemeisies, maar dit is interessant om daarop te let dat die Bantoemeisies van Qumbu van en na hulle tiende jaar heelwat korter as die gemiddelde Bantoemeisie is.

5. *Chest Circumference (Contracted).*

Boys.

It is not possible to compare the Bantu with White boys in this measurement in view of the fact, that the Bantu figures are for the contracted chest circumference, while that for the Whites is for normal chest circumference.

The relevant information for this dimension is given in Table 9 and Graph 7.

5. *Borsomvang (na uitaseming)*

Seuns.—In hierdie geval is dit onmoontlik om die Bantoeseuns met blanke seuns te vergelyk, omdat die syfers ten opsigte van eersgenoemdes die borsomvang na uitaseming en die syfers ten opsigte van die blanke seuns normale borsomvang aandui.

Die betreklike inligting rakende hierdie meting verskyn in tabel 9 en grafiek 7.

TABLE 9.—CHEST CIRCUMFERENCE (CONTRACTED) OF TOTAL NUMBER OF BANTU BOYS ACCORDING TO AGE.

TABEL 9.—BORSOMVANG (NA UITASEMING) VAN TOTALE AANTAL BANTOESEUNS OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Getal in groep....	77	140	224	232	391	365	482	367	418	235
Mean Gemiddelde.....	55·14	56·11	57·53	58·78	60·68	61·60	63·49	65·44	67·72	71·11
S.D. S.A.....	3·40	2·96	2·92	2·95	2·90	3·26	3·48	3·54	4·00	4·79
S.E. S.F.....	·39	·25	·20	·19	·15	·16	·16	·18	·19	·31
Coëff. of Var. Afwykingskoëffisiënt.....	6·17	5·28	5·08	5·13	4·78	5·29	5·48	5·40	5·52	6·74
Range * Grense *.....	47–61	51–63	51–65	53–69	53–73	51–75	53–75	56–81	57–81	61–86
Unspecified Ongespesifiseerd..	3	5	5	13	4	5	3	4	3	7

Total Number of Cases: } 2,931.
Totale aantal gevalle: }

* Range is given as the midpoints of the intervals in which the maximum and minimum falls.
* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimum en die maksimum syfers val.

Inspection of Graph 7 shows that Pietermaritzburg boys have slightly smaller chests than the average up to 10½ years after which their chests are greater in circumference than the average.

The Qumbu boys have chests greater than the average. This difference is especially marked in the ages 7½ to 13½.

Girls.—In the case of Bantu girls the contracted chest circumference was also taken as in the case of the boys.

The information in regard to this dimension is given in Table 10 and in Graph 8.

Uit grafiek 7 blyk dat die Pietermaritzburgse Bantoeseuns tot op die leeftyd 10½ jaar 'n ietwat kleiner borsomvang het as die gemiddelde; daarna is die omvang groter as die gemiddelde.

Die seuns van Qumbu het groter borsomvang as die gemiddelde; die verskil is veral opvallend by die leeftye 7½ tot 13½ jaar.

Meisies.—Ook in die geval van Bantoemeisies is die borsomvang gemeet na uitaseming.

Die inligting rakende hierdie meting verskyn in tabel 10 en grafiek 8.

TABLE 10.—CHEST CIRCUMFERENCE OF TOTAL NUMBER OF BANTU GIRLS ACCORDING TO AGE.

TABEL 10.—BORSOMVANG VAN DIE TOTALE AANTAL BANTOEMEISIES, OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Getal in groep....	78	159	262	328	454	451	551	461	411	293
Mean Gemiddelde.....	55·51	54·96	56·41	57·46	59·01	60·75	63·62	66·36	68·75	70·65
S.D. S.A.....	2·92	2·96	2·99	3·11	3·44	3·43	3·65	4·11	3·91	4·92
S.E. S.F.....	·33	·23	·19	·17	·16	·16	·16	·19	·15	·29
Coëff. of Var. Afwykingskoëffisient.....	5·46	5·39	5·30	5·42	5·83	5·65	5·73	6·19	5·69	6·97
Range * Grense *.....	47–65	49–63	49–67	45–67	49–75	53–75	53–75	55–83	59–81	55–87
Unspecified Ongespesifiseerd..	10	15	10	10	13	9	4	1	2	3

Total Number of Cases: } 3,448.
Totale aantal gevalle: }

* Range is given as the midpoints of the intervals in which the maximum and minimum values fall.
* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimum en die maksimum syfers val.

Inspection of Graph 8 shows that Pietermaritzburg girls have slightly larger chests than the average, but here again the Qumbu girls have chest circumference up to 4.5 cm. larger in, e.g. the 8-year age group.

Why the Qumbu children should have chest circumference greater than the average figure for the Bantu children is difficult to explain.

Uit grafiek 8 blyk dat die Pietermaritzburgse Bantoemeisies 'n ietwat groter borsomvang het as die gemiddelde, dog ook hier is die borsomvang van die Qumbu-meisies tot 4.5 cm. groter, byvoorbeeld in die 8-jaar-groep.

Dit is moeilik om te verklaar waarom die kinders van Qumbu 'n' groter borsomvang het as die gemiddelde vir Bantoekinders.

6. *Relaxed upper arm Girth.*

Boys.

6. *Omvang van ontspanne bo-arm.*

Seuns

TABLE 11.—RELAXED UPPER ARM GIRTH IN CENTIMETRES OF TOTAL NUMBER OF BANTU BOYS ACCORDING TO AGE.

TABEL 11.—OMVANG VAN ONTSPANNE BO-ARM, IN CENTIMETERS, VAN TOTALE AANTAL BANTOESEUNS OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Getal in groep....	76	141	225	231	387	365	480	364	418	235
Mean Gemiddelde.....	14·83	14·90	15·24	15·59	16·15	16·50	17·15	17·91	18·72	19·86
S.D. S.A.....	·92	1·18	1·23	1·43	1·41	1·48	1·64	1·54	1·81	2·19
S.E. S.F.....	·11	·10	·08	·09	·07	·08	·07	·08	·09	·14
Coëff. of Var. Afwykingskoëffisient.....	6·19	7·82	8·06	9·37	8·74	8·94	9·56	8·57	9·70	11·28
Range * Grense *.....	13–17	13–19	13–19	13–23	13–21	13–21	13–23	15–23	11–25	15–29
Unspecified..... Ongespesifiseerd..	4	4	4	14	8	5	5	7	3	7

Total Number of Cases: } 2,922.
Totale anatal gevalle: }

* The range is given as the midpoints of the intervals in which the minimum and maximum values fall.
* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimu en die maksimum syfers val.

The following table shows the differences in relaxed upper arm girth between Bantu and White boys in the various age-groups.

In regard to the relaxed upper arm girth of Bantu and White boys one may conclude the following from a study of Table 12 and Graph 9:—

(1) The White boys have a significantly greater relaxed upper arm circumference at all ages.

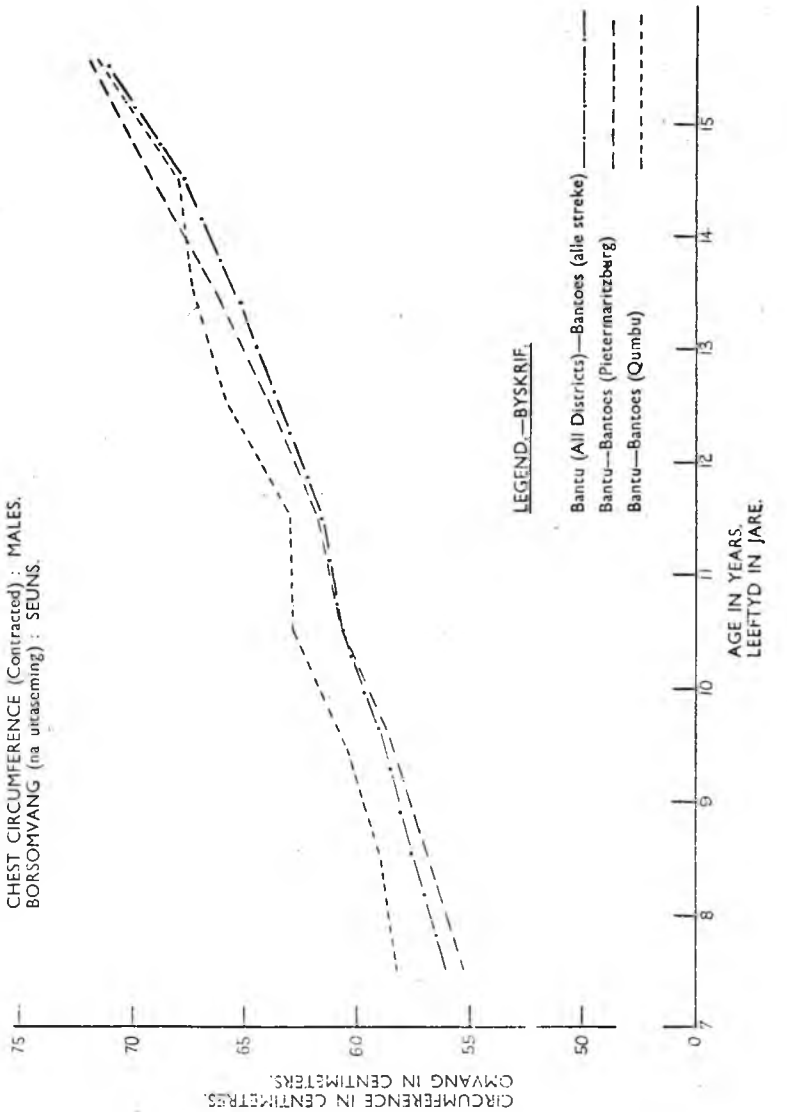
Uit onderstaande tabel blyk die verskille in omvang van ontspanne bo-arm tussen Bantoeseuns en blanke seuns in die verskillende leeftydsgroepe.

Uit 'n studie van tabel 12 en grafiek 9 kan onderstaande gevolgtrekkings gemaak word:—

(1) Die omvang van die ontspanne bo-arm is op alle leeftye betekenisvol groter by die blanke seuns.

(2) The percentage differences are greatest in the thirteen-year old group (16.97 per cent.), and least in the eight year old group (13.84 per cent.).

(2) Die grootste persentasieverskil kom in die 13-jaar-groep voor (16.97 persent) en die kleinste in die 8-jaar-groep (13.84 persent).



(3) The difference between the Bantu and White boys is 2.11 cm. at eight years and 2.97 at thirteen years.

The Pietermaritzburg boys have an arm circumference greater than the average Bantu. It is more or less intermediate between the Whites and the average Bantu. The Qumbu boys have a slightly greater circumference from $8\frac{1}{2}$ to $13\frac{1}{2}$ years than the average Bantu.

(3) Op die leeftyd 8 jaar is die verskil tussen Bantoeseuns en blanke seuns 2.11 cm. en op 13 jaar 2.97 cm.

Die arm-omvang van die Pietermaritzburgse Bantoeseuns is groter as die gemiddelde vir Bantoeseuns en staan ongeveer halfpad tussen dié van blanke seuns en die gemiddelde Bantoeseuns. Op die leeftyd $8\frac{1}{2}$ tot $13\frac{1}{2}$ jaar is die arm-omvang van Bantoeseuns te Qumbu ietwat groter as die gemiddelde vir Bantoeseuns.

TABLE 12.—A COMPARISON BETWEEN RELAXED UPPER ARM GIRTH OF BANTU AND WHITE BOYS.
TABEL 12.—VERGELYKING VAN OVMANG VAN ONTSPANNE BO-ARM VAN BANTOESEUNS MET DIE VAN BLANKE SEUNS.

Age. Leeftyd.	Differences Between Means in Cm. Verskille tussen gemiddeldes in cm.	S.E. of Difference. S.F. se verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	2·11 S/B	·13	13·84
9–	2·18 S/B	·13	13·97
10–	2·15 S/B	·14	13·37
11–	2·58 S/B	·16	15·64
12–	2·62 S/B	·13	15·22
13–	2·97 S/B	·18	16·97
14–	2·68 S/B	·22	14·32

Girls. *Meisies.*

TABLE 13.—RELAXED UPPER ARM GIRTH IN CENTIMETRES OF TOTAL NUMBER OF BANTU GIRLS ACCORDING TO AGE.
TABEL 13.—OMVANG VAN ONTSPANNE BO-ARM ,IN CENTIMETERS, VAN TOTALE AANTAL BANTOEMEISIES OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Getal in groep....	78	161	264	331	458	451	552	461	410	293
Mean Gemiddelde.....	14·78	15·27	15·78	16·17	16·73	17·46	18·47	19·73	20·74	21·6
S.D. S.A.....	1·37	·99	1·28	1·45	1·64	1·59	1·88	2·26	2·02	2·37
S.E. S.F.....	·16	·08	·08	·08	·08	·06	·08	·11	·10	·14
Coeff. of Var. Afwykingskoëffisiënt.....	9·27	6·51	8·03	8·98	9·78	7·56	10·16	11·48	9·47	10·88
Range * Grense *.....	11–17	13–19	13–21	13–19	13–23	15–21	15–27	15–27	17–29	15–31
Unspecified Ongespesifiseerd..	10	13	8	7	9	9	3	1	3	3

Total Number of Cases: 3,459.
Totale aantal gevalle:

* The range is given as the midpoints of the intervals in which the minimum and maximu values fall.
* Grense word aangedui as die middelpunte van die intervalle waarin onderskiedlcik die minimum en die maksimum syfers val.

The following table shows the differences in relaxed upper arm girth between Bantu and White girls in the various age-groups. See also Graph 10:—

In onderstaande tabel word die verskille ten opsigte van omvang van ontspanne bo-arm tussen Bantoemeisies en blanke meisies in die verskillende leeftydsgroepe weergegee. Sien ook grafiek 10.

TABLE 14.—A COMPARISON BETWEEN RELAXED UPPER ARM GIRTH OF BANTU AND WHITE GIRLS.
TABEL 14.—VERGELYKING TUSSEN OMVANG VAN ONTSPANNE BO-ARM BY BANTOEMEISIES EN BLANKE MEISIES.

Age. Leeftyd.	Differences Between Means in Cm. Verskille tussen gemiddeldes in cm.	S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	1·96 S/B	·14	12·42
9–	2·18 S/B	·13	13·48
10–	2·73 S/B	·13	16·32
11–	2·38 S/B	·15	13·63
12–	2·18 S/B	·18	11·05
13–	1·28 S/B	·19	6·49
14–	1·57 S/B	·22	7·57

In regard to the relaxed upper arm girth the following deductions may be made (Table 13 Graph 10):—

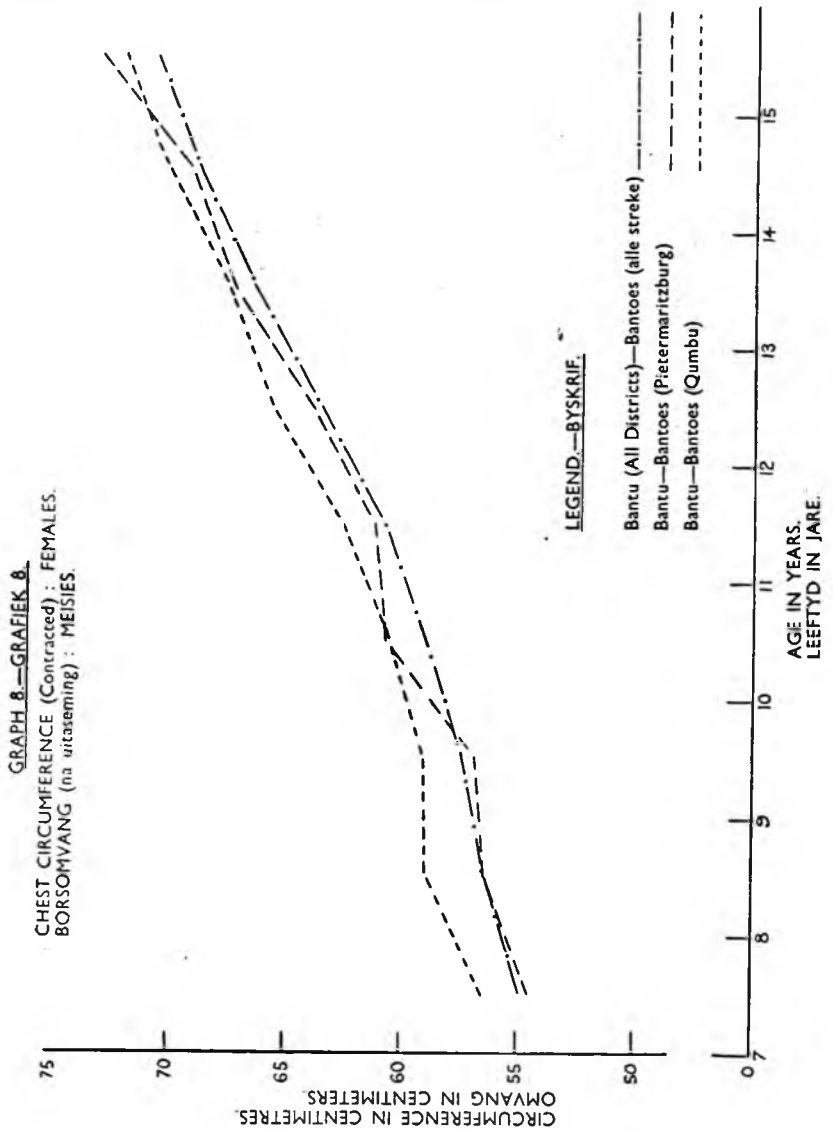
(1) The White girls have a significantly greater relaxed upper arm circumference than Bantu girls, in all the age-groups under consideration.

Uit tabel 13 en grafiek 10 kan onderstaande afgelei word:—

(1) By die blanke meisies is die omvang van die ontspanne bo-arm in al die leeftydsgroepe onder bespreking betekenisvol groter as by Bantoemeisies.

(2) Concerning percentage differences, these are much greater in the lower ages than in the higher ages, in contrast with the boys in whom the differences were greatest at 13 years. For example, the percentage difference between relaxed upper arm circumference of Bantu and White girls is 12.42 at eight years, while it is only 7.57 at 14 years.

(2) Ten opsigte van persentasie verskille is die verskille veel groter in die laer leeftydsgroepe as in die hoër groepe, in teenstelling met die seuns by wie die verskille op die leeftyd 13 jaar die grootste was. Byvoorbeeld, die persentasieverskil tussen Bantoemeisies en blanke meisies is 12.42 op die leeftyd 8 jaar en slegs 7.57 op die leeftyd 14 jaar.



(3) At 8 years the White girls have an arm girth exceeding that of the Bantu girls by 1.96 cm, while at 14 years this difference is only 1.57 cm.

The Pietermaritzburg Bantu girls are again intermediate between the total Bantu and the Pretoria White girls. Their arm circumference

(3) Op die leeftyd 8 jaar oortref die arm-omvang van die blanke meisies dié van die Bantoemeisies met 1.96 cm.; op die leeftyd 14 jaar is hierdie verskil slegs 1.57 cm.

In hierdie opsig val die Pietermaritzburgse Bantoemeisies weer tussen die Bantoemeisies as totale groep en die blanke meisies van Pretoria. Soos uit grafiek 10 blyk, kom

approaches that of the White girls very closely in the age-groups 13 to 14 as is shown in Graph 10.

7. *Bi-iliac Width.*

Boys.

hulle arm-omvang in die leeftydsgroepe 13 en 14 baie na aan dié van die blanke meisies.

7. *Heupwydte*

Seuns

TABLE 15.—BI-ILIAC WIDTH IN CENTIMETRES OF TOTAL NUMBER OF BANTU BOYS ACCORDING TO AGE.
TABEL 15.—HEUPWYDTE, IN CENTIMETERS, VAN TOTALE AANTAL BANTOESEUNS OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Aantal in groep...	80	144	229	238	391	364	483	367	419	236
Mean Gemiddelde.....	17·54	18·08	18·60	19·02	19·75	20·13	20·77	21·57	22·29	23·27
S.D. S.A.....	1·01	1·12	1·19	1·17	1·32	1·25	1·29	1·44	1·68	1·53
S.E. S.F.....	·11	·09	·08	·08	·07	·07	·06	·07	·08	·10
Coëff. of Var. Afwykingskoëffisient.....	5·74	6·21	6·42	6·14	6·67	6·21	6·22	6·68	7·26	6·57
Range * Grense *.....	15–19	15–21	15–21	17–23	17–23	15–25	17–27	19–25	15–27	21–27
Unspecified Ongespesifiseerd..	—	1	—	7	4	6	2	4	2	6

Total Number of Cases : Totale aantal gevalle : } 2,951.

* The range is given as the midpoints of the intervals in which the minimum and maximum values fall.

* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimum en die maksimum syfers val.

The following table shows the differences in bi-iliac width between Bantu and White boys in the various age-groups.

Uit onderstaande tabel blyk die verskille in heupwydte tussen Bantoeseuns en blanke seuns in die verskillende leeftydsgroepe.

TABLE 16.—A COMPARISON BETWEEN BI-ILIAC WIDTH OF BANTU AND WHITE BOYS.
TABEL 16.—VERGELYKING VAN HEUPWYDTE VAN BANTOESEUNS EN BLANKE SEUNS.

Age. Leeftyd.	Differences Between Means in Cm. Verskille tussen gemiddeldes in cm.	S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	1·78 S/B	·12	9·57
9–	1·96 S/B	·12	10·31
10–	2·05 S/B	·16	10·38
11–	1·98 S/B	·15	9·84
12–	2·31 S/B	·12	11·12
13–	2·87 S/B	·14	13·31
14–	2·61 S/B	·16	11·71

In regard to bi-iliac width in Bantu and White boys a study of Table 16 and Graph 11 will show the following:—

(1) White boys are significantly larger in bi-iliac width than Bantu boys in all the age-groups studied.

(2) Percentage differences do not appear to change much with age, although there seems to be a slight increase with age.

(3) At eight years the difference in bi-iliac width between boys of the two races comes to 1.78 cms., while at 14 years the difference comes to 2.61 cm.

The Pietermaritzburg boys are again bigger than the average Bantu boys, but not by very much as is shown in Graph 11. They are narrower in the hip in the age-groups 7 and 8.

The Qumbu measurements are very close to those of Pietermaritzburg, being slightly less.

Uit 'n studie van tabel 16 en grafiek 11 kan onderstaande gevolgtrekkings gemaak word:—

(1) Blanke seuns het, in al die behandelde leeftydsgroepe, betekenisvol breër heupe as Bantoeseuns.

(2) Persentasieverskille skyn nie veel met toenemende leeftyd te verander nie, hoewel dit effens met die leeftyd toeneem.

(3) Op die leeftyd 8 jaar kom die verskil in heupwydte tussen seuns van die twee rasse op 1.78 cm. te staan, en op 14 jaar is die verskil 2.61 cm.

Ook hier is die Pietermaritzburgse Bantoeseuns groter as die gemiddelde vir Bantoeseuns, maar nie veel nie, soos uit grafiek 11 blyk. In die leeftydsgroepe 7 en 8 is hulle heupwydte kleiner.

Metings vir die Qumbu-seuns staan baie na aan dié van Pietermaritzburg; hulle is effens kleiner.

TABLE 17.—BI-ILIAC WIDTH IN CENTIMETRES OF TOTAL NUMBER OF BANTU GIRLS ACCORDING TO AGE.
TABEL 17.—HEUPWYDTE, IN CENTIMETERS, VAN TOTALE AANTAL BANTOEMEISIES OOREENKOMSTIG LEEFTYD.

Ages. Leeftye.	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Number in Group Aantal in groep...	87	171	269	331	463	452	552	461	412	294
Mean Gemiddelde.....	17·64	18·15	18·97	19·42	19·97	20·69	21·75	22·98	23·91	24·54
S.D. S.A.....	1·35	·122	1·43	1·37	1·46	1·39	1·86	1·72	2·15	1·72
S.E. S.F.....	·15	·08	·09	·08	·07	·07	·08	·08	·11	·10
Coëff. of Var. Afwykingskoëffisiënt.....	7·66	6·71	7·58	7·06	7·32	6·71	8·56	7·47	8·99	7·01
Range * Grense *.....	15–21	15–21	17–29	17–23	17–25	17–25	17–27	17–27	19–33	21–31
Unspecified Ongespesifiseerd..	1	3	3	7	4	8	3	1	1	2

Total Number of Cases: } 3,492.
Totale aantal gevalle: }

* The range is given as the midpoints of the intervals in which the minimum and maximum values fall.
* Grense word aangedui as die middelpunte van die intervalle waarin onderskeidelik die minimum en die maksimum syfers val.

The following table shows the differences in bi-iliac width between Bantu and White girls in the various age-groups:—

Uit onderstaande tabel word die verskille in heupwydte tussen Bantoemeisies en blanke meisies in die verskillende leeftydsgroepe weergegee:—

TABLE 18.—A COMPARISON BETWEEN BI-ILIAC WIDTH OF BANTU AND WHITE GIRLS.
TABEL 18.—VERGELYKING VAN HEUPWYDTE VAN BANTOEMEISIES EN BLANKE MEISIES.

Age. Leeftyd.	Differences Between Means in Cm. Verskille tussen gemiddeldes in cm.	S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	1·49 S/B	·13	7·85
9–	1·76 S/B	·11	9·06
10–	2·04 S/B	·12	10·22
11–	2·55 S/B	·15	12·32
12–	2·43 S/B	·21	11·17
13–	1·83 S/B	·17	7·97
14–	2·27 S/B	·19	9·49

In regard to the bi-iliac width in Bantu and White females the following salient facts might be gathered from a study of Table 18 and Graph 12:—

(1) The White girls have significantly wider hips in all the age-groups studied.

(2) As regards the percentage differences, they are less than in the case of the boys, e.g. in the eight-year old group the differences are 9.57 for boys and 7.85 for girls. At 14 years the differences are 11.71 for boys and 9.49 for girls.

(3) In the eight-year old group the difference in centimetres comes to 1.49, and in the fourteen-year old group the difference comes to 2.27.

As usual, the Pietermaritzburg Bantu girls are bigger than the average Bantu, but only to a small degree. The Qumbu figures are very close to the average Bantu figures.

Discussion.

The figures quoted show clearly that the Bantu children are considerably smaller than White children of the same ages. It might be said that

Uit 'n bestudering van tabel 18 en grafiek 12 kan onderstaande afgelei word:—

(1) In al die behandelde leeftydsgroepe het die blanke meisies betekenisvol wyer heupe.

(2) Die persentasieverskille is kleiner as in die geval van die seuns, byvoorbeeld, in die 8-jaar-groep is die verskille 9.57 vir seuns en 7.85 vir meisies. Op 14 jaar is die verskille 11.71 vir seuns en 9.49 vir meisies.

(3) In die 8-jaar-groep kom die verskil op 1.49 cm. te staan en in die 14-jaar-groep op 2.27 cm.

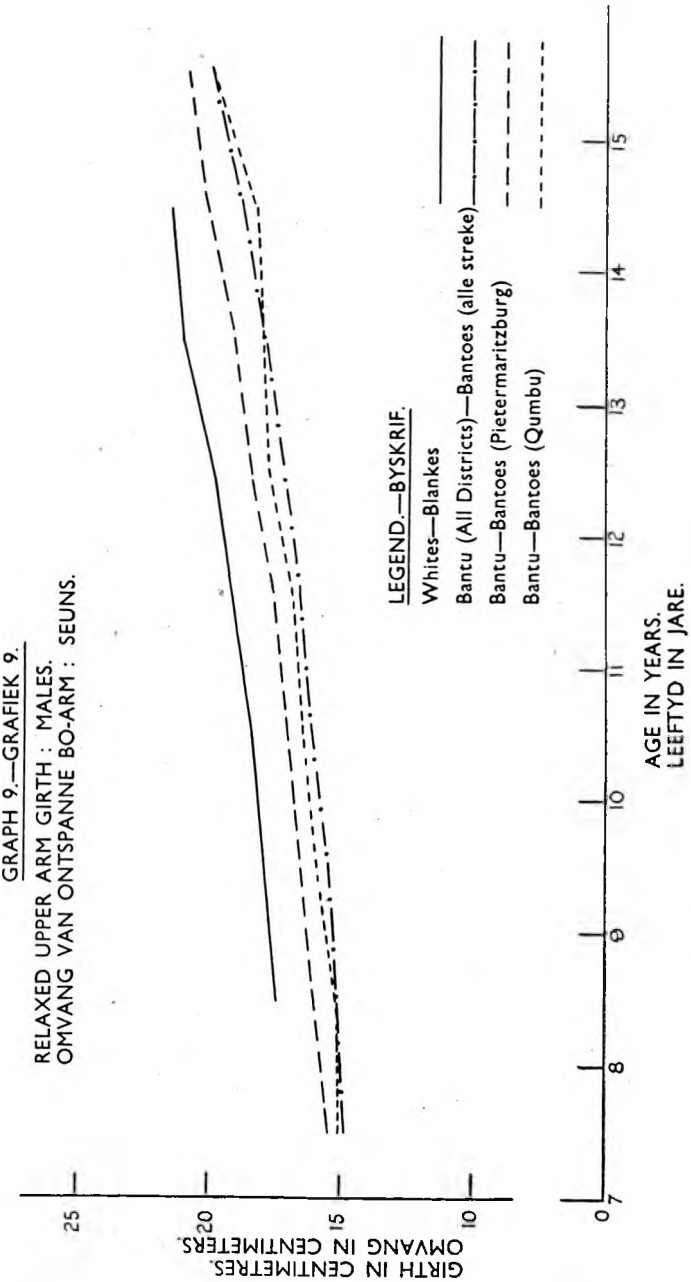
Soos gewoonlik is die Pietermaritzburgse Bantoemeisies groter as die gemiddelde Bantoemeisie, maar nie veel nie. Die syfers vir Qumbu-meisies staan baie na aan dié vir die gemiddelde Bantoemeisie.

Bespreking

Uit die aangehaalde syfers blyk duidelik dat die Bantoekinders heelwat kleiner is as blanke kinders van dieselfde leeftyd. Daar kan gesê word dat hierdie verskille geheel en al aan

such differences are due entirely to racial differences. This might be true if we were certain that races are not changing in size. How does one explain the fact that certain races are becoming taller, heavier and bigger? Surely, the potentialities of the genes are not

rasseverskille toegeskryf kan word, en dit kon waar wees as ons seker was daarvan dat die rasse nie ten opsigte van hulle liggaamsgrootte aan die verander is nie. Watter verklaring is daar vir die feit dat sekere rasse langer, swaarder en groter word? Die potensialiteite van genes kan tog nie aan verander wees nie. Die enigste



changing. The only reasonable conclusion one may come to is that the increase in size is due to an improved environment in general, and good feeding in particular. One cannot

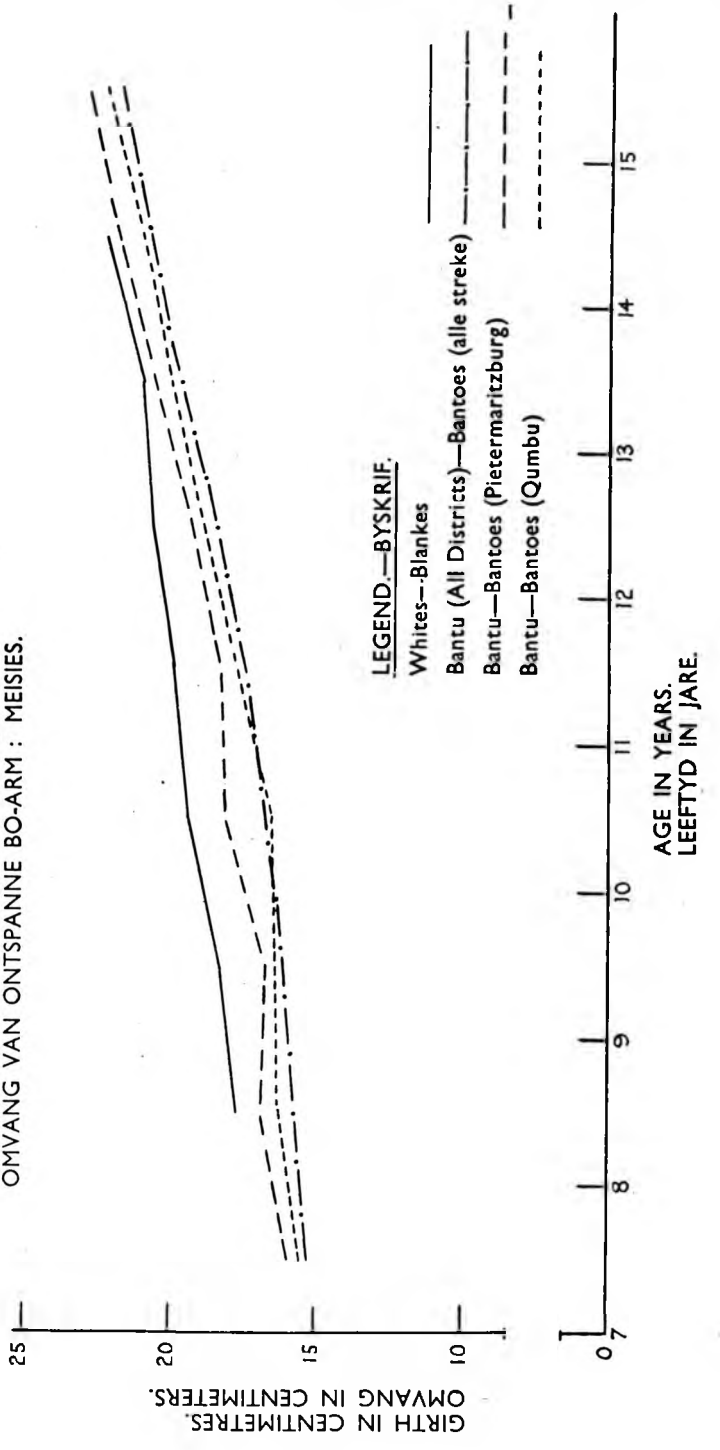
redelike gevolgtrekking waartoe 'n mens kan geraak is dat die toename in grootte aan algemene verbetering van die omgewing en veral aan goeie voeding toegeskryf moet word. Die klein bou van die Bantoekinders

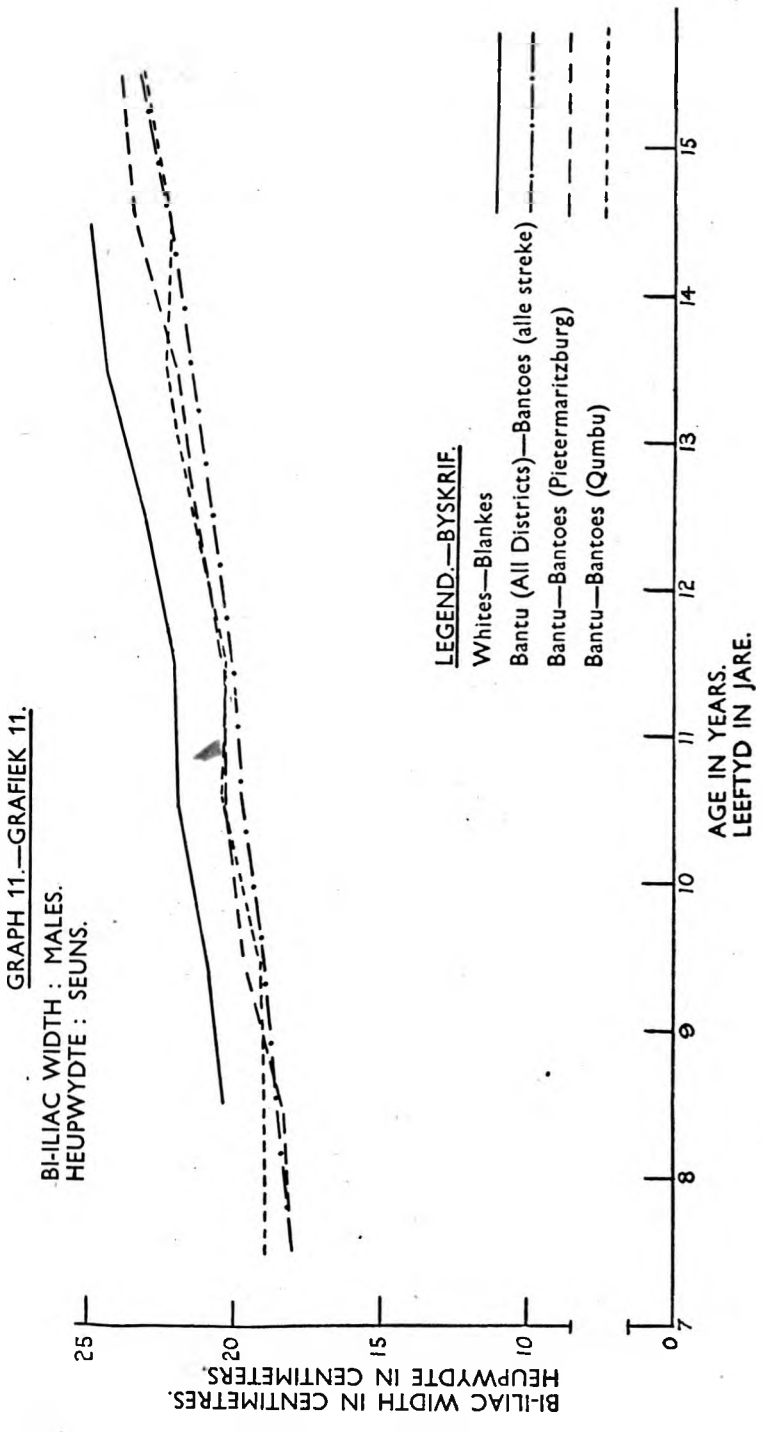
ascribe the smallness of the Bantu children to hereditary factors until these children have been subjected to an optimum environment. As far as one can see, the environment of the Bantu children is very bad, their food is inadequate in amount and quality, and as a race their morbidity rates are high.

kan nie aan erflikheidsfaktore toegeskryf word alvorens hierdie kinders 'n tydperk in 'n optimum omgewing deurgemaak het nie. Vir sover geoordeel kan word, is die omgewingsfaktor by die Bantoekind baie swak; hul voedsel is ontoereikend sowel ten opsigte van hoeveelheid as kwaliteit, en die sieklikheidsyfer vir die ras as geheel is hoog

GRAPH 10.—GRAFIEK 10.

RELAXED UPPER ARM GIRTH : FEMALES.
OMVANG VAN ONTSPANNE BO-ARM : MEISIES.





The following table shows changes in Norwegian children in recent years. It cannot be said that the Norwegians have changed in their hereditary make-up, so one must assume that it is due to better feeding and generally improved environment. The whole

In onderstaande tabel word veranderings in Noorse kinders gedurende onlangse jare weergegee. Daar kan nie beweer word dat die erflike samestelling van die Nore 'n verandering ondergaan het nie, en derhalwe moet veronderstel word dat die veranderings aan beter voeding, en 'n algemene verbetering van die omgewingsfaktor toe-

question is discussed in the Final Report of the Mixed Committee of the League of Nations on the Relation of Nutrition to Health, Agriculture and Economic Policy (Geneva 1937) from which the following table is taken (p. 304):—

TABLE 19.—HEIGHT AND WEIGHT OF FOURTEEN-YEAR-OLD CHILDREN AT STATE AND PRIVATE SCHOOLS (NORWAY).

STATE SCHOOLS.

	Boys.		Girls.	
	Height Cm.	Weight Kg.	Height Cm.	Weight Kg.
1920	148·2	38·5	150·6	41·8
1925	150·5	40·0	152·4	42·4
1930	153·1	42·6	154·9	45·5
1935	155·0	43·6	157·3	47·3

PRIVATE SCHOOLS.

	Boys.		Girls.	
	Height Cm.	Weight Kg.	Height Cm.	Weight Kg.
1920	153·5	42·4	154·9	44·9
1925	155·9	43·8	155·9	45·9
1930	157·4	45·5	158·5	48·2
1935	162·7	50·0	161·2	50·1

Quoting from this report:—

" Two points in this table are of great interest. One is the steady increase in the height and weight of school children in Norway in 1935: this is unquestionably connected with the improvement in food-consumption habits to which reference has been made in Part III, Chapter I. The second point of interest is the considerable difference which exists between the heights and weights of children of the same age but of different income groups. This may also be mainly attributed to the difference in their food consumption."

CHAPTER II.

A Comparison Between the Bantu Boys and Girls.

Weight—Standing Height—Chest Circumference—Relaxed Upper Arm Girth—Graphic Presentation of Relative Sizes of Bantu and White Twelve Year Old Children.

Weight.—It is interesting to note that the curves for boys and girls are practically the same up to the age of eleven, after which the girls considerably exceed the boys in weight, the difference being greatest in the period thirteen to fourteen. It seems that the boys show a slight upward trend from fifteen-and-a-half years onwards. Whether such an upward trend

geskryf moet word. Hierde hele aangeleentheid word bespreek in die Finale Verslag van die Gemengde Komitee van die Volkebond insake die Verhouding van Voeding tot Gesondheid, Landbou en Ekonomiese Beleid (Genève, 1937) waaruit onderstaande tabel geneem is (bladsy 304):—

TABLE 19.—LIGGAMSLENGTE EN GEWIG VAN VEERTIEN-JARIGE KINDERS OP STAATSKOLE EN PRIVATE SKOLE (NOORWEË).

STAATSKOLE.

	Seuns.		Meisies.	
	Lengte cm.	Gewig Kg.	Lengte cm.	Gewig Kg.
1920	148·2	38·5	150·6	41·8
1925	150·5	40·0	152·4	42·4
1930	153·1	42·6	154·9	45·5
1935	155·0	43·6	157·3	47·3

PRIVATE SKOLE.

	Seuns.		Meisies.	
	Lengte cm.	Gewig Kg.	Lengte cm.	Gewig. Kg.
1920	153·5	42·4	154·9	44·9
1925	155·9	43·8	155·9	45·9
1930	157·4	45·5	158·5	48·2
1935	162·7	50·0	161·2	50·1

Aanhaling uit hierdie verslag:—

„ Twee punte in hierdie tabel is van groot belang. Een is die gestadigde toename, gedurende 1935, van skoolkinders in Noorweë in lengte en gewig; dit staan ongetwyfeld in verband met die verbetering ten opsigte van voedselverbruik waarna in deel 3, hoofstuk 1, verwys is. Die tweede punt van belang is die aansienlike verskil wat daar aangetref word in die lengte en gewig van kinders van dieselfde leeftyd maar uit verskillende inkomstegroepe. Dit kan ook hoofsaaklik aan die verskil in voedselverbruik toegeskryf word."

HOOFSTUK II

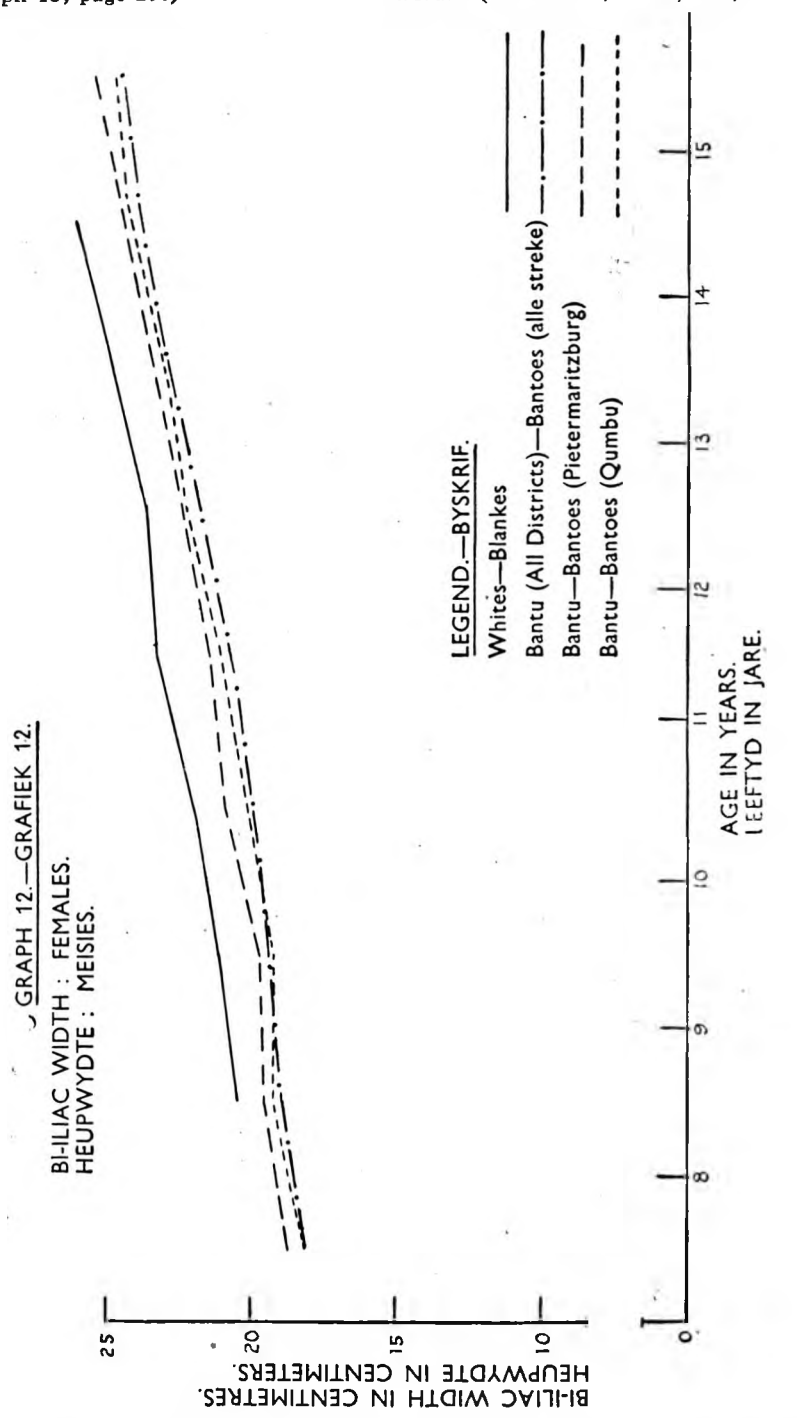
'n Vergelyking van Bantoeseuns met Bantoemeisies.

Gewig—Lengte, staande—Borsomvang—Omvang van ontspanne bo-arm—Grafiese voorstelling van betreklike liggaamsgroottes van Bantoekinders en blanke kinders op die leeftyd 12 jaar.

Gewig.—Dit is interessant om daarop te let dat die kurwes tot op die leeftyd 11 jaar feitlik eenders loop vir seuns en meisies; daarna oortref die meisies die seuns heelwat ten opsigte van gewig, met die grootste verskil merkbaar gedurende die tydperk 13 to 14 jaar. Dit lyk asof die seuns van 15½ jaar af weer 'n bietjie toeneem. Of so'n opwaartse neiging werklik bestaan of maar net skynbaar

is real or apparent can only be shown by a study of higher age-groups. (Graph 13, page 29.)

so is, kan slegs deur middel van studie van hoër leeftydsgroepe vasgestel word. (Grafiek 13, bladsy 29.)



Standing Height.—In the case of this measurement the curves for boys and girls are superimposed up to the age of about eleven-and-a-half, when the girls are taller up to fifteen years, after which the boys gain the ascedency. (Graph 14, page 30.)

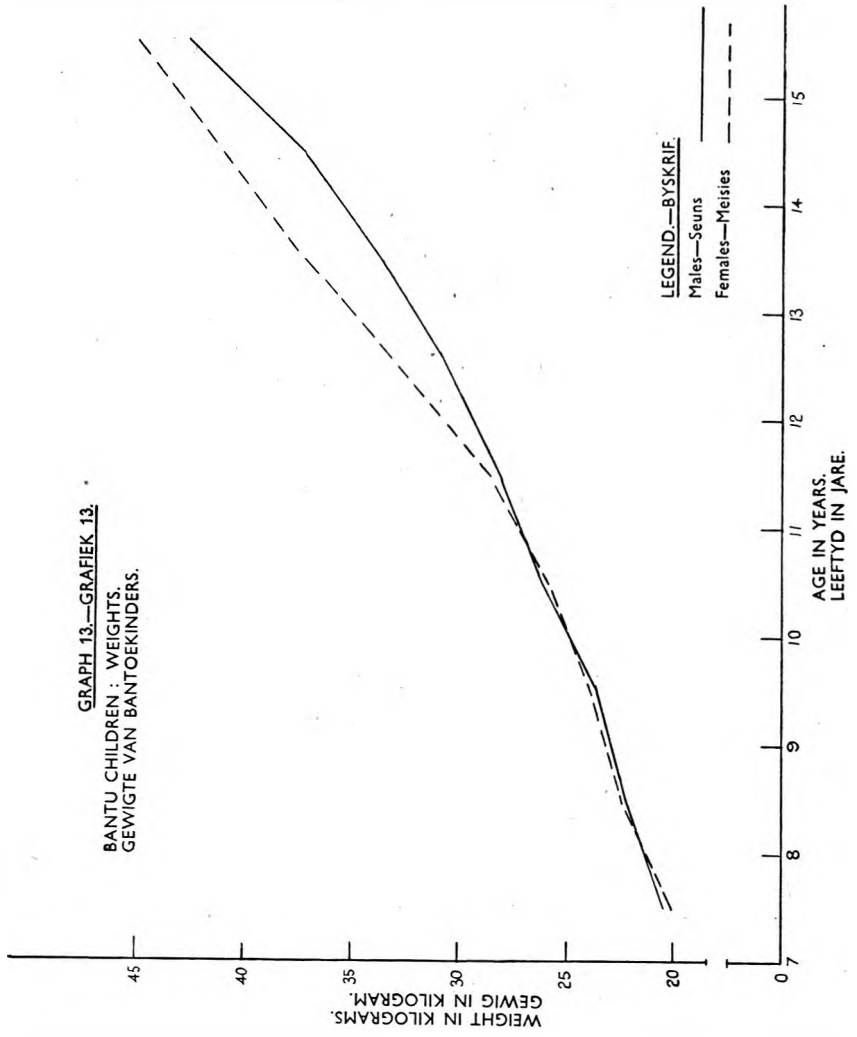
Lengte, staande.—Ten opsigte van lengte is die kurwes vir seuns en meisies tot ongeveer die leeftyd 11½ jaar dieselfde; daarna is die meisies langer tot op die leeftyd 15 jaar, waarna die seuns hulle weer verbygroei. (Grafiek 14, bladsy 30.)

Chest Circumference (contracted).—In the case of this measurement the boys have a greater circumference up to twelve years. From twelve to fifteen-and-a-half the girls have a greater circumference. At this age the lines cross again, the males having a greater measurement. (Graph 15, page 32.)

Relaxed Upper Arm Girth.—With reference to this measurement, the girls are larger at all ages, the difference becoming greater as age increases. The fact that the girls have considerably more soft tissues than the boys, as shown by this measurement, would suggest that the girls are better nourished. (Graph 16, page 33.)

Borsomvang (na uitaseming).—In seuns groter tot op die leeftyd 12 jaar. Van 12 tot 15½ jaar is die borsomhierdie geval is die borsomvang van vang van die meisies weer groter; daarna is die seuns weer groter. (Grafiek 15, bladsy 32.)

Omvang van ontspanne bo-arm.—Ten opsigte van hierdie meting is die meisies van alle leeftyde groter as die seuns en word die verskil groter met toenemende leeftyd. Die feit dat die meisies, blykens hierdie meting, heelwat meer sagte weefsel het as die seuns, skyn daarop te dui dat die meisies beter gevoed word. (Grafiek 16, bladsy 33.)



Bi-iliac Width (Graph 17, page 34).—The girls have wider hips than the boys. The graphs are parellel up to ten-and-half years after which the increase is greater. In White children the girls have a wider bi-iliac measurement, but not by so much, and also the curves are parallel.

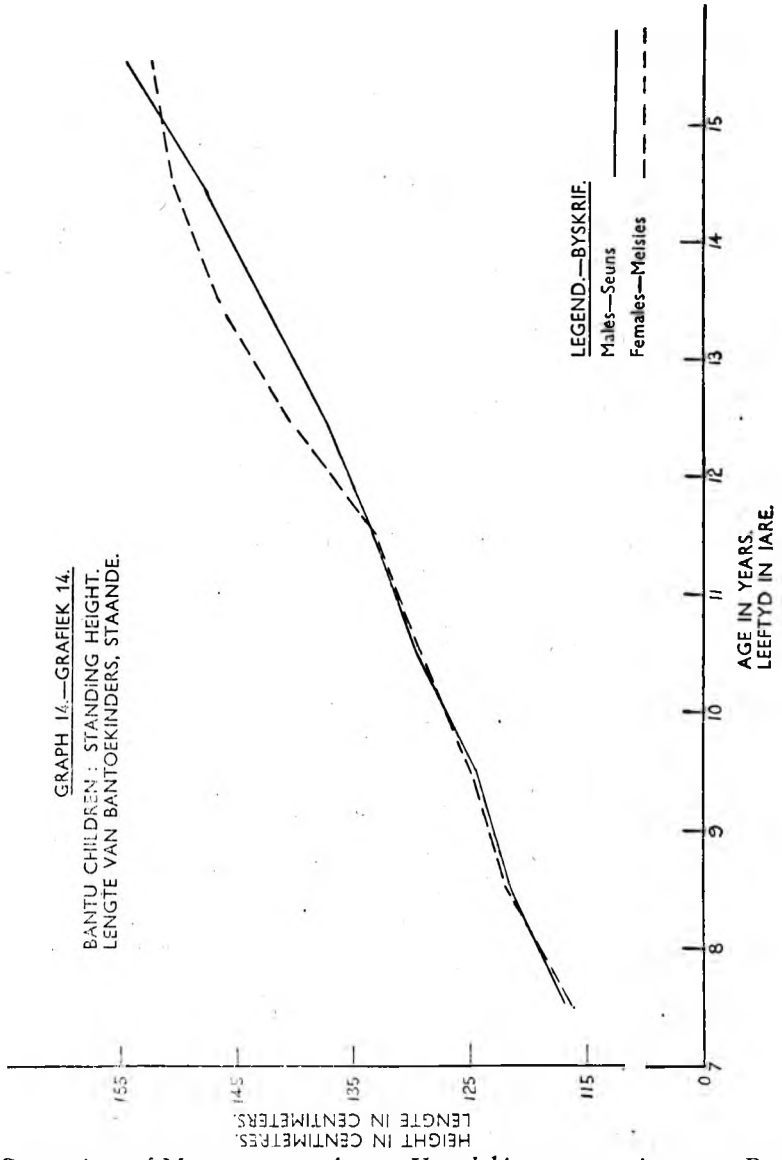
Heupwydte (Grafiek 17, bladsy 34).—Die meisies het breër heupe as die seuns. Tot op die leeftyd 10½ jaar loop die grafieke parallel —daarna word die verskil groter. Onder blanke kinders is die meisies groter om die heupe, maar nie in so'n mate nie, en loop die kurwes ook parallel.

Diagrammatic Presentation of Relative Sizes of Bantu and White Twelve Year Old Children, p. 31.

The point to be noted about these diagrams is that, at a cursory glance, the Bantu children do not seem to be much smaller than the White, while in fact, they are significantly smaller in all the measurements discussed in Chapter I Section B. The dark colour of the Bantu Children is deceptive and these children appear to be bigger than they really are. The drawings are based on the measurements discussed in Chapter I, Section B.

Diagramatiese voorstelling van betreklike groottes van Bantoekinders en blanke kinders op die leeftyd 12 jaar, bl. 31.

Wat by hierdie diagramme van belang is, is dat die Bantoekinders by die eerste oogopslag nie veel kleiner as die blanke kinders lyk nie, terwyl hulle in werklikheid betekenisvol kleiner is ten opsigte van alle metings wat in hoofstuk I, afdeling B, bespreek word. Die donker kleur van die Bantoekinders is bedrieglik, met die gevolg dat die kinders groter lyk as wat hulle werklik is. Die tekenings is op die metings wat in hoofstuk I, afdeling B, bespreek word, gebaseer.

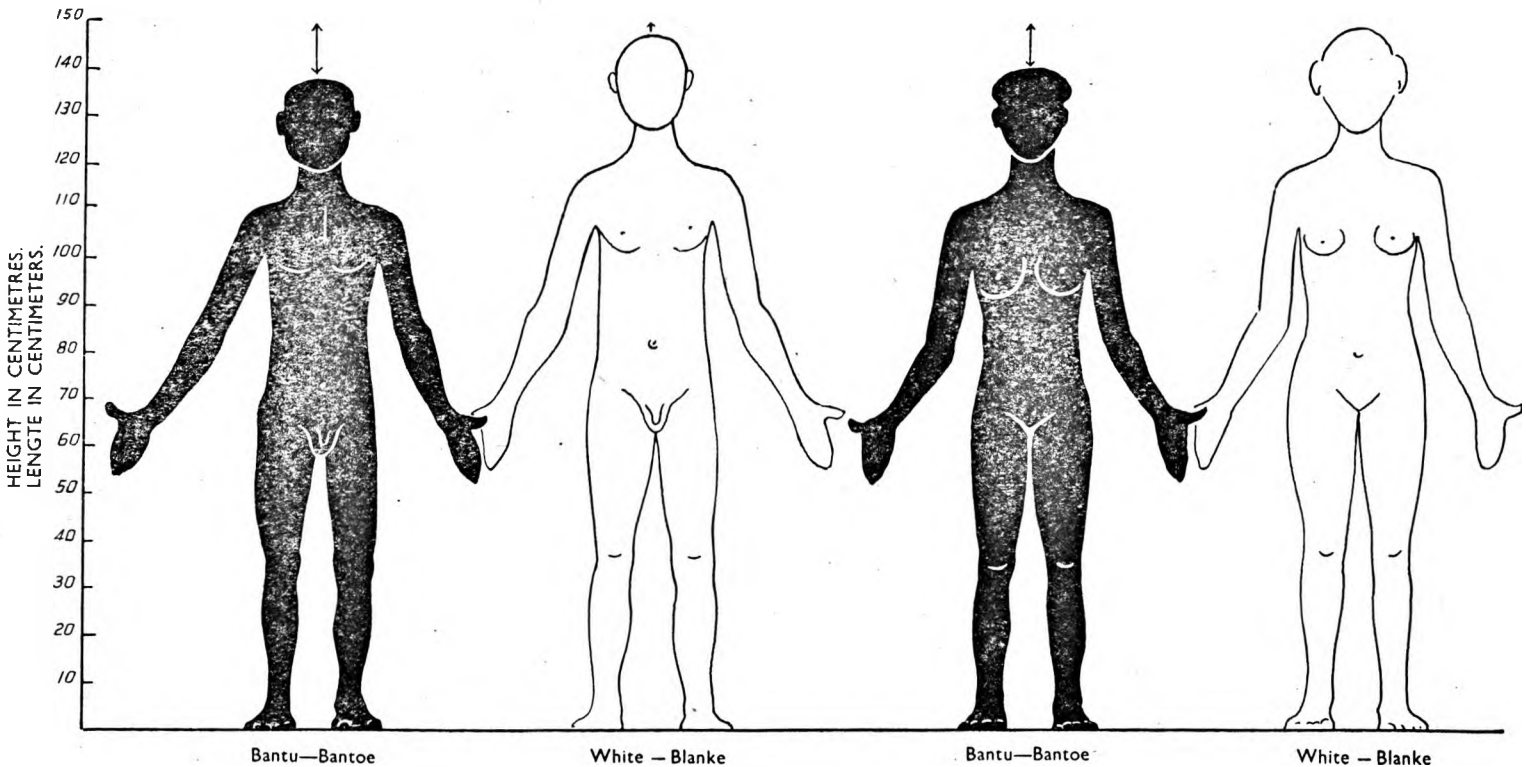


Comparison of Measurements of Bantu Children in Certain Districts.

Pietermaritzburg and Nqutu—Pietermaritzburg and Bochem—Six

Vergelyking van metings van Bantoekinders in sekere streke.

Pietermaritzburg en Nqutu—Pietermaritzburg en Bochem—6 streke:



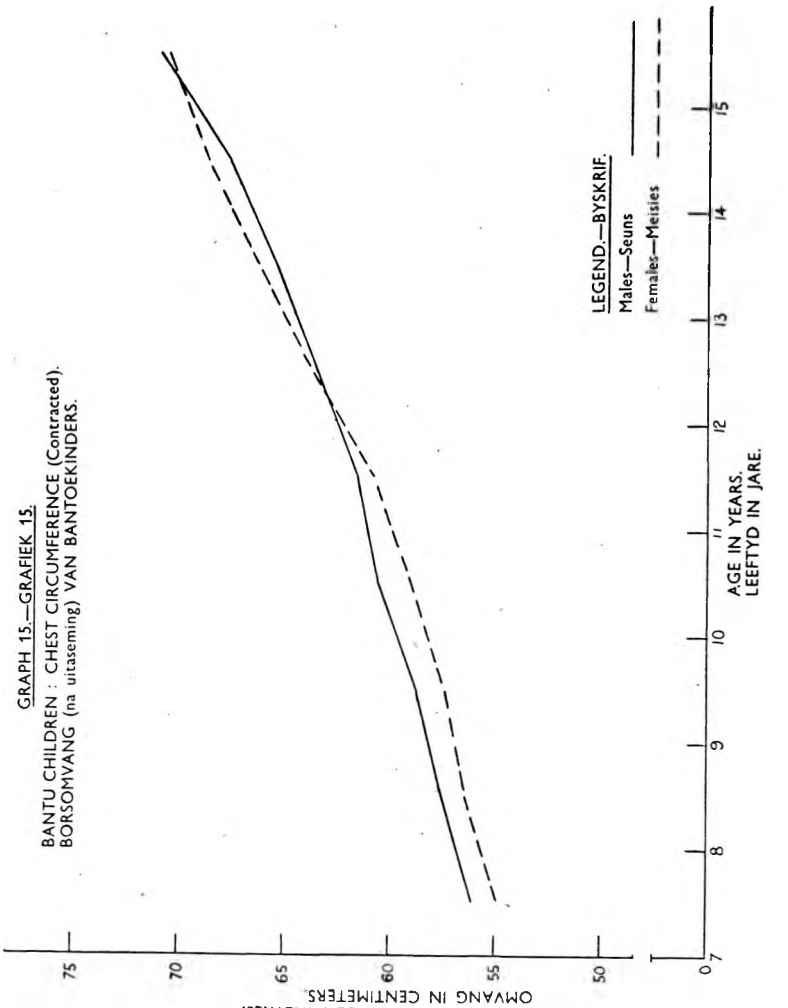
Diagrams showing relative sizes of Bantu and white twelve-year-old boys and girls.
Diagramme om die betreklike groottes van 12-jarige Bantoe- en blanke seuns en dogters te laat sien

districts: Pietermaritzburg, Bochem, Nqutu, Pretoria, Qumbu and Kentani —Children from these areas studied in regard to weight and standing height.

It has been found impracticable to undertake a full discussion of all the measurements taken in all the districts visited. These statistics have been calculated, but it has not been found possible to publish them.

Pietermaritzburg, Bochem, Nqutu, Pretoria, Qumbu en Kentani—kinders uit hierdie gebiede bestudeer ten opsigte van gewig en lengte, staande.

Dit het onuitvoerbaar geblyk om 'n volledige bespreking van al die metings van al die besoekte streke te onderneem. Hierdie statistiek is bereken, maar dit was ongelukkig nie moontlik om dit te publiseer nie.



What has been done, however, is to compare statistically children who appear to be relatively well-nourished in two districts and then to compare those in a good district with those in a district considered to be one of the worst from the health and nutritional points of view.

Wat wel gedoen is, is om kinders uit twee streke wat betreklik goed gevoed skyn te wees, met mekaar statisties te vergelyk, en diegene in 'n goeie streek dan weer te vergelyk met kinders in 'n streek wat, vanuit die standpunt van gesondheid en voeding, een van die swakste geag word.

In addition graphs of heights and weights for both sexes have been drawn for the districts of:—

Pietermaritzburg.
Nqutu.
Qumbu.
Pretoria.
Pietersburg. (Bochem).
Kentani.

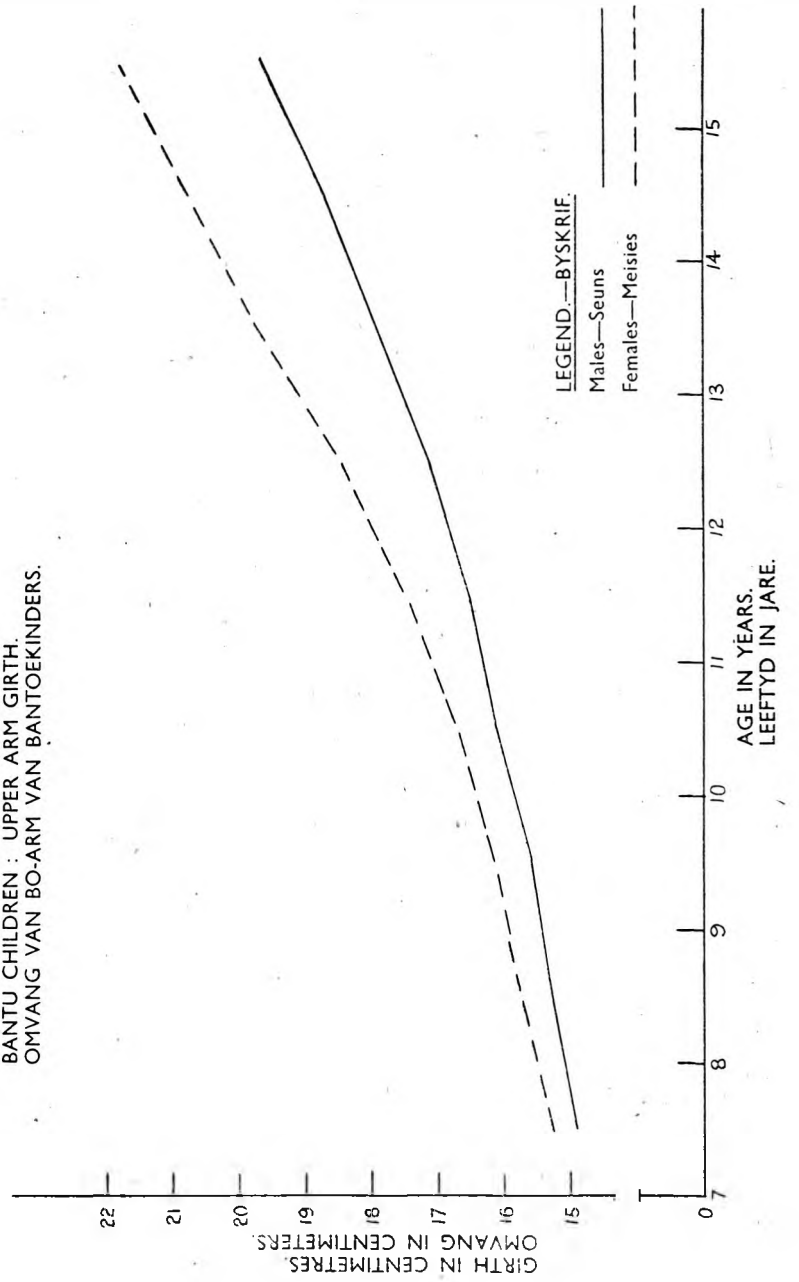
The two relatively good districts compared are Pietermaritzburg and Nqutu. In addition the children in these areas are mainly from one tribal group (Zulu).

Daarbenewens is grafieke van lengtes en gewigte ten opsigte van albei geslagte geteken vir die distrikte:—

Pietermaritzburg.
Nqutu.
Qumbu.
Pretoria.
Pietersburg (Bochem).
Kentani.

Die twee betreklik goeie streke wat met mekaar vergelyk is, is Pietermaritzburg en Nqutu. Hierdie kinders is hoofsaaklik ook lede van een groot stamgroep (Zoeloe).

GRAPH 16.—GRAFIEK 16.
BANTU CHILDREN : UPPER ARM GIRTH.
OMVANG VAN BO-ARM VAN BANTOEKINDERS.



Pietermaritzburg and Nqutu

Graphs 18 and 19.

Boys.—The standing heights are found in graph 18 (page 35) and the weights in graph 19 (page 36). It will be noticed that in height the curves criss-cross and are virtually the same. In weight the Nqutu boys are very slightly lighter, but the differences are negligible.

Graphs 20 and 21.

Girls.—The standing heights are compared in graph 20 (page 37), and the weights are shown in graph 21 (page 38).

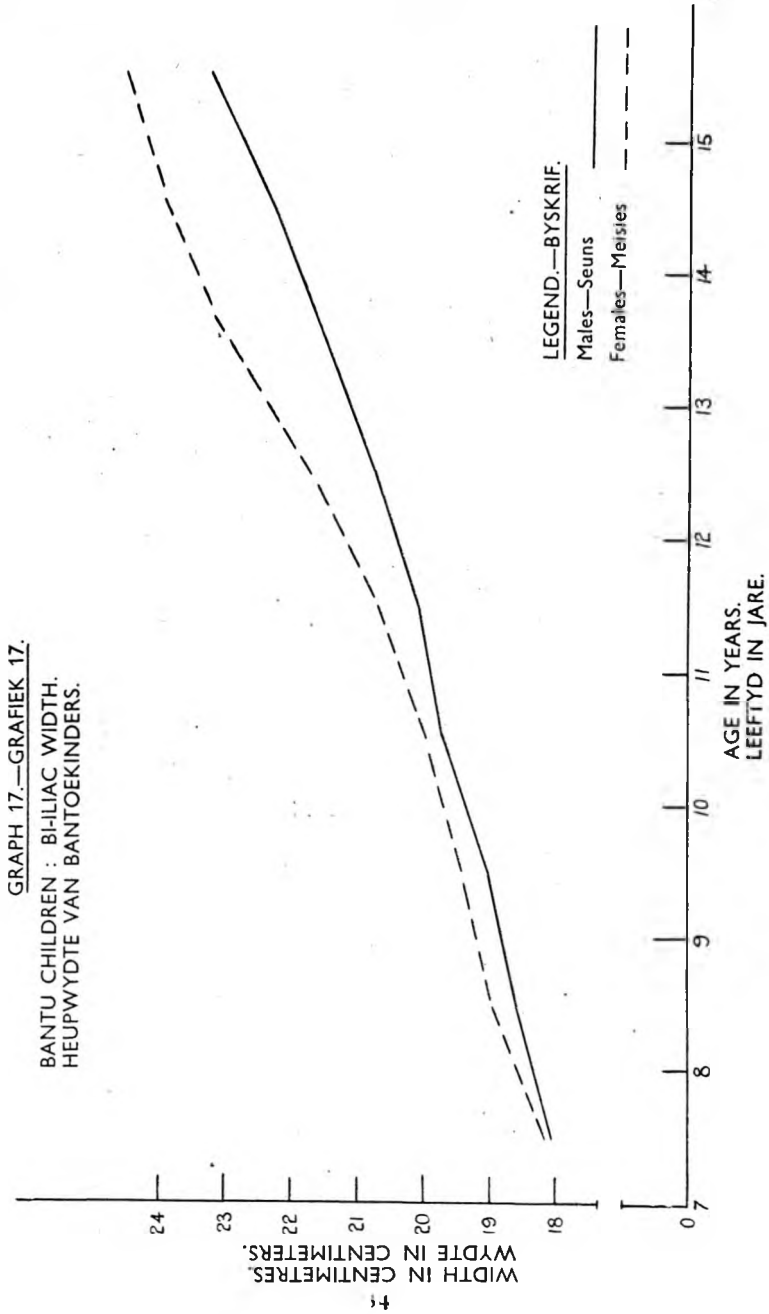
Pietermaritzburg en Nqutu

Grafieke 18 en 19.

Seuns.—Die lengtes, staande, word in grafiek 18 (bladsy 35) en die gewigte in grafiek 19 (bladsy 36) weergegee. Daar sal opgelet word dat die hoogtekurwes kris-kras loop en feitlik dieselfde is. Ten opsigte van gewig staan die Nqutu-seuns by die ander ietwat agter, dog die verskille is onbeduidend.

Grafieke 20 en 21.

Meisies.—Die lengtes, staande, word in grafiek 20 (bladsy 37) vergelyk, en die gewigte verskyn in grafiek 21 (bladsy 38).

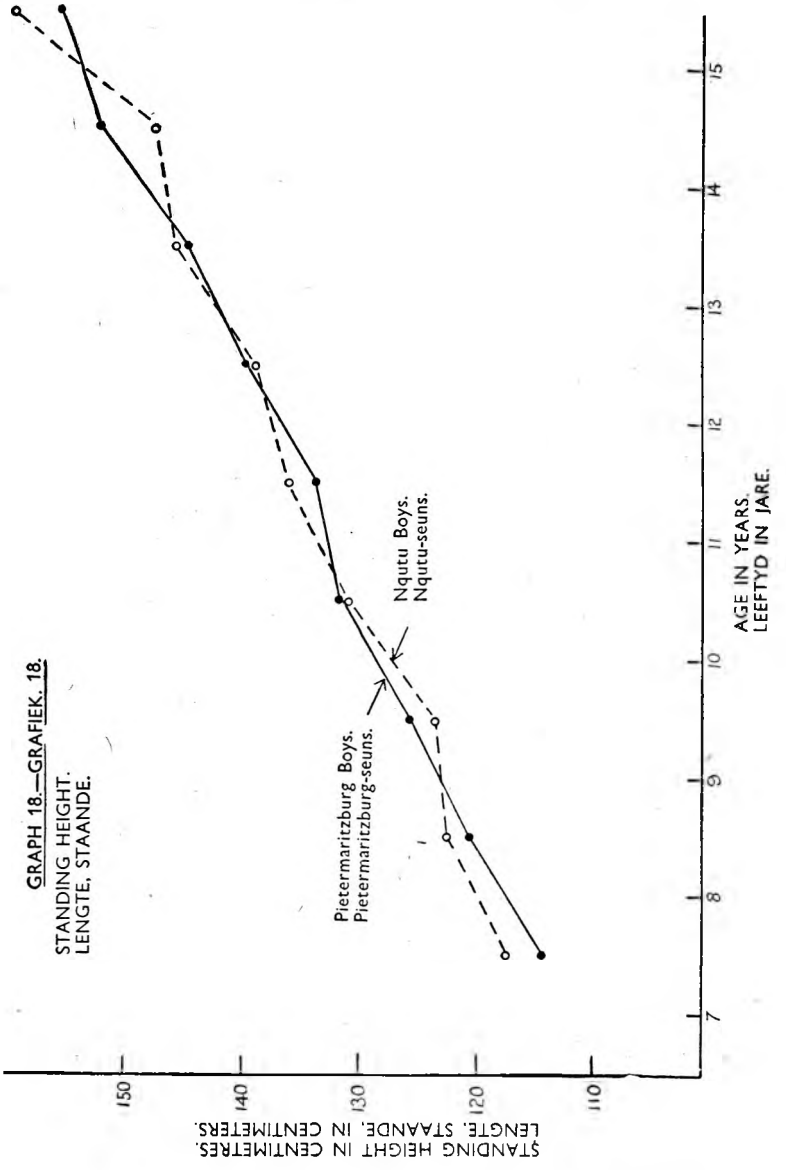


The curves for height are practically the same, but in the case of weight the Nqutu girls differ from the Pietermaritzburg girls by more than the boys do in these two areas.

These differences are not statistically significant, taking as a level of significance that the difference between the means should be greater than three times the standard error of the difference.

Die lengtekurwes is feitlik dieselfde, dog ten opsigte van gewig verskil die Nqutu-meisies meer van die Pietermaritzburg-meisies as wat die geval is onder die seuns uit hierdie twee gebiede.

Indien die peil van betekenisvolheid vasgestel word as volg: Dat die verskil tussen die gemiddeldes groter is as driemaal die standaardfout van die verskil—dan is hierdie verskille nie statisties betekenisvol nie.



Pietermaritzburg and Bochem.

Pietermaritzburg is considered to be one of the best districts visited while Bochem appeared to be one of the worst. As will be shown later the clinical findings bear out this contention.

Pietermaritzburg en Bochem

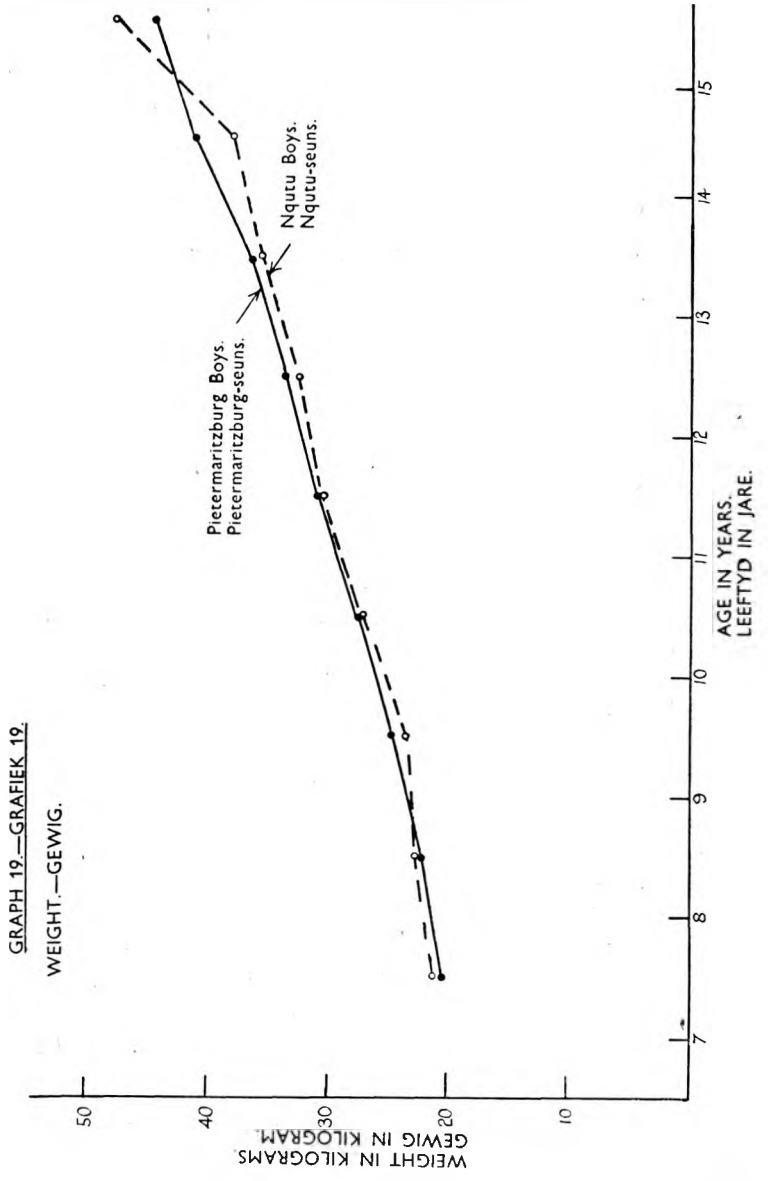
Pietermaritzburg word beskou as een van die beste en Bochem as een van die swakste streke wat die werkers besoek het. Uit die kliniese bevindings blyk dat hierdie stelling juis is.

Boys.—The comparison of Pietermaritzburg and Bochem boys in regard to standing height is shown in graph 22 (page 39).

It will be noticed that the graphs coincide up to the age of 9½, after which age, except for a fall at 11½, probably due to the smallness of the sample, the Pietermaritzburg boys are consistently taller. This difference is not statistically significant.

Seuns.—In grafiek 22 (bladsy 39) word die lengtes, staande, van Pietermaritzburg- en Bochem-seuns vergelyk.

Daar sal opgemerk word dat die grafieke tot op die leeftyd 9½ jaar saamval en dat die Pietermaritzburg-seuns daarna, met uitsondering van 'n daling op die ouderdom van 11½ jaar (waarskynlik weens die klein omvang van die monster), deurgaans langer is. Hierdie verskil is egter nie statisties betekenisvol nie.



GRAPH 19.—GRAFIEK 19.

WEIGHT.—GEWIG.

The comparison in regard to the weight of Pietermaritzburg and Bochem boys is shown in graph 23 (page 40). The Pietermaritzburg boys are considerably heavier, the difference increasing with age. At 7½ years the difference is about 1 kilogram, while

In grafiek 23 (bladsy 40) verskyn 'n vergelyking van Pietermaritzburg-seuns met Bochem-seuns ten opsigte van gewig. Eersgenoemde is heelwat swaarder, en die verskil word groter met toenemende leeftyd. Op die leeftyd 7½ jaar is die verskil ongeveer 1

at 14 years it is almost six kilograms. The differences are shown in table 20.

Kg. en op 14 jaar is dit byna 6 Kg. Die verskille word in tabel 20 aangedui.

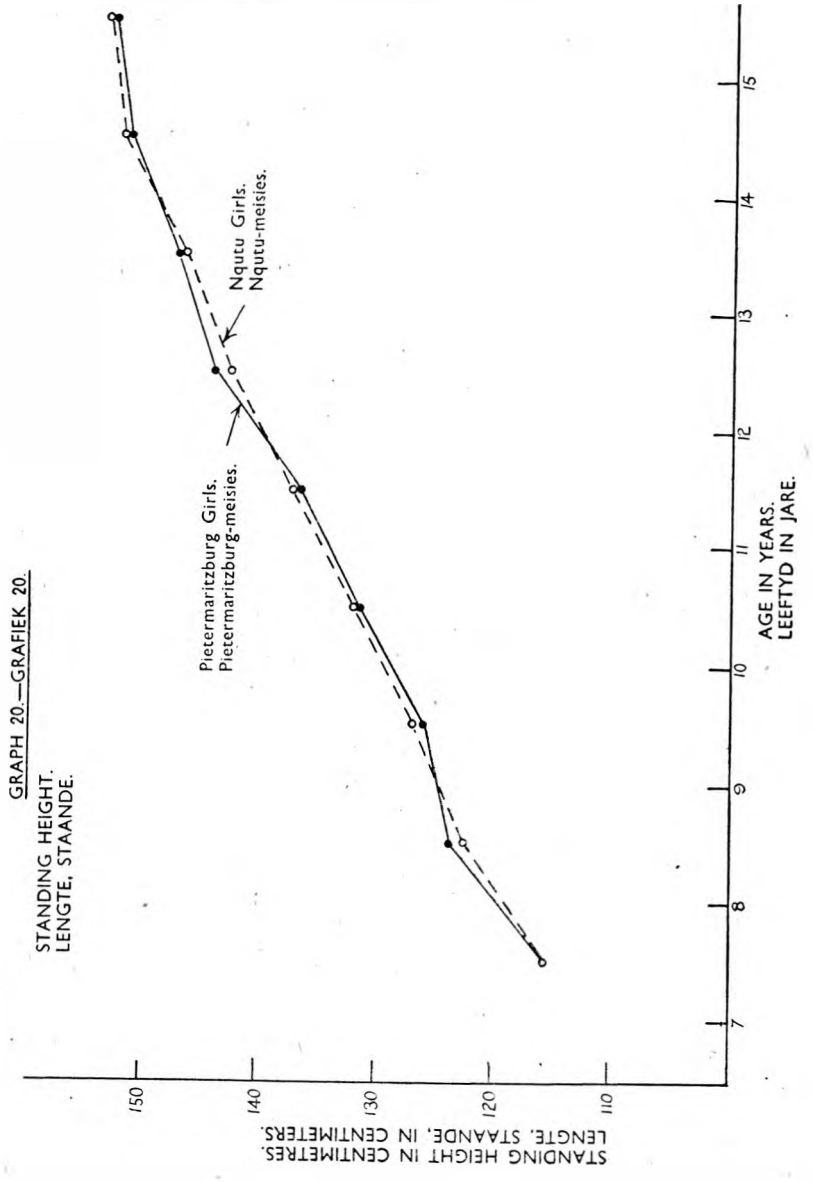


TABLE 20.—A COMPARISON BETWEEN WEIGHTS OF PIETERMARITZBURG AND BOCHEM BANTU BOYS.

TABEL 20.—'N VERGELYKING VAN DIE GEWIGTE VAN PIETERMARITZBURG- EN BOCHEM-BANTOESEUNS.

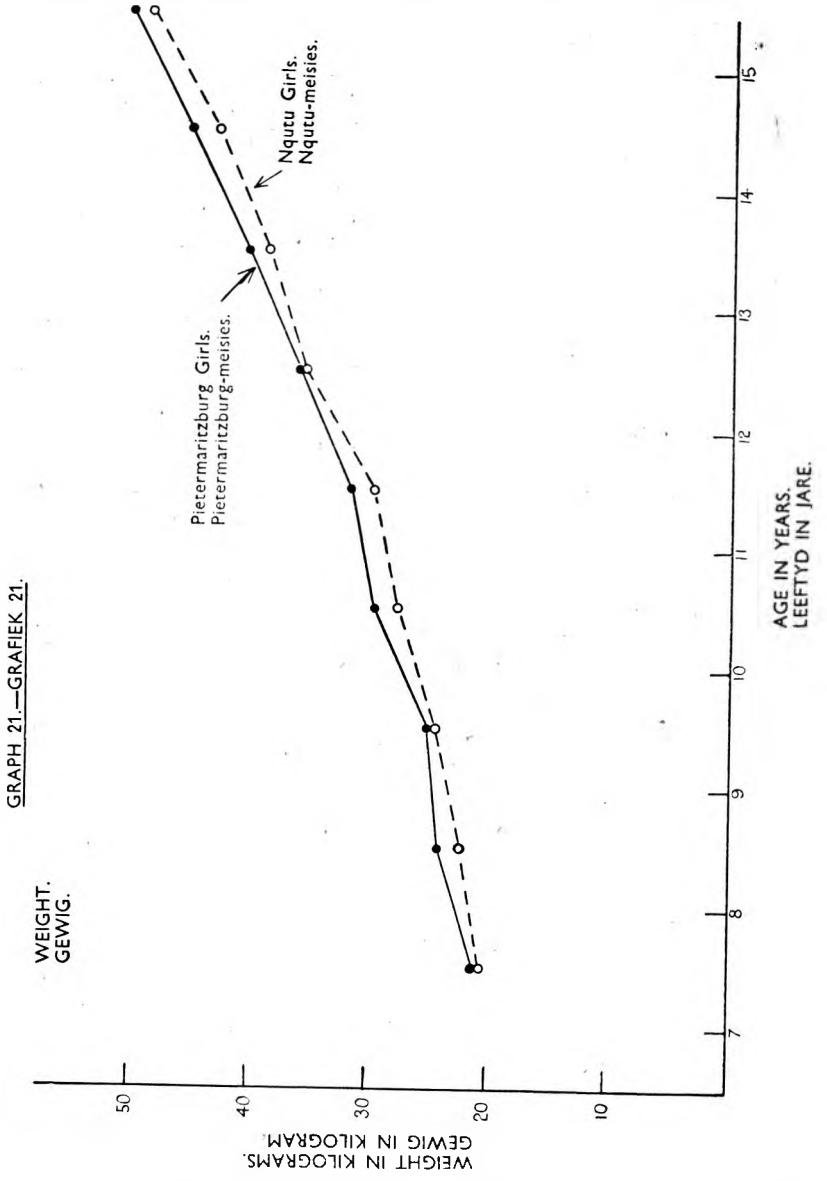
Age. Leeftyd.	Differences Between Means in Kg. Verskille tussen gemiddeldes in Kg.		S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	1·08		·67	5·10
9–	1·43		·91	6·12
10–	3·05	S/B	·84	13·04
11–	3·66	S/B	1·02	13·43
12–	3·63	S/B	·83	12·28
13–	4·76	S/B	1·03	14·86
14–	5·61	S/B	1·32	15·48
15–	2·33		1·67	5·49

Pietermaritzburg boys are significantly heavier than Bochem boys in the age groups 10, 11, 12, 13 and 14. In the remaining groups the differences are not significant probably mainly as a result of the smallness in numbers of cases in these groups.

The percentage difference comes to as much as 15.48 per cent. in the fourteen-year-old group.

Pietermaritzburg-seuns is betekenisvol swaarder as Bochem-seuns in die leeftydsgroepe 10, 11, 12, 13 en 14. In die orige groepe is die verskille nie betekenisvol nie, waarskynlik hoofsaaklik weens die klein getalle in hierdie groepe.

In die groepe van 14 jaar kom die persentasieverskil op 15.48 te staan.



Girls.—The comparative curves for standing height in Bantu girls from Pietermaritzburg and Bochem are shown in graph 24 (page 41).

It will be noticed that the differences are greater in the case of the girls than in the boys (graph 22).

Meisies.—In grafiek 24 (bladsy 41) verskyn die vergelykingskurwes ten opsigte van lengte, staande, van Bantoemeisies uit Pietermaritzburg en Bochem.

Daar sal opgelet word dat die verskille onder die meisies groter is as onder die seuns (grafiek 22).

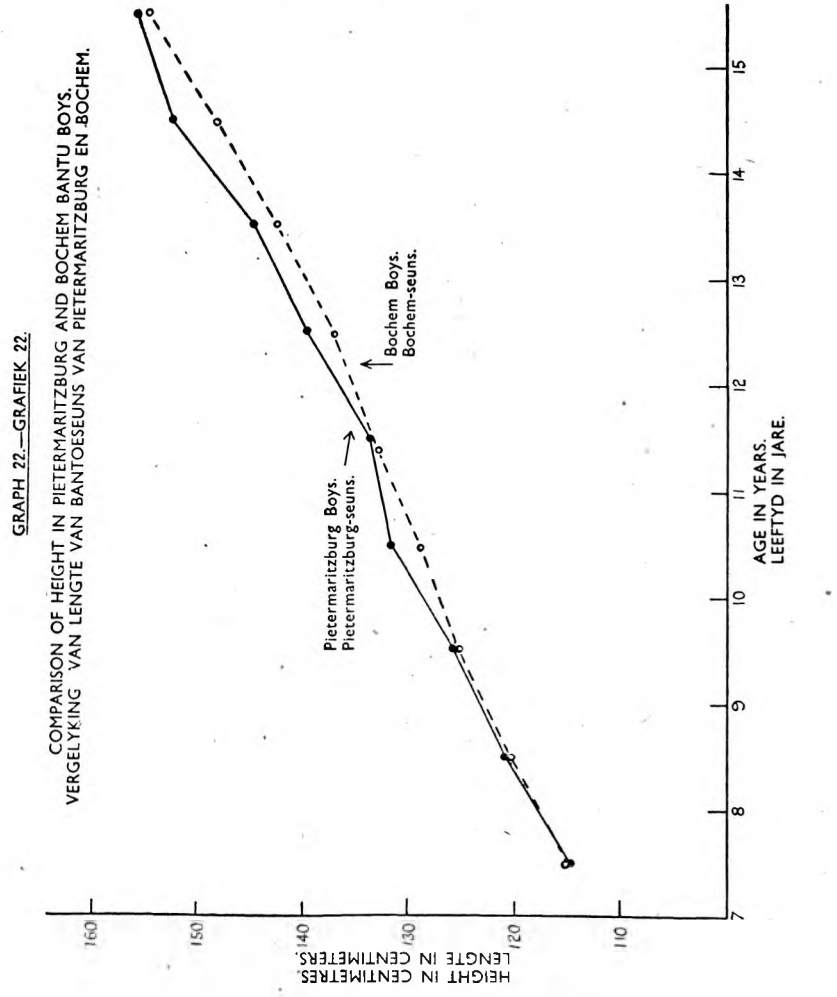
The differences are shown in the following table:—

Die verskille word in onderstaande tabel weerspieël:—

TABLE 21.—A COMPARISON BETWEEN HEIGHTS OF PIETERMARITZBURG AND BOCHEM GIRLS.

TABEL 21.—'N VERGELYKING VAN DIE LENGTES VAN PIETERMARITZBURG- EN BOCHEM-MEISIES.

Age. Leeftyd.	Differences Between Means in Cm. Verskille tussen gemiddeldes in cm.	S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	5·15 S/B	1·28	4·34
9–	3·77 S/B	1·16	3·09
10–	6·75 S/B	1·10	5·47
11–	2·95	1·32	2·20
12–	4·36 S/B	1·32	2·12
13–	3·65	1·72	2·47
14–	3·27	1·37	2·19
15–	1·28	1·31	·84



Pietermaritzburg girls are significantly taller than Bochem girls in age groups 8, 9, 10 and 12. It will be noted that boys in these two areas are not significantly different in regard to height.

The comparative figures for weights are shown in graph 25 (page 42).

In die leeftydsgroepe 8, 9, 10 en 12 is die Pietermaritzburg-meisies betekenisvol langer as Bochem-meisies. Daar sal opgelet word dat seuns in in hierdie twee gebiede nie betekenisvol ten opsigte van lengte verskil nie.

In grafiek 25 (bladsy 42) verskyn die vergelykingsyfers ten opsigte van gewig.

It will be noticed that the differences in weight between the girls of this group are greater than in the case of the boys of the two groups.

The differences are shown in the following table:—

Daar sal opgelet word dat die verskille in gewig tussen meisies van hierdie groep groter is as die geval van seuns in die twee groepe.

Die verskille word in onderstaande tabel weerspieël:—

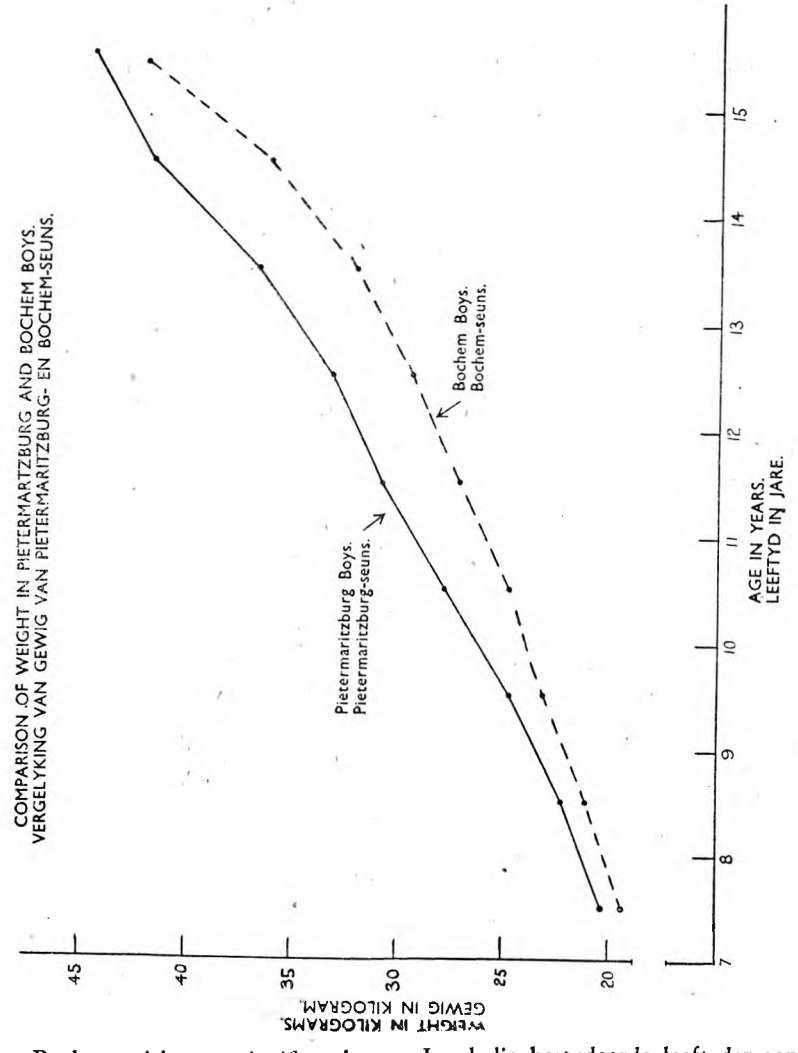
TABLE 22.—A COMPARISON BETWEEN THE WEIGHTS OF PIETERMARITZBURG AND BOCHEM BANTU GIRLS.

TABEL 22.—'N VERGELYKING VAN DIE GEWIGTE VAN PIETERMARITZBURG- EN BOCHEM-BANTOEMEISIES.

Age. Leeftyd.	Differences Between Means in Kg. Verskille tussen gemiddeldes in Kg.	S.E. of Difference. S.F. van verskil.	Percentage Difference Between Means. Persentasieverskil tussen gemiddeldes.
8–	3·89 S/B	·73	19·23
9–	3·80 S/B	·71	13·64
10–	6·22 S/B	·82	26·57
11–	3·78 S/B	·95	13·58
12–	3·77 S/B	1·11	11·84
13–	5·18 S/B	1·41	15·00
14–	7·31 S/B	1·27	19·39
15–	8·81 S/B	1·56	20·92

GRAPH 23.—GRAFIEK 23.

COMPARISON OF WEIGHT IN PIETERMARITZBURG AND BOCHEM BOYS.
VERGELYKING VAN GEWIG VAN PIETERMARITZBURG- EN BOCHEM-SEUNS.

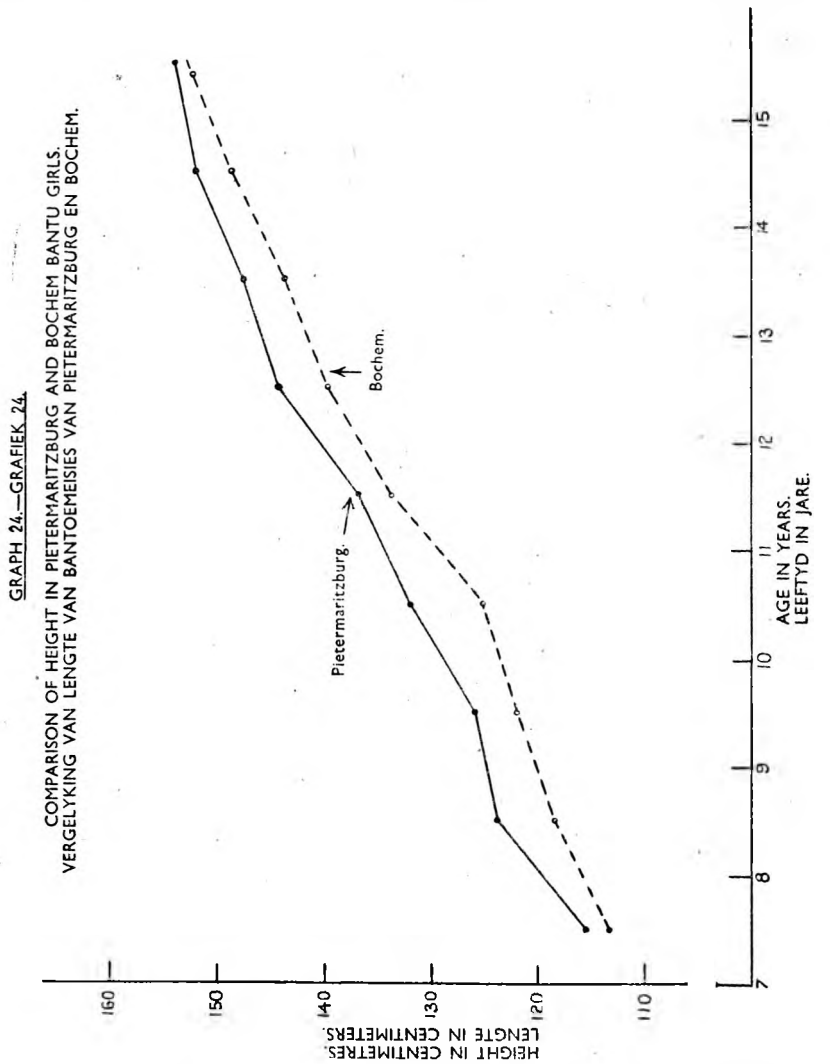


The Bochem girls are significantly lighter in all age groups studied. The Bochem boys are lighter in five out of eight age groups.

In al die bestudeerde leeftydsgroepe is die Bochem-meisies betekenisvol ligter. In vyf uit die agt leeftydsgroepe is die Bochem-seuns ligter.

The percentage difference for the girls comes to 19.39 per cent., as against 15.48 per cent. for the boys. The girls in an adverse environment therefore, appear to cease growth both in height and weight to a greater extent than in the case of the boys. The poorly-nourished boys keep growing in height, which is not the case with the girls. The boys will, therefore, probably appear to be in a worse state of nutrition than the girls.

Die persentasieverskil ten opsigte van meisies is 19.39, teenoor 15.48 vir die seuns. Dit lyk dus asof die meisies in 'n ongunstige omgewing in 'n groter mate in hulle groei (sowel in lengte as in gewig) gestrem word as wat dit die geval met die seuns is. Die swakgevoede seuns hou aan om in die lengte te groei, wat nie die geval met die meisies is nie. Gevolglik sal die seuns waarskynlik meer ondervoed lyk as die meisies.



Standing Height of Bantu Boys, Comparing Six Districts

Graph 26 (Page 43).

For comparative purposes six districts have been selected. In Pietermaritzburg and Nqutu the children are Zulus. Those in Bochem and Pretoria are mainly Transvaal Sesuto, while Qumbu and Kentani are both in the Transkei (Xosas, Fingoes and Pondos.)

In the present discussion the Pietermaritzburg figures are used as an arbitrary standard of reference.

Lengte, staande, van Bantoeseuns; vergelyking van ses streke

Grafiek 26 (bladsy 43).

Vir vergelykingsdoeleindes is ses streke gekies. In Pietermaritzburg en Nqutu is die kinders Zoeloes. Te Bochem en Pretoria is hulle hoofsaaklik Transvaal-Sesoeto. Qumbu en Kentani lê albei in die Transkei (Xosas, Fingo's en Pondo's).

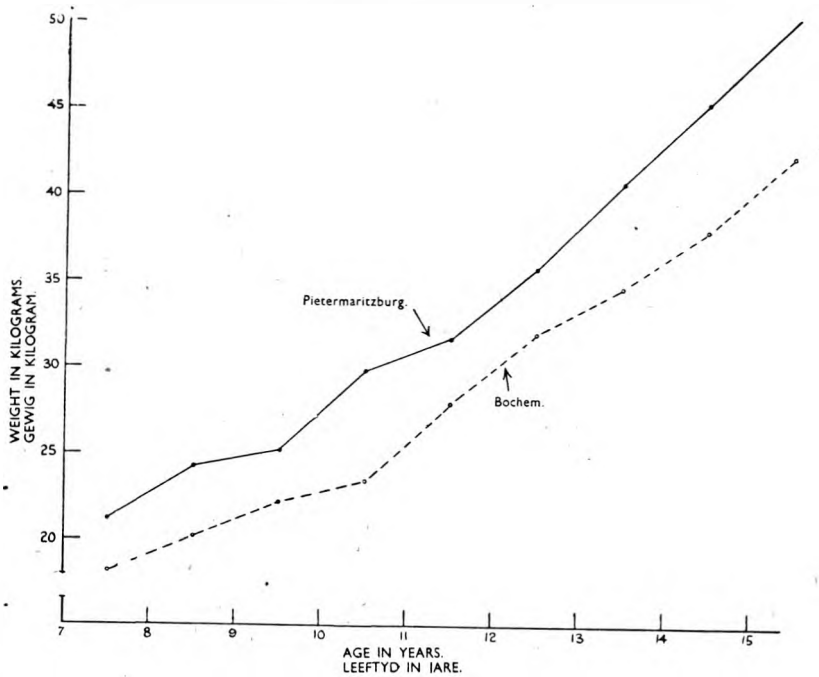
In die huidige bespreking word die syfers vir Pietermaritzburg gebruik as 'n arbitrêre standaard vir verwysingsdoeleindes.

It is interesting to note that up to the age of nine years all the boys in the different areas are taller than the Pietermaritzburg boys. After the age of nine the Nqutu boys are more or less of the same size, but those in Bochem, Pretoria and Kentani are definitely smaller. The graph for Qumbu fluctuates but is also lower than that of Pietermaritzburg in a number of age groups.

Dit is interessant om daarop te let dat al die seuns in die verskillende gebiede tot op die leeftyd nege jaar langer as die Pietermaritzburg-seuns is. Na die leeftyd nege jaar is die Nqutu-seuns min of meer net so groot, maar dié van Bochem, Pretoria en Kentani beslis kleiner. Die grafiek vir Qumbu toon 'n skommelende lyn, maar is ook laer as dié van Pietermaritzburg in 'n aantal leeftydsgroepe.

GRAPH 25.—GRAFIEK 25.

COMPARISON OF WEIGHTS IN PIETERMARITZBURG AND BOCHEM GIRLS.
VERGELYKING VAN GEWIG BY PIETERMARITZBURG EN BOCHEM MEISIES.



One may interpret these graphs as meaning that, while the boys of the five districts start life taller than those in Pietermaritzburg, an adverse environment causes a slowing in the tempo of growth. Also in view of the fact that they are all practically the same size at 9 years, it would be rather unwise to try to ascribe their smaller size at later ages to racial or other non-environmental causes.

Weights of Bantu Boys in Six Districts

Graph 27 (Page 44).

Qumbu boys are heavier than Pietermaritzburg boys up to about ten years, while Nqutu boys are heavier up to about nine years. Bochem, Pretoria and Kentani boys are lighter at all ages, Kentani reaching the lowest levels. The Qumbu figures fluctuate again as in the case of height. This is probably due to sampling errors. It will be noted that the divergences in weight between e.g. Kentani boys are almost 7 kg. lighter than Pietermaritzburg boys in fifteen-year-old group, while they are only about 2 kg. lighter in the seven-year-old group. As far as

Hierdie grafieke kan vertolk word as 'n aanduiding daarvan dat, hoewel die seuns van die vyf streke vroeg in hul lewe langer is as dié van Pietermaritzburg, 'n ongunstige omgewing die groeitempo vertraag; ook dat dit, met die oog daarop dat hulle op die leeftyd nege jaar almal feitlik ewe groot is, ietwat onverstandig sou wees om hulle kleiner gestalte op later leeftyd aan rasse-oorsake of ander nie-omgewingsoorsake toe te skryf.

Gewigte van Bantoeseuns in ses streke

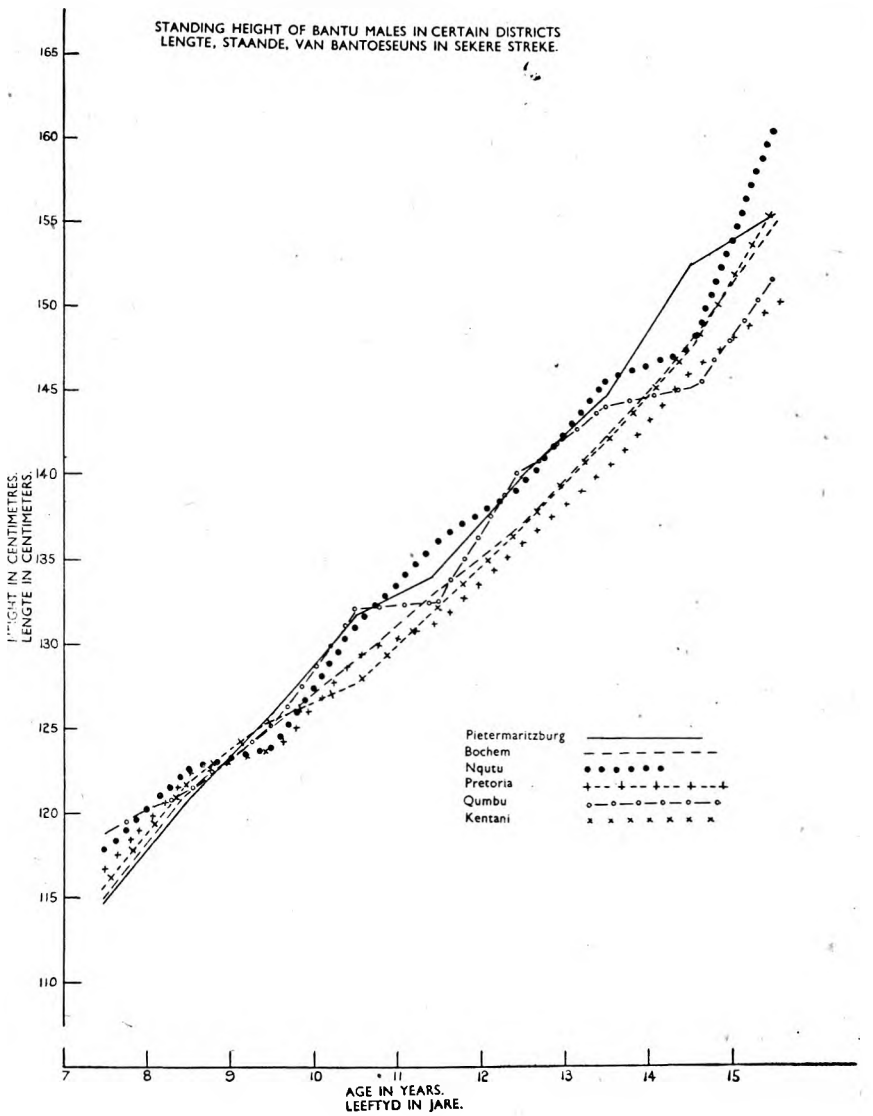
Grafiek 27 (bladsy 44).

Qumbu-seuns is tot op die leeftyd tien jaar swaarder as Pietermaritzburg-seuns, en Nqutu-seuns is tot ongeveer nege jaar swaarder. Bochem-, Pretoria- en Kentani-seuns is op alle leeftye ligter—die ligstes is dié van Kentani. Soos in die geval van liggaamslengte, toon die Qumbu-syfers 'n skommelende lyn, wat waarskynlik aan foute met die monsterneming toegeskryf moet word. Daar sal opgelet word dat die Kentani-seuns byna 7 Kg. ligter as Pietermaritzburg-seuns in die leeftydsgroep 15 jaar is, en slegs

height is concerned the Kentani boys are actually about 2 centimetres taller than the Pietermaritzburg boys in the seven-year group. In the fifteen-year-old group, however, the Kentani boys are shorter by about 6 centimetres than the Pietermaritzburg boys.

2 Kg. ligter in die groep sewe jaar. Ten opsigte van liggaamslengte is die Kentani-seuns in werklikheid ongeveer 2 cm. langer as die Pietermaritzburg-seuns in die groep van sewe jaar. In die leeftydsgroep 15 jaar is die Kentani-seuns egter omtrent 6 cm. korter as die Pietermaritzburg-seuns.

GRAPH 26.—GRAFIEK 26.



Standing Height of Bantu Girls in Six Districts

Graph 28 (Page 45).

The Qumbu girls are slightly taller up to 8½ years, while Nqutu girls are smaller up to 9 years than those in Pietermaritzburg. In the case of the boys it will be recollected that those from five areas are taller than the Pietermaritzburg boys up to about 9 years. In the case of the girls they are smaller all the time than Pietermaritz-

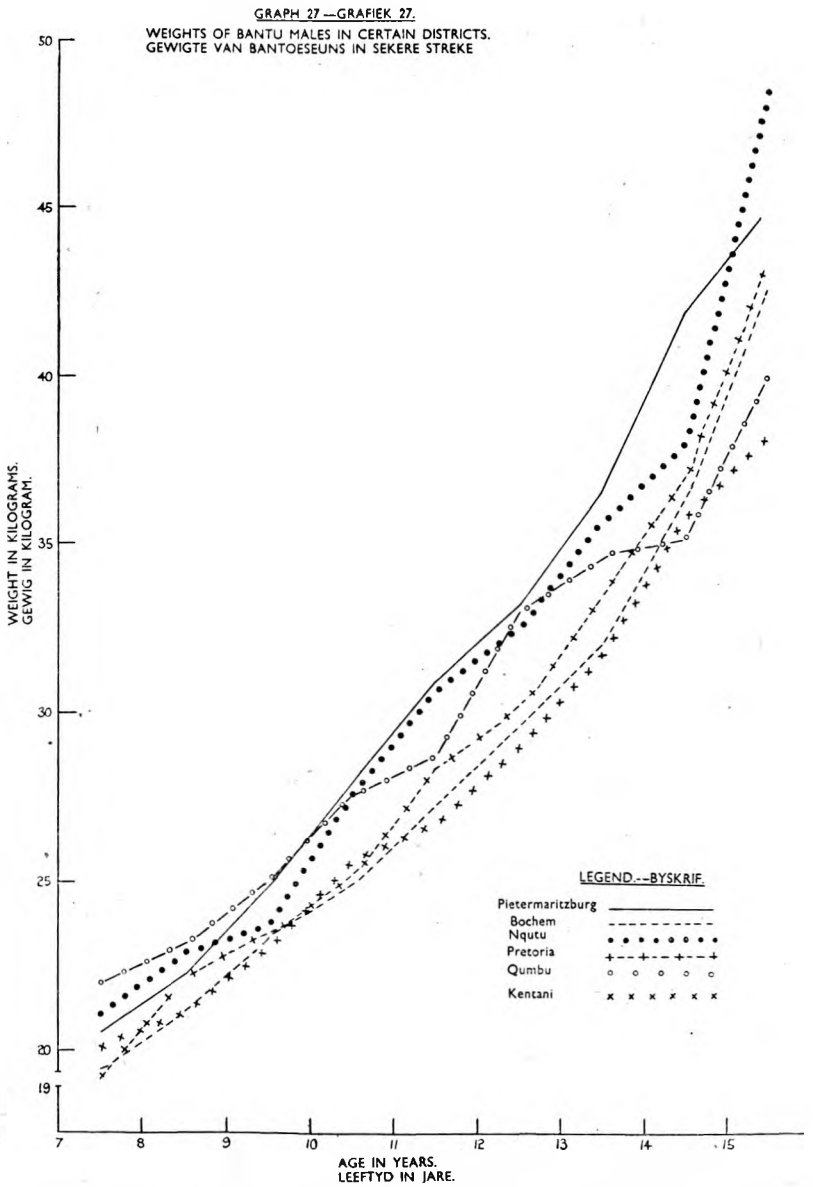
Lengte, staande, van Bantoemeisies in ses distrikte

Grafiek 28 (bladsy 45).

Tot op 8½ jaar is die Qumbu-meisies ietwat langer en tot op nege jaar is Nqutu-meisies korter as dié van Pietermaritzburg. Daar sal onthou word dat die seuns uit vyf gebiede tot op nege jaar langer is as die Pietermaritzburg-seuns. In die geval van die meisies hulle in vier streke deurentyd kleiner as te Pietermaritzburg. Die

burg in the case of four districts. The exception is Qumbu where the girls are taller than those in Pietermaritzburg from 13½ years to 15½. Whether this holds in the higher ages can only be told from studies of such higher ages.

uitsondering is Qumbu, waar die meisies van 13½ tot 15½ jaar langer is as dié van Pietermaritzburg. Of hierdie toestand in die hoër leeftydsgroepe voortduur, sal slegs uit navorsing van daardie groepe vasgestel kan word.



Weight of Bantu Girls in Six Districts

Graph 29 (Page 46).

As is the case with height, the Qumbu girls are heavier up to 9½ years, i.e. for one year longer than they are taller, than the Pietermaritzburg girls.

With the exception of the Qumbu girls, those in all the other areas are lighter than those in Pietermaritzburg.

Gewig van Bantoemeisies in ses streke

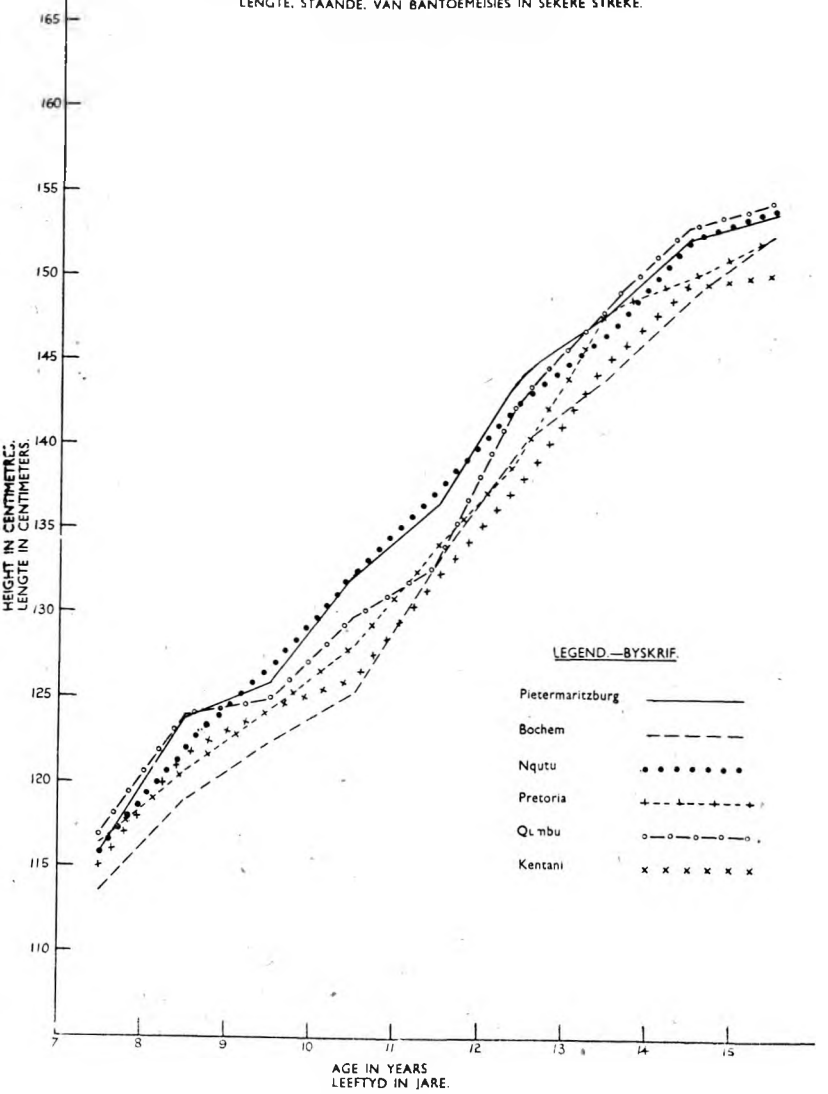
Grafiek 29 (bladsy 46).

Soos in die geval van liggaamslengte is die Qumbu-meisies tot op 9½ jaar, d.w.s. vir een jaar langer as die tydperk waarin hulle langer is, swaarder as die Pietermaritzburg-meisies.

Met uitsondering van die Qumbumeisies is dié in al die ander gebiede ligter as dié in Pietermaritzburg.

GRAPH 28.—GRAFIEK 28

STANDING HEIGHT OF BANTU FEMALES IN CERTAIN DISTRICTS.
LENGTE, STAANDE, VAN BANTOEMEISIES IN SEKERE STREKE.



SUMMARY AND CONCLUSIONS.

SECTION B.

1. *Sampling and Selection of Cases.*

A random sample of Bantu children was taken from schools in the areas visited. It is considered that these children are probably the best of the Bantu child population. The picture presented by the survey is probably much more favourable than is actually the case if the samples were completely representative including also the non-school-going children. Child-

SAMEVATTING EN GEVOLGTREKKINGS

AFDELING B

1. *Monsterneming en keuring van gevalle.*

Uit die skole in die besoekte gebiede is lukraak 'n monster uit Bantoekinders geneem. Die navorsers is van oordeel dat hierdie kinders waarskynlik tot die beste van die Bantoekinderbevolking behoort. Die beeld wat uit die opname weergegee word, is waarskynlik baie gunstiger as wat werklik die geval is waar monsters heeltemal verteenwoordigend is van die bevolking, met inbegrip ook van

ren were examined in the following areas:—

Pretoria, Harrismith (Witzieshoek), Bloemfontein, Qumbu, Kentani, Pietermaritzburg, Pietersburg (Bochem) and Letaba (Tzaneen).

An attempt was made to obtain as accurate an account as possible of the ages of these children.

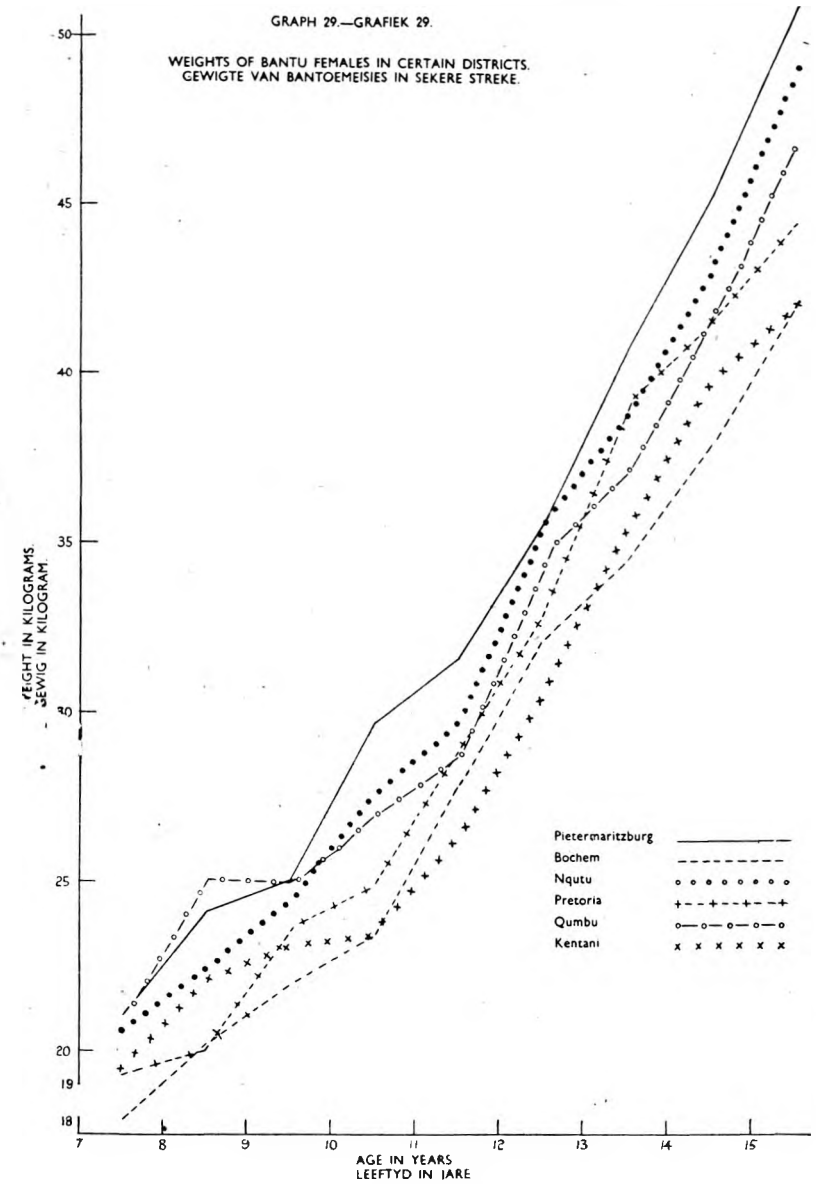
nie-skoolgaande kinders. Kinders is in onderstaande gebiede ondersoek:—

Pretoria, Harrismith (Witzieshoek), Bloemfontein, Qumbu, Kentani, Pietermaritzburg, Pietersburg (Bochem) en Letaba (Tzaneen).

'n Poging is aangewend om so presies as moontlik die ouderdomme van hierdie kinders te wete te kom.

GRAPH 29.—GRAFIEK 29.

WEIGHTS OF BANTU FEMALES IN CERTAIN DISTRICTS.
GEWIGTE VAN BANTOEMEISIES IN SEKERE STREKE.



2. *Comparison of Bantu with White Children.*

(1) Bantu boys are significantly lighter than White boys. In the 9 year-old group the Bantu are 19.4 per cent. lighter and in the 14 year-old-group 21.2 per cent. lighter than the White boys.

2. *Vergelyking van Bantoekinders met blanke kinders*

(1) Bantoeseuns is betekenisvol ligter as blanke seuns. In die leeftydsgroepe 9 jaar is die Bantoekinders 19.4 persent en in die leeftydsgroep 14 jaar 21.2 persent ligter as die blanke seuns.

(2) The Bantu girls are also significantly lighter by 18.67 per cent. in the 9 year-old group and 16.30 per cent. in the 14 year-old group.

(3) Bantu boys are significantly shorter than White boys, by 6.53 per cent. in the 9 year-old group and by 7.42 per cent. in the 14 year-old group.

(4) Bantu girls are significantly shorter than White girls by 6.87 per cent. in the 9 year-old group and by 5.58 per cent. in the 14 year-old group.

(5) As regards relaxed upper arm girth the Bantu boys are smaller by 13.97 per cent. in the 9 year-old and by 14.32 per cent. in the 14 year-old group compared with Whites.

(6) In the case of girls the differences in relaxed upper arm girth are also significant but are not as great as in the case of the boys, especially in the higher age groups. The difference comes to 13.48 per cent. in the 9 year-old group and 7.57 per cent. in the 14 year-old group.

(7) In bi-iliac width the Bantu boys are significantly smaller by 10.31 per cent. in the 9 year-old group and 11.71 per cent. in the 14 year-old group.

(8) The difference in bi-iliac width between girls of the two groups are also significant, but appear to be slightly less. The percentage figures come to 9.06 per cent. in the 9 year-olds and 9.49 per cent. in the 14 year-olds.

(9) The differences are discussed and it is concluded that environmental factors such as nutrition and preventable disease are at least as important as hereditary factors in deciding the size of children.

3. *Comparison of Growth Trends in Bantu Boys and Girls.*

(*a*) *Weight.*—The girls are heavier than the boys from 11 years to 15½ years, the oldest group studied.

(*b*) *Standing Height.*—Girls are taller than the boys from 11¼ to 15 years, after which the boys are again taller.

(*c*) *Chest Circumference (Relaxed).*—In this dimension the girls are smaller from 7½ to 12¾ years, after which they exceed the boys up to about 15 years.

(*d*) In regard to bi-iliac width the girls are bigger than the boys especially from 11 years onwards.

(*e*) In regard to relaxed upper arm girth the girls are bigger at all ages, the difference becoming more marked in the higher age groups.

4. *Comparisons Between Bantu Children of Six Different Areas in Regard to Height and Weight.*

(*a*) Two relatively "good" areas: Pietermaritzburg and Nqutu.

(2) Die Bantoemeisies is ook betekenisvol ligter, d.w.s. 18.67 persent in die leeftydsgroep 9 jaar en 16.30 persent op 14 jaar.

(3) Bantoeseuns is betekenisvol korter as blanke seuns, d.w.s. 6.53 persent in die leeftydsgroep 9 jaar en 7.24 persent op 14 jaar.

(4) Bantoemeisies is betekenisvol korter as blanke meisies, d.w.s. 6.87 persent op 9 jaar en 5.58 persent op 14 jaar.

(5) Die omvang van ontspanne boarm is by Bantoeseuns op 9 jaar 13.97 persent en op 14 jaar 14.32 persent kleiner as by blanke seuns.

(6) By die meisies is die verskille in omvang van ontspanne bo-arm ook betekenisvol, maar nie in so'n mate as by die seuns nie, en veral nie in die hoë leeftydsgroepe nie. Die verskil kom op 9 jaar op 13.48 persent en op 14 jaar op 7.57 persent te staan.

(7) Ten opsigte van heupwydte is die Bantoeseuns betekenisvol kleiner, d.w.s. 10.31 persent op 9 jaar en 11.71 persent op 14 jaar.

(8) By die meisies is die verskille in heupwydte ook betekenisvol, maar in ietwat geringer mate. Die persentasiesyfers is 9.06 persent op 9 jaar en 9.49 persent op 14 jaar.

(9) Die verskille is bespreek en daar is tot die gevolgtrekking gekom dat omgewingsfaktore soos voeding en voorkombare siektes minstens net so belangrik as erflikheidsfaktore is by die bepaling van liggaamsgrootte by kinders.

3. *Vergelyking van groeineigings by Bantoeseuns en -meisies*

(*a*) *Gewig.*—Die meisies is vanaf 11 tot 15½ jaar swaarder as die seuns. Hoër leeftye val buite die ondersoek.

(*b*) *Lengte, staande.*—Meisies is langer as seuns vanaf 11½ tot 15 jaar, waarna die seuns weer langer is.

(*c*) *Borsomvang (na uitaseming).*—In hierdie opsig is die meisies van 7½ tot 12¾ jaar kleiner; daarna is hulle groter as die seuns tot op die leeftyd van ongeveer 15 jaar.

(*d*) *Heupwydte.*—Ten opsigte van hierdie meting is die meisies groter as die seuns, veral van 11 jaar en daarbo.

(*e*) *Omvang van ontspanne boarm.*—Hier is die meisies op alle leeftye groter, en word die verskil meer opvallend met toenemende leeftyd.

4. *Vergelyking van Bantoekinders uit ses verskillende gebiede, ten opsigte van lengte en gewig*

(*a*) Twee betreklik „goeie" gebiede: Pietermaritzburg en Nqutu.

Boys.—The differences between heights are not significant. Nqutu boys are slightly lighter but not significantly so, than the Pietermaritzburg boys.

Girls.—The differences for both height and weight are not significant, but the Nqutu girls are lighter than the Pietermaritzburg girls, by more than the Nqutu boys are lighter than the Pietermaritzburg boys.

(*b*) A relatively "good" area compared with a bad area. Pietermaritzbugr compared with Bochem.

Boys.—The Pietermaritzburg boys are taller but this is not significant statistically. Bochem boys are lighter, significantly so, in five out of eight age groups, than the Pietermaritzburg boys.

Girls.—The Bochem girls are shorter, significantly so in four out of eight age groups. They are lighter than the Pietermaritzburg girls in all the age groups studied. An adverse environment therefore appears to affect girls in both weight and height, while in the case of boys its effect appears to be more marked in regard to weight.

5. *Graphic Comparison of Weight and Height of Bantu Boys and Girls in Six areas.*

Boys.—Up to the age of 9 the boys from five districts (Pretoria, Qumbu, Bochem, Kentani and Nqutu) are taller than those in Pietermaritzburg. After this age those in Bochem, Pretoria and Kentani are much shorter. Qumbu fluctuates and Nqutu is about the same.

Up to 10 years Qumbu boys, and up to 9 years, Nqutu boys are heavier than those in Pietermaritzburg. Those at Bochem, Kentani and Pretoria are lighter in all ages. Qumbu figures fluctuate again probably due to errors of sampling.

Girls.—In the case of the girls they are shorter up to 9 years in four districts (Nqutu, Kentani, Pretoria and Bochem) than the Pietermaritzburg standard.

In the case of girls those in three districts (Pretoria, Bochem and Kentani) are shorter in all the age groups. Those in Qumbu are a little taller up to 8½ years while Nqutu is, in general, very close to the Pietermaritzburg level.

In regard to weight, the Qumbu girls are heavier up to 9½ years. The girls in all the other districts are lighter especially in Pretoria, Kentani and Bochem, as is also the case with the boys.

Seuns.—Die verskille ten opsigte van lengte is nie betekenisvol nie. Nqutu-seuns is ietwat, dog nie betekenisvol nie, ligter as Pietermaritzburg-seuns.

Meisies.—Verskille in sowel lengte as gewig is nie betekenisvol nie, maar die Nqutu-meisies staan ten opsigte ven gewig verder agter by die Pietermaritzburg-meisies as die Nqutu-seuns by die Pietermaritzburg-seuns.

(*b*) 'n Betreklik „goeie" gebied vergeleke met 'n swak gebied: Pietermaritzburg teenoor Bochem.

Seuns.—Die Pietermaritzburg-seuns is langer maar nie in statisties betekenisvolle mate nie.

Bochem-seuns is ligter as Pietermaritzburg-seuns en in 5 uit die 8 leeftydsgroepe in betekenisvolle mate.

Meisies.—Die Bochem-meisies is korter, en in vier uit die agt leeftydsgroepe in betekenisvolle mate.

In al die bestudeerde leeftydsgroepe is hulle ligter as die Pietermaritzburg-meisies.

Dit lyk dus asof 'n ongunstige omgewing die meisies ten opsigte van sowel gewig as lengte aantas, terwyl dit in die geval van seuns 'n meer merkbare uitwerking op gewig skyn te hê.

5. *Grafiese vergelyking van lengte en gewig van Bantoe-seuns en -meisies in ses gebiede*

Seuns.—Tot op die leeftyd nege jaar is die seuns van die vyf ander streke (Pretoria, Qumbu, Bochem, Kentani en Nqutu) langer as dié van Pietermaritzburg. Na hierdie leeftyd is die seuns van Bochem, Pretoria en Kentani veel korter. Te Qumbu wissel dit en te Nqutu is die syfers omtrent dieselfde.

Tot op die leeftyd tien jaar is Qumbu-seuns en tot op die leeftyd nege jaar Nqutu-seuns swaarder as dié van Pietermaritzburg. Dié van Bochem, Kentani en Pretoria is op alle leeftye ligter. Te Qumbu wissel die syfers weereens, waarskynlik weens foute met monsterneming.

Meisies.—In vier streke (Nqutu, Kentani, Pretoria en Bochem) is die meisies tot op die leeftyd nege jaar korter as dié van Pietermaritzburg.

In drie streke (Pretoria, Bochem en Kentani) is die meisies in al die leeftydsgroepe korter. Dié van Qumbu is tot op 8½ jaar ietwat langer, terwyl die van Nqutu oor die algemeen baie naby die Pietermaritzburgse standaard is.

Die Qumbu-meisies is tot op die leeftyd 9½ jaar swaarder. In al die ander distrikte is die meisies ligter en veral in Pretoria, Kentani en Bochem; soos ook die geval met die seuns is.

APPENDIX 1

AANHANGSEL 1

Tables A and B below indicate the age and sex distribution of the children examined in the various areas.

Tabelle A en B hieronder is 'n weergawe van die leeftyds- en geslagsverspreiding van die kinders wat in die verskillende gebiede ondersoek is.

TABLE A.—BANTU GIRLS EXAMINED SOMATOMETRICALLY IN AGE GROUPS ACCORDING TO DISTRICTS.
TABEL A.—BANTOEMEISIES WAT SOMATOMETRIES IN LEEFTYDSGROEPE OOREENKOMSTIG STREKE ONDERSOEK IS.

Area. Gebied.	Age Groups. Leeftydsgroepe.									
	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–
Pietermaritzburg	19	22	32	40	52	49	52	47	33	33
Nqutu	4	13	31	33	55	51	71	78	60	37
Qumbu	21	29	33	35	54	46	72	51	43	45
Tzaneen (Letaba)	—	6	13	16	24	42	49	33	48	40
Pretoria	3	17	29	39	53	77	78	66	61	31
Bloemfontein	18	23	39	42	59	61	59	52	28	24
Witzieshoek (Harrismith)	9	25	30	42	75	55	86	73	59	34
Bochem	2	10	24	36	39	38	30	31	50	33
Kentani	12	27	40	51	53	36	56	30	30	18
TOTAL.—TOTAAL	87	171	269	331	463	452	552	461	412	294

GRAND TOTAL:
GROOTTOTAAL: 3,492.

TABLE B.—BANTU BOYS EXAMINED SOMATOMETRICALLY IN AGE GROUPS ACCORDING TO DISTRICTS.
TABEL B.—BANTOESEUNS WAT SOMATOMETRIES IN LEEFTYDSGROEPE OOREENKOMSTIG STREKE ONDERSOEK IS.

Area. Gebied.	Age Groups. Leeftydsgroepe.									
	6–	7–	8	9–	10–	11–	12–	13–	14–	15–
Pietermaritzburg	23	23	36	26	40	29	54	49	34	29
Nqutu	2	11	13	22	19	38	42	38	47	18
Qumbu	13	17	23	23	60	27	45	28	36	25
Tzaneen (Letaba)	—	5	10	23	51	59	67	53	69	50
Pretoria	—	10	19	32	39	38	50	51	53	27
Bloemfontein	13	25	35	34	44	50	83	49	45	17
Witzieshoek (Harrismith)	1	9	15	15	20	27	39	22	38	12
Bochem	1	13	33	22	51	43	62	47	62	34
Kentani	27	32	45	41	67	56	41	34	35	25
TOTAL—TOTAAL	80	144	229	238	391	364	483	367	419	236

GRAND TOTAL:
GROOTTOTAAL: 2,951.

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A Clinical Study of the Health and Nutrition of Bantu Schoolchildren

by Sidney L. Kark.

The clinical assessment of the state of nutrition of an individual is liable to many errors, even in the hands of the most experienced clinical nutrition workers. The nutritional condition of a child is dependant on many factors. The diet is no doubt of extreme importance, but it must be remembered that the utilisation of the food eaten is dependent on the capacity of the body to absorb and metabolise the food products. All disease interferes in one way or another with metabolism. Furthermore, such factors as the amount of sleep, work and exercise in relation to the diet also play an important part. The nutrition of the body may thus be briefly stated to be dependant on the following main factors:—

(1) *Extrinsic*—e.g. diet, sleep, exercise.

(2) *Intrinsic*—e.g. disease.

The importance of extrinsic factors is well recognised in nutrition studies, and the study of diets of groups of people has become a well developed science within the past few decades.

Intrinsic factors which inhibit the correct use of food are, however, frequently overlooked as important causes of malnutrition. The omission of the study of the incidence of various chronic diseases, such as syphilis, malaria, bilharzia, intestinal parasitic infections and tuberculosis, would give a very poor picture of the health and nutritional state of the group examined. More particularly is this the case in a study of the South African Bantu, whose general health is frequently influenced by the presence of two or more diseases.

The body functions as a unit and the influence of dietetic and disease factors cannot always be separated. The picture as seen by the clinician is in reality the resultant of several factors. The concept of the term "healthy" is no longer that of an absence of gross abnormalities, such as ear disease, tuberculosis, tonsillitis, etc., but includes the more positive feeling of well being which is as much the result of adequate feeding and sleep as it is due to the absence of disease

Kliniese Studie van die Gesondheid en Voeding van Bantoeskoolkinders

deur Sidney L. Kark.

Selfs vir die mees ervare voedingsdeskundiges in klinieke is die kliniese bepaling van die voedingstoestand van 'n indiwidu 'n saak waarby maklik 'n fout gemaak kan word. Die voedingstoestand van 'n kind is van baie faktore afhanklik. Ongetwyfeld is die dieët van die allergrootste belang, maar daar moet onthou word dat die benuttiging van die voedsel wat ingeneem word, afhanklik is van die vermoë van die liggaam om die voedselprodukte te absorbeer en te metaboliseer. Alle siekte werk op een of ander manier die stofwisseling teë. Verder speel faktore soos die hoeveelheid slaap, werk en oefening in verhouding met die dieët ook 'n belangrike rol. Dit kan dus kortliks gestel word dat die voeding van die liggaam van onderstaande hooffaktore afhanklik is:—

(1) *Uitwendig*—bv. dieët, slaap, oefening.

(2) *Inwendig*—bv. siekte.

Voedingswetenskaplikes is deeglik bewus van die belangrikheid van uitwendige faktore, en gedurende die afgelope paar dekades het die bestudering van die dieët van groepe mense 'n goed-ontwikkelde wetenskap geword.

Inwendige faktore wat die korrekte benuttiging van voedsel teëwerk, word egter dikwels oor die hoof gesien as belangrike oorsake van ondervoeding. Waar geen aandag aan die voorkoms van verskeie chroniese siektes soos sifilis, malaria, bilharzia, parasitêre ingewandsbesmettings en tuberkulose gewy word nie, word daar maar 'n baie gebrekkige voorstelling van die gesondheids- en voedingstoestand van die ondersoekte groep verkry. Dit is veral die geval by die bestudering van die Suid-Afrikaanse Bantoe, wie se algemene gesondheid dikwels deur die aanwesigheid van twee of meer siektes beïnvloed word.

Die liggaam funksioneer as 'n eenheid en die uitwerking van dieët- en siektefaktore kan nie altyd afsonderlik betrag word nie. Die beeld wat hom aan die kliniekwerker voordoen, is in werklikheid die uitvloeisel van verskeie faktore. Die begrip „gesond" dui nie meer bloot aan dat daar geen growwe abnormaliteite soos 'n oorsiekte, tuberkulose, tonsillitis, ens., aanwesig is nie, maar behels die meer positiewe begrip van welsyn wat net soveel die resultaat van toereikende voeding en slaap is as wat dit die gevolg is van die afwesigheid van siekteprosesse of geestelike onaanpasbaarheid. So ook is goeie voeding

processes or mental maladjustment. In like manner good nutrition can only be present when all these factors are so balanced as to exclude disease processes and social maladjustment. The child with anaemia resulting from repeated attacks of a disease such as malaria will never be rendered healthy by an improvement in diet without the eradication of this disease. Similarly the malnourished child suffering from malaria must needs have both conditions treated before recovery can be expected.

The present clinical study was, therefore, conducted in a manner which was thought would best indicate the various factors responsible for the health conditions of the children.

The presentation of the findings has been so arranged as to give as clear a picture as possible of the various abnormalities noted. Each abnormal sign has been discussed separately in the first instance with a note on the probable causes of this sign in each district. In the latter sections of the report the more important disease syndromes have been described and an attempt has been made to indicate the influence of all these factors in the various areas. This method has meant a certain amount of repetition, but in view of the preceding remarks it is hoped that a more precise understanding of the true state of affairs will thus result.

CHAPTER I

THE SKIN

" The patient with a disease of the skin expects to be given a diet. He needs it, but not always for the reason he has in mind. Dietary regulation accomplishes good in the treatment of cutaneous diseases not so frequently by eliminating certain foods as by insuring an adequate intake of nutritive essentials, for it is the lack of food rather than its harmful effect that is the more frequent cause of disease ". ((McLester, J. S., 'Nutrition and Diet in Health and Disease' Page 276—3rd Edition ").

That skin disease is very frequently a result of malnutrition is today an accepted fact. A number of abnormalities have been shown to be related to a specific deficiency in the diet, while others are apparently the result of a general lowering of the individual's health with which an inadequate diet is frequently related. Among the former more specific groups are those which have been described as resulting from such deficiencies as vitamins A and C, nicotinic acid, and riboflavin, and which can be readily cured by

slegs daar aanwesig waar al hierdie faktore in so'n volkome ewewig aanwesig is dat dit siekteprosesse en maatskaplike wanaanpassing uitsluit. Die kind wat ly aan bloedarmoede as gevolg van herhaalde aanvalle van 'n siekte soos malaria sal nooit deur 'n verbetering in sy dieët gesondgemaak word voordat hierdie siekte uitgeroei is nie. Om dieselfde redes moet die ondervoede kind wat aan malaria ly, noodwendig vir albei toestande behandel word voordat herstel verwag kan word.

Die huidige kliniese studie is dus uitgevoer op 'n wyse wat, na gemeen is, die beste aanduiding sou gee van die verskillende faktore wat vir die gesondheidstoestand van die kinders verantwoordelik is.

Die vorm waarin die bevindings weergegee word, is van so'n aard dat daaruit die duidelikste beeld van die verskillende abnormaliteite wat aangetref is, opgebou kan word. Elke teken van abnormaliteit is in die eerste plek afsonderlik bespreek en 'n aantekening daarby gemaak in verband met die waarskynlike oorsake daarvan in elke streek. In die laaste afdelings van die verslag word die belangrikste simptomekomplekse beskryf en gepoog om aan te dui watter uitwerking al hierdie faktore in die verskillende gebiede het. Hierdie metode het 'n mate van herhaling veroorsaak, maar die vertroue is dat bostaande opmerkings tot 'n juister begrip van die ware toedrag van sake sal lei.

HOOFSTUK I

DIE VEL

„ Die pasiënt met 'n huidaandoening verwag dat hy 'n dieët sal moet volg. Hy het dit dan ook nodig, maar nie altyd om die rede wat hy in die gedagte het nie. Reëling van dieët het 'n heilsame uitwerking by die behandeling van huidsiektes, dog nie so dikwels deurdat dit sekere voedselsoorte uitsluit nie as deurdat dit verseker dat noodsaaklike voedingsbestanddele in toereikende hoeveelhede ingeneem word, aangesien dit eerder die gebrek aan voedsel as sy skadelike uitwerking is wat mees dikwels siekte veroorsaak." (McLester, J. S., „ Nutrition and Diet in Health and Disease ", bladsy 276—3de Uitgawe.)

Vandag word algemeen aangeneem dat huidaandoenings baie dikwels die gevolg van ondervoeding is. Daar is bewys dat 'n aantal abnormaliteite in betrekking staan tot 'n spesifieke tekort in die dieët, terwyl ander weer skynbaar die gevolg is van 'n algemene agteruitgang van die indiwidu se gesondheid—'n omstandigheid wat dikwels gepaard gaan met 'n ontoereikende dieët. Onder eersgenoemde meer spesifieke groepe tel dié wat beskryf is as voortvloeiende uit tekorte aan vitamines A en C, nikotiensuur en riboflavine en geredelik deur aan-

administration of the particular deficiency factor. The more general group, which is commonly found in malnourished people but for which no specific food factor cure has been determined, includes the infectious skin diseases such as tropical ulcer and possibly impetigo. Further reference to these various lesions will be made in the succeeding sections. At this stage it is sufficient to state that the condition of the skin is an invaluable aid to the clinician in estimating the nutritional well-being or otherwise of an individual. In the present survey it formed one of the most important aspects of the clinical examination.

The Texture and Lustre of the Skin.—The healthy Bantu skin varies in colour from a light to a dark brown. It has a characteristic lustre and smoothness dependent on the degree of moistness as well as on the cleanliness of the individual. The dry, lustreless skin so commonly seen in the non-European hospitals of this country is assumed to be analogous to the pale dry skin of the malnourished or sick European child. The Bantu child with a muddy dry skin frequently exhibits other abnormal findings.

The assumption that this sign is suggestive of malnutrition is justified by the fact that more marked specific deficiency skin diseases are very often associated with this general lack of lustre. Apart from the frequency with which phrynoderma (follicular keratosis), hyperkeratosis of pellagra and tropical ulcer are found in patients who also evidence a lustreless skin, there are many less advanced abnormalities which in a survey of this nature cannot be overlooked. Such conditions as dry cracked legs (ichthyosis), prominence of the follicles giving an appearance of goose skin (cutis anserina), mild exfoliation resembling powdery flakes and thickening over joints and pressure points, were all so common in those children whose skin was dry and lustreless that they are best considered together with the latter group. Several of these abnormalities are so often seen among the Bantu that their very frequency might lead to their acceptance as a normal feature. Their etiology and significance have been studied by not a few nutrition workers and the following remarks are but a brief resume of their nature.

Ichthyosis of the Legs.—The skin of the anterior aspect of the legs becomes thickned and an irregular criss-cross pattern retults from cracking of the surface. Rao (1937) found this

dag aan die betrokke tekortfaktor genees kan word. Die mees algemene groep wat gewoonlik by ondervoede persone aangetref word, maar ten opsigte waarvan daar tot dusver nog geen spesifieke voedselfaktorgeneesmetode vasgestel is nie, behels die aansteeklike huidsiektes, soos bv. tropiese swere en moontlik impetigo. In later afdelings word verder na hierdie verskeie letsels verwys. Op hierdie stadium hoef slegs gemeld te word dat die toestand van die vel vir die klinieknavorser van onberekenbare waarde is by die bepaling van die voedingstoestand van 'n indiwidu. Gedurende die huidige opname het dit een van die belangrikste aspekte van die kliniese ondersoek uitgemaak.

Die tekstuur en glans van die vel.—Die kleur van 'n gesonde Bantoe wissel van lig- tot donkerbruin. Dit het 'n kenmerkende glans en gladheid, wat van sowel die graad van vogtigheid as die sindelikheid van die indiwidu afhanklik is. Die droë glanslose vel wat so algemeen in die nieblanke-hospitale van ons land aangetref word, word beskou as die teenhanger van die bleek droë vel van die ondervoede of siek blanke kind. Die Bantoekind met 'n modderkleurige, droë vel vertoon dikwels ander abnormale tekens en die veronderstelling dat hierdie verskynsel op ondervoeding dui, word geregverdig deur die feit dat meer opvallende spesifieke huidsiektes wat uit dieetgebreke ontstaan, baie dikwels met hierdie algemene gebrek aan glans in verbinding staan. Afgesien van die herhaalde voorkoms van phrynoderma (follikulêre keratose), hiperkeratose of pellagra en tropiese sweer by pasiënte van wie die vel ook glansloos is, is daar talle minder gevorderde abnormaliteite wat in 'n opname van hierdie aard nie oor die hoof gesien mag word nie. Toestande soos droë, gebarste bene (visskubbesiekte of ichthyose), uitstaande huidfollikels wat die voorkoms van hoendervleis gee (*cutis anserina*), 'n ligte vorm van poeieragtige huidskilfering en verdikking oor die litte en drukpunte, het almal so veelvuldig voorgekom by kinders van wie die vel droog en glansloos was, dat hulle bes bespreek kan word tesame met laasgenoemde groep. Verskeie van hierdie abnormaliteite word so dikwels onder Bantoes aangetref dat die algemeenheid daarvan daartoe kan lei dat aangeneem word dat hierdie toestande normaal is. Talryke voedingsnavorsers het die etiologie en betekenis van hierdie abnormaliteite bestudeer, en onderstaande opmerkings behels slegs 'n kort samevatting van hulle aard:—

Ichthyose van die bene.—Die vel aan die voorkant van die bene raak verdik en wanneer die oppervlakte dan vol barsies word, vorm dit 'n onreëlmatige kris-kras patroon. Rao (1937) het ontdek dat hierdie letsel

lesion to be a very common associate of the vitamin deficiency follicular keratosis, known as phrynoderma. The etiology of this latter condition will be further discussed at a later stage.

Cutis Anserina.—The goose skin appearance resulting from enlargement of the follicles is considered by most authorities to be but an early stage of well developed phrynoderma. It has been included in this section so that the more advanced signs of this follicular keratosis could be considered separately as indicating well established malnutrition. The distribution of these early follicular enlargements is exactly that of the more marked changes and will be discussed together with these.

Mild exfoliation.—The dry skin flakes which resemble large powder granules are most often seen on the face and are not uncommonly found over the back of the shoulders. In typical cases the cheeks and forehead give the impression of a face patchily powdered with flour. In describing pellagra among the Sudanese, Corkill (1934) refers to a " 'sulphur flake' sebaceous disfunction on the forehead, wings of the nose, cheeks and chin". Persistence of this "floury" appearance after cleaning with methylated spirit indicates that it was not simply due to dust or dirt.

Wrinkling of the Nose.—The wizened wrinkled facies of a severely malnourished baby is well recognised. This extreme manisfestation is not often seen in older children, more particularly in those who are still well enough to attend school. However, a certain amount of wrinkling would be expected in children whose skins were dry and loose due to subcutaneous tissue wasting. The skin overlying joints was frequently found to be thickened and wrinkled and of a darker hue than the adjacent area, resembling closely the appearance of the skin at these sites in elderly persons.

The fact that the above signs are all minor manifestations of nutritional disturbance often results in their being overlooked by the patients themselves. They give rise to no pain nor discomfort and when the affected person sees so many others in the same state he accepts them as normal. They are, however, of great value as they are the early manifestations of severe disorders. Their incidence forms a very useful guide to the extent of

baie algemeen voorkom tesame met die follikulêre keratose wat uit 'n vitaminetekort ontstaan en as phrynoderma bekend is. Die etiologie van laasgenoemde toestand sal op 'n later stadium verder bespreek word.

Cutis anserina.—Die hoendervleisvoorkoms wat deur vergroting van die follikels veroorsaak word, word deur die meeste gesaghebbendes beskou as niks meer dan 'n vroeë stadium van goed-ontwikkelde phrynoderma nie. Dit word onder hierdie afdeling ingesluit sodat die meer gevorderde siektetekens van hierdie follikulêre keratose afsonderlik oorweeg kan word as 'n aanduiding van goed-gevestigde ondervoeding. Die verspreiding van hierdie vroeë follikulêre vergrotings is presies dieselfde as dié van die meer opvallende veranderings en sal tesame daarmee bespreek word.

Ligte vorm van huidskilfering.—Die droë huidskilfers wat soos groot poeierkorrels lyk, kom hoofsaaklik op die gesig voor en word taamlik dikwels agter oor die skouers ook aangetref. In tipiese gevalle het die wange en voorkop die voorkoms van 'n gesig wat in kolle met meelblom gepoeier is. In sy beskrywing van pellagra by die Soedan-negers verwys Corkill (1934) na „wasagtige ,swawelskilfer'-disfunksies aan die voorkop, neusvleuels, wange en ken". Aangesien hierdie meelagtige voorkoms nie met brandspiritus verwyder kan word nie, is dit duidelik dat dit nie eenvouding deur stof of vullis veroorsaak is nie.

Rimpeling van die neus.—Die maer verrimpelde facies, d.w.s. gelaatstrekke, van 'n erg ondervoede baba is welbekend. Hierdie uiterste verskynsel word nie dikwels by ouer kinders aangetref nie, veral by diegene wat gesond genoeg is om die skool te besoek nie. Daar kon egter 'n mate van verrimpeling verwag word by kinders wie se velle droog en los is vanweë uittering van die onderhuidse weefsel. Daar is dikwels gevind dat die vel om die litte verdik en verrimpeld en van 'n donkerder kleur as die aanliggende oppervlakte is, waardeur dit baie lyk op die vel van bejaarde persone aan die betrokke liggaamsdele.

Die feit dat bogenoemde siektetekens almal klein aanduidings van voedingsversteurings is, is dikwels die oorsaak dat hulle deur die pasiënte self oor die hoof gesien word. Hulle veroorsaak geen pyn of ongerief nie, en wanneer die aangetaste persoon merk dat talle ander in dieselfde toestand verkeer, dan beskou hy hierdie verskynsels as normaal. Vir diegene wat in die voeding van mensegroepe belangstel, is hulle egter van groot waarde, aangesien hulle die vroeë manifestasies van ernstige versteurings is. Die omvang van hulle voorkoms stel 'n baie nuttige leidraad daar by die bepaling van die omvang van wanvoeding in 'n gebied. Tabel 1

malnutrition in an area. Table I indicates the incidence of dry, lustreless skins associated with one or more of the manifestations described above.

is 'n weergawe van die voorkoms van droë, glanslose vel tesame met een of meer van die verskynsels wat hierbo beskrywe is.

TABLE 1.—THE INCIDENCE OF DRY, LUSTRELESS SKINS ASSOCIATED WITH ONE OR MORE EARLY MANIFESTATIONS OF MALNUTRITION (SEE TEXT).
TABEL 1.—VOORKOMS VAN DROË, GLANSLOSE VEL TESAME MET EEN OF MEER VROEË AANDUIDINGS VAN ONDERVOEDING (SIEN TEKS).

District. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases with Above Abnormalities. Getal gevalle met bogenoemde abnormaliteite.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases with Above Abnormalities. Getal gevalle met bogenoemde abnormalitiete.	Percentage Incidence. Persentasie-voorkoms.
Qumbu (Transkei)	36	10·59	16	3·31
Pietermaritzburg (Natal)	53	13·91	40	10·05
Kentani (Transkei)	149	34·42	86	22·70
Pretoria (Transvaal)	139	39·94	81	17·38
Nqutu (Natal)	106	37·33	95	20·30
Bloemfontein (O.F.S.—O.V.S.)	150	36·95	100	23·98
Witzieshoek (O.F.S.—O.V.S.)	102	45·13	158	31·05
Letaba (Transvaal)	292	57·03	138	43·81
Bochem (Transvaal)	287	62·13	146	44·66

In all areas the incidence of this group of abnormalities is more common in boys than in girls. Similar findings have been recorded during the course of investigations by other workers and subsequent sections of this report indicate that a considerable number of malnutrition manifestations are more frequently found in boys than girls. Various theories have been propounded to explain this difference, but no useful purpose can be served by their further consideration at this stage.

The considerable variation in the findings of the different districts is of extreme interest. It was not to be expected that the children of a town such as Pietermaritzburg should evidence lesions less commonly than other urban groups such as those of Pretoria and Bloemfontein, The exact causes of these differences cannot be stated with any degree of truthfulness. The discussion which follows in the remaining portions of this report will no doubt aid us in our final estimation of these factors. These considerations are therefore more suitably judged in the concluding sections.

The number of children examined was not the same in each district. For this reason no figures have been calculated for the total incidence of these and other manifestations, as those areas with a larger number of children examined would unduly weight the final figures in the direction of their results. On similar grounds boys and girls are not combined in order to arrive at an estimate of the total findings for each district. As has been demonstrated (Table I) boys are significantly more commonly affected

In alle gebiede kom hierdie groep abnormaliteite meer algemeen by seuns as by meisies voor. Ander navorsers het in die loop van hulle ondersoekings tot soortgelyke bevindings gekom, en latere afdelings van hierdie verslag dui daarop dat daar 'n aansienlike aantal ondervoedingsverskynsels is wat meer dikwels by seuns as by meisies voorkom. Verskeie teorieë word gehuldig ten opsigte van die verklaring van hierdie verskil, dog dit het min nut om hulle op hierdie stadium verder te bespreek.

Die aansienlike wisseling in die bevindings ten opsigte van die verskillende streke is uiters interessant. Daar kon nie verwag word dat die kinders van 'n dorp soos Pietermaritzburg die letsels minder algemeen sou vertoon as kinders van ander stedelike groepe soos bv. dié van Pretoria en Bloemfontein nie. Die presiese oorsaak van hierdie verskille kan nie met enige mate van waarheidsgetrouheid verduidelik word nie. Die bespreking wat in die oorblywende gedeeltes van hierdie verslag volg, sal ons ongetwyfeld help by ons finale waardering van hierdie faktore. Dit sou dus meer paslik wees om hierdie oorwegings in die latere afdelings te beoordeel.

Die aantal kinders wat ondersoek is, was nie in elke streek dieselfde nie. Om hierdie rede is daar geen berekening van die totale voorkoms van hierdie en ander verskynsels gedoen nie, aangesien gebiede met 'n groter aantal ondersoekte kinders die finale syfers te veel in die rigting van hulle resultate sou beswaar het. Om dieselfde redes word seuns en meisies nie gesamentlik behandel ten einde 'n beeld van die totale bevindings vir elke streek weer te gee nie. Soos reeds aangedui (tabel 1) word seuns betekenisvol meer algemeen as meisies aangetas en is die verhouding van

than girls and the ratio of girls: boys examined in the various areas is not constant (Appendix I). Thus an area in which the ratio of girls to boys is greater than in another district will appear in a better comparative light than it does when the actual sex incidence is determined. Any attempt to obviate these statistical difficulties and yet present a truthful picture is not a simple measure.

Malnutrition, as judged by these abnormalities alone, is common in all districts. In 7 of the 9 districts more than *one of every three boys examined was affected* and of these there were two areas in which this figure was *more than one of every two boys*. The girls, although less commonly manifesting their skin signs, were involved to the extent of *more than one in every five* examined in 6 of the areas.

Phrynoderma (Follicular Keratosis).—Lowenthal (1933) in investigating the clinical condition of prisoners in Uganda noted some skin lesions which were often associated with nightblindness and xerophthalmia, both common results of Vitamin A deficiency. His excellent description of these abnormalities enables one to realise that some of the manifestations seen by him are exactly the same as those commonly met with in the Bantu of this country. He described those in question as follows:—

(*a*) "Smooth topped, shiny papules, distributed over the exterior surfaces of the arms, the anterior and external surfaces of the thighs and sometimes on the buttocks, loins, chest and back."

(*b*) "A folliculitis in which pilosebaceous follicles are sealed with a mass of horny tissue accompanied by hyperkeratosis in the immediate neighbourhood and deep black pigmentation."

Little can be added to this description of follicular keratosis, with the exception that it is not uncommonly distributed over the abdomen—more particularly *cutis anserina* and the above descriptions (*a*) and (*b*) would appear to be different stages of one and the same condition.

Frazier and Hu (1931, 1936) in China, Lowenthal (1933) in Uganda and Karunakaran and Krishnan Nair (1940) in India have reported the cure of this lesion by administration of cod liver oil. There is thus evidence to the effect that Vitamin A deficiency is responsible for the apperance of follicular keratosis.

It has, however, also been described as an early skin manifestation of scurvy. Crandon et al (1940) reported

ondersoekte meisies teenoor seuns in die verskillende gebiede nie konstant nie (Aanhangsel 1). 'n Gebied waarin die verhouding van meisies tot seuns groter is as in 'n ander streek, sal derhalwe vergelykenderwys in 'n beter lig staan as wat die geval is wanneer die werklike voorkoms onder die geslagte bepaal word. 'n Poging om hierdie statistiese moeilikhede te ontwyk en nogtans 'n waarheidsgetroue weergawe te verkry, is nie 'n eenvoudige saak nie.

Word wanvoeding slegs aan die hand van hierdie abnormaliteite betrag, dan is dit in alle streke van algemene voorkoms. In sewe uit die nege streke *was meer as een uit elke drie ondersoekte seuns aangetas* en van hierdie gebiede was daar twee waarin hierdie syfer op *meer as een uit elke twee seuns te staan gekom het.* Hoewel die meisies hierdie huidverskynsels minder algemeen vertoon, was daar in ses van hierdie gebiede *meer as een uit elke vyf wat ondersoek is, aangetas.*

Phrynoderma (Follikulêre keratose).—By sy ondersoek na die kliniese toestand van prisoniers in Uganda het Lowenthal (1933) sekere huidletsels teëgekom wat dikwels met nagblindheid en *Xerophthalmus,* albei siektes wat algemeen deur vitamine A-tekort veroorsaak word, geassosieer is. Sy uitstekende beskrywing van hierdie abnormaliteite stel ons in staat om te begryp dat sommige van die verskynsels wat hy waargeneem het, presies dieselfde is as dié wat algemeen onder die Bantoes van ons land aangetref word. Hy het die betrokke verskynsels as volg beskryf:—

(*a*) „Gladtoppige, blink papelle, versprei oor die uitwendige oppervlaktes van die arms, die voorste en buite-oppervlaktes van die dye en soms op die boude, lende, bors en rug."

(*b*) „'n Follikulitis waarby pilosebaceuse follikels met 'n massa horingagtige weefsel verseël is, vergesel van hiperkeratose in die onmiddellike omgewing, en diep swarte pigmentasie."

Daar kan min by hierdie beskrywing van follikulêre keratose bygevoeg word, behalwe dat dit nogal dikwels oor die buik versprei is—veral *cutis anserina,* en bostaande beskrywings (*a*) en (*b*) skyn verskillende stadiums van een en dieselfde toestand te weerspieël.

Frazier en Hu (1931, 1936) het uit Sjina, Lowenthal (1933) uit Uganda, en Karunakaran en Krishnan Nair (1940) uit Indië gerapporteer dat hierdie letsel deur gebruik van lewertraan genees is. Daar is dus bewyse dat vitamine A-tekort die oorsaak is van follikulêre keratose.

Dit is egter ook beskryf as 'n vroeë huidverskynsel van skeurbuik. Crandon en ander (1940) het die voorkoms hiervan gerapporteer in 'n geval

its occurrence in a case of experimental human scurvy in which the only known defect in the diet was Vitamin C.

Stannus (1912) in Nyasaland and the author have noted this skin deficiency sign to be fairly common in pellagrins. The possibility of a relationship to the Vitamin B_2 complex must therefore be considered. However, Karunakaran and Krishnan Nair (1940) were unable to effect an improvement in cases treated with Marmite.

While further work will no doubt elucidate many of the more intricate etiological factors of this dermatitis, sufficient data are available to justify the conclusion that it is essentially a food deficiency disease.

The incidence of the early manisfestation of "goose skin" has already been discussed in association with dry, lustreless skins and other early dermal indications of malnutrition. The figures now to be discussed are confined to the more advanced stages in an attempt to assess the occurrences of the grosser signs of malnutrition.

van eksperimentele skeurbuik by die mens waarby die enigste bekende dieetgebrek 'n tekort aan vitamine C was.

Stannus (1912), (Niassaland) en skrywer hiervan het opgemerk dat hierdie tekortteken in die vel taamlik algemeen onder pellagra-lyers voorkom. Derhalwe moet die moontlikheid daarvan dat dit in 'n verhouding tot die vitamine B_2-kompleks staan, oorweeg word. Karunakaran en Krishnan Nair (1940) kon egter geen verbetering in gevalle wat met Marmite behandel is, teweeg bring nie.

Ofskoon verder navorsingswerk ongetwyfeld lig op talle van die meer ingewikkelde etiologiese faktore van hierdie huidaandoening sal werp, is daar reeds genoeg gegewens beskikbaar om die gevolgtrekking te regverdig dat dit in wese 'n voedselgebreksiekte is.

Die voorkoms van die vroeë verskynsel van „hoendervleis" is alreeds tesame met die droë glanslose vel en ander vroeë huidaanduidings van wanvoeding bespreek. Die syfers wat tans bespreek gaan word, het betrekking slegs op die meer gevorderde stadiums, in 'n poging om die voorkoms van die ernstiger tekens van ondervoeding te bepaal.

TABLE 2.—THE INCIDENCE OF THE MORE ADVANCED SIGNS OF PHRYNODERMA FOLLICULAR KERATOSIS).

TABEL 2.—VOORKOMS VAN DIE MEER GEVORDERDE TEKENS VAN PHRYNODERMA (FOLLIKULÊRE KERATOSE).

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases of Advanced Phrynoderma. Getal gevalle van gevorderde Pyrynoderma.	Percentage Incidence. Persentasie-voorkoms.	Number of Casse of Advanced Phrynoderma. Getal gevalle van gevorderde Phrynoderma.	Percentage Incidence. Persentasie-voorkoms.
Qumbu (Transkei).....	10	2·94	5	1·03
Pietermaritzburg (Natal)....	10	2·63	10	2·51
Kentani (Transkei).....	15	3·46	18	4·75
Witzieshoek (O.F.S.—O.V.S.).....	24	10·62	33	6·48
Bloemfontein (O.F.S.—O.V.S.).....	47	11·58	26	6·24
Nqutu (Natal).....	48	16·90	28	5·98
Bochem (Transvaal).....	114	24·68	57	17·44
Letaba (Transvaal).....	147	28·71	63	20·00
*Pretoria (Transvaal).....	Figures not calculated.— Syfers nie bereken nie.			

* The figures for this, the first area visited, are not calculated for the reason that it was in this district that many of the standards of judgement were determined. No distinction was, therefore, made between the various stages of phrynoderma).

* Die syfers vir hierdie gebied, die eerste wat besoek is, is nie bereken nie, omdat dit in hierdie streek was waar baie van die standaarde vir beoordeling vasgestel is. Gevolglik is daar geen onderskeid tussen die verskillende stadiums van phrynoderma gemaak nie).

As would be expected there is a fairly close parallelism in the comparative incidence of phrynoderma and the skin signs analysed in the previous section. It will be noted that the districts, which are arranged in both tables (1 and 2) in order of increasing frequency of abnormal signs, hold more or less the same position in both analyses. Qumbu and Pietermaritzburg exhibit the least number of cases in both groups of findings, whereas Bochem and Letaba evidence the highest occurrences in both. In the majority of districts there is a fairly

Soos verwag kon word, is daar 'n taamlik noue parallelisme tussen die voorkoms van phrynoderma en die huidtekens wat in die voorafgaande afdeling ontleed is. Daar sal opgelet word dat die streke, wat in albei tabelle (1 en 2) in die volgorde van toenemende voorkoms van abnormale siektetekens gerangskik is, min of meer in dieselfde volgorde by albei ontledings staan. In albei die groepe bevindings vertoon Qumbu en Pietermaritzburg die kleinste aantal gevalle en Bochem en Letaba die grootste. In die meeste distrikte is daar 'n taamlik

marked difference in the sexes, boys again being more commonly affected than girls.

The fact that these advanced lesions were found in all the areas visited indicates that marked vitamin deficiency must be present in all. The probability that Vitamin A is the particular deficiency involved has already been discussed. The range of incidence in boys, from 2.63 per cent. in Pietermaritzburg to 28.71 per cent. in Letaba is a probable index of the extent to which this vitamin is wanting in the diets of the various groups of children. The comparatively low incidence in such areas as Pietermaritzburg and Qumbu should not lead to the conclusion that these children are in an ideal state of nutrition. A select group of children, as are the Bantu who attend school (see introductory chapter to this report), must be considered to be markedly defective when over 10 per cent. of boys manifest minor skin signs of malnutrition and more than 2.5 per cent. exhibit advanced phrynoderma probably resulting from gross Vitamin deficiency.

Dermatitis of Pellagra.—The deficiency syndrome of pellagra will be discussed in greater detail in a later section of this report. The dermatitis which is highly characteristic, will be considered with the whole syndrome (see Chapter 14).

Infectious Skin Diseases.—The following diseases are discussed in this section:—

(*a*) Scabies and Impetigo.
(*b*) Tropical ulcer.

(*a*) *Scabies and Impetigo.*—These conditions are discussed and analysed together because chronic impetigo is very often superimposed on scabies. In the present series the vast majority of cases of impetigo were associated with the latter.

They are spread mainly by contact depending to a considerable extent on overcrowding and the huddling together of people. The use of communal blankets and the frequent interchange of clothing no doubt assist in the propagation.

The incidence of these diseases, more particularly when in combination as in the present study, is a very useful index of the standard of personal hygiene of a community. This statement is not meant to imply merely an individual or communal disregard for cleanliness but even more important is the social environment of the particular group. The high incidence of scabies in England during war time is is an illustration of this statement.

opvallende verskil tussen die geslagte, en word seuns meer algemeen as meisies aangetas.

Die feit dat hierdie gevorderde letsels in al die besoekte gebiede teëgekom word, dui daarop dat opvallende vitaminetekorte in al die distrikte aanwesig is. Die moontlikheid dat die tekort aan vitamine A die belangrikste is, is alreeds bespreek. Die voorkoms van die siekte onder seuns (van 2.63 persent te Pietermaritzburg tot 28.7 persent te Letaba) is 'n waarskynlike indeks van die mate waarin hierdie vitaminegebrek in die dieët van die verskillende groepe kinders gevoel word. Die betreklik lae syfer in gebiede soos die van Pietermaritzburg en Qumbu behoort nie tot die gevolgtrekking te lei dat hierdie kinders in 'n ideale voedingstoestand verkeer nie. 'n Uitgesoekte groep kinders, soos die Bantoekinders wat die skole besoek (sien inleiding tot hierdie verslag) moet geag word opvallend gebrekkig te wees wanneer meer as 10 persent van die seuns geringe huidaanduidings van ondervoeding en meer as 2.5 persent tekens van gevorderde phrynoderma vertoon —die waarskynlike gevolg van ernstige vitaminetekort.

Dermatitis van pellagra.—Die tekortsindroom van pellagra sal in 'n later afdeling van hierdie verslag uitvoeriger bespreek word. Die dermatitis self, wat in hoë mate kenmerkend is, sal tesame met die hele sindroom bespreek word (sien hoofstuk 14).

Aansteeklike huidsiektes.—In hierdie afdeling word die volgende aansteeklike siektes bespreek:—

(*a*) Scabies en impetigo.
(*b*) Tropiese swere.

(*a*) *Scabies en impetigo.*—Hierdie toestande word tesame bespreek en ontleed, omdat scabies baie dikwels superponeerd saam met chroniese impetigo voorkom. In die huidige reeks gevalle is die oorgrote meerderheid impetigo-gevalle tesame met scabies aangetref.

Hierdie siektes word hoofsaaklik deur aanraking versprei, veral waar mense in hutte saamdring en 'n oorbevolkte toestand veroorsaak. Die gesamentlike gebruik van komberse en die feit dat die naturelle dikwels mekaar se klere aantrek, help ongetwyfeld om die siektes te versprei.

Die omvang waarin hierdie siektes voorkom, en veral wanneer hulle saam aangetref word soos in die huidige ondersoek, is 'n baie nuttige maatstaf van die peil van persoonlike higiëne in 'n gemeenskap. Hiermee word nie bedoel bloot 'n indiwiduele of gemeenskaplike veronagsaming van sindelikheid nie, maar ook veral die maatskaplike omgewingsfaktor van die besondere groep. Die uitgebreide voorkoms van scabies in Engeland gedurende die oorlogstyd [illegible] voorbeeld van so 'n toestand.

TABLE 3.—THE INCIDENCE OF SCABIES AND IMPETIGO CONTAGIOSA.
TABEL 3.—VOORKOMS VAN SCABIES EN IMPETIGO CONTAGIOSA.

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases with Scabies and/or Impetigo. Getal gevalle met scabies en/of impetigo.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases with Scabies and/or Impetigo. Getal gevalle met scabies en/of impetigo.	Percentage Incidence. Persentasie-voorkoms.
Pretoria (Transvaal).....	21	6·03	18	3·86
Bloemfontein (O.F.S.—O.V.S.).....	25	6·16	17	4·08
Pietermaritzburg (Natal)....	26	6·83	17	4·27
Witzieshoek (O.F.S.—O.V.S.).....	24	10·62	23	4·52
Nqutu (Natal).....	32	11·27	33	7·05
Qumbu (Transkei).....	39	11·48	44	9·09
Letaba (Transvaal).....	84	16·41	29	9·21
Bochem (Transvaal).....	107	23·16	59	18·05
Kentani (Transkei).....	137	31·63	76	20·05

In comparing these findings (table 3) with those of table 1 and 2, it is seen that there is no correlation in the incidence of these infectious diseases with those skin changes of nutritional deficiency origin. The outstanding feature is that the three urban areas, Pretoria, Bloemfontein and Pietermaritzburg have a considerably lower percentage of both girls and boys manifesting scabies and impetigo than have the rural areas. There are many who believe that the rural Bantu in their own territories maintain a higher standard of hygiene than do those of urban areas. The findings in regard to scabies and impetigo do not conform to these impressions, and if it is accepted that the spread of these diseases is a result of an insanitary environment and lack of personal cleanliness then we must conclude that the rural Bantu are at a comparative disadvantage.

The incidence in all areas must be viewed as being very high. The author has found that intensive education and group treatment can do much to exclude these filth diseases from Bantu schools. There is always a danger that familiarity with such sights as endemic scabies and concomitant impetigo might lead to their acceptance as inevitable.

(*b*) *Tropical Ulcer.*—This interesting condition was found to be localised to the children of only one of the nine districts visited, namely Letaba. A considerable amount of attention has been paid to this disease in many other parts of Africa and the understanding of its nature and methods of control are acute problems to most authorities of Southern Africa. The fact that it was limited to one area visited by the survey unit compels us

Word hierdie bevindings (tabel 3) met dié van tabelle 1 en 2 vergelyk, dan blyk dit dat daar geen korrellasie tussen die voorkoms van hierdie aansteeklike siektes en huidaandoenings wat uit 'n voedingstekort ontstaan, bespeurbaar is nie. Die opvallendste eienskap is dat in die drie stedelike gebiede Pretoria, Bloemfontein en Pietermaritzburg 'n aansienlik laer persentasie seuns en meisies aan scabies en impetigo ly as wat die geval in die plattelandse gebiede is.

Baie navorsers glo dat die landelike Bantoes in hul eie gebiede 'n hoër plei van higiëne kan handhaaf as hulle rasgenote in die stedelike gebiede. Die bevindings ten opsigte van scabies en impetigo staaf nie hierdie bewerings nie, en as aangeneem word dat die verspreiding van hierdie siektes 'n uitvloeisel is van 'n onsanitêre amgewing en gebrek aan persoonlike sindelikheid, dan moet ons tot die gevolgtrekking kom dat die landelike Bantoe daar betreklik slegter aan toe is.

In alle gebiede moet die omvang van die siekte as baie groot beskou word. Skrywer hiervan het gevind dat intensiewe onderwys en groepbehandeling veel daartoe kan bydra om hierdie vuilheidsiektes uit Bantoeskole te verwyder. Daar is altyd gevaar dat daaglikse aanraking met endemiese scabies en vergesellende impetigo daartoe sal lei dat aangeneem word dat hierdie siektes 'n onvermydelike deel van die bestaan uitmaak.

(*b*) *Tropiese swere.*—Dit het geblyk dat hierdie interessante toestand by die kinders van slegs een uit die nege besoekte streke, tewete, Letaba, aangetref is. Heelwat aandag is in baie ander dele van Afrika aan hierdie siekte geskenk en die meeste outoriteite van Suidelike Afrika vind dat 'n begrip van die aard van hierdie siekte en die nodige bestrydingsmetodes probleme van dringende aard is. Aangesien die siekte slegs in 'n enkele gebied voorkom, moet ons noodwendig ons bespreking daarvan

to limit our discussion and only a brief resumé of its main features will be considered in this report.

The tropical ulcers seen during this survey were all localised to the legs, with usually only a single ulcer on the limb. The size of the ulcer varied considerably, from an half-inch to a diameter of three, or in a few cases four inches. The appearance of the ulcer differs according to the degree of activity. In some, a hard granulating surface was seen in juxtaposition with a sloughing penetrating area. This power of penetration is almost characteristic and within a few days an innocent looking blister or small superficial ulcer can penetrate through soft tissues down to bone causing a periostitis.

The exact cause of this disabling disease is yet to be determined. In many cases there is a history of the formation of a blister or more commonly a small ulcer following an injury even of a mild abrasive nature. This injury can, however, only be viewed as an exciting agent. The disease is infectious, the infecting agent *B. fusiformis* and a *spirillum* being found in the majority of cases. In all the smears of ulcers examined during the survey these two organisms were present.

The influence of climate and the co-existence of malaria and various other parasitic infections such as bilharziasis may all be of importance. Evidence is accumulating that the diet is of no small importance in determining the occurrence of this ulcerative condition. Two sets of observations in different African territories illustrate the relationship to diet.

In Kenya, Orr and Gilks (1931) noted that the condition was very common among the vegetarian Kikuyu, Kavirondo, Wakamba and other tribes, whereas it was uncommon among the carnivorous Masai and Swahili.

Lowenthal (1937) reporting on the incidence of tropical ulcer in the Teso district of Uganda, found it to be rare in the Opami fish eating tribe, while their very near non-fish eating neighbours, the Ajuluku, were commonly affected.

That there is some relationship to the food habits of groups of people is thus demonstrated to be very probable. In spite of numerous intensive studies to determine the specific deficiency involved it cannot be accepted that any such specificity has

beperk en kan ons slegs 'n kort opsomming van sy vernaamste verskynsels in hierdie verslag opneem.

Die tropiese swere wat gedurende hierdie opname teëgekom is, was almal aan die bene van die aangetaste kinders en gewoonlik was daar slegs een sweer aan 'n been. Die grootte van die swere het heelwat gewissel—van 'n half duim tot drie en in enkele gevalle 4 duim in deursnee. Die voorkoms van die swere verskil ooreenkomstig die graad van hul aktiwiteit. In sommige gevalle was daar 'n harde korrelrige oppervlakte in teenstelling met 'n oppervlakte waar die sweer indring en dooie materiaal afwerp. Hierdie indringingsvermoë is byna 'n kenmerkende eienskap; binne enkele dae kan 'n oënskynlik onskuldige waterblaas of 'n klein oppervlakkige sweertjie deur die sagte weefsel dring tot op die been en periostitis veroorsaak.

Die juiste oorsaak van hierdie belemmerende siekte moet nog bepaal word. In baie gevalle dui die siekteverloop op die vorming van 'n waterblaas, of meer algemeen 'n klein sweertjie na 'n besering wat selfs so gering kan wees as 'n skaafplekkie. Hierdie besering kan egter slegs as 'n prikkeling tot die ontstaan van die sweer beskou word. Die siekte is aansteeklik, en in die meeste gevalle word die besmettingveroorsakende *bacillus fusiformis* en *spirillum* aangetref. Hierdie twee organismes was aanwesig in al die sweersmere wat gedurende die opname ondersoek is.

Die uitwerking van klimaat en die gelyktydige voorkoms van malaria en verskeie ander parasitêre besmettings soos bilharzia kan almal van belang wees. Daar kom al meer en meer bewys wat daarop dui dat diëet van geen geringe belang is by die veroorsaking van hierdie ulcereuse toestand nie. Uit twee stelle waarnemings in verskillende Afrikaanse gebiede blyk dat diëet van belang is.

In Kenia het Orr en Gilks (1931) opgemerk dat die toestand baie algemeen voorkom onder die vegetariese Kikuyu-, Kavirondo-, Vakamba- en ander stamme, terwyl dit baie selde onder die vleisetende Masai- en Swahili-stamme aangetref word.

In 1937 het Lowenthal in 'n verslag insake die voorkoms van tropiese sweer in die distrik Teso, Uganda, verklaar dat dit selde onder die visetende Opami-stam dog baie algemeen onder hulle baie naby geleë nie-visetende bure, die Ajaluko, aangetref word.

Daar is dus bewys dat daar hoogswaarskynlik 'n verband bestaan tussen die voedsel van mensegroepe en die voorkoms van hierdie siekte. Ten spyte van talryke intensiewe studies met die oog op die bepaling van die spesifieke tekort wat hierdie toestand veroorsaak, kan daar nog nie aangeneem word dat so 'n spesifieke tekort

been proved beyond dispute. In the light of the above remarks, the occurrence of tropical ulcer in Letaba can be examined.

TABLE 4 (*a*)—THE INCIDENCE OF TROPICAL ULCER IN THE LETABA DISTRICT.

		Percentage Incidence.
Total No. of Cases seen in Schoolchildren.....	83	10·03
Total No. of Boys seen in Schoolchildren.....	62	12·11
Total No. of Girls seen in Schoolchildren.....	21	6·67

The above table indicates that boys are more commonly affected than girls. It will be remembered that in discussing other skin diseases met with during the survey similar results were obtained. The high incidence of 12.11 per cent. in boys and 6.67 per cent. in girls is more likely an understatement of the position. Scars which were probably the remnants of healed ulcers were not included in the estimation of the presence of tropical ulcer, only those children with frank unhealed lesions being so considered. Furthermore, in view of the fact that in some instances the children had to travel several miles to the point at which the examination was conducted, it can be assumed that some of those with severe ulcers did not attend. Teachers also gave information to the effect that several children were absent from school on the day of examination. That this absence was due to tropical ulcer in some of the cases is probable.

The extent of the infection was not found to be equal in all schools. Three distinct areas of the district were visited and the following table (4*b*) indicates the variability.

met beslistheid vasgestel is nie. In die lig van bostaande opmerkings kan die voorkoms van die tropiese sweer in Letaba tans die aandag geniet.

TABEL 4 (*a*)—VOORKOMS VAN TROPIESE SWEER IN DIE LETABA-GEBIED.

		Persentasievoorkoms.
Totale aantal gevalle onder skoolkinders aangetref...	83	10·03
Totale aantal seuns onder skoolkinders.....	62	12·11
Totale aantal meisies onder skoolkinders.....	21	6·67

Uit die tabel blyk dat seuns meer algemeen as meisies aangetas word. Daar sal onthou word dat soortgelyke resultate in verband met ander huidsiektes gedurende die opname verkry is. Die hoë syfers, 12.11 persent onder seuns en 6.67 persent onder meisies, is hoogswaarskynlik nog 'n onderskatting van die werklike toestand. Littekens wat waarskynlik die spore was van swere wat gesond geword het, is nie by die berekening ingesluit nie—slegs gevalle van klaarblyklike, aktiewe swere is inaggeneem. Verder kan aangeneem word dat sommige van die kinders wat ernstige swere gehad het, nie hul opwagting gemaak het nie, aangesien hulle in sommige gevalle etlike myle moes aflê na die plek waar die ondersoek moes plaasvind. Onderwysers het ook verklaar dat verskeie kinders die dag van die ondersoek afwesig was. Dit is waarskynlik dat hierdie afwesigheid in sommige gevalle deur tropiese swere veroorsaak is.

Die omvang van die siekte was nie in alle skole ewe groot nie. Drie afsonderlike streke is in die gebied besoek, en uit onderstaande tabel 4 (*b*) blyk die skommeling in die syfers.

TABLE 4 (*b*)—INCIDENCE OF TROPICAL ULCER IN DIFFERENT AREAS OF THE LETABA DISTRICT.

TABEL 4 (*b*)—VOORKOMS VAN TROPIESE SWEER IN VERSKILLENDE DELE VAN DIE LETABA-GEBIED.

Area. Streek.	Number Examined. Aantal ondersoek.	Number of Cases of Tropical Ulcer. Aantal gevalle van tropiese sweer.	Percentage Incidence. Persentasievoorkoms.
Shilubane.....	309	53	17·15
Mohlaba.....	311	24	7·72
Medingen.....	208	6	2·89

These differences are worthy of more detailed study for it is by such contrasts in adjacent areas that much light can be thrown on the various etiological factors involved. Later sections of this report (see Malaria, Intestinal and Urinary Parasitic Infections) will show that these three areas have other important differences in incidence of disease. Suffice it to say at present that the general state of health and nutrition bears a close resemblance to the incidence of tropical ulcer. More particularly is this relationship noted in the Medingen area as compared to the others, the incidence of various signs of malnutrition as well as that of malaria and bil-

Hierdie verskille verdien meer noukeurige oorweging, aangesien dit juis sulke verskille in aanliggende streke is wat baie lig op die betrokke etiologiese faktore kan werp. Uit later afdelings van hierdie verslag (sien Malaria, Ingewandsbesmettings en Urinêre Parasitêre Besmettings) sal blyk dat die voorkoms van siektes in hierdie drie streke in ander opsigte ook belangrike verskille openbaar. Hier hoef slegs gesê te word dat die algemene gesondheids- en voedingstoestand in noue verband met die persentasievoorkoms van tropiese sweer staan. Dit is veral die geval in die Medingenstreek waar verskeie tekens van wan-

harziasis being considerably lower in Medingen than in the remaining two areas.

Other Skin Diseases.—Cases of acne, seborrhoea, eczema and some suggestive of secondary syphilis were met with from time to time. Their incidence was insufficient to warrant any further analysis for the purposes of this report.

CHAPTER 2

THE MOUTH

LESIONS of the mouth are among the commonest manifestations of various nutritional deficiency syndromes. They are also found in other systematic diseases whose primary cause is not dietetic, as for example, syphilis.

Excluding the teeth which will be discussed separately, the main abnormalities recorded in the present survey may be briefly described as follows:—

Stomatitis

Lips

(*a*) Chapped or raw lips. The lips may be dry, cracked, bleeding or smooth, shiny and red.

(*b*) Angular stomatitis in which condition the muco-cutaneous junctions at the angles of the lips may appear sodden or ulcerated and bleeding. The affected area encroaches to a varying extent over the adjacent skin.

Cheeks

The buccal mucous membranes are often slightly reddened and show a line of tooth imprints. More advanced lesions such as ulceration and bleeding do occur in nutritional disorders, but were not seen during the survey.

Glossitis

(*a*) *Marginal Glossitis.*—Varying degrees of this condition are often found in association with a dry thick fur of the central dorsum area of the tongue. There is often a blue-black or red stippling of the enlarged papillae. There may be very slight reddening and smoothness with tooth indentations. The latter in severe degrees produces a chiselled appearance at the edge of the tongue. In these more advanced cases the edge may be fiery red, smooth and shiny. Frequently only the tip manifests one or more of these signs, the remainder of the tongue usually being furred.

(*b*) *Glossitis involving the major portion of the Dorsum.*—This also varies in its appearance. Lesions often seen are (1) prominent papillae, red and blue-black on a furred background; (2) an atrophic

voeding sowel as dié van malaria en bilharzia heelwat minder voorkom as in die ander twee streke.

Ander huidsiektes.—Van tyd tot tyd is gevalle van acne, seborrhoea, ekseem en ook gevalle wat op sekondêre sifilis gelyk het, aangetref. Hulle het egter so selde voorgekom, dat verdere ontleding vir die doel van hierdie verslag onnodig is.

HOOFSTUK II

DIE MOND

LETSELS aan die mond tel onder die mees algemeen voorkomende verskynsels van verskeie voedingsgebreksindrome. Hulle word ook aangetref by ander gestelsiektes waarvan die dieet nie die primêre oorsaak is nie, bv. sifilis.

Afgesien van die tande wat afsonderlik bespreek sal word, is die belangrikste abnormaliteite wat gedurende die huidige opname opgeteken is, kortliks as volg:—

Stomatitis

Lippe

(*a*) Gebarste of rou lippe. Die lippe kan droog, gebars en bloeiend of glad, blink en rooi wees.

(*b*) Mondhoekontsteking, waarby die aansluiting tussen die lipvel en mondslymvlies en die mondhoeke deurweek of versweerd en bloederig mag lyk. Die aangetaste oppervlakte brei in meerdere of mindere mate oor die aanliggende vel uit.

Wange

Die buccale slymvlies is dikwels ietwat rooi en vertoon 'n ry tandindrukke. Meer gevorderde letsels, soos verswerings en bloeding, kom wel by voedingsiektes voor, dog is nie gedurende die loop van die opname waargeneem nie.

Glossitis

(*a*) *Marginale glossitis.*—Hierdie toestand kom dikwels en in verskillende grade voor tesame met 'n droë dik beslag of aanpaksel op die middelste dorsale oppervlakte van die tong. Dikwels is die vergrote papelle blou-swart of rooi gestippeld. Daar kan 'n baie ligte rooiverkleuring voorkom en 'n gladheid met tandindrukke. Waar laasgenoemde straf voorkom, kry die tongrand 'n uitgebeitelde voorkoms. In sulke meer gevorderde gevalle kan die tongrand vurig rooi, glad en blink wees. Dikwels kan een of meer van hierdie verskynsels slegs aan die tongpunt waargeneem word, terwyl die res van die tong gewoonlik onder 'n aanpaksel bedek is.

(*b*) *Glossitis oor die grootste gedeelte van die dorsum.*—Hierdie toestand wissel ook in voorkoms. Letsels wat dikwels voorkom is: (1) uitstaande papelle, rooi en blou-swart op 'n agtergrond van aanpaksel; (2) 'n atrofiese glossi-

glossitis, in which the tongue is usually very red, shiny and smooth. Occasionally pallor is the outstanding feature of this type of glossitis; (3) the tongue may be cracked, raw and red, giving rise to the "beefy tongue" appearance.

(*c*) Patchy denudation of the tongue was also seen but far less commonly than the above.

Gingivitis

(*a*) Soft, spongy, bleeding gums or those which bleed easily on touching.

(*b*) Red gums which do not bleed easily. These are invariably found to be associated with buccal stomatitis of varying degrees of severity.

(*c*) Pyorrhoea.

(*d*) Irregular swollen gums which do not evidence signs of an active disease but would appear to be the sequel of a previous malady such as spongy gums.

This brief description of the abnormalities seen would be incomplete were it not again recorded that the population of children examined during the survey were a so called healthy group, for they were in attendance at school at the time of examination. The observer had, therefore, to pay particular attention to the earlier lesions of various syndromes.

Stomatitis.

The commonest lesions seen were those in which the main body of the lips were involved as well as the buccal mucous membranes. Angular stomatitis, although not uncommon, was less frequent than these.

The following table (table 5) indicates the incidence of stomatitis in boys and girls of the various areas visited.

tis, waarby die tong gewoonlik baie rooi, blink en glad is. Af en toe is bleekheid die opvallendste verskynsel by hierdie soort glossitis; (3) 'n gebarste, rou en rooi toestand van die tong wat dit soos beesvleis laat lyk.

(*c*) Kaal kolle op die tong is aangetref, maar veel minder algemeen as voorgaande siektetekens.

Tandvleisontsteking (Gingivitis)

(*a*) Sagte sponsagtige, bloeiende tandvleis, of tandvleis wat maklik bloei as dit aangeraak word.

(*b*) Tandvleis wat nie maklik bloei nie. Hierdie toestand word sonder uitsondering aangetref tesame met buccale stomatitis in verskillende grade van hewigheid.

(*c*) Pyorrhoea.

(*d*) Onreëlmatige, opgeswelde tandvleis wat geen tekens van aktiewe siekte vertoon nie maar wat skynbaar die gevolg is van vorige siekte, bv. sponsagtige tandvleis.

Hierdie kort beskrywing van die waargenome abnormaliteite sou onvolledig wees as daar nie weer gemeld word nie dat die kinderbevolking wat gedurende die opname besoek is, 'n sogenaamde gesonde groep was, aangesien hulle ten tyde van die ondersoek die skole bygewoon het. Die waarnemer moes derhalwe besondere aandag aan die vroeër letsels van verskillende sindrome wy.

Stomatitis

Die mees algemeen voorkomende letsels wat aangetref is, was dié waarby sowel die grootste gedeelte van die lippe as die buccale slymvlies aangetas was. Angulêre stomatitis het minder dikwels voorgekom, dog was nie 'n ongewone verskynsel nie.

Onderstaande tabel (tabel 5) is 'n weergawe van die omvang waarin stomatitis in die verskillende besoekte streke onder seuns en meisies voorgekom het.

TABLE 5.—THE INCIDENCE OF STOMATITIS.
TABEL 5.—VOORKOMS VAN STOMATITIS.

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemde voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases Evidencing Stomatitis. Getal gevalle met stomatitis.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases Evidencing Stomatitis. Getal gevalle met stomatitis.	Percentage Incidence. Persentasie-voorkoms.
Qumbu (Transkei)	26	7·65	13	2·69
Pietermaritzburg (Natal)	40	10·50	13	3·27
Nqutu (Natal)	46	16·20	31	6·63
Letaba (Transvaal)	91	17·77	37	11·74
Bochem (Transvaal)	105	22·73	41	12·54
Bloemfontein (O.F.S.—O.V.S.)	103	25·37	47	11·27
Witzieshoek (O.F.S.—O.V.S.)	55	24·34	65	12·77
Kentani (Transkei)	99	22·87	60	15·83
Pretoria (Transvaal)	Figures not analysed.— Syfers nie ontleed nie.			

Discussion on these findings will be considered with those of the following section on glossitis.

Glossitis.

. The advanced lesion of complete denudation was not uncommonly seen, the numbers in the following tables being made up mainly of children in whom the tongue evidenced either a marginal glossitis with definite tooth imprints along the edge or cases of 'tip glossitis' in which the anterior end of the dorsum evidences similar changes to those described under the head of marginal glossitis, with prominent blue, black or red papillae over the rest of the dorsum. The incidence of these signs is indicated in table 6.

Hierdie bevindings sal tesame met dié ten opsigte van tongontsteking in onderstaande afdeling bespreek word.

Glossitis

Algehele ontbloting van die tong is 'n gevorderde letsel wat dikwels aangetref is. Die syfers in onderstaande tabelle het betrekking hoofsaaklik op kinders by wie die tong óf deur marginale glossitis met duidelike tandindrukke langs die rand aangetas is óf gevalle van tongpuntontsteking waarby die voorste ent van die dorsum soortgelyke veranderings toon soos dié wat onder die hoof Marginale Glossitis beskryf word, met uitstaande blou-swart of rooi papelle oor die res van die dorsum. In tabel 6 word die omvang waarin hierdie verskynsels voorkom, weergegee:—

TABLE 6.—THE INCIDENCE OF GLOSSITIS.
TABEL 6.—VOORKOMS VAN GLOSSITIS.

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases with Glossitis. Getal gevalle met glossitis.	Percentage Incidence. Persentasievoorkoms.	Number of Cases with Glossitis. Getal gevalle met glossitis.	Percentage Incidence. Persentasievoorkoms.
Pietermaritzburg	0	0·00	0	0·00
Pretoria	9	2·59	1	0·21
Qumbu	9	2·65	5	1·03
Witzieshoek	9	3·98	15	2·95
Nqutu	22	7·75	18	3·85
Bloemfontein	43	10·59	18	4·32
Letaba	48	9·37	21	6·67
Kentani	45	10·40	24	6·33
Bochem	62	13·42	28	8·57

Comparison of tables 5 and 6 shows that stomatitis is more common than glossitis in boys and girls of all areas. Apart from the district of Witzieshoek, areas which have a relatively high incidence of stomatitis also evidence a comparatively common degree of glossitis. This parellelism is also to be found in areas such as Pietermaritzburg and Qumbu, where both glossitis and stomatitis were not as often seen as in other areas. The difference in incidence of these conditions in boys and girls is obvious, boys being more commonly affected with stomatitis and glossitis in all districts.

Stomatitis and glossitis are both well recognised signs of malnutrition. They have been recorded as being among the oustanding signs of pellagra, as well as pellagra-like diseases. In themselves, without any other manifestations of deficiency disease, they have been shown to respond to vitamin therapy (Aykroyd and co-workers in India 1937, 1938, 1939), Katzenellenbogen in Palestine (1928, 1939). Spies et al (1938) used these mucous membrane lesions as a measure of the effectiveness of nicotinic acid in cases of pellagra. Stannus (1936) considers that glossitis and stomatitis are often the only signs of pellagra which may

Uit 'n vergelyking van tabelle 5 en 6 blyk dat stomatitis meer algemeen as glossitis onder seuns en meisies van alle streke voorkom. Met uitsondering van Witzieshoek, vertoon die gebiede met 'n betreklik hoë syfer vir stomatitis ook 'n betreklik hoë syfer vir glossitis. Hierdie parallelisme kom ook voor in gebiede soos Pietermaritzburg en Qumbu waar nóg glossitis nóg stomatitis so dikwels aangetref word as in ander gebiede. Dit is heeltemal duidelik dat seuns meer algemeen as meisies deur stomatitis en glossitis aangetas word; dit geld vir alle distrikte.

Sowel stomatitis as glossitis is heeltemal erkende aanduidings van ondervoeding. Hulle is opgeteken onder die mees opvallende tekens van pellagra en pellagra-agtige siektes. Waar hulle sonder enige ander manifestasies van gebreksiektes voorkom, is bewys dat hulle goed reageer op vitamineterapie (Aykroyd en mede-navorsers in Indië, 1937, 1938 en 1939; Katzenellenbogen in Palestina, 1928 en 1939). Spies en ander (1938) het hierdie letsels van die slymvlies gebruik as maatstaf van die doelmatigheid van nikotiensuur in gevalle van pellagra. Stannus (1936) is van mening dat glossitis en stomatitis dikwels die enigste waarneembare tekens van pellagra is en dat hulle

be manifest and that they frequently precede the other signs of this disease by several years. While not all workers are agreed on their exact relationship to pellagra there is agreement that deficiency in the vitamin B_2 complex is closely connected with their appearance.

Glossitis is met with in several other well defined nutritional syndromes, such as pernicious anaemia, simple achlorhydric anaemia and sprue.

Angular stomatitis or a condition closely resembling it has been described in several cases of anaemia associated with upper dysphagia (Patterson's or Plummer-Vinson syndromes—Hurst—1940).

The lesions of the lips in many cases of syphilis are similar to those seen in deficiency diseases such as pellagra, and the latter condition is not uncommonly misdiagnosed as syphilis as a result of this resemblance (Daneel 1939).

Further discussion of the significance of these lesions will be found in Chapter 14 on Pellagra. The preceding paragraphs, however, indicate that food deficiency, particularly the vitamin B_2 group and nicotinic acid, is a paramount influence in determining their incidence. The fact that one or both are so common in the different groups of children examined is a further indication of the extent of malnutrition among the Bantu of this country.

Gingivitis

As was noted to be the case in lesions of the tongue and other mucous membrane lesions of the mouth, the gums evidenced the milder manifestations of abnormality rather than such conditions as ulceration and profuse bleeding.

The incidence of spongy soft gums which were either found to be bleeding slightly, or more commonly, which bled on gentle pressure is indicated in table 7.

dikwels die ander aanduidings van hierdie siektes verskeie jare vooraf-gaan. Hoewel nie alle navorsers dit eens is betreffende die juiste verband waarin hierdie verskynsel tot pellagra staan nie, stem almal saam dat 'n tekort ten opsigte van die vitamin B_2-kompleks baie nou verbonde is met hulle verskyning.

Glossitis word in verskeie ander duidelik omlynde voedingsindromes soos kwaadaardige bloedarmoede, eenvoudige achloorhidriese anemie en sproei, aangetref.

Angulêre stomatitis of 'n toestand wat baie daarna lyk is beskryf in verskeie gevalle van anemie wat met dysphagia van die boonste sluk-apparaat in verbinding gebring word (Patterson of Plummer-Vinson se sindroom—Hurst—1940).

Die lipletsels in baie gevalle van sifilis is soortgelyk aan dié wat by gebreksiektes soos pellagra voorkom, en laasgenoemde toestand word nogal dikwels weens wandiagnose as gevolg van hierdie ooreenkoms vir sifilis aangesien (Daneel, 1939).

In hoofstuk 14 word die betekenis van hierdie letsels verder bespreek onder die hoof Pellagra. Uit voorgaande paragrawe blyk egter dat voedselgebreke, en veral 'n tekort aan die vitamine B_2-groep en nikotiensuur, van die allergrootste belang is by die veroorsaking van hierdie letsels. Dat een of albei so algemeen onder die kinders van die verskillende groepe wat ondersoek is, voorkom, is 'n verder aanduiding van die omvang van ondervoeding onder die Bantoes van ons land.

Tandvleisontsteking (Gingivitis)

Soos ook die geval was met letsels aan die tong en ander slymvliese van die mond, was die abnormale verskynsels aan die tandvleis ook eerder van ligte aard en nie van toestande soos dié van verswering en hewige bloeding nie.

In tabel 7 word aangedui in hoeveel gevalle daar sponsagtige, sagte tandvleis aangetref is wat óf effens gebloei het, óf, meer dikwels, gebloei het wanneer daar saggies op gedruk word.

TABLE 7.—THE INCIDENCE OF SOFT SPONGY GUMS (SEE TEXT).
TABEL 7.—DIE OMVANG WAARIN SAGTE SPONSAGTIGE TANDVLEIS VOORGEKOM HET (SIEN TEKS).

Districts. Arranged in Order of Increasing Frequency. Streek. van toenemende voorkoms. Gerangskik in volgorde	Boys. Seuns.		Girls. Meisies.	
	Number of Cases with Above Abnormality. Getal gevalle met bogenoemde abnormaliteit.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases with Above Abnormality. Getal gevalle met bogenoemde abnormaliteit.	Percentage Incidence. Persentasie-voorkoms.
Pietermaritzburg	4	1·05	2	0·50
Nqutu	4	1·41	1	0·21
Qumbu	5	1·47	2	0·41
Letaba	5	0·98	4	1·27
Pretoria	4	1·15	5	1·07
Bloemfontein	9	2·22	5	1·20
Kentani	20	4·62	8	2·11
Boehem	33	7·14	10	3·06
Witzieshoek	19	8·41	23	4·52

The bleeding spongy gums of scurvy resulting from Vitamin C deficiency are so well known in this country that further amplification would seem unnecessary. The condition of the gums as a clinical indication of the presence of early scurvy has been frequently assessed in various surveys. Fox, Gottlich and co-workers (*a*, *b* and *c* 1940), discuss gum changes in relation to Vitamin C deficiency, and state that "the opinion is growing that gingivitis and a deficiency of vitamin C in the diet are associated phenomena". While this opinion might be questioned as applying to all forms of gingivitis, there is more general acceptance of the relationship between spongy bleeding gums and deficiency of vitamin C. Examined in this light the findings of table 7 indicate signs of deficiency in all areas, the range in boys being from 0.98 per cent. in Tzaneen (Letaba) children to 8.41 per cent. in Witzieshoek, and in girls from 0.21 per cent. in Nqutu to 4.52 per cent. in Witzoeshoek.

Pyorrhoea was found in only four of the nine districts. In three of these, namely, Nqutu, Letaba, and Kentani there were 2, 2 and 1, cases respectively. In the fourth district, Bochem, there were 13 boys (2.81 per cent.) and 4 girls (1.22 per cent.), this being the only area in which this abnormality was at all common.

Die bloeiende, sponsagtige tandvleis wat deur skeurbuik veroorsaak word en ontstaan uit 'n tekort aan vitamine C, is in ons land so goed bekend dat dit onnodig skyn te wees om verder daaroor uit te wy.

Die toestand van die tandvleis as 'n kliniese aanduiding van die teenwoordigheid van skeurbuik in sy vroeë stadiums, is dikwels reeds in verskeie opnames behandel. Fox, Gottlich en mede-navorsers (a, b en c, 1940) bespreek tandvleisveranderings met betrekking tot vitamine C-tekort, en verklaar dat „die mening al hoe meer posvat dat gingivitis en 'n tekort aan vitamine C in die dieët, verskynsels is wat met mekaar gepaard gaan". Hoewel dit in twyfel getrek kan word of hierdie mening op alle vorms van tandvleisontsteking van toepassing is, word die verband tussen sponsagtige, bloeiende tandvleis en 'n tekort aan vitamine C meer algemeen aangeneem. Word die feite in hierdie lig betrag, dan is die bevinding van tabel 7 'n aanduiding van 'n tekort in alle gebiede—'n tekort wat loop van 0.98 persent onder seuns te Tzaneen (Letaba) tot 8.41 persent te Witzieshoek, en van 0.21 persent onder meisies te Nqutu tot 4.52 persent te Witzieshoek.

Pyorrhoea is in slegs vier uit die nege streke aangetref. In drie van hierdie streke, d.w.s. Nqutu, Letaba en Kentani, is daar onderskeidelik twee, twee en een gevalle aangetref. In die vierde, Bochem, was daar dertien seuns (2.81 persent) en vier meisies (1.22 persent), en was hierdie gebied die enigste waarin hierdie abnormaliteit enigsins algemeen voorgekom het.

TABLE 8.—THE INCIDENCE OF CARIES AND IRREGULARITIES OF THE TEETH.
TABEL 8.—OMVANG VAN VERROTTING EN ONREËLMATIGHEDE VAN DIE TANDE.

(*a*) CARIES—VERROTTING.

Districts Arranged in Order of Increasing Frequency. Streek, Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases. Getal gevalle.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases with Caries. Getal gevalle met verrotting.	Percentage Incidence. Persentasie-voorkoms.
Bochem	37	8·01	29	8·87
Nqutu	31	10·91	58	12·40
Qumbu	50	14·71	66	13·63
Kentani	64	14·78	60	15·83
Pietermaritzburg	60	15·75	78	19·60
Witzieshoek	41	18·14	89	17·49
Letaba	102	19·92	97	30·80
Bloemfontein	123	30·30	136	32·61
Pretoria	123	35·34	137	29·40

(*b*) IRREGLARITIES—ONREËLMATIGHEDE.

Pietermaritzburg	31	8·14	24	6·03
Nqutu	32	11·27	44	9·40
Qumbu	39	11·48	45	9·30
Kentani	50	11·54	39	10·29
Pretoria	45	12·93	42	9·01
Letaba	82	16·02	32	10·16
Witzieshoek	37	16·37	72	14·15
Bloemfontein	93	22·91	76	18·23
Bochem	107	23·16	65	19·88

The Teeth

The examination of the teeth was of a rapid nature. Probe and mirror were not used. The findings thus refer only to gross abnormalities, such as one or more advanced carious teeth and obvious irregularities and malformations.

The incidence of caries and irregularities as noted by this method is indicated in tables 8 (*a*) and 8 (*b*).

Several interesting features emerge from this analysis.

1. Bochem, the district which had the lowest incidence of caries was found to be the worst district in so far as irregularities were concerned.

2. Two of the three urban areas visited, Pretoria and Bloemfontein, had the highest number of children with caries, of all nine districts.

3. The children of Letaba had a far higher incidence of caries than did those of the urban area Pietermaritzburg. This was the only rural group which had caries to an extent approaching that of the two urban areas mentioned above (2). In this area, however, there may have been a special factor responsible. The major number of children with caries evidenced the lesions in the upper central and lateral incisor, the carious areas being along the lines of apposition of these teeth. Many questions regarding the possibility of some local customary interference were denied by the children and further information would be of value.

4. No definite relationship between the occurrence of caries and irregularities can be established.

5. The higher incidence of various skin and other mouth abnormalities in boys as compared to girls is not found in the case of caries. In some areas boys are more commonly affected than girls, whereas in others the reverse is the case and in most districts the difference is very small. Irregularities were, however, diagnosed more often in boys than girls in all areas visited.

The various factors responsible for the production of caries and irregularities are not at all clearly defined in the literature. Vitamin A and D (Mellanby 1929, Bessey and Wolbach 1938) have both been demonstrated to be of importance in the development

Die tande

Ondersoek van die tande het snel geskied. Nóg peilstiffie, nóg spieël is gebruik. Gevolglik het die bevindings betrekking slegs op ernstige abnormaliteite soos een of meer erg verrotte tande en klaarblyklik onreëlmatighede en wanformasies.

In tabelle 8 (*a*) en 8 (*b*) is 'n weergawe van die voorkoms van tandeverrotting en onreëlmatighede soos op hierdie wyse aan die lig gebring.

Hierdie ontleding bring verskeie interessante punte aan die lig:—

1. Bochem, die streek waar die minste tandeverrotting aangetref is, was die ergste gebied vir sover dit onreëlmatighede van die tande betref.

2. Twee van die drie stedelike gebiede wat besoek is, Pretoria en Bloemfontein, het die grootste aantal kinders met tandeverrotting gehad, d.w.s. uit al nege streke.

3. By die kinders van Letaba het tandeverrotting veel meer voorgekom as onder dié van die stedelike gebied Pietermaritzburg. Hierdie was die enigste landelike groep waaronder tandeverrotting voorgekom het in 'n omvang wat enigermate naby dié was van die twee stedelike gebiede hierbo gemeld (2). In hierdie gebied kon daar egter 'n besondere faktor die oorsaak gewees het. Die meeste kinders met verrotte tande het die letsels in die boonste middelste en laterale snytande vertoon; daarby het die verrotting voorgekom al langs die lyne van aanraking met die ander tande. Op talle vrae rakende die moontlikheid dat daar onder een of ander plaaslike gebruik met hulle tande gepeuter is, het die kinders altyd ontkennend geantwoord. Nadere inligting sou waardevol wees.

4. Daar kan geen besliste verband tussen die voorkoms van tandeverrotting en onreëlmatighede van die tande vasgestel word nie.

5. In die geval van tandeverrotting word die seuns nie, soos in die geval van verskeie huidaandoenings en ander abnormaliteite van die mond, meer algemeen as meisies aangetas nie. Hoewel seuns in sommige gebiede meer algemeen as meisies aangetas word, is die teenoorgestelde in ander streke weer waar en is die verskil in die meeste gebiede baie gering. In al die besoekte gebiede het onreëlmatighede van tande egter meer dikwels by seuns as by meisies voorgekom.

In die literatuur oor die onderwerp word die verskeie faktore wat tandeverrotting en onreëlmatighede veroorsaak hoegenaamd nie duidelik uiteengesit nie. Daar is bewys (Mellanby, 1929; Bessey en Wolbach, 1938) dat vitamines A en D belangrik is vir die

of the teeth, and Vitamin C (Hanke 1933, Keeton 1939) has also been thought of value in the treatment of caries. An adequate supply of calcium and phosphorus would appear to be essential for the proper development of teeth as the hard structures of the tooth are mainly composed of these substances. While there can be little argument that Vitamin A, C and D as well as calcium and phosphorus have an important bearing on the development of teeth and the consequent susceptibility to caries, there can also be little doubt that these elements do not control the process in its entirety. The fact that no definite relationship exists between the incidence of irregularities and caries in the various groups of children examined during this survey is of importance in considering the etiology of these conditions. If they were both due to a similar group of factors then we might reasonably expect a fairly close correlation in their occurrence. Furthermore, if maldevelopment of whatever cause, always rendered teeth more susceptible to caries we would not expect to find an area such as Bochem, which had the lowest incidence of carious mouths, despite the fact that the number of children with one or other irregularity was higher in this district then in any other.

Oranje et al (1935) found that the more urbanised the Bantu become the higher the incidence of caries. This survey does not wholly confirm their findings but the fact that two of the three urban areas in which children were examined evidenced the highest occurrence of caries is suggestive that the degree of urbanisation is an important influence on this condition. Pederson (1938) reported similar findings in Greenland, following a study of three groups of people, the one out of contact with traders, the other two having been in contact with trading stations for different lengths of time. The incidence of caries was found to be lowest in the people who had no contact with such a station, and of the remaining two those who had had a trader in their midst for a longer period of time evidenced more caries than did the other.

It would appear, therefore, that 'shop' foods have a very close relationship to the appearance of caries in groups of people. The foods suspected to be mainly responsible are the refined cereals, sugar, sweets and biscuits.

ontwikkeling van tande, en daar is ook gemeen (Hanke, 1933; Keeton, 1939) dat vitamine C van waarde is by die behandeling van tandbederf. Dit blyk dat 'n toereikende hoeveelheid kalsium en fosfor noodsaaklik is vir die behoorlike ontwikkeling van tande, aangesien die harde struktuur hoofsaaklik uit hierdie stowwe bestaan. Hoewel daar min teenspraak kan wees daarteen dat vitamines A, C en D sowel as kalsium en fosfor 'n belangrike uitwerking het op die ontwikkeling van tande en die gevolglike vatbaarheid vir bederf, ly dit ook geen twyfel dat hierdie elemente nie die proses volkome beheer nie. Die feit dat daar in die verskeie groepe kinders wat gedurende hierdie opname ondersoek is, geen besliste verband tussen die voorkoms van onreëlmatighede en die omvang van tandbederf bestaan nie, is van belang by die oorweging van die etiologie van hierdie toestande. Was albei toe te skryf aan die werking van gelyksoortige groepfaktore, dan kon ons redelikerwys 'n taamlike noue korrelasie ten opsigte van die omvang van hul voorkoms verwag. Meer nog, indien wanontwikkeling, hoe ook al veroorsaak, altyd die tande meer vatbaar vir verrotting maak, dan sou ons nie verwag om toestande aan te tref soos te Bochem nie, waar die persentasie tandeverrotting die kleinste was ten spyte daarvan dat die persentasie onreëlmatighede daar hoër was as in enige ander streek.

Oranje en ander (1935) het gevind dat hoe meer die Bantoe verstedelik raak, hoe hoër die persentasie tandeverrotting wat by hom aangetref word. Die huidige opname bevestig hierdie bevindings nie in hulle geheel nie, dog die feit dat daar in twee uit die drie stedelike gebiede waarin kinders ondersoek is, die hoogste persentasie tandeverrotting aangetref is, dui daarop dat die graad van verstedeliking 'n belangrike uitwerking in hierdie verband het. Uit Groenland het Pederson (1938) soortgelyke bevindings gerapporteer as uitvloeisel van 'n studie van drie groepe persone waarvan die een nie met handelaars in aanraking was nie, en die ander twee gedurende verskillende tydperke met handelsposte in aanraking was. Dit het geblyk dat die persentasie tandeverrotting die kleinste was onder diegene wat nie in kontak met so'n stasie was nie en dat, uit die ander twee groepe, die een wat die langste in aanraking met die handelaars was ook meer aan tandeverrotting onderhewig was as die ander.

Dit wil ons dus voorkom asof „ winkelkos " in baie noue verband staan met die voorkoms van tandeverrotting by die mens. Die voedselsoorte wat, na gemeen word, veral hiervoor verantwoordelik is, is geraffineerde graanvoedsels, suiker, lekkers en beskuitjies.

No such claim is made for the influence of 'shop' foods on the incidence of irregularities. Irregularities are well known to be common results of congenital syphilis. Reference to chapter 12 indicates the extent to which syphilis is found among the different groups of Bantu children seen and it is more than likely that this disease was the most important single factor in the production of the irregularities seen. There is a closer parallelism between the syphilis and teeth irregularity rates than there is between either of these and caries.

At the present stage it would perhaps be best not to go further than to state that a good wholesome diet, with a minimum of refined cereals and sugar foods would do much to lower the incidence of both caries and irregularities in a community in which syphilis was not a major problem.

CHAPTER III

THE TONSILS, CERVICAL GLANDS AND EARS

Enlarged Tonsils.

THE exact definition of what constitutes an enlarged tonsil is extremely difficult. There are scarcely two observers whose findings would agree in a survey of this nature. The lack of a fixed clinical standard, although inevitable at present, is unfortunate for the relationship of tonsillitis and hypertrophied tonsils to malnutrition is well established. In the present survey the author found a considerable number of the children in all districts to have enlarged and/or septic tonsils (table 9).

Daar word nie verklaar dat „winkelkos" dieselfde uitwerking het ten opsigte van onreëlmatighede van die tande nie. Dit is algemeen bekend dat onreëlmatighede van die tande een van die algemene gevolge van oorgeërfde sifilis is. In hoofstuk 12 word aangedui in watter mate sifilis aangetref word onder die Bantoekinders van die verskillende groepe wat ondersoek is, en dit is meer as waarskynlik dat hierdie siekte die belangrikste enkele faktor is wat die waargenome onreëlmatighede veroorsaak het. Daar is tussen sifilis en onreëlmatigheid van die tande 'n nouer parallelisme as tussen òf sifilis òf onreëlmatighede en tandeverrotting.

Op hierdie stadium sou dit miskien die beste wees om niks verder te gaan as net te konstateer dat 'n goeie gesonde dieët, met 'n minimum hoeveelheid geraffineerde graan- en suikervoedsels, veel daartoe sal bydra om sowel tandeverrotting as onreëlmatighede van die tande te verminder in 'n gemeenskap waarin sifilis nie 'n ernstige probleem uitmaak nie.

HOOFSTUK III

DIE MANGELS, HALSKLIERE EN ORE

Vergrote mangels

DIT is uiters moeilik om presies te omskryf wat onder 'n vergrote mangel verstaan word. Daar is skaars twee waarnemers wie se bevindings met mekaar sal ooreenslaan by 'n opname van hierdie aard. Hoewel dit op die huidige tydstip onvermydelik is, is die gebrek aan 'n vasgestelde kliniese standaard tog te betreur, aangesien die verband waarin tonsillitis en hipertrofie van die mangels teenoor ondervoeding staan wel deeglik bewys is. Gedurende die huidige opname het skrywer hiervan gevind dat 'n aansienlike aantal kinders in alle distrikte aan vergrote en/of septiese mangels ly (tabel 9).

TABLE 9.—THE INCIDENCE OF ENLARGED AND/OR SEPTIC TONSILS.
TABEL 9.—DIE OMVANG WAARIN VERGROTE EN/OF SEPTIESE MANGELS VOORKOM.

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases with Abnormality. Getal gevalle met abnormaliteite.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases with Abnormality. Getal gevalle met abnormaliteite.	Percentage Incidence. Persentasie-voorkoms.
Letaba	125	24·41	82	26·03
Pietermaritzburg	130	34·12	149	37·44
Qumbu	120	35·30	198	40·92
Bochem	156	33·77	146	44·66
Nqutu	119	41·90	201	42·95
Pretoria	152	43·67	212	45·48
Kentani	202	46·66	181	47·76
Bloemfontein	207	50·99	208	49·89
Witzieshoek	131	57·97	275	54·03

Cervical Gland Abnormalities.

The examination included inspection and palpation. The main glands palpated were those of the anterior

Abnormaliteite van die halskliere (cervikale limfkliere)

Die ondersoek het ingesluit inspeksie en palpasie. Die vernaamste kliere wat gepalpeer is, was die van die voor-

group—the superficial and anterior cervical groups as well as the submaxillary and submental sets. Most authorities record that cervical lymph glands are not normally palpable. The incidence of enlarged cervical glands varied from 49.25 per cent. in the girls of Pietermaritzburg to as high as 84.72 per cent. of the girls examined in Bochem (table 10).

ste groep—die oppervlakkige en anterieure cervikale groepe submaksillêre en submentale groepe. Die meeste outoriteite verklaar dat cervikale limfkliere nie onder normale toestande palpeerbaar is nie. Die persentasie vergrote cervikale kliere het gewissel van 49.25 by die meisies van Pietermaritzburg tot 84.72 by die meisies wat te Bochem ondersoek is (tabel 10).

TABLE 10.—THE INCIDENCE OF PALPABLE CERVICAL GLANDS.
TABEL 10.—VOORKOMS VAN PALPEERBARE CERVIKALE KLIERE.

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Casse with Palpable Glands. Getal gevalle met palpeerbare kliere.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases with Palpable Glands. Getal gevalle met palpeerbare kliere.	Percentage Incidence. Persentasie-voorkoms.
Pietermaritzburg	226	59·32	196	49·25
Qumbu	238	70·00	289	59·71
Witzieshoek	172	76·10	361	70·92
Nqutu	228	80·28	321	68·60
Pretoria	271	77·87	344	73·82
Letaba	389	75·97	246	77·09
Kentani	357	82·45	282	74·40
Bloemfontein	341	84·01	324	77·69
Bochem	375	81·17	277	84·72

The multiplicity of conditions which can result in enlargement of the cervical glands does not allow of any specific relation to nutritional state being established in this report. Lesions of the tongue, buccal mucous membrane, gums, tonsils, ears and skin of the face can all produce enlargement of glands of one or more of the groups examined. The influence of such diseases as syphilis and tuberculosis can also not be excluded. Cases of marked cervical adenitis suggestive of tuberculosis will be discussed in Chapter 4.

The fact that boys were generally more commonly found to have palpable glands than girls is to be expected in view of the fact that mouth abnormalities such as stomatitis, glossitis and gingivitis are more common in them and furthermore impetigo and scabies are also predominant in boys. A further point of interest in regard to these findings is the relative positions which such districts as Pietermaritzburg and Bochem occupy. Study of several of the previous tables will have indicated that Pietermaritzburg children are generally far less unhealthy than are those of Bochem and the contrast between the occurrence of enlargement of cervical glands in these two groups is similar to these previous findings.

This high incidence of cervical lymph gland enlargement, while not a specific sign of any particular deficiency or disease, is nevertheless an important indication of the very com-

Daar is so 'n groot aantal toestande wat op 'n vergroting van die cervikale kliere kan uitloop dat dit nie doenlik is om in hierdie verslag te bepaal of daar enige spesifieke verband tot die voedingstoestand bestaan nie. Letsels van die tong, die bûccale slymvlies, die tandvleis, die mangels, die ore en die vel van die gesig kan almal 'n vergroting van die kliere van een of meer van die ondersoekte groepe veroorsaak. Die uitwerking van siektes soos sifilis en tuberkulose kan ook nie uitgesluit word nie. In hoofstuk vier is 'n bespreking van gevalle van opvallende cervikale adenitis wat aan tuberkulose laat dink.

Die feit dat dit by seuns meer algemeen voorgekom het dat die kliere palpeerbaar was as by meisies, is slegs wat verwag kon word met die oog daarop dat mondabnormaliteite soos stomatitis, glossitis en gingivitis by hulle meer algemeen voorkom en dat ook van impetigo en scabies dieselfde waar is. Wat ook van belang is in verband met hierdie bevindings, is die betreklike plekke wat streke soos Pietersmaritzburg en Bochem inneem. Uit 'n bestudering van die voorafgaande tabelle sal reeds opgemerk gewees het dat Pietermaritzburgkinders oor die algemeen veel minder aan ongesondheid onderhewig is as dié van Bochem; die kontras tussen hierdie twee groepe ten opsigte van vergroting van cervikale kliere is in ooreenstemming met daardie vroeëre bevindings.

Hoewel hierdie algemene voorkoms van vergroting van die cervikale limfkliere nie 'n spesifieke aanduiding van enige besondere tekort of siekte is nie, is dit nogtans 'n belangrike aanduiding

mon occurrence of the manifold abnormalities which give rise to such enlargement.

The Ears

The examination of the ears was very cursory, the only item noted being an obvious discharge from one or both ears. The incidence as recorded in table 11 is thus not to be assumed to be an accurate estimate of ear disease, but rather an indication of the number of children with obvious otorrhoea.

van die uiters algemene voorkoms van die talryke abnormaliteite wat tot sodanige vergroting aanleiding gee.

Die ore

Die ondersoek van die ore was baie vlugtig en al wat opgeteken is, is slegs gevalle waar een of albei ore klaarblyklik gedra het. Daar moet dus nie aangeneem word dat die syfers van tabel 11 'n juiste weergawe is van die omvang van oorsiekte nie—eerder is dit 'n aanduiding van die aantal kinders wat klaarblyklik aan otorrhoea ly.

TABLE 11.—THE INCIDENCE OF OBVIOUS OTORRHOEA.
TABEL 11.—VOORKOMS VAN KLAARBLYKLIKE OTORRHOEA.

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases with Discharging Ears. Getal gevalle met ore wat dra.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases with Discharging Ears. Getal gevalle met ore wat dra.	Percentage Incidence. Persentasie-voorkoms.
Pretoria	4	1·45	1	0·21
Pietermaritzburg	6	1·58	2	0·50
Nqutu	4	1·41	4	0·85
Bochem	9	1·95	3	0·92
Letaba	9	1·76	4	1·27
Witzieshoek	6	2·66	4	0·79
Bloemfontein	17	4·19	10	2·40
Qumbu	13	3·82	16	3·31
Kentani	45	10·40	19	5·01

Boys again are the more commonly affected of the two sexes. The compartively high incidence in the Transkeian territories, Qumbu and Kentani, is similar to the results of analysis of lung abnormalities, suspicious tuberculous adenitis and tuberculous disease of the bones and joints (chapter IV).

The influence of syphilis must also be considered to be important as a cause of chronic ear disease and chapter XII indicates that this disease was common in all areas. There is, however, no direct correlation to be found in the incidence of these two diseases in the various districts.

Ook hier was die seuns meer algemeen as die meisies aangetas. Die betreklik hoë persentasievoorkoms in die Transkei-gebiede Qumbu en Kentani is soortgelyk aan die resultate van 'n ontleding van longabnormaliteite, verdagte tuberkulose, adenitis en tuberkuleuse siekte van die bene en gewrigte (hoofstuk IV).

Die uitwerking van sifilis moet ook belangrik geag word as 'n oorsaak van chroniese ooraandoening, en uit hoofstuk XII blyk dat hierdie siekte in alle gebiede algemeen voorkom. Daar kan egter geen regstreekse korrelasie tussen die voorkoms van hierdie twee siektes in die verskeie streke gevind word nie.

CHAPTER IV

THE LUNGS AND TUBERCULOSIS

THE assessment of the incidence of tuberculosis in the children examined was rendered extremely difficult by the absence of X-ray facilities. Furthermore, sputum examinations and tuberculin tests were not carried out, the main reason being that each child was only available for a single morning or afternoon. The diagnosis of tuberculosis by clinical examination alone has repeatedly been shown to be defective. Not only are a considerable number of early cases missed, but seemingly obvious signs of tuberculosis might be caused by other serious lung diseases such as unresolved

HOOFSTUK IV

DIE LONGE EN TUBERKULOSE

BY gebrek aan X-straal-fasiliteite was dit uiters moeilik om die omvang van tuberkulose onder die ondersoekte kinders te bepaal. Daarbenewens is sputumondersoeke en tuberkulinetoetse nie uitgevoer nie, hoofsaaklik omdat elke kind slegs vir een enkele voormiddag of namiddag beskikbaar was. Daar is herhaaldelik bewys dat 'n diagnose van tuberkulose wat slegs op kliniese ondersoek gebaseer is, gebrekkig is. Nie alleen word 'n aansienlike aantal gevalle wat in die vroeë stadium is, oor die hoof gesien nie, maar skynbaar klaarblyklike tekens van tuberkulose kan ook veroorsaak word deur ander ernstige longaandoenings soos onopgeloste longontsteking, bronchiëktasie, long-

pneumonia, bronchiectasis, lung abcess, etc. The high incidence of pneumonia, among the Bantu, and its frequent recurrence in the same child without adequate treatment, is a justification of the belief that bronchiectasis of varying degrees of severity is a not uncommon condition among these people.

For these reasons it has been considered advisable to discuss the abnormal physical signs found on examination of the lungs, rather than to attempt a dogmatic statement of their underlying pathology. The examination included inspection and auscultation of all children and in suspect cases the chest was percussed and further tests for vocal fremitus and resonance were carried out.

In view of the variation in the use of clinical terms applied to lung auscultatory findings, it has been considered advisable to include the following brief summary of the terms used to describe the abnormalities found in the present analysis.

1. *Bronchial breathing.*—This term includes all such abnormal types of breathing as are variously described as bronchial, tubular or cavernous. It is always indicative of serious lung disease.

2. *Rales or Crepitations.*—These terms are considered as synonymous. Rales or Crepitations are divided into two groups:—

(*a*) *Coarse* which are usually of a bubbly nature and are assumed to be the result of air passing through large bronchial tubes which are plugged or lined with mucous etc. These sounds are extremely common in children who are suffering from upper respiratory infections. The common cold with running nose and sore throat often produces these abnormal sounds.

(*b*) *Fine.*—This fine crackling sound is commonly accepted to be produced by air passing through inflamed or degenerated bronchioles and alveoli. When not dispelled by coughing fine rales are usually assumed to be indicative of lung tissue disease. Watkins-Pitchford and Allan, however, concluded in 1924 that in the Bantu they are frequently due to an alveolitis resulting from exposure to smoke from open fires in huts.

abses, ens. Die veelvuldige voorkoms van longontsteking onder die Bantoes, en die herhaalde aanvalle wat dieselfde kind sonder behoorlike behandeling moet ondervind, regverdig die veronderstelling dat bronchiëktasie in wisselende grade van hewigheid 'n nie ongewone toestand onder hierdie mense uitmaak.

Om hierdie redes is dit wenslik geag om die bespreking toe te spits op die abnormale fisiese tekens wat deur ondersoek van die longe aan die lig gebring word, liewer as om te poog om hul onderliggende patologie dogmaties te bepaal. Die ondersoek het 'n inspeksie en auskultasie van alle kinders ingesluit, en 'n verdagte gevalle is perkussietoetse aan die bors en verdere toetse in verband met stemfremitus en -resonansie uitgevoer.

Vanweë die wisseling ten opsigte van kliniese terminologie vir sover dit die bevindings van longauskultasie raak, is dit raadsaam geag om onderstaande kort opsomming te maak van die terme wat hier gebruik word om die abnormaliteite wat gedurende die huidige ontleding teëgekom is, te beskryf:—

1. *Bronchiale asemhaling.*—Onder hierdie term is inbegrepe al sulke abnormale asemhaling as wat beskryf kan word as bronchiaal, tubulêr of caverneus. Dit is altyd 'n aanduiding van ernstige longaandoenings.

2. *Longgeruis.*—Vir die doel van hierdie verslag word die terme râle of krepitasie geag sinoniem te wees. Longgeruise word in twee groepe onderverdeel:—

(*a*) *Grof.*—Geruise wat gewoonlik van borrelende aard is en veronderstel word veroorsaak te wees wanneer lug deur die groot bronchiale buise gaan wanneer laasgenoemde met slym, ens., verstop of die wande daarmee bedek is. Hierdie geluide word baie dikwels aangetref by kinders wat aan asemhalingsversteurings in die boonste gedeelte van die bors ly. Die gewone verkoue met neusloop en seerkeel veroorsaak dikwels hierdie abnormale geluide.

(*b*) *Fyn.*—Hierdie fyn kraakgeluid word algemeen geag veroorsaak te word wanneer lug deur bronchioli en alveoli wat in 'n toestand van ontsteking of degenerasie verkeer, gaan. Wanneer fyn longgeruise nie deur hoes beëindig word nie, word hulle gewoonlik geag 'n aanduiding van longweefselaandoening te wees. Watkins-Pitchford en Allan het in 1924 egter tot die gevolgtrekking gekom dat hierdie geruise by die Bantoe dikwels die gevolg is van alveolitis veroorsaak deur blootstelling aan rook uit oop vure in hutte.

3. *Rhonchi.*—Low pitched and high pitched musical sounds are included under this head. They are accepted as being the result of air passing over inflamed or swollen mucous membranes of the bronchial tubes.

The following table (table 12) is a summary of the incidence of these various auscultatory findings in the districts visited. No case has been included in which the sounds disappeared completely on clearing the throat by one or two coughs.

3. *Rhonchus.*—Onder hierdie hoof val lae en hoë musikale geluide. Daar word aangeneem dat hulle veroorsaak word wanneer lug oor ontsteekte of geswelde slymvliese van die bronchiale buise trek.

In onderstaande tabel (tabel 12) verskyn 'n opsomming van die omvang waarin hierdie verskillende auskultasiebevindings in die besoekte streke voorgekom het. Geen geval waarin die geluide verdwyn het nadat die keel deur een of tweemaal te hoes skoongemaak is, is ingesluit nie.

TABLE 12.—INCIDENCE OF VARIOUS ABNORMAL AUSCULTATORY LUNG SIGNS.
TABEL 12.—VOORKOMS VAN VERSKEIE ABNORMALE AUSKULTATIESE LONGTEKENS.

Districts. Arranged in Order of Increasing Incidence. Streke. In volgorde van toenemende voorkoms.	Bronchial Breathing. Number of Cases. Bronchiale asemhaling. Aantal gevalle.	Fine Crepitations. Number of Cases. Fyn kraakgeluide. Aantal gevalle.	Coarse Crepitations. Number of Cases. Growwe kraakgeluide. Aantal gevalle.	Rhonchi Number of Cases. Rhonchi Aantal gevalle.	Total Children with Abnormal Findings. Totale aantal kinders met abnormaliteite.	
					Number of Cases. Aantal gevalle.	Percentage Incidence. Persentasievoorkoms.
Pretoria	Nil–Nul	Nil–Nul	Nil–Nul	Nil–Nul	Nil–Nul	0·00
Bloemfontein	Nil–Nul	Nil–Nul	1	Nil–Nul	1	0·12
Witzieshoek	Nil–Nul	1	Nil–Nul	1	1	0·14
Letaba	Nil–Nul	4	3	3	6	0·73
Bochem	Nil–Nul	2	6	2	6	0·76
Nqutu	Nil–Nul	4	2	2	6	0·80
Pietermaritzburg	Nil–Nul	7	14	17	19	2·44
Qumbu	2	14	11	23	32	3·88
Kentani	2	22	26	48	56	6·90

This analysis shows that all abnormal signs in the lung are commonest in the districts of Qumbu and Kentani and to a less extent in Pietermaritzburg.

Uit hierdie ontleding blyk dat alle abnormale tekens in die longe mees algemeen in die distrikte Qumbu en Kentani voorkom en in mindere mate in Pietermaritzburg.

Suspected Tuberculous Adenitis

As has already been indicated (chapter III) a considerable number of children had palpable cervical glands. Among these there were several whose glands were indicative of more serious underlying disease. Masses of glands on one or both sides of the neck, with changes of the overlying skin such as scarring and sinus formation, were noted. In all the children a brief history of the condition was obtained and the shortest length of the illness was given as being eighteen months. All stated that their glands had swollen and discharged at recurrent periods. The following is a list of the findings in various areas:—

Bochem, Letaba, Pretoria, Bloemfontein, Nqutu, Witzieshoek	No cases.
Pietermaritzburg	2 cases.
Kentani	5 cases.
Qumbu	8 cases.

Verdagte tuberkuleuse adenitis

Soos reeds in hoofstuk III gemeld, het 'n aansienlike aantal kinders palpeerbare cervikale kliere gehad. Onder hulle was daar 'n aantal van wie die kliere aanduidings gegee het van ernstiger onderliggende siekte. Massas kliere aan een of albei kante van die nek, met veranderings van die oorliggende vel soos littekens en sinusformasie, is opgemerk. In die geval van elke kind is 'n kort beskrywing van die verloop van die ongesteldheid verkry, en die kortste tydperk van siekte wat opgegee is, was agtien maande. Almal het verklaar dat hulle kliere herhaaldelik opgeswel en gedra het. Onderstaande is 'n lys van bevindings in die verskillende streke:—

Bochem, Letaba, Pretoria, Bloemfontein, Nqutu, Witzieshoek	Geen gevalle / 1 geval elk.
Pietermaritzburg	2 gevalle.
Qumbu	5 gevalle.
Kentani	8 gevalle.

Tuberculosis of Bones and Joints.

Reference to chapter V indicates that tuberculosis was not an uncommon cause of cripling in Kentani (5 cases) and Qumbu (4 cases). Of the

Tuberkulose van bene en gewrigte

Uit hoofstuk V is dit duidelik dat tuberkulose dikwels in die streke Kentani (5 gevalle) en Qumbu (4 gevalle) die oorsaak van gebreklikheid

remaining districts there were 2 Pietermaritzburg children and 1 child in Bochem with skeletal tuberculosis. Of these 12 children, 8 had Pott's disease of the spine, one of whom had associated hip disease, and hip and knee disease accounted for 2 each of the remaining four cases. Detailed descriptions of the findings in these cases are given in chapter V. What is of interest at this stage is the evidence of these severe lesions in the districts of Kentani, Qumbu and Pietermaritzburg. Pott's disease of the spine was not seen in any children of the other districts vsiited.

Discussion of the Above Findings.

The close parallelism which exists between the incidence of these three sets of abnormalities in the various districts requires further discussion. The Transkei areas, Kentani and Qumbu, evidence lung disease, severe cervical adenitis and skeletal tuberculosis to a greater extent than do the other districts. To a less extent similar findings are recorded in regard to Pietermaritzburg. On the other hand districts with no or few cases of respiratory disease, such as Pretoria, Witzieshoek, Bloemfontein, Nqutu, Bochem and Letaba, have no children or only one of either suspected tuberculosis, cervical adenitis, or skeletal tuberculosis.

It would therefore not be unreasonable to suspect that the higher the incidence of abnormal lung signs in an area, the higher is the probable tuberculosis rate in that area, unless it be assumed that the abnormal lung signs are due to exposure to smoke as suggested by Watkins-Pitchford and Allan. The following are examples of cases seen:—

Kentani

1. Dullness to percussion of the left apical region with fine crepitations in this area. Scattered coarse crepitations and multiple rhonchi whole of the left chest. Extensive scarring of the right side of the neck with chronic sinuses and swollen glands of irregular consistency.

2. Wasting of the muscles of the left apex, with a markedly sunken supraclavicular fossa, associated with bronchial breathing and fine crepitations and multiple rhonchi scattered over both sides of the chest.

3. Dullness of the right apical region, associated with fine crepitations, increased vocal resonance and fremitus. Scattered rhonchi over both sides. Very hoarse voice.

4. Left base—multiple fine and coarse crepitations, with an impaired percussion note. Gums spongy and bleeding. Very marked angular stomatitis.

was. In die orige streke was daar twee kinders te Pietermaritzburg en een te Bochem met skelet-tuberkulose. Van bogenoemde twaalf kinders het agt gely aan Pott se siekte van die ruggraat (van wie een ook aan heupsiekte gely het) en het twee van die orige vier heupsiekte en twee kniesiekte gehad. Uitvoerige beskrywings van die bevindings in hierdie gevalle verskyn in hoofstuk V. Wat op hierdie stadium van belang is, is die aanwesigheid van hierdie ernstige letsels in die streke Kentani, Qumbu en Pietermaritzburg. Pott se ruggraatsiekte is by geen kind in die ander besoekte distrikte aangetref nie.

Bespreking van bostaande bevindings

Die noue parallelisme wat daar tussen hierdie drie groepe abnormaliteite in die verskillende streke bestaan, maak verder bespreking daarvan noodsaaklik. In die Transkei-gebiede Kentani en Qumbu kom longaandoenings, ernstige cervikale adenitis en skelet-tuberkulose in groter omvang voor as in die ander gebiede. In geringer mate geld dieselfde ten opsigte van Pietermaritzburg. Daarenteen is daar in streke met geen of min gevalle van aandoening van die asemhalingstelsel, soos Pretoria, Witzieshoek, Bloemfontein, Nqutu, Bochem en Letaba, geen kinders of hoogstens slegs een met óf verdagte tuberkulose, cervikale adenitis óf skelet-tuberkulose.

Dit sou derhalwe nie onredelik wees nie om te verwag dat hoe veelvuldiger die voorkoms abnormale longtekens in 'n gebied is, hoe hoër die aantal verdagte tuberkulosegevalle in daardie streek moet wees, tensy daar veronderstel word dat die abnormale longtekens toegeskryf moet word aan blootstelling aan rook, soos deur Watkins-Pitchford en Allan beweer word. Onderstaande is voorbeelde van gevalle wat aangetref is:—

Kentani

1. Dowwe klankreaksie op perkussie oor die linkerhandse apikale streek, met fyn geruis in hierdie gebied. Verspreide growwe longgeruise en rhonchi oor die hele linkerbors. Uitgebreide littekens aan die regterkant van die nek met chroniese sinusse en geswelde kliere met onreëlmatige konsistensie.

2. Uittering van die spiere van die linker-apex, met 'n opvallend diepe supraclavikulêre fossa, geassosieer met bronchiale asemhaling en fyn geruise, en talryke rhonchi oor albei kante van die borskas versprei.

3. Dowwe klankreaksie oor die regterhandse apikale streek, geassosieer met fyn geruise, verhoogde stemresonansie en fremitus. Verspreide rhonchi oor albei kante van borskas. Stem baie hees.

4. Linkerhandse longbasis—veelvuldige fyn en growwe geruise, met onsuiwere perkussieklanke. Tandvleis sponsagtig en bloeiend. Baie opvallende angulêre stomatitis.

Qumbu

1. Wasting of left supra—and infra-clavicular areas with dullness and bronchial breathing. Fine scattered crepitations adjacent to this area. Bilateral otorrhoea.

2. Fine crepitations right apical region with coarse crepitations over the whole of this side. Scarring of the right side of the neck with palpable glands of irregular consistency.

3. Diminished movements of the left side of the chest with diminished air sounds over the whole of this side. Impaired percussion note and fine crepitations over the left apex. Bilateral scarring of the neck with a history of operative interference two years previous to examination.

Pietermaritzburg

Fine crepitations and sibilant rhonchi over right apical region. Mass of glands right side of the neck with puckering and hyperpigmentation of the overlying skin.

Nqutu

Wasting of left supraclavicular fossa, with dullness and fine crepitations in this area. Matted mass of glands left cervical region.

The above are some of the more severe cases met with. No mention is made of the children with spinal or joint tuberculosis as these are described in chapter V.

While it is thus not possible to present the incidence of tuberculosis or other particular lung diseases in tabular form, it is hoped that the above findings and discussion will assist in the presentation of the clinical picture seen during the survey. All the evidence points to the conclusion that serious lung disease is common in the Transkeian territories of Qumbu and Kentani, and not uncommon in Pietermaritzburg. The numbers of cases found in the remaining six districts visited are not sufficient to warrant the conclusion that these conditions are common in those areas. The parallelism which exists between signs of lung abnormalities, severe cervical adenitis and skeletal tuberculous disease requires further investigation in this country, more particularly in regard to their possible etiological relationship.

CHAPTER V
POSTURAL DEFORMITIES

THE results of the examination for postural abnormalities are considered under the following headings:—

1. Musculature and other soft supporting tissues.
2. Bony framework.

Qumbu

1. Uittering van die gebied bo en onder linkerhandse sleutelbeen met dowwe klankreaksie en bronchiale asemhaling. Fyn verspreide geruise uit aanliggende gebiede. Bilaterale otorrhoea.

2. Fyn geruise, regterhandse apikale streek, met growwe geruise oor die hele regtersy. Littekens aan regterkant van nek, met palpeerbare kliere van onreëlmatige konsistensie.

3. Verminderde bewegings van linkersy van borskas, met verminderde luggeluide oor die hele linkersy. Onsuiwer perkussieklanke en fyn geruise oor linker-apex. Littekens weerskante van nek—operasie ondergaan twee jaar voor ondersoek.

Pietermaritzburg

Fyn geruise en sibilante rhonchi oor regterhandse apikale streek. Massa kliere regtersy van nek, met rimpeling en hiperpigmentasie van oorliggende vel.

Nqutu

Uittering van linkerhandse supraclavikulêre fossa, met dowwe klankreaksie en fyn geruise in hierdie streek. Saamgedronge massa kliere, linkerhandse cervikale streek.

Bostaande is sommige van die ernstige gevalle wat ons teëgekom het. Geen melding word gemaak van kinders met tuberkulose van die ruggraat of van die gewrigte nie, aangesien hierdie siektes in hoofstuk V beskryf word.

Aangesien dit dus nie moontlik is om die voorkoms van tuberkulose of ander partikuliere longaandoenings in tabelvorm weer te gee nie, is dit nogtans ons vertroue dat bostaande bevindings en besprekings daartoe sal bydra om 'n getroue weergawe van die kliniese beeld wat die opname aan die lig gebring het, te bewerkstellig. Al die gegewens lei tot die gevolgtrekking dat ernstige longaandoening algemeen in die Transkei-gebiede Qumbu en Kentani voorkom, en ook te Pietermaritzburg nie selde aangetref word nie. Die klein aantal gevalle wat in die oorblywende ses streke aangetref is, regverdig nie die gevolgtrekking dat hierdie toestande algemeen in daardie streke heers nie. Die parallelisme wat daar tussen tekens van longabnormaliteite, ernstige cervikale adenitis en skeletale tuberkuleuse aandoening bestaan, verg nadere ondersoek in ons land, veral ten opsigte van hulle moontlike etiologiese verwantskap.

HOOFSTUK V
POSTUURGEBREKE

DIE resultate van die ondersoek in verband met postuurabnormaliteite word onder die volgende hoofde bespreek:—

1. Spierstelsel en ander sagte stutweefsels.
2. Die skelet.

Musculature and Other Soft Supporting Tissues

(*a*) A well nourished healthy child evidences a well developed musculature with a firm layer of subcutaneous tissue which not only rounds off the bony framework but gives to the body an appearance and feel of vitality and elasticity. The child stands and walks with head erect, shoulders squared, chest forming a broad arch from the sternum to the axillae and the abdomen does not protrude beyond the chest line nor does it sag.

(*b*) At the other extreme is the child suffering from a severe degree of malnutrition. His muscles are flabby, the subcutaneous tissue layers are either very wasted or lax and the general appearance is one of excessive fatigue and lack of a zest for life. The child's stance is influenced by this general lack of tone and his head is usually pushed forward, he has a postural scoliosis, rounded shoulders with the lower angles of the scapulae protruding, giving the appearance of "wings". His chest is flat and narrow and slopes backwards from below up and the abdomen is usually markedly protuberant and flabby or less commonly it sags. The bony prominences are all easily visible and form angular protrusions. The extreme type is best described by the phrase "skin and bone".

The following tables (13) indicate the incidence of these types of children in the various areas visited.

Die spierstelsel en ander sagte stutweefsels

(*a*) 'n Goedgevoede gesonde kind besit 'n goed-ontwikkelde spierstelsel met 'n stewige laag onderhuidse weefsel wat nie alleen die skelet afrond nie maar die liggaam die voorkoms in aanvoeling gee van lewenskragtigheid en elastisiteit. Die kind staan en loop met die kop omhoog, skouers terug, borskas in die vorm van 'n breë boog wat strek van die sternum tot aan die oksels, en 'n maag wat nie verder as die bors uitstaan nie en nie hang nie.

(*b*) Die ander uiterste is die kind wat aan ernstige wanvoeding ly. Sy spiere is pap, die onderhuidse weefsels is òf vervalle òf slap en die algemene voorkoms maak die indruk van uitermate vermoeienis en gebrek aan lewenslus. Die kind se postuur en houding word nadelik deur hierdie algemene gebrek aan kondisie geraak —sy kop is gewoonlik na vorentoe gestoot, hy ly aan scoliose deur swak postuur veroorsaak, sy skouers is rond en die onderste punte van sy blaaie steek uit soos twee vlerke. Sy borskas is plat en smal en loop van onder af agtertoe na boontoe; die maag staan gewoonlik ver uit en is pap—soms, minder algemeen, hang dit. Die beendere van die liggaam is almal maklik sigbaar en vorm hoekige uitsteeksels. In uiterste gevalle kan die kind bes beskryf word as net vel en been.

Tabelle 13a en b is 'n weergawe van die aantal kinders van hierdie tipe wat in die verskillende besoekte streke aangetref is.

TABLE 13 A.—THE INCIDENCE OF GOOD POSTURE AND MUSCULATURE.
[FOR DESCRIPTION SEE TEXT (*a*).]
TABEL 13 A.—GOEIE POSTUUR EN SPIERSTELSEL [SIEN TEKS (*a*).]

Districts. Arranged in Order of Diminishing Incidence. Streek. Gerangskik in voglorde van verminderende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Children with Good Posture. Getal kinders met goeie postuur.	Percentage Incidence. Persentasie-voorkoms.	Number of Children with Good Posture. Getal kinders met goeie postuur.	Percentage Incidence. Persentasie-voorkoms.
Pietermaritzburg	46	12·08	83	20·85
Qumbu	40	11·77	80	16·53
Pretoria	32	9·19	74	15·88
Witzieshoek	17	7·52	53	10·41
Nqutu	10	3·52	64	13·68
Bloemfontein	20	4·93	27	6·48
Bochem	14	3·03	18	5·51
Letaba	15	2·93	11	3·49
Kentani	1	0·23	10	2·64

TABLE 13 B.—THE INCIDENCE OF VERY POOR POSTURE AND MUSCULATURE.
[SEE TEXT (*b*) ABOVE].
TABEL 13 B.—VOORKOMS VAN BAIE SWAK POSTUUR EN SPIERSTELSEL [SIEN TEKS (*b*).]

Districts. Arranged in Order of Increasing Incidence. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Children with Poor Posture. Getal kinders met swak postuur.	Percentage Incidence. Persentasie-voorkoms.	Number of Children with Poor Posture. Getal kinders met swak postuur.	Percentage Incidence. Persentasie-voorkoms.
Pietermaritzburg	41	10·76	45	11·31
Qumbu	66	19·41	80	16·53
Pretoria	93	26·73	78	16·74
Witzieshoek	51	22·57	113	22·20
Nqutu	70	24·65	98	20·94
Bloemfontein	134	33·01	157	37·65
Kentani	207	47·80	136	35·88
Letaba	225	43·94	148	46·99
Bochem	271	58·66	172	52·60

The remaining children, who formed the majority in most districts, had one or several of the abnormalties noted in the discussion on the poorly nourished child. These abnormalities were, however, not severe enough to consder that child having a very poorly developed musculature and the posture of extreme fatigue or "skin and bines".

The very close inverse relationship between the numbers of children evidencing the two extremes of development, namely good and very poor posture, is to be expected when the standards set are observed by one person. It would be a very wild guess to explain the differences on an assumed inherited characteristic posture. The differences between the various areas are in accord with the various clinical findings of malnutrition.

Reference to tables 1, 2, 5, 6 and 7 in which the nutritional deficiency signs of the skin and mouth are discussed, will indicate the relationship which exists between posture and nutrition, if any further proof is wanted. The dependence of good posture and muscular development on good nutrition and feeding has been established beyond any reasonable doubt by most nutrition workers. (Emerson 1926, Roberts 1926.)

The figures (tables 13A and B) are a useful addition to the complete clinical picture of the children examined and they further indicate the consderable degree of malnutrition which exists among Bantu schoolchildren.

Bony Framework.

The skeletal abnormalities noted have been divided into two main sections, those children with minor deformities being discussed as distinct from those who exhibted such severe changes as to lead to very marked deformity and crippling.

Minor Deformities.

The examination was necessarily rapid and the incidence of these deformities as emunerated in this section should be judged in the light of this fact. It is obvious that many children with very slight changes would escape notice. The descriptive term "minor" must therefore not be interpreted as indicating that these deformities are unimportant, but rather that no severe degree of crippling or deformed appearance resulted from these abnormalities. For example, syphilitic periostitis resulting in the so-called "sabre tibia" has been included

Die orige kinders—en hulle het in die meeste streke die meerderheid uitgemaak—het een of meer van die abnormaliteite waarvan in die bespreking van die swak-gevoede kind melding gemaak is, vertoon. Hierdie abnormaliteite was egter nie van so'n ernstige aard dat die kind geag kon word 'n uiters swak ontwikkelde spierstelsel te hê nie of dat sy postuur een van uitermate vermoeienis is of dat hy slegs vel en been is nie.

Die uiters noue omgekeerde verhouding tussen die getalle kinders wat die twee uiterstes van ontwikkeling in hul liggaam getoon het, d.w.s. goeie en uiters swak postuur, kan verwag word wanneer die opgestelde standaarde deur een persoon waargeneem word. Dit sou 'n baie wilde gissing verg indien hierdie verskille verklaar moes word as die uitvloeisel van 'n veronderstelde oorgeërfde karakteristieke postuur. Die verskille tussen die verskeie gebiede is in ooreenstemming met die kliniese bevindings betreffende ondervoeding. Indien daar nog verder bewys verlang word, sal verwysing na tabelle 1, 2, 5, 6 en 7, waarin die voedingstekorttekens aan vel en mond bespreek word, die verband wat daar tussen postuur en voeding bestaan duidelik aan die lig bring. Dat goeie postuur en spierontwikkeling van goeie voeding afhanklik is, is bo alle redelike twyfel deur die meeste voedingsnavorsers bewys (Emerson, 1926; Roberts, 1926).

Die syfers van tabelle 13A en B is 'n nuttige byvoegsel by die volledige kliniese beeld van die ondersoekte kinders en bring daarby ook aan die lig watter aansienlike graad van ondervoeding daar onder Bantoeskoolkinders bestaan.

Die skelet

Die skeletabnormaliteite is in twee hoofafdelings onderverdeel. Kinders met geringe gebreke word afsonderlik bespreek en nie tesame met diegene wat sulke ernstige veranderings vertoon dat dit tot baie opvallende wanstaltigheid en belemmering gely het nie.

Geringe wanstaltighede

Die ondersoek was uit die aard van die saak vlugtig, en die omvang waarin hierdie gebreke aangetref is (soos in hierdie afdeling uiteengesit) behoort in die lig van hierdie feit betrag te word. Dit is klaarblyklik dat talle kinders met uiters geringe veranderings nie die aandag sou trek nie. Die beskrywende term „geringe" moet derhalwe nie vertolk word as aanduidende dat hierdie gebreke onbelangrik is nie, dog liewer dat daar geen ernstige graad van belemmering of wanstaltigheid uit die abnormaliteite ontstaan het nie. Byvoorbeeld, in hierdie afdeling is ingesluit sifilitiese periostitis wat op die vorming van die sogenaamde „sabelskeenbeen" (platycnemie) uitgeloop het waar die kind

in this section where the child exhibited no obvious crippling, but it would be incorrect to assume this to mean that this disease is not serious.

The main abnormalities noted were the following:—

1. Irregular chest shape, including pigeon chest, enlarged costo-chondral junctions, eversion of the lower ribs and Harrison's sulcus, markedly depressed sternum, and asymmetry other than that due to underlying lung disease or tuberculosis of the spine.
2. Knock knee and genu recurvatum.
3. Bow leg.
4. "Sabre" tibia.
5. Skull bossing.
6. Enlarged radial epihyses.

nie sigbaar kruppel loop nie, dog dit sou onjuis wees om aan te neem dat dit beteken dat die siekte nie ernstig is nie.

Die belangrikste abnormaliteite wat opgeteken is, is onderstaande:—

1. Onreëlmatige borskasvorm, met inbegrip van hoenderbors, vergroting van die costo-chondrale aansluitings, uitbuiging van die onderste ribbe en Harrison se sulcus, opvallende induiking van die sternum, en asimmetrie wat nie deur onderliggende longaandoening of tuberkulose van die ruggraat veroorsaak is nie.
2. X-bene en *Genu recurvatum*.
3. Bakbene.
4. „ Sabelskeenbeen ".
5. Skedelbeenverdikking.
6. Vergrote radiale epifise.

TABLE 14.—THE INCIDENCE OF "MINOR" BONY DEFORMITIES.
TABEL 14.—VOORKOMS VAN „GERINGE" BEENWANSTALTIGHEID.

District Arranged in Order of Approximate increasing Incidence. Streek. Gerangskik in volgorde van toenemende voorkoms (by benadering).	Irregular Chest Shape. Onreëlmatige borskasvorm.		Knock Knee. X-bene.		Genu Recurvatum. Genu recurvatum.		Bow Leg. Bakbene.		Sabre Tibia. „ Sabelskeenbeen ".		Skull Bossing. Skedelbeenverdikking.		Enlarged Radial Epiphys. Vergrote radiale epifise.	
	Cases. Gevalle.	Percentage. Persentasie.	Cases. Gevalle.	Percentage. Persentasie.	Cases. Gevalle.	Percentage. Persentasie.	Cases. Gevalle.	Percentage. Persentasie.	Cases. Gevalle.	Percentage. Persentasie.	Cases. Gevalle.	Percentage. Persentasie.	Cases. Gevalle.	Percentage. Persentasie.
Nqutu.....	3	0·40	13	1·73	—	—	3	0·40	—	—	1	0·13	4	0·53
Witzieshoek..	1	0·14	27	3·67	—	—	1	0·14	—	—	—	—	—	—
Pietermaritzburg.....	7	0·90	27	3·47	—	—	5	0·64	—	—	2	0·26	5	0·64
Qumbu.....	4	0·49	56	6·80	—	—	2	0·24	—	—	—	—	—	—
Pretoria.....	5	0·61	44	5·41	—	—	30	3·69	1	0·12	—	—	1	0·12
Bloemfontein..	7	0·85	60	7·29	—	—	14	1·70	3	0·36	—	—	—	—
Kentani.....	5	0·62	91	11·20	1	0·12	1	0·12	—	—	—	—	—	—
Letaba.....	6	0·73	97	11·73	1	0·12	33	3·99	—	—	1	0·12	5	0·60
Bochem.....	16	2·03	170	21·54	1	0·13	43	5·45	11	1·39	1	0·13	3	0·38

One or more of these deformities often occurred together in the same child. As examples may be cited a case in the Bochem district who had bilateral "sabre" tibia and an asymmetrical pigeon shaped chest, and another child in the Letaba area who had marked knock knee, pigeon chest, eversion of the lower ribs and easily observed enlargement of the radial epiphyses.

The absence of X-ray facilities renders it difficult to assess the exact nature of the various lesions noted. Syphilis no doubt played an important part in producing these signs and can reasonably be assumed to be the cause of sabre tibia. However, it cannot be assumed to be the sole factor responsible for the remaining abnormalities, for it will be noted that an area like Letaba, with a comparatively low incidence of syphilis (see chapter XII) manifested many more of these bony changes than did other areas, such as Nqutu, in which the syphilis rate was very much higher.

Een of meer van hierdie wanstaltighede is dikwels tesame by dieselfde kind aangetref. In die Bochem-streek was daar 'n kind met bilaterale platycnemie en 'n asimmetriese hoenderbors, 'n ander in die Letaba-streek het opvallende x-bene gehad, tesame met hoenderbors, uitbuiging van die onderste ribbe en maklik sigbare vergroting van die radiale epifise.

By gebrek aan X-straal-fasiliteite was dit moeilik om die juiste aard van die verskillende aangetroffe letsels te bepaal. Ongetwyfeld het sifilis 'n belangrike rol gespeel by die veroorsaking van hierdie toestande—in die geval van sabelskeenbeen kan redelikerwys aangeneem word dat sifilis die oorsaak was. Daar kan egter nie van die veronderstelling uitgegaan word dat sifilis die enigste faktor is wat die oorblywende abnormaliteite veroorsaak het nie, want daar moet op gelet word dat in 'n gebied soos Letaba, waar betreklik min sifilis voorkom (hoofstuk XII), veel meer van hierdie beenveranderings teëgekom is as in ander gebiede soos Nqutu, waar sifilis veel meer algemeen is.

The possibility of rickets being responsible for not a few of these abnormalities cannot be excluded. While not wishing to dogmatise, the author would express the opinion that this deficiency disease is more common in S.A. Bantu than has hitherto been thought to be the case. Chapter XV describes the occurrence of rickets in several cases examined during the survey and the possible causes of the disease in this country.

Severe Deformity and Crippling.

At tne commencement of the survey it was not expected that crippling would be as common as has been found to be the case. The fact that severe degrees of such disability were met with in all areas visited, demands a somewhat detailed discussion of the types of cripples seen and the possible causes of the various disablements.

All children with such gross defects were more carefully examined and a short history obtained of the cause of crippling. The following is a detailed list of these cases with a short description of the main findings with the probable cause:—

Die moontlikheid dat rhachitis 'n aantal van hierdie abnormaliteite kon veroorsaak het, kan ook nie uitgesluit word nie. Skrywer hiervan wil nie graag dogmatiseer nie, maar wens tog die mening uit te spreek dat hierdie gebreksiekte meer algemeen onder Suid-Afrikaanse Bantoes voorkom as wat tot dusver vermoed is. In hoofstuk XV word die voorkoms van rhachitis in verskeie gevalle wat gedurende die opname ondersoek is, beskryf, tesame met die moontlike oorsake van die siekte in ons land.

Ernstige wanstaltigheid en belemmering

Toe met die opname 'n begin gemaak is, was dit nie die verwagting dat gebreklikheid so algemeen sou voorkom as wat inderdaad geblyk het nie. Die feit dat ernstige ongeskiktheid van hierdie aard voorgekom het in alle gebiede wat besoek is, maak dit nodig om die tipes gebreklikes wat teëgekom is en die moontlike oorsake van die toestand, ietwat meer breedvoerig te bespreek.

Alle kinders met sulke ernstige gebreke is meer versigtig ondersoek en 'n kort uiteensetting van die verloop van die geval en oorsaak van die belemmering verkry. Onderstaande is 'n uitvoerige lys met die besonderhede van hierdie gevalle en daarby 'n kort beskrywing van die belangrikste bevindings en die waarskynlike oorsake:—

Description of Case.	Probable Cause.
PRETORIA.	
1. Wasting of all muscles of the left lower extremity with drop foot and absent knee jerks	Infantile paralysis.
2. Wasting of all muscles of left lower extremity. Drop foot with marked eversion, resulting in walking on inner side of foot	Infantile paralysis.
3. Bony exostoses of calcaneum resulting in considerable enlargement of the left heel. Wasting of the leg muscles	Injury.
4. Bilateral club foot..... 5. Right club foot.....	Congenital.
6. Marked bowing with angulation of upper third left tibia.....	Injury.
7. Very marked bowlegs with right sabre tibia. Rolling gait.....	Syphilis.
8. Exostoses of right knee. Interference with flexion.....	Injury.
9. Right ankle joint movements very limited. Unable to dorsiflex. Tip toe gait.	Injury.
WITZIESHOEK.	
1. Lateral displacement of forearm on arm at elbow joint. Unable to supinate when forearm is in extension	Injury.
2. Subluxation of left shoulder joint with marked wasting of deltoid muscle. Unable to abduct arm unless head of humerus fitted into joint. Extension and flexion at shoulder joint are possible but require considerable effort	Injury, resulting in probable dislocation of shoulder joint which was untreated.
3. Ankylosis of right elbow joint with forearm in a position of slight flexion. Marked prominence of olecranon	Injury.
4. Wasting of all muscles of right lower extremity. Drop foot.....	Infantile paralysis.
BLOEMFONTEIN.	
1. Wasting of muscles of left lower extremity with very marked weakness—unable to flex knee more than a few degrees. Passive movements possible. Walks on medial aspect of foot	Infantile paralysis.
2. Wasting of muscles of left lower extremity with fixed inverted drop foot. Tip toe gait.	Infantile paralysis.
3. Very marked knock knee. Feet well over one foot apart when knees together. Pigeon chest.	Syphilis? Rickets?
4. Bilateral clubfoot.....	Congenital.
5. Wasting of muscles of right lower extremity.....	Infantile paralysis.
6. Left upper and lower extremities—shortening, wasting and spasticity	History of convulsions in infancy. Possible birth injury.
7. Bony excrescence on lateral aspect of left elbow joint. Unable to flex forearm beyond right angle	? (No history of injury).
8. Right elbow joint, convex angle medially. Incomplete flexion.....	Injury.

Description of Case.	Probable Cause.
QUMBU.	
1. 2. 3. Pott's disease of the spine with marked kyphosis resulting in "hunchback".	Tuberculosis.
4. Swollen, disorganised, fixed left knee joint. Wasting of thigh and leg muscles especially near joint. Marked genu valgum. Drop foot with tip toe gait.	Tuberculosis.
5. Bony swelling of right temporo-mandibular joint. Only able to open jaws about ½ inch.	
KENTANI.	
1. 2. 3. Pott's disease of the spine with marked deformity of "hunchback" type	Tuberculosis.
4. Wasting of muscles of thigh with shortening of limb, tilted pelvis and tip toe gait. Marked limitation of movements of extension and abduction of hip joint	Tuberculosis.
5. Ankylosis of left knee in slight flexion associated with marked wasting of muscles. Genu valgum	Tuberculosis.
6. Wasting of all muscles of right lower extremity. Weakness and shortening. Passive joint movements free.	Infantile paralysis.
7. Bilateral clubfoot	Congenital.
8. Left clubfoot	
9. Hydrocephalus associated with a jerky unsteady gait	?
10. Osteomyelitis of left lower jaw	Chronic osteomyelitis.
PIETERMARITZBURG.	
1. Pott's disease of the spine with right hip disease. In addition to marked kyphosis, there was shortening of right inferior extremity with limitation of movements of hip joint	Tuberculosis.
2. Pott's disease of the spine with marked "hunchback" deformity	Tuberculosis.
3. Bilateral spastic paralysis of both lower extremities	Birth injury.
4. Bilateral clubfoot	Congenital.
5. Left knee swollen with very limited flexion. Wasting of muscles of thigh and leg	Injury in infancy.
6. Knee joint disease. Seen in Plaster of Paris. Knee swelled of its own accord	?
7. Fracture upper third of right leg. In Plaster of Paris	Injury.
8. Wasting of right deltoid muscle. Abduction and extension movements at shoulder joint limited	Injury in infancy.
9. Irregularity of lower third left humerus. Limited flexion at elbow joint and unable to extend forearm in position of supination	?
10. Unable to fully extend right forearm	?
11. Very marked knock knees, the right knee being more involved.	
12. Enlarged and irregular radial epiphyses	
13. Very marked knock knees, more marked on left side. Enlarged sternocostal junctions. Eversion of lower rib margin. Frontal and parietal bossing	Rickets (Cases 11–16). Confirmed radiologically. (see Chapter 15).
14. Very marked right knock knees. Tilting of pelvis and scoliosis. Enlarged radial epiphyses	
15. Very marked knock knees, especially right knee. Bowing of right forearm. Enlargement of both radial epiphyses. Frontal bossing	
16. Marked antero-lateral bowing of femora with side-to-side rolling gait	
NQUTU.	
1. Osteomyelitis right leg with visible sequestrum	Chronic osteomyelitis.
2. Wasting of muscles of right leg	?
3. Left upper and lower extremity muscles wasted and flabby	Infantile paralysis.
4. Left lower extremity—only three toes present, not including big toe of which there was only a remnant. Wasting of muscles of whole lower extremity with shortening	Congenital.
5. Marked convex outward angulation of left elbow joint. Unable to pronate forearm fully. Knock knees marked. Frontal bossing. Enlargement of radial epiphyses	Rickets or Syphilis.
6. Contracture and scarring of left palm and wrist joint with only thumb and index finger present	Burn.
7. Very marked bowing of legs. Radial epiphyses enlarged and irregular	Rickets or syphilis.
LETABA.	
1. Left lower extremity—wasting of all muscles with drop foot	Infantile paralysis.
2. Wasting of muscles of left lower extremity, most marked above and below knee. Knock knees ++. Leg internally rotated. History of having had swollen knee four years previously	? Not injury. Tuberculosis possible.
3. Wasting and shortening of lower left extremity	Congenital dislocation hip.
4. Very marked knock knee of right side with lesser degree of left knee. Enlarged irregular radial epiphyses	Rickets.
5. Bowing laterally of left thigh associated with marked knock knee. Wasting of muscles of leg. Radial epiphyses enlarged	Rickets.
6. Marked deformities at epiphyseal areas of bones at knee joints, ankle joints and wrists	Rickets.
7. Surgical amputation of arm at level of upper third right humerus	Following snake bite.
8. Angle of elbow markedly convex laterally with limitation of movement	Injury.
9. Deformity of elbow increasing normal carrying angle to almost 45°	Injury.
10. Deformity of lower third of humerus—limitation of elbow joint movements.	Injury.
BOCHEM.	
1. Left upper and lower extremities deformed. Left hand fingers spastic inco-ordinate action, palmar surface inverted, thumbs abducted. Unable to flex forearm fully. Left big toe inverted. All muscles of lower extremity wasted	Birth injury.
2. Marked antero-lateral bowing of right femur with shortening of limbs	Injury.
3. Left lower extremity shortened with wasting, especially of thigh muscles. Left hip ankylosed with inversion and internal rotation of extremity	Tuberculosis.

Description of Case.	Probable Cause.
4. Right foot wasted. Scar on medial aspect	Burn.
5. Right knock knee very marked. Shortening of limb	Injury.
6. Right inferior and superior extremities spastic and wasted	Birth injury.
7. Right sabre tibia with very marked knock knee and shortening	Syphilis.
8. Bilateral clubfoot	Congenital.
9. Very marked right knock knee with shortening. Less severe degree of knock knee on left side	Syphilis or Rickets.
10. Right hand undeveloped. Primitive finger buds only present	Congenital.
11. Left arm—wasted—elbow fixed in 90° flexion	Birth injury.
12. Thumb of left hand amputated at metacarpophalangeal joint	Injury.
13. Ankylosed left elbow joint in slight flexion	?
14. Marked asymmetry of face and head. Right face more prominent especially laterally. Right side of head flattened and apparently longer than left	Congenital.

Beskrywing van geval.	Waarskynlike oorsaak.
PRETORIA.	
1. Uittering van alle spiere van die linkerbeen, met hangvoet: geen knieseningreflcks	Kinderverlamming.
2. Uittering van alle spiere van die linkerbeen. Hangvoet met opvallende uitbuiging sodat die pasiënt op die binnesy van die voet loop	Kinderverlamming.
3. Beenuitwasse van die heupbeen met gevolglike aansienlike vergroting van die linkerhak. Uittering van die beenspiere	Besering.
4. Bilaterale horrelvoet	Oorgeërf.
5. Horrelvoet (regs)	
6. Opvallende hoekige buiging van boonste tibia, derde van links	Besering.
7. Baie opvallende bakbene met sabelskeenbeen, regs. Rollende stapbeweging	Sifilis.
8. Beenuitwasse aan regterknie. Belemmering van kniebuiging	Besering.
9. Bewegings van regterenkelgewrig baie beperk. Agterwaartse buiging onmoontlik. Loop op punte van tone.	Besering.
WITZIESHOEK.	
1. Laterale verskuiwing van onderarm op arm by elmbooggewrig. Supinasie onmoontlik as onderarm uitgestrek is	Besering.
2. Onvolledige ontwrigting van linkerskouergewrig met opvallende uittering van skouerspier. Abduksie van arm onmoontlik tensy kop van humerus in gewrig gestoot word. Ekstensie en fleksie by skouergewrig moontlik maar vereis heelwat inspanning.	Besering, met waarskynlike ontwrigting van skouergewrig en gebrek aan behandeling.
3. Ankylose van regterelmbooggewrig met orderarm in 'n posisie van geringe fleksie. Opvallende prominensie van olecranon	Besering.
4. Uittering van alle spiere van regterbeen. Hangvoet.	Kinderverlamming.
BLOEMFONTEIN.	
1. Uittering van spiere van linkerbeen met baie opvallende swakheid—kan knie nie meer as enkele grade buig nie. Passiewe bewegings moontlik. Loop op mediale aspek van voet	Kinderverlamming.
2. Uittering van spiere van linkderbeen met stywe omgekeerde hangvoet. Loop op punte van tone.	Kinderverlamming.
3. Baie opvallende x-bene. Voete heelwat meer as een voet uitmekaar met knieë teenmekaar. Hoenderbors	Sifilis? Rhachitis?
4. Bilaterale horrelvoet	Aangebore.
5. Uittering van spiere van regterbeen	Kinderverlamming.
6. Linkerhand en linkervoet verkort, en uitgeteer: spasties	Stuiptrekkings as suigeling: moontlik beseer by geboorte.
7. Beenuitwas aan laterale aansig van linkerelmbooggewrig. Kan onderarm nie deur meer as reghoek buig nie	? (Geen besonderhede van besering).
8. Regterelmbooggewrig—mediale bolhoek. Onvolledige buiging	Besering.
QUMBU.	
1. 2. 3. Pott se siekte van die ruggraat met opvallende kyphose en gevolglike boggelrug	Tuberkulose.
4. Geswelde, gedesorganiseerde, stywe linkerkniegewrig. Uittering van dy- en beenspiere, veral naby die gewrig. Opvallende genu valgum. Hangvoet—loop op punte van tone	Tuberkulose.
5. Beenagtige swelling van regterhandse temporo-mandibulêre gewrig. Kan kakebeen slegs sowat halfduim oopmaak	?
KENTANI.	
1. 2. 3. Pott se siekte van die ruggraat met opvallende wanstaltigheid—boggelrug-tipe	Tuberkulose.
4. Uittering van dyspiere met verkorting van been; skuins bekken; loop op punte van tone. Opvallende beperking van bewegings, d.w.s. van ekstensie en abduksie van heupgewrig	Tuberkulose.
5. Ankylose van linkerknie by geringe fleksie, wat in verband staan met opvallende uittering van spiere. Genu valgum	Tuberkulose.
6. Uittering van alle spiere van regterbeen en -voet. Swakheid en verkorting. Passiewe gewrigsbewegings vry	Kinderverlamming.
7. Bilaterale horrelvoet	Aangebore.
8. Horrelvoet, links	
9. Waterhoof vergesel van 'n rukkerige, onvaste, spastiese gang	?
10. Osteomyelitis van onderste linkerkaak	Chroniese osteomyelitis.

Beskrywing van geval.	Waarskynlike oorsaak.
PIETERMARITZBURG.	
1. Pott se siekte van die ruggraat, tesame met heupsiekte, regs. Benewens opvallende kyphose was daar ook verkorting van die regterbeen met beperking van die bewegings van die heupgewrig	Tuberkulose.
2. Pott se ruggraatsiekte met opvallende wanstaltigheid—boggelrug-tipe	Tuberkulose.
3. Bilaterale spastiese verlamming van albei bene	Besering by geboorte.
4. Bilaterale horrelvoet	Aangebore.
5. Linkerknie geswel, uiters beperkte fleksie. Uittering van dy- en beenspiere	Besering as suigeling.
6. Kniegewrigsiekte. In gips tydens ondersoek. Knie het vanself opgeswel	?
7. Breuk boonste derde van regterbeen. In gips	Besering.
8. Uittering van regterdeltoideusspier. Beperking van abduksie- en ekstensiebewegings in skouergewrig	Besering as suigeling.
9. Onreëlmatigheid van onderste derde van linkerhumerus. Beperkte fleksie van elmbooggewrig; kan nie onderarm in supinasiehouding uitstrek nie.	?
10. Onvermoë om regteronderarm volledig te strek	?
11. Baie opvallende x-bene, regterknie erger	Rhachitis (gevalle 11–16). Radiologies bevestig (sien hoofstuk 15).
12. Vergrote en ietwat onreëlmatige radiale epifises	
13. Baie opvallende x-bene, linkerbeen erger. Vergorte sterno-costale aansluitings. Uitbuiging van onderste ribberand. Frontale en pariëtale verdikking	
14. Baie opvallende x-been, regs. Skuins bekken. Scoliose. Vergrote radiale epifises	
15. Baie opvallende x-bene, veral regterknie. Regteronderarm krom. Vergroting van albei radiale epifises. Frontale verdikking	
16. Opvallende antero-laterale kromming van femora met waggelende, rollende gang	
NQUTU.	
1. Osteomyelitis, regterbeen, met sigbare sekwester	Chronisee osteomyelitis.
2. Uittering van regterbeenspiere	?
3. Spiere van linkerarm en -been uitgeteer en slap	Kinderverlamming.
4. Linkerbeen—slegs drie tone aanwesig, plus oorblyfsel van groottoon. Uittering van spiere van hele been, met verkorting	Aangebore.
5. Opvallende bolvormige uitwaartse hoekbuiging van linkerelmbooggewrig. Onvermoë tot volledige pronasie van onderarm. Opvallende x-bene. Frontale verdikking. Vergroting van radiale epifises	Rhachitis of sifilis.
6. Krimping en littekenskending van linkerhandpalm en -gewrig; slegs duim en voorvinger aanwesig	Brand.
7. Baie opvallende bakbene. Radiale epifises vergroot en onreëlmatig	Rhachitis of sifilis.
LETABA.	
1. Linkerbeen—uittering van alle spiere, met hangvoet	Kinderverlamming.
2. Uittering van spiere van linkerbeen, mees opvallend bo en onder die knie. X-bene. Inwendige rotering van been. Verloop: vier jaar voorheen gely aan geswelde knie.	? Nie beseer nie. Tuberkulose moontlik.
3. Uittering en verkorting van linkerbeen	Aangebore ontwrigting van heup.
4. Baie opvallende x-bene, regs erger as links. Vergrote onreëlmatige radiale epifises	Rhachitis.
5. Laterale buiging van linkerdy, tesame met opvallende x-bene. Uittering van beenspiere. Radiale epifises vergroot	Rhachitis.
6. Opvallende wanstaltigheid by epifises van bene by kniegewrigte, enkelgewrigte en handgewrigte	Rhachitis.
7. Snykundige afsetting van arm op hoogte van boonste derde van regterhumerus	Slangbyt.
8. Elmbooghoek opvallend bolvormig, lateraal, met beperking van beweging.	Besering.
9. Wanvorming van elmboog waardeur normale draaghoek tot byna 45 grade vergroot is	Besering.
10. Wanvorming van onderste derde van humerus—beperking van bewegings in elmbooggewrig	Besering.
BOCHEM.	
1. Linkerarm en -been gebreklik. Vingers van linkerhand—ongekoördineerde, spastiese aksie: omgekeerde handpalmoppervlakte, met abduksie van duime. Onvermoë om onderarm heeltemal te buig. Linkergroottoon omgekeerd. Alle beenspiere uitgeteer	Besering by geboorte.
2. Opvallende antero-laterale kromming van regterdybeen met verkorting van ledemate	Besering.
3. Linkerbeen verkort weens uittering, veral van dyspiere. Ankylose van linkerheup, met inversie en interne rotasie van been	Tuberkulose.
4. Regtervoet uitgeteer. Litteken aan mediale aansig	Brand.
5. Baie opvallende x-been, regs. Verkorting van been	Besering.
6. Regterbeen en arm spasties en uitgeteer	Besering by geboorte.
7. Regterbeen, sabeltibia met baie opvallende x-been en verkorting	Sifilis.
8. Bilaterale horrelvoet	Aangebore.
9. Baie opvallende x-been regs, met verkorting. Minder ernstiger graad van x-been links	Sifilis of rhachitis.
10. Regterhand onontwikkeld. Slegs primitiewe vingerknoppies aanwesig.	Aangebore.
11. Linkerarm uitgeteer—elmboog styf met buiging op 90°	Besering by geboorte.
12. Duim van linkerhand afgesit in matacarpo-falangiale gewrig	Besering.
13. Ankylose van linkerelmbooggewrig met geringe buiging	?
14. Opvallende asimmetrie van gesig en kop. Regtersy van gesig meer prominent, veral lateraal gesien. Regtersy van kop plat en skynbaar langer as linkersy	Aangebore.

In all the above children, with the exception of one (no. 14 Bochem), there was an interference with function resulting from the deformity. Table 15 is a summary of the incidence of these gross abnormalities in the various districts.

TABLE 15.—THE INCIDENCE OF SEVERE DEFORMITY AND CRIPPLING.

District.	No. of Cases.	Percentage Incidence.
Pretoria	9	1·11
Witzieshoek	4	0·54
Bloemfontein	8	0·97
Qumbu	5	0·61
Kentani	10	1·23
Pietermaritzburg	16	2·05
Nqutu	7	0·93
Letaba	10	1·21
Bochem	14	1·77

There were 83 cases in all the districts, a percentage incidence of 1.16 per cent. for all children examined. The analysis of the probable causes of these cases is given in table 16.

TABLE 16.—SUMMARY OF PROBABLE CAUSES OF 83 CASES OF SEVERE DEFORMITY AND CRIPPLING.

Probable Cause.	No. of Cases.
Injury (Accidents, Burns, etc.)	21
Tuberculosis	12
Congenital	11
Rickets	9
Infantile Paralysis	9
Birth Trauma	5
Syphilis	2
? Syphilis or Rickets	4
Osteomyelitis	2
No Tentative Diagnosis made	8

The results of examination of tables 14, 15 and 16 reveal that diseases, such as rickets and tuberculosis, which have a close relationship to dietetic deficiencies, are not uncommon causes of disability among the Bantu. No less important, however, are the children who are permanently handicapped as a result of syphilis, injuries, birth trauma and congenital defects. The majority are preventable and even adequate treatment would render them more fit for their future work.

The problem of crippling must therefore be viewed not only as it may result from malnutrition, but also its actual effect on the future earning ability of the individual and thus on that person's powers of adequately feeding himself or herself. Viewed in this light the comparatively common occurrence of preventable crippling among the Bantu school children examined is of extreme importance to those interested in their nutritional state.

By al bogenoemde kinders, met uitsondering van een (no. 14, Bochem), het die wanstaltigheid sekere liggaamlike funksies belemmer. In tabel 15 verskyn 'n opsomming van die omvang van hierdie ernstige abnormaliteite in die verskillende streke.

TABEL 15.—VOORKOMS VAN ERNSTIGE WANSTALTIGHEID EN BELEMMERING.

Streek.	Aantal gevalle.	Persentasievoorkoms.
Pretoria	9	1·11
Witzieshoek	4	0·54
Bloemfontein	8	0·97
Qumbu	5	0·61
Kentani	10	1·23
Pietermaritzburg	16	2·05
Nqutu	7	0·93
Letaba	10	1·21
Bochem	14	1·77

Daar was altesame 83 gevalle in die nege distrikte, d.w.s. 'n persentasie van 1.16 ten opsigte van alle kinders wat ondersoek is. In tabel 16 word die waarskynlike oorsake van hierdie abnormaliteite ontleed.

TABEL 16.—OPSOMMING VAN WAARSKYNLIKE OORSAKE VAN 83 GEVALLE VAN ERNSTIGE WANSTALTIGHEID EN BELEMMERING.

Waarskynlike oorsaak.	Aantal gevalle.
Besering (ongelukke, brande, ens.)	21
Tuberkulose	12
Aangebore	11
Rachitis	9
Kinderverlamming	9
Besering by geboorte	5
Sifilis	2
? Sifilis of rhachitis	4
Osteomyelitis	2
Geen tentatiewe diagnose gemaak nie	8

Uit tabelle 14, 15 en 16 blyk dat siektes soos rhachitis en tuberkulose wat in nou verband met diëettekorte staan, nogal dikwels die oorsaak van ongeskiktheid onder die Bantoes is. Van niks minder belang nie is egter die kinders wat permanent belemmer is weens sifilis, beserings, beserings by geboorte en aangebore gebreke. Die meeste van hierdie belemmerings is voorkombaar en aangetaste persone kon selfs vir hulle toekomstige werk meer geskik gemaak word met behoorlike behandeling.

Die vraagstuk van belemmering moet derhalwe nie net betrag word waar dit die resultaat van wanvoeding is nie, maar ook ten opsigte van sy werklike uitwerking op die toekomstige verdienvermoë van die indiwidu, en derhalwe sy of haar vermoë om homself of haarself te voed. In hierdie lig beskou, is die betreklik algemene aanwesigheid van voorkombare belemmering onder Bantoeskoolkinders wat ondersoek is, van die uiterste belang vir diegene wat in hulle voedingstoestand belangstel.

CHAPTER VI

THE EYES

THE examination of the eyes was an inspection with direct and lateral lighting. The abnormalities noted did not include tests for refractory errors nor for visual dark adaptation.

The main lesions diagnosed were the following:—

Eyelids

Blepharitis.—The children recorded as having this condition all evidenced purulent eyelids which resulted in matting together of the eyelashes. The lashes were frequently stuck down to the lids by this purulent discharge and in not a few cases, more particularly in the Bochem district, they were inverted and must have been a source of chronic irritation to the eye itself. The palpebral angles were often the only sites involved. In such cases (angular blepharitis) the lesion resembled very closely the appearance of angular stomatitis (see chapter II). The skin at the corners of the eyes was involved to a varying extent and the general picture was that of a sodden or cracked purulent mucocutaneous junction. *Ptosis, entropion and ectropion* were noted in several children.

Conjunctiva.—Both acute and chronic conjunctivitis were seen, the chronic condition being by far the more serious. In not a few of these there were small sago-like granules on the inner surface of the eyelids and pannus formation, encroaching on to the cornea was also found. The majority of children thus affected were of the Bochem district. The resemblance to trachoma was striking and this disease will be further discussed when considering the etiology of the various abnormalities noted.

Cornea.—Keratitis was not uncommonly found in association with one or other of the above signs. It varied in severity from a few scattered opalescent spots to a thick opaque film which, as will be seen in the accompanying table (Table 17) was the cause of blindness in one eye in not a few cases.

Other Conditions.

Strabismus of one or both eyes was seen in all areas. Nystagmus occurred in two albino children.

Other conditions not found in more than one child throughout the survey

HOOFSTUK VI

DIE OË

DIE ondersoek van die oë het bestaan uit 'n inspeksie met direkte en sydelingse beligting. Die ondersoek het nie toetse vir refraksiefoute of vir gesigsadaptasies (donkerte) ingesluit nie.

Onderstaande is die belangrikste letsels wat gediagnoseer is:—

Ooglede

Blefaritis.—Al die kinders wat aan hierdie toestand gely het, het purulente ooglede gehad met die gevolg dat die ooghare aanmekaar gekoek het. Die ooghare is dikwels deur hierdie purulente afskeiding aan die ooglede vasgeheg en in 'n aantal gevalle, veral in die Bochem-streek, het daar inversie van die ooghare plaasgevind en moes die toestand 'n bron van chroniese irritering vir die oog self gewees het. Die palpebrale hoeke was dikwels die enigste gedeeltes wat aldus aangetas was. In sulke gevalle (angulêre blefaritis) het die letsel baie gelyk soos angulêre stomatitis (sien hoofstuk II). Die vel rondom die ooghoeke is in meerdere of mindere mate aangetas en oor die algemeen het die aangetaste plek die voorkoms van 'n deurweekte of gebarste purulente aansluiting tussen slymvlies en vel gehad. *Ptose, entropion en ektropion* is by verskeie kinders aangetref.

Conjunctiva.—Sowel akute as chroniese conjunctivitis is aangetref. Die chroniese toestand was verreweg die ernstigste. By 'n hele aantal chroniese gevalle was daar aan die binneoppervlakte van die ooglede klein sagoagtige korreltjies; en pannusvorming wat oor die cornea begin strek het, is ook aangetref. Die meeste kinders wat aldus aangetas was, was in die Bochem-streek woonagtig. Die ooreenkoms met trachoma was treffend, en hierdie siekte sal verder bespreek word wanneer die etiologie van die verskillende aangetekende abnormaliteite die aandag geniet.

Cornea.—Keratitis is dikwels tesame met een of ander van bostaande abnormaliteite aangetref. Die strafheid van die toestand het gewissel van gevalle waar daar 'n paar verspreide melkagtige kolle voorgekom het tot dié waarin daar 'n dik ondeursigtige vlies aanwesig was wat, soos uit onderstaande tabel 17 sal blyk, by 'n aantal gevalle die oorsaak van blindheid in een oog was.

Ander toestande

In alle gebiede is gevalle van strabismus in een of albei oë aangetref. By twee albinokinders is nystagmus aangetref. Ander toestande wat nie by meer as een kind gedurende die hele opname aangetref is nie, is eksentriese kyker (nie die gevalle waar die toe-

were eccentric pupil (other than that associated with keratitis, meibomian cyst), pinguicula and pterygium.

With the exception of strabismus, these conditions are not further discussed in view of their rarity.

The incidence of these abnormalities, as well as the number of children with eyes affected by one or more signs, is indicated in Table 17.

stand met keratitis in verbinding staan nie), cyste in die meibomkliere, pinguicula en pterygium.

Met uitsondering van strabismus, word hierdie toestande vanweë hulle seldsame voorkoms, nie verder bespreek nie.

Tabel 17 is 'n weergawe van die getal gevalle waarin die oë deur een of meer van bogenoemde siektes aangetas is, sowel as die persentasievoorkoms.

TABLE 17.—THE INCIDENCE OF COMMON EYE DISEASES (SEE TEXT).
TABEL 17.—VOORKOMS VAN GEWONE OOGSIEKTES (SIEN TEKS).

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Purulent Blepharitis. Purulente blefaritis.		Acute Conjunctivitis. Akute conjunctivitis.		Chronic Conjunctivitis. Chroniese conjunctivitis.		Keratitis and Corneal Opacity. Keratitis en ondeursigtigheid van cornea.		Strabismus. Strabismus.		Complete Blindness of One Eye. Volkome blindheid in een oog.		Number of Children with One or More Defects. Aantal kinders met een of meer gebreke.	
	No. G't'l	%	No. G't'l	%	No. G't'l	%	No. G't'l	%	No. G't'l	%	No. G't'l	%	No. G't'l	%
Pretoria	6	0·74	6	0·74	1	0·12	7	0·86	3	0·37	0	0·00	16	1·97
Pietermaritzburg	7	0·90	22	0·26	2	0·26	5	0·64	6	0·77	1	0·13	17	2·18
Witzieshoek	5	0·68	5	0·68	0	0·00	5	0·68	5	0·68	2	0·27	18	2·45
Qumbu	13	1·58	5	0·61	0	0·00	8	0·97	2	0·24	1	0·12	23	2·79
Nqutu	10	1·33	0	0·00	2	0·27	15	2·00	8	1·06	6	0·80	27	3·59
Bloemfontein	17	2·07	5	0·61	3	0·36	14	1·70	4	0·49	2	0·24	32	3·89
Kentani	25	3·08	9	1·11	3	0·37	5	0·62	1	0·12	2	0·25	34	4·19
Letaba	10	1·21	13	1·57	11	1·33	11	1·33	2	0·24	3	0·36	38	4·60
Bochem	117	14·83	2	0·25	59	7·48	95	12·04	15	1·90	14	1·77	217	27·51

The outstanding feature of these figures is the high incidence of the various abnormalities in the Bochem district. The sight of so many schoolchildren with purulent blepharitis, chronic conjunctivitis and interstitial keratitis was pathetic. More than one of every four examined had one or more serious defects and almost 2 per cent were already completely blind in one eye, the other being affected less severely.

In discussing the probable causes of the eye diseases seen during the survey, stress will be placed on those of the Bochem area, as there were more children affected in this area alone than in the remaining eight districts combined. The main etiological factors are briefly considered in the following account.

Syphilis is a well recognised cause of interstitial keratitis and consequent blindness in the Bantu of this country. It no doubt was an important causative agent of eye diseases in this survey. This, however, does not mean that it was the only cause or even the most important. There is no satisfactory evidence that this was the case and to be satisfied that anti-syphilitic measures would eradicate most of the eye disease seen would be a gross underestimation of the problem. The findings of this survey are definitely

Die belangrikste aspek van die syfers is die veelvuldige voorkoms van die verskeie abnormaliteite in die Bochemstreek. Dit was pateties om so baie skoolkinders aan te tref met purulente blefaritis, chroniese conjunctivitis en interstisiële keratitis. Meer as een uit elke vier wat ondersoek is, het een of meer ernstige gebreke gehad, en byna twee persent was alreeds in een oog totaal blind terwyl die ander oog minder ernstig aangetas was.

By die bespreking van die waarskynlike oorsake van die oogsiektes wat gedurende die opname aangetref is, sal nadruk gelê word op die siektes van die Bochem-streek, aangesien daar meer kinders in hierdie gebied alleen aangetas was as in die orige agt streke saam. In onderstaande bespreking word die belangrikste etiologiese faktore kortliks behandel.

Sifilis is 'n bekende oorsaak van interstisiële keratitis en gevolglike blindheid onder die Bantoerasse van ons land. Ongetwyfeld was dit 'n belangrike veroorsakende faktor by die ontstaan van die oogsiektes wat gedurende hierdie opname aangetref is. Dit beteken egter nie dat dit die enigste oorsaak of selfs die belangrikste oorsaak was nie. Daar is geen bevredigende bewys dat dit die geval was nie, en om aan te neem dat maatreëls teen sifilis die aangetroffe oogsiektes grotendeels sal verwyder, sou op 'n ernstige onderskatting van die probleem neerkom. Die bevindings van hierdie opname strook beslis

not in accord with such an assumption. The comparison of two districts such as Bloemfontein and Bochem affords useful information. Both areas had a very high rate of syphilis as judged by the Wasserman reaction, the incidence in the case of Bloemfontein children being 42.50 per cent., and that in Bochem 46.38 per cent (Chapter XII). Examination of Table 17 reveals a very marked difference in the incidence of eye disease. The following is a short summary of these comparative findings.

	Bloemfontein.	*Bochem.*
Incidence of Syphilis	42·50%	46·38%
Incidence of Keratitis	1·70%	12·04%
Incidence of Strabismus	0·49%	1·90%
Incidence of Purulent Blepharitis	2·07%	14·83%
Incidence of Chronic Conconjunctivitis	0·36%	7·48%
Percentage of Children with Affected Eyes	3·89%	27·51%

These findings are a definite indication that syphilis alone cannot explain the eye disease frequency of Bochem.

Trachoma.—A contagious disease which mainly affects groups who are living in an unhygienic manner and who are underfed, is a not uncommon disease of the Bantu (Vide Annual Reports of the Union Health Department). Many of the children in the Bochem area, and a few of the Letaba district, evidenced chronic conjunctivitis and keratitis of a type indistinguishable bv ordinary clinical examination from trachoma. Pannus formation and a granular appearance of the eyelids were noted in several of these. The conclusion is inevitable that trachoma was an important cause of eye disease in the Bochem children and to a less extent in Letaba. There was no conclusive evidence that this disease was present in the children of the other areas visited.

Deficiency Diseases.—Vitamin A deficiency, a common cause of night blindness and xerophthalmia, has been shown to have been a probable cause of other deficiency signs noted (Chapter I). Loss of eye lustre was very common in several areas but localised patches of thickened epithelium and Bitot's spots were not noted. The incidence of night blindness would have been interesting but as previously stated no tests for this defect were carried out. The influence of Vitamin A deficiency cannot be assessed—although it should not be assumed from this statement that it is unimportant.

Stannus (1936) mentioned that in the early stages of pellagra, redness of the eyes with epiphora were not uncommon; that xerosis had been described for many years and that phlyctenular ulceration and keratoma-

nie met so'n veronderstelling nie. 'n Vergelyking tussen twee gebiede soos Bloemfontein en Bochem verstrek nuttige inligting. In albei gebiede is die sifilis-syfer, volgens Wasserman-reaksie geoordeel, baie hoog—onder Bloemfontein-kinders 42.5 persent en onder Bochem-kinders 46.38 persent (hoofstuk XII). Uit tabel 17 blyk dat daar in die twee gebiede 'n groot verskil is ten opsigte van die persentasie oogsiektes wat daar voorkom. In onderstaande kort opsomming word hierdie bevindings vergelyk:—

	Bloemfontein.	*Bochem.*
Voorkoms van sifilis	42·50%	46·38%
Voorkoms van keratitis	1·70%	12·04%
Voorkoms van strabismus	0·49%	1·90%
Voorkoms van purulente blefaritis	2·07%	14·83%
Voorkoms van chroniese conjunctivitis	0·36%	7·48%
Persentasie kinders met aangetaste oë	3·89%	27·51%

Hierdie bevindings dui beslis daarop dat sifilis alleen nie die oorsaak van die veelvuldige voorkoms van oogsiektes te Bochem kan wees nie.

Trachoma.—Hierdie aansteeklike siekte, wat hoofsaaklik groepe persone aantas wat onder onhigiëniese toestande leef en ondervoed is, word dikwels onder die Bantoe aangetref (sien Jaarverslae van die Departement van Volksgesondheid). Baie van die Bochem-kinders en enkeles uit die Letaba-streek, het gely aan chroniese conjunctivitis en keratitis van 'n tipe wat deur middel van 'n gewone kliniese ondersoek nie van trachoma te onderskei is nie. Pannus-formasie en 'n korrelrige voorkoms van die ooglede is in verskeie van hierdie gevalle opgemerk. Die gevolgtrekking is dus onvermydelik dat trachoma 'n belangrike oorsaak van oogsiekte onder Bochem-kinders, en in mindere mate onder Letaba-kinders, is. Daar was geen afdoende bewys dat hierdie siekte onder die kinders van die ander besoekte gebiede aanwesig was nie.

Gebreksiektes.—Daar is bewys dat vitamine A-tekort, 'n algemene oorsaak van nagblindheid en xerophthalmie, die waarskynlike oorsaak van ander waargenome tekortsimptome (hoofstuk I) was. Gebrek aan glans in die oë was baie algemeen in verskeie gebiede, maar gelokaliseerde kolle van verdikte epiteel en Bitot-kolle is nie opgemerk nie. Die aanwesigheid van nagblindheid sou 'n interessante feit gewees het. Maar soos reeds aangestip, is geen toetse vir hierdie gebrek onderneem nie. Die uitwerking van 'n tekort aan vitamine A kan nie bepaal word nie—nogtans moet daar nie uit hierdie verklaring afgelei word dat dit onbelangrik is nie.

Stannus (1936) het gemeld dat rooiheid van die oë tesame met epifora dikwels in die vroeë stadiums van pellagra voorgekom het, dat xerose jare vantevore reeds beskryf is en dat phlyctenulêre ulcerasie en keratomala-

lacia might also occur. Various other African workers (Wright 1930, Harkness 1935, Dumont 1934) have recorded the occurrence of blepharitis, conjunctivitis and keratitis in association with pellagra-like diseases. Wright's description of cases seen in Sierra Leone conforms closely to many cases of the present survey. His description includes the following : " the skin canthi become glazed . . . the lower lid may be altered in appearance so that it seems deficient in eyelashes and at other times the eyelashes are gummed down by discharge. The eyes may water profusely and there may be some obvious conjunctivitis."

Bulbar conjunctivitis, lacrimation and burning of the eyes have been successfully treated with riboflavin (Spies, Vilter and Ashe 1939). More recent Krause et al (1940 a and b) have conclusively shown the beneficial effect of riboflavin on photophobia, burning of the eyes, circumcorneal injection, corneal vascularisation and corneal opacity. Other signs of Vitamin B_2 deficiency were also present. These same workers have reported improvement in two cases of syphilitic keratitis when treated with riboflavin. Following on this work the author (1941) has successfully treated a Bantu child with riboflavin orally and cod liver oil drops to the eyes. The child had a chronic conjunctivitis associated with marked opacity of cornea, very similar to the findings in a number of children seen during the survey.

The possibility of deficiency of the Vitamin B_2 complex being responsible for many of the abnormal signs noted cannot, therefore, be excluded. Were this to be the case, other signs of this deficiency would be expected, and this is found to be so. Reference to Chapter XIV indicates that pellagra-like manifestations were very common in the Bochem district, no fewer than 14.83 per cent. of children being diagnosed as having a pellagra-like syndrome.

It is not intended to discuss other possible factors, as the above comments indicate the probable main causative agents. Syphilis, trachoma and avitaminosis (more especially Vitamin B_2) must all be taken into consideration as important causes of eye diseases in the children examined.

CHAPTER VII

THE HEART

THE examination of the heart consisted of inspection and palpation for the apex beat, and auscultation.

The heart was considered to be enlarged when the apex beat was

cie ook aangetref kon word. Verskeie ander navorsers in Afrika (Wright, 1930; Harkness, 1935; Dumont, 1934) maak melding van die voorkoms van blefaritis, conjunctivitis en keratitis in assosiasie met pellagra-agtige siektes. Wright se beskrywing van gevalle in Sierra Leone kom taamlik nou ooreen met baie gevalle wat gedurende die huidige opname aangetref is. Onder andere verklaar hy dat „ die velhoeke kry 'n verglaasde voorkoms . . . die onderste ooglid kan van voorkoms verander word sodat dit lyk asof daar min ooghare is en op ander tye is die ooghare weer deur die afskeiding vasgelym. Die oë kan erg water en daar kan 'n mate van klaarblyklike conjunctivitis wees ".

Bulbêre conjunctivitis, traning en brand van die oë is met sukses behandel met riboflavine (Spies, Vilter en Ashe, 1939). Meer onlangs het Kruse en ander (1940 a en b) op afdoende wyse bewys watter heilsame uitwerking riboflavine het op fotofobie, brand van die oë, pericorneale injeksie, corneale vascularisasie en corneale opaciteit. Ander tekens van vitamine B_2-tekort was ook aanwesig. Dieselfde werkers meld verbetering in twee gevalle van sifilitiese keratitis na behandeling met riboflavine. Na aanleiding van hierdie werk het skrywer hiervan (1941) met sukses 'n Bantoekind met riboflavine deur die mond en met druppels lewertraan in die oë behandel. Die kind het gely aan chroniese conjunctivitis en opvallende ondeursigtigheid van die cornea—'n toestand wat baie ooreenstem met die bevindings in 'n aantal gevalle gedurende hierdie opname.

Die moontlikheid dat 'n tekort aan die vitamine B_2-kompleks vir talle van die waargenome abnormale verskynsels verantwoordelik kan wees, kan derhalwe nie uitgesluit word nie. Indien dit die geval is, sou mens ander tekens van hierdie tekort verwag het, en dit blyk inderdaad ook so te wees. Uit verwysing na hoofstuk XIV blyk dat pellagra-agtige verskynsels baie algemeen in die Bochem-streek aangetref is, waar nie minder as 14.83 persent van die kinders pellagra-agtige sindrome vertoon het nie.

Dit is nie die bedoeling om ander moontlike faktore hier te bespreek nie, aangesien bostaande kommentaar die vernaamste waarskynlik oorsaaklike faktore aandui. Sifilis, trachoma en avitaminose (veral vitamine B_2) moet almal beskou word as belangrike oorsake van oogsiektes by die ondersoekte kinders.

HOOFSTUK VII

DIE HART

DIE ondersoek van die hart het bestaan uit inspeksie en palpasie vir waarneming van die hartstoot, en auskultasie.

Dit hart is as vergroot beskou wanneer die hartstoot heelwat ander-

visible and/or palpable well outside the midclavicular line whatever the intercostal space. When in the sixth intercostal space or lower it was also assumed to be enlarged.

Auscultation findings include various murmurs heard. No cases of irregularity by other than sinus arrhythmia were noted.

The following table (Table 18) is a summary of the various auscultatory signs noted:—

kant die midclavikulêre lyn sigbaar en/of palpeerbaar was, ongeag die grootte van die intercostale ruimte. Waar dit in die sesde intercostale ruimte of laer waarneembaar was, is ook aangeneem dat die hart vergroot is.

Onder die auskultatiese bevindings is inbegrepe die verskillende waargenome vorms van gesuis. Geen ander gevalle van onreëlmatigheid behalwe dié van *sinus arrhythmia* is aangeteken nie. In onderstaande tabel 18 word die verskillende auskultatiese verskynsels weergegee:—

TABLE 18.—THE INCIDENCE OF AUSCULTATORY SIGNS—HEART MURMURS.
TABEL 18.—VOORKOMS VAN AUSKULTATIESE SIMPTOME—HARTGERUISE.

District. Streek.	Systolic Murmer. Sistoliese geruis.		Rumbling Diastolic Apical Murmers. (Typical Mitral Stenosis Murmur. Rommelende diastoliese apikale geruis. (Tipiese geruis van mitrale stenose).		Other Diastolic Murmurs. Diastoliese geruise van ander aard.	
	Number of Cases. Getal gevalle.		Number of Cases. Getal gevalle.		Number of Cases. Getal gevalle.	
	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.
Pretoria	16	7	1	1	0	1
Witzieshoek	3	21	1	0	0	2
Bloemfontein	14	15	1	1	0	0
Qumbu	6	12	2	2	0	1
Kentani	11	13	1	0	0	1
Pietermaritzburg	5	3	0	1	0	0
Nqutu	6	7	0	1	0	0
Letaba	21	7	0	1	0	1
Bochem	11	7	0	0	0	0
Total—Totaal	93	92	6	7	0	6
Total Percentage Incidence Totale persentasievoorkoms	2·74	2·45	0·18	0·19	0·00	0·16

There were five children with enlarged hearts, all of them having one or other type of diastolic murmur.

The Systolic Murmur

This murmur in itself cannot be said to be diagnostic of heart disease. Several children of this group gave a history very suggestive of a recent attack of acute rheumatic fever, but by far the greatest number had no history of illness which might have been the cause of a diseased heart. It is possible that some of the cases exhibiting this murmur will later develop more definite signs of heart disease, but at the present stage no useful purpose will be served by assuming such a possibility. In analysing the incidence of heart disease this sign, *per se*, has therefore been excluded.

Diastolic Murmurs

The characteristic murmur of mitral stenosis was found in thirteen children, there being no significant difference

Daar was vyf kinders met vergrote hart en by elkeen is een of ander soort diastoliese geruis waargeneem.

Die sistoliese geruis

Op homself kan hierdie geruis nie as aanduiding van hartaandoening beskou word nie. Verskeie kinders van hierdie groep het vertel van 'n siekteverloop wat baie laat dink het aan 'n onlangse aanval van akute rumatiekkoors, maar verreweg die meeste het voorheen aan geen siekte gely wat die oorsaak van hartkwaal kon gewees het nie. Dit is moontlik dat sommige van die kinders by wie hierdie geruis waargeneem is later meer besliste tekens van hartkwaal kan ontwikkel, maar op die huidige stadium kan niks nuttigs bereik word deur so 'n moontlikheid te aanvaar nie. By die ontleding van die omvang waarin hartkwaal voorkom, is hierdie simptoom, waar dit alleen voorkom, derhalwe weggelaat.

Diastoliese geruise

Die kenmerkende geruis van mitrale stenose is by dertien kinders aangetref —daar was geen betekenisvolle verskil

between the sexes. All but one of these had a history of one or several attacks of a symptom complex indistinguishable from the symptoms of acute rheumatic fever.

Diastolic murmurs localised to the base of the heart were found in six girls and no boys.

The Incidence of Diseased Hearts

Assuming that all diastolic murmurs are significant of heart disease, there were in all 19 children (0.27 per cent.) with such defect and 5 of these had clinically detectable enlargement. Heart disease was, therefore, a minor cause of ill-health in the children examined.

tussen die geslagte nie. In alle gevalle behalwe een het die kinders een of meer aanvalle beleef van 'n simptomekomplek wat nie van die simptome van akute rumatiekkoors te onderskei was nie.

By ses meisies en geen seuns is diastoliese geruise aangetref wat tot die hartbasis beperk was.

Omvang waarin hartkwaal voorkom

Op die veronderstelling dat alle diastoliese geruise 'n aanduiding van hartkwaal is, was daar altesame negentien kinders (0.27 persent) met hartkwaal, waarvan vyf gely het aan klinies waarneembare vergroting. Onder die kinders wat ondersoek is, was hartkwaal derhalwe 'n ondergeskikte oorsaak van ongesondheid.

CHAPTER VIII

THE LIVER, SPLEEN AND MALARIA

THE examination for enlargement of the liver and spleen was undertaken with the child bending slightly forwards in the standing position. The abdomen was kept as relaxed as possible and the usual deep breathing was carried out. This method is of extreme value in a survey of the nature undertaken and is as reliable as examination in the recumbent position once the observer has become used to examining patients in the standing position.

The incidence of palpable livers in the various groups of children examined is indicated in Table 19 (*a*) and the palpable spleen rate in Table 19 (*b*). The degree of enlargement varied considerably in the Letaba, and to a lesser extent in the Bochem district, it was not rare to palpate both spleens and livers almost to the level of the umbilicus. A more detailed analysis of the splenic index will be considered in conjunction with malaria.

HOOFSTUK VIII

DIE LEWER, MILT, EN MALARIA

DIE ondersoek na vergroting van die lewer en milt is gedoen terwyl die kind staande effens vooroor buig. Die buik is sover moontlik heeltemal ontspanne gehou en die kind moes, soos gebruiklik, diep asemhaal. Hierdie metode is van die allergrootste waarde by 'n opname van hierdie aard, en is net so betroubaar as 'n ondersoek van 'n pasiënt wat lê, as die waarnemer eenmaal daaraan gewoond geraak het om pasiënte in daardie houding te ondersoek.

In tabel 19A word aangedui die omvang waarin palpeerbare lewer by die verskillende groepe ondersoekte kinders voorgekom het; in tabel 19B verskyn die syfers ten opsigte van palpeerbare milt. Die mate van vergroting het heelwat gewissel; in die Letaba-streek, en in geringer mate in die Bochem-streek, het dit dikwels gebeur dat sowel milt as lewer byna tot gelyk met die nawel gepalpeer kon word. Meer uitgebreide ontleding van die miltindeks word later tesame met malaria bespreek.

TABLE 19 (*a*)—THE INCIDENCE OF PALPABLY ENLARGED LIVERS.
TABEL 19 (*a*)—VOORKOMS VAN PALPEERBAAR VERGROTE LEWER.

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases. Getal gevalle.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases. Getal gevalle.	Percentage Incidence. Persentasie-voorkoms.
Witzieshoek	0	0·00	0	0·00
Pretoria	3	0·86	2	0·43
Qumbu	11	3·24	9	1·86
Bloemfontein	13	3·20	5	3·60
Pietermaritzburg	24	6·30	14	3·52
Kentani	59	13·62	25	6·60
Nqutu	40	14·09	43	9·19
Bochem	85	18·40	63	19·27
Letaba	263	51·37	109	34·60

TABLE 19 (*b*)—THE INCIDENCE OF PALPABLY ENLARGED SPLEENS.
TABEL 19 (*b*)—VOORKOMS VAN PALPEREBAAR VERGROTE MILT.

Districts. Arranged in Order of Increasing Frequency. Streek. Gerangskik in volgorde van toenemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases. Getal gevalle.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases. Getal gevalle.	Percentage Incidence. Persentasie-voorkoms.
Witzieshoek, Pretoria, Qumbu, Bloemfontein, Kentani		NIL./NUL.		
Pietermaritzburg	0	0·00	1	0·25
Nqutu	4	1·41	5	1·07
Bochem	73	15·81	52	15·91
* Letaba	345	67·38	179	56·83

* Seventeen cases with enlarged spleen—sex not recorded. Total number of children with enlarged spleen in this area is therefore higher than figures given for boys and girls.
* Sewentien gevalle met vergrote milt—geslag nie opgeteken nie. Die totale aantal kinders met vergrote milt in hierdie gebied is derhalwe groter as wat aangedui word deur die syfers vir seuns en meisies.

Some of the causes of these enlargements are not far to seek. Malaria was no doubt the cause of the enlarged spleens, as these were found to occur in well known malarious areas. Other rarer causes of enlarged spleen are not considered as of sufficient importance to be discussed. Malaria was also probably partially responsible for the cases of enlarged liver found in the areas of Bochem and Letaba. However it cannot be considered to be the main or only cause, for a district such as Kentani, in which no children were found with palpable spleens had a comparatively high enlarged liver rate (13.62 per cent. in boys and 6.60 per cent. in girls). Bilharziasis was common in this district and its possible effect on the liver cannot be excluded as a cause of enlargement. This disease (see Chapter X and XI) was found in the majority of children examined in the Letaba district, and it was also not uncommon in the specimens examined of Pietermaritzburg and Nqutu children. In these areas, therefore, the relationship of bilharzia to liver enlargement must be taken into account. The common occurrence of syphilis in all areas no doubt also influenced the figures. The author, however, feels that even these three diseases—malaria, bilharzia and syphilis—are not the whole explanation of this condition, and that further research into the influence of various specific food deficiency states would be of interest.

Malaria.

The anaemic pot bellied thin child suffering from chronic malaria is indistinguishable in build and general appearance from the malnourished child. The degree to which an inadequate diet is responsible for this characteristic posture and physique of malnutrition in endemic areas is

Sommige van die oorsake van hierdie vergrotings hoef nie ver gesoek te word nie. Malaria was ongetwyfeld die oorsaak van die miltvergroting, aangesien hierdie gevalle in bekende malariastreke aangetref is. Ander seldsamer gevalle van vergrote milt word nie van genoeg belang geag vir bespreking nie. Malaria was waarskynlik ook gedeeltelik verantwoordelik vir die vergroting van die lewer by die gevalle wat te Bochem en Letaba ondersoek is. Dit kan egter nie as die hoofoorsaak of die enigste oorsaak beskou word nie, aangesien daar in 'n distrik soos Kentani, waarin geen kinders met palpeerbare milt gevind is nie, betreklik baie gevalle van vergrote lewer was (13.62 persent onder seuns en 6.60 persent onder meisies). In hierdie distrik was bilharzia algemeen, en die moontlike uitwerking van hierdie siekte op die lewer moet as 'n oorsaak van vergroting nie uit die oog verloor word nie. Hierdie siekte (sien hoofstukke X en XI) is by die meeste kinders wat in die Letaba-streek ondersoek is, aangetref, en het ook taamlik algemeen voorgekom onder die kinders van Pietermaritzburg en Nqutu wat ondersoek is. In hierdie gebiede moet daar dus rekening gehou word met die verband wat daar tussen bilharzia en vergroting van die lewer bestaan. Ongetwyfeld het die veelvuldige voorkoms van sifilis in alle gebiede ook die syfers beïnvloed. Skrywer hiervan voel egter dat selfs hierdie drie siektes—malaria, bilharzia en sifilis—nie 'n volledige oplossing bied nie en dat verder navorsing na die uitwerking van verskeie spesifieke voedseltekorte van belang sou wees.

Malaria

Die bloedarmoedige, maer, dikmaagkind, wat aan chroniese malaria ly, kan, vir sover dit liggaamsbou en algemene voorkoms betref, nie van die ondervoede kind onderskei word nie. Die mate waarin 'n ontoereikende dieët die oorsaak is van hierdie kenmerkende postuur en liggaamsbou van ondervoede kinders in endemiese

difficult to assess. At present we are only justified in saying that chronic malaria, with almost annual re-infestation or even more often, is bound to have considerable effect on even the well fed child. Far more so must this be the case when that child is badly nourished.

The incidence of enlarged spleens has already been analysed (Table 19B) and this rate is a useful guide to the degree of malaria infestation in an area. The figures show that a considerable number of children of the Letaba area had severe chronic malaria (spleen rate of over 65 per cent. in boys and over 55 per cent. in girls). When it is remembered that spleen palpability decreases with age and that older children have a far lower spleen rate than younger, it will be realised how severe malaria is in this area. The percentage of enlarged spleens was considerably decreased by the fact that the team visited the Medingen area in the Letaba district, which although in the heart of the malaria region, is situated on a high mountain. The following figures (Table 20) reveal the incidence of enlarged spleens as well as the splenic index in the three districts which were visited in the Letaba area.

The splenic index was determined on the basis shown in the accompanying diagram.

malariastreke kan moeilik bepaal word. Op die huidige tydstip kan ons met regverdiging slegs sê dat chroniese malaria, met byna jaarlikse herbesmetting (of selfs meer dikwels), noodwendig 'n aansienlike uitwerking selfs op 'n goedgevoede kind moet hê. Hoeveel meer moet dit dan nie die geval wees wanneer die kind swak-gevoed is nie.

Die omvang waarin vergrote milt voorkom, is reeds ontleed (tabel 19B) en hierdie syfers is 'n nuttige leidraad vir die bepaling van die graad van malariabesmetting in 'n gebied. Uit die syfers blyk dat 'n aansienlike aantal kinders in die Letaba-streek aan ernstige chroniese malaria ly (miltsyfers: meer as 65 persent onder seuns en meer as 55 persent onder meisies). Word daar nou onthou dat palpeerbaarheid van die milt met toenemende leeftyd afneem en dat ouer kinders veel minder aan vergroting van die milt onderhewig is as die jongeres, dan sal daar besef word hoe straf malaria in hierdie gebied heers. Die persentasie miltvergroting is aansienlik verminder deurdat die span die Medingen-streek in die Letaba gebied besoek het—hierdie gebied lê in die hartjie van die malaria-streek, dog bo-op 'n hoë berg. Onderstaande syfers (tabel 20) weerspieël die mate waarin vergrote milt aangetref word tesame met die milt-indekssyfers vir die drie streke wat in die Letaba-gebied besoek is.

Die miltindekssyfers is op onderstaande diagrammatiese basis bepaal:

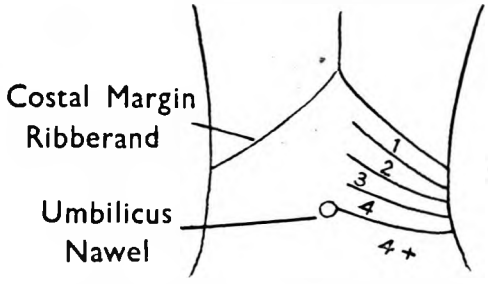


DIAGRAM ILLUSTRATING SPLENIC INDEX.
(The numbers 1, 2, 3, 4 and 4+ indicate roughly the level at which the splenic margin was felt.

DIAGRAM VAN MILTINDEKSYFERS.
(Die syfers 1, 2, 3, 4 en 4+ is 'n ruwe aanduiding van die hoogte waarop die miltrand gevoel is)

TABLE 20.—THE SPLENIC INDEX OF CHILDREN IN THREE OF THE LETABA DISTRICTS.
TABEL 20.—DIE MILTINDEKSSYFER VAN KINDERS IN DRIE STREKE VAN DIE LETABA-GEBIED.

Splenic Index (See Diagram). Miltindekssyfer (sien diagram).	"Shilubane".		„Mohlaba".		„Medingen".	
	Number of Cases. Aantal gevalle.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases. Aantal gevalle.	Percentage Incidence. Persentasie-vookroms.	Number of Cases. Aantal gevalle.	Percentage Indicence. Persentasie-voorkoms.
1.....	59	19·41	74	23·86	12	5·77
2.....	109	35·85	107	34·51	6	2·89
3.....	82	26·98	52	16·77	3	1·44
4.....	18	5·92	14	4·52	1	0·48
4+.....	3	0·99	1	0·32	0	0·00
Total with Palpable Spleen Totale aantal kinders met palpeerbare milt.....		89·15		79·98		10·58

The considerable effect which such a high incidence of malaria must have had on other clinical findings is shown by this analysis. The only other area in which enlargement of the spleen was common was Bochem, 15.81 per cent. of boys and 15.91 per cent. of girls being affected.

Letaba and Bochem children are thus the only two groups whose health can be stated to have been greatly affected by malaria. Prior to the introduction of the intensive anti-malaria campaign of the Union Health Department, Nqutu was an area in which this disease was stated to be not at all uncommon. The findings of only 1.41 per cent. of boys and 1.07 per cent. of girls with enlarged spleens (Table 19B) in this area is indicative of the fact that malaria was not a major cause of ill-health in the schoolchildren examined.

Apart from one girl in Pietermaritzburg none of the remaining districts had any children in whom splenic enlargement was detected and thus malaria can be excluded as an important factor in the production of ill-health in these children.

CHAPTER IX

HAEMOGLOBIN ESTIMATIONS

A "Sicca" haemometer with lighting suitably adjusted for a 6-volt battery was used throughout the survey. An attempt was made to determine the incidence of anaemia by clinical inspection of the mucous membranes, more particularly by the colour of the inner surface of the lower eyelid. After considerable trial with this method it was rejected as being very inaccurate. The comparison with readings on the heamometer in those cases from whom blood samples were taken justified this conclusion. The present discussion will thus be confined to those cases in whom haemoglobin values were determined. Blood samples were taken from random samples of boys and girls in all areas with the exception of Pretoria. All readings were recorded by one observer (S.L.K.). In all, 1,754 blood specimens were tested.

Table 21 indicates the frequency distribution and mean haemoglobin percentages for boys and girls of the 8 districts. It will be noted that in no area was there a significant difference between boys and girls (standard of significance adopted:— Difference in means to be at least three times as great as the standard error of the difference).

Die aansienlike uitwerking wat sulke hoë malariasyfers op ander kliniese bevindings moes gehad het, blyk uit hierdie ontleding. Die enigste ander gebied waar vergroting van dit milt algemeen aangetref is, was Bochem, waar 15.81 persent van die seuns en 15.91 persent van die meisies aangetas was.

Die Letaba- en Bochem-kinders maak dus die enigste twee groepe uit van wie gesê kan word dat hulle gesondheid grootliks deur malaria aangetas is. Voordat die intensiewe malariabestrydingsveldtog van die Departement van Volksgesondheid onderneem is, was Nqutu 'n gebied waarin hierdie siekte, na verklaar is, nogal algemeen voorgekom het. Die bevinding dat slegs 1.41 persent van die seuns en 1.07 persent van die meisies in hierdie gebied vergrote milt vertoon het (tabel 19B), is 'n aanduiding daarvan dat malaria nie 'n belangrike oorsaak van ongesondheid by die ondersoekte skoolkinders was nie.

Met uitsondering van een meisie in Pietermaritzburg, was daar geen kinders in die orige distrikte by wie vergroting van die milt aangetref is nie, en gevolglik kan malaria uitgeskakel word as 'n belangrike faktor by die veroorsaking van ongesondheid van hierdie kinders.

HOOFSTUK IX

HAEMOGLOBINEBEPALINGS

BY hierdie opname is deurgaans gebruik gemaak van 'n „Sicca"-haemometer met ligtoestel behoorlik ingestel vir 'n sesvoltbattery. 'n Poging is aangewend om die aanwesigheid van bloedarmoede vas te stel deur middel van kliniese inspeksie van die slymvliese, en veral volgens die kleur van die binne-oppervlakte van die binneste ooglid. Nadat hierdie metode op aansienlike skaal uitgetoets is, is dit verwerp omdat dit uiters onakkuraat was. Hierdie stap is geregverdig deur vergelyking van die haemometerlesings met die uitslae waar bloedmonsters geneem is. Die huidige bespreking word dus beperk tot die gevalle waarin die haemoglobinewaardes vasgestel is. Bloedmonsters is geneem van seuns en meisies wat lukraak gekies is uit alle gebiede, met uitsondering van Pretoria. Al die lesings is deur een waarnemer opgeteken (S.L.K.). Altesame is 1,754 bloedmonsters getoets.

Tabel 21 weerspieël die gemiddelde haemoglobinepersentasies vir seuns en meisies in die agt streke. Daar sal opgelet word dat daar in geen enkele gebied 'n betekenisvolle verskil tussen seuns en meisies was nie. (Maatstaf van betekenisvolheid: verskil in gemiddeldes moet minstens driemaal so groot wees as die standaardfout van verskil.)

TABLE 21.—FREQUENCY DISTRIBUTION AND MEAN HAEMOGLOBIN PERCENTAGES OF BOYS AND GIRLS.
TABEL 21.—VERSPREIDING VAN GEVALLE EN GEMIDDELDE HAEMOGLOBINEPERSENTASIES VAN SEUNS EN MEISIES.

Percentage Haemoglobin. Persentasie Haemoglobine.	Pietermaritzburg.		Ngutu.		Qumbu.		Witzieshoek.		Bochem.		Letaba.		Bloemfontein.		Kentani.	
	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.	Boys. Seuns.	Girls. Meisies.
45-											1					
50-											4	2				
55-											4	2				
60-			1	1				2	1		5	4	1			
65-		1	5			1	2	2	5	1	7	6	4	4	2	3
70-		2	3	1		2	5	10	16	4	8	12	8	4	6	8
75-	3	3	1	3	3	3	14	23	20	16	21	19	19	14	18	13
80-	5	9	6	6	10	10	19	38	33	24	38	29	37	25	19	24
85-	18	20	15	25	15	13	32	40	31	25	31	32	32	14	18	18
90-	18	15	13	23	11	10	16	27	19	17	30	23	16	10	7	9
95-	28	29	19	24	3	7	5	11	15	4	16	11	5	2	3	1
100-	20	20	9	20	2	2	4		7	3	4	6		1	3	
105-	24	18	10	10			3	1	4	1	8	1				
110-	12	11	3	7	1		1				4					
115-	1	3	2	4			1									
120-	3		4	2				1			1					
125-	1															
TOTAL—TOTAAL	133	131	91	126	45	48	102	155	151	95	182	147	122	74	76	76
Mean Hb. % Gemiddelde Hb. %	99·31	97·16	94·70	96·39	88·83	87·92	87·06	85·18	84·85	85·71	85·19	83·89	83·65	83·18	83·62	82·57
Standard Deviation Standaardafwyking	9·855	10·135	12·805	10·135	6·865	7·625	9·025	8·075	9·325	7·325	12·855	10·425	6·975	7·180	7·635	6·60
Standard Error Standaard fout	0·8543	0·8857	1·343	0·9033	1·023	1·101	0·8935	0·6486	0·7588	0·7515	0·9532	0·860	0·6314	0·8347	0·8758	0·7640
Difference between Boys and Girls Verskil tussen seuns en miesies	Not Significant. Nie betekenisvol nie.		Not Significant. Nie betekenisvol nie.		Not Significant. Nie betekenisvol nie.		Not Significant. Nie betekenisvol nie.		Not Significant. Nie betekenisvol nie.		Not Significant. Nie betekenisvol nie.		Not Significant. Nie betekenisvol nie.		Not Significant. Nie betekenisvo nie.	

Comparison of these findings with those of other sections of this report indicate a striking parallelism. A district such as Pietermaritzburg, in which the children were found to be relatively healthy, showed a considerably higher mean haemoglobin percentage for both boys and girls than did such areas as Bloemfontein, Kentani, Bochem and Letaba. The specific causes of these differences would be difficult to assess, but the comparison of the various areas demonstrates that the haemoglobin estimations are additional useful indices of the influence of malnutrition and/or disease on Bantu school children. Considering the high incidence of various abnormalities in the different areas the haemoglobin values are generally not very low. However, if for purposes of discussion we assume that our findings in Pietermaritzburg children were the optimum, the relatively very low means of Bloemfontein, Kentani, Bochem and Letaba are far from optimal. This statement applies to a less extent to the areas of Witzieshoek and Qumbu. These comparative findings, examined in the light of the other results recorded in this report, justify the conclusion that an improved standard in general health and nutrition of these groups of children would be a potent influence. in raising the haemoglobin level.

Word hierdie bevindings met dié van ander afdelings van hierdie verslag vergelyk, dan blyk daaruit 'n treffende ooreenkoms. In 'n distrik soos Pietermaritzburg waar die kinders betreklik gesond is, is die gemiddelde haemoglobinepersentasie vir sowel seuns as meisies aansienlik hoër as in gebiede soos Bloemfontein, Kentani, Bochem en Letaba. Dit sou moeilik wees om die spesifieke oorsake van hierdie verskille te bepaal, maar 'n vergelyking van die verskillende gebiede bring aan die lig dat die haemoglobinebepalings bykomende nuttige aanduidings is van die uitwerking van ondervoeding en/of siekte op Bantoeskoolkinders. As 'n mens die uitgebreide voorkoms van verskeie abnormaliteite in die verskillende streke in agneem, dan is die haemoglobinewaardes oor die algemeen nie baie laag nie. As ons egter vir besprekingsdoeleindes aanneem dat ons bevindings in Pietermaritzburg die optimum verteenwoordig, dan is die betreklik gesproke baie laer gemiddeldes van Bloemfontein, Kentani, Bochem en Letaba ver onderkant die optimum. Dit geld in mindere mate ten opsigte van Witzieshoek en Qumbu. Word hierdie vergelykende bevindings in die lig van ander resultate wat in hierdie verslag opgeneem is, betrag, dan is daar regverdiging vir die gevolgtrekking dat 'n verhoging van die algemene gesondheid en voeding van hierdie groepe kinders kragtig daartoe sal bydra om die haemoglobinesyfers te verhoog.

CHAPTER X

INTESTINAL PARASITIC INFECTIONS

SPECIMENS of faeces were collected from a random sample of children examined in each area. These were forwarded to the South African Institute for Medical Research, Johannesburg, for examination. The results reported are briefly discussed in the following sections.

Bilharzia

Ova of Schistosoma mansoni were found in 27 of the 109 specimens (24.77 per cent.) examined from the Letaba area. The majority of these positive cases were reported from one district. Of 31 specimens examined of the "Mohlaba" area children, 22 were found to have S. *mansoni ova.* 4 of the 40 specimens in the Shilubane area were positive and only one of 38 in the Medingen group.

Ova of Schistosoma Haematobium were reported in 3.67 per cent. of the specimens examined in this same area, all 4 cases being reported from the Mohlaba area.

In no other area visited were Schistosoma mansoni or haematobium

HOOFSTUK X

PARASITÊRE INGEWANDS-BESMETTINGS

VAN lukraak gekose kinders onder dié wat in elke gebied ondersoek is, is monsters van fekalië geneem en vir ondersoek na die Suid-Afrikaanse Instituut vir Mediese Navorsing, Johannesburg, gestuur. Die resultate word kortliks in onderstaande paragrawe bespreek.

Bilharzia

Ova van Schistosoma mansoni is aangetref in sewe-en-twintig uit die honderd-en-nege monsters (24.77 persent) uit die Letaba-gebied. Die meeste van hierdie positiewe gevalle is uit een streek afkomstig. Van een-en-dertig ondersoekte monstens afkomstig van kinders in die Mohlaba-streek, was daar twee-en-twintig waarin ova van S. *mansoni* gevind is. Van die veertig monsters uit die Shilubane-streek was vier positief en uit die agt-en-dertig van die Medingen-groep was slegs een positief.

Ova van Schistosoma haematobium is in 3.67 persent van die ondersoekte monsters in hierdie gebied aangetref. Al vier gevalle is uit die Mohlaba-streek afkomstig.

In geeneen van die ander besoekte streke is ova van *Schistosoma mansoni*

ova recorded in the faeces, but as will be seen (Chapter XI) urinary bilharziasis was common in several of these.

Ascaris lumbricoides

The east coastal area of Kentani was by far the most heavily infested (25.84 per cent.), and the children of Pietermaritzburg were not uncommonly affected (9.78 per cent.). The high incidence of this parasitic infestation among the inhabitants of the east coast and neighbouring inland areas of South Africa is well recognised.

Tapeworm

1. *Taenia.*—The difficulties of finding taenia ova in the stools of tapeworm infested cases are well known. The results of the examination of specimens collected during the survey must be treated with the utmost reserve. There can be no doubt that they represent but a fraction of the true state of affairs.

2. *Hymenolepis nana (dwarf tapeworm).*—The commonest occurrence of H. nana ova was found to be in two of the three urban areas visited, namely Pretoria (21.52 per cent. positive specimens) and Bloemfontein (12.58 per cent. positives). There were only 4 cases in which ova of this parasite were reported from the specimens sent for examination from all the remaining districts.

Oxyuris vermicularis and Trichuris trichuria

Ova of these two parasites were not commonly reported in any districts, the former being reported in three districts, Pretoria (2.53 per cent.), Witzieshoek (5.80 per cent.) and Nqutu (0.81 per cent.), and the latter in only two areas, Pietermaritzburg (2.17 per cent.) and Pretoria (1.7 per cent.).

Giardia lamblia

There is considerable divergence of opinion as to whether intestinal infestation with this parasite is necessarily pathological. Some claim that it is always pathological, others are prepared to admit that it might be an occasional cause of diarrhoea, and there are many who deny that there is any evidence indicating pathological sequelae following the presence of Giardia. The discussion is best left to those most qualified to judge. It was found in specimens from all districts, and in five of the nine areas approximately 1 in every 5 samples examined were found to be positive.

of *haematobium* in die fekaliëe aangetref nie, dog uit hoofstuk XI sal gesien word dat urinêre bilharziase in verskeie van hierdie streke algemeen voorkom.

Ascaris lumbricoides

In die ooskus-streek Kentani is verreweg die hewigste besmetting aangetref (25.84 persent), terwyl daar ook aansienlike besmetting onder die kinders van Pietermaritzburg gevind is (9.78 persent). Die hoë voorkoms van hierdie parasitêre besmetting onder die inwoners van die ooskus en aangrensende binnelandse streke van Suid-Afrika is geen onbekende verskynsel nie.

Lintwurm

1. *Taenia.*—Dit is 'n bekende feit dat dit baie moeilik is om *Taenia*-eiers in die fekaliëe van gevalle van lintwurmbesmetting te vind. Die resultate van die ondersoek van monsters wat gedurende die opname geneem is, moet met die grootste mate van voorbehoud betrag word. Dit ly geen twyfel nie dat hulle slegs 'n gedeeltetjie van die ware toedrag van sake verraai.

2. *Hymenolepis nana (dwerglintwurm).*—Eiers van *H. nana* is mees algemeen gevind in twee uit die drie stedelike gebiede wat besoek is, d.w.s. Pretoria (21.52 persent positiewe monsters), en Bloemfontein (12.58 persent positiewe monsters). Uit al die monsters wat uit die vorige streke vir ondersoek ingestuur is, was daar slegs vier gevalle waarin eiers van hierdie parasiet aangetref is.

Oxyuris vermicularis en *Trichuris trichuria*

Die eiers van hierdie twee parasiete is nie algemeen in enigeen van die streke aangetref nie. Eersgenoemde is uit drie streke gerapporteer, te wete Pretoria (2.53 persent), Witzieshoek (5.80 persent) en Nqutu (0.81 persent), laasgenoemde uit slegs twee streke, te wete, Pietermaritzburg (2.17 persent) en Pretoria (1.27 persent).

Giardia lamblia

Daar bestaan heelwat uiteenlopendheid van mening betreffende die vraag of ingewandsbesmetting met hierdie parasiet noodwendig patologies is. Sommige beweer dat dit altyd patalogies is, andere is bereid om toe te gee dat dit af en toe diarree kan veroorsaak en daar is menigeen wat ontken dat daar enige bewys is wat dui op patologiese gevolge as uitvloeisel van die aanwesigheid van Giardia. Hierdie bespreking word bes oorgelaat aan diegene wat die bevoegdste is om daaroor te oordeel. Die parasiet is aangetref in monsters uit al die streke, en in vyf uit die nege gebiede het ongeveer een uit elke vyf ondersoekte monsters geblyk positief te wees.

TABLE 22.—THE INCIDENCE OF INTESTINAL PARASITIC INFECTION.
TABEL 22.—VOORKOMS VAN PARASITÊRE INGEWANDSBESMETTING.

Districts. Streke.	Number of Specimens Examined. Aantal monsters ondersoek.	Number of Abnormalities Noted. Aantal abnormaliteite aangetref.	One or More Abnormalities Noted. Een of meer abnormaliteite aangetref.	Schistosoma-mansoni.	Schistosoma haematobium.	Ascaris lumbricoides.	Taenia.	Hymenolepis nana.	Oxyuris vermicularis.	Trichuris trichuria.	Giardia lamblia.
		%	%	%	%	%	%	%	%	%	%
Bochem	100	91·00	9·00	0·00	0·00	0·00	1·00	2·00	0·00	0·00	6·00
Nqutu	123	83·73	16·26	0·00	0·00	4·07	1·63	0·81	0·81	0·00	9·76
Qumbu	100	76·00	24·00	0·00	0·00	0·00	3·00	0·00	0·00	0·00	20·00
Witzieshoek	69	72·47	27·54	0·00	0·00	0·00	0·00	0·00	5·80	0·00	23·19
Pietermartizburg	92	70·65	29·35	0·00	0·00	9·78	1·09	1·09	0·00	2·17	17·39
Kentani	89	65·16	34·83	0·00	0·00	25·84	1·12	0·00	0·00	0·00	8·99
Bloemfontein	80	68·76	31·25	0·00	0·00	0·00	2·50	12·50	0·00	0·00	16·25
Letaba	109	68·82	31·20	24·77	3·67	0·00	0·00	0·00	0·00	0·00	2·75
Pretoria	79	63·30	36·71	0·00	0·00	1·27	3·80	21·52	2·53	1·27	16·45

The details of the incidence of these various parasites are analysed in Table 22. In several cases more than one parasite was reported.

The effect of these various parasites on their hosts in the different districts may now be briefly indicated.

Bochem

It will be noted that this comparatively dry north-western Transvaal area was the least infected. Of the 9 per cent. of cases in which one or other parasite was found, 6 per cent. (6 of the 9 cases) were recorded as having Giardia infection. It can, therefore, be fairly confidently stated that intestinal parasites played but a small part in determining the clinical picture of ill-health and malnutrition in this area.

Nqutu

After Bochem this area had the lowest infestation rate, 83.73 per cent. of specimens examined being free of parasites. More than half of the positive results were accounted for by Giardia, but a rate of 4.07 per cent. Ascaris lumbricoides and 1.6 per cent. Taenia are sufficient to suggest that more intensive study would reveal that these parasites are important impediments to the nutrition and health of the children of this district.

Qumbu and Witzieshoek

By far the commonest parasite found in these two areas was Giardia. The doubtful influence of this organism has already been discussed. The finding of 3 specimens with Taenia ova of the 100 examined from the Qumbu district is indicative that further investigation might show this parasite to be common.

Pretoria and Bloemfontein

The occurrence of parasites was similar in these two urban areas. Hymenolepis nana and Giardia were the commonest found.

Pietermaritzburg

Ascaris infection was more common in these children than in either of the other two urban areas, and the finding of this parasite in almost 10 per cent. of specimens examined, indicates that it is common enough to have been an important influence on the children's health. Giardia was the commonest infection found and its incidence resembles that of Pretoria and Bloemfontein.

Besonderhede betreffende die voorkoms van hierdie verskillende parasiete word in tabel 22 ontleed. In verskeie gevalle is daar meer as een parasiet aangetref.

Daar kan nou kortliks nagegaan word watter uitwerking hierdie verskillende parasiete in die verskillende streke op die aangetaste persone gehad het.

Bochem

Daar sal opgelet word dat daar in hierdie betreklik droë noordwestelike Transvaalse gebied die geringste mate van besmetting aangetref is. Van die nege persent van gevalle waarin een of ander parasiet aangetref is, was ses persent (ses uit die nege gevalle) met *Giardia* besmet. Daar kan dus met 'n aansienlike mate van vertroue verklaar word dat ingewandsparasiete maar 'n klein rol gespeel het by die veroorsaking van ongesondheid en ondervoeding in hierdie gebied.

Nqutu

Na Bochem is hierdie gebied die een met die laagste besmettingsyfers. Van die ondersoekte monsters was 83.73 persent vry van parasiete. Meer as die helfte van die positiewe resultate het gedui op die aanwesigheid van *Giardia*, dog die aanwesigheid van 4.07 persent *Ascaris lumbricoides* en 1.6 persent *Taenia* is groot genoeg om die vermoede te staaf dat 'n meer intensiewe studie aan die lig sal bring dat hierdie parasiete belangrike struikelblokke in die weg van goeie voeding en gesondheid van die kinders in hierdie streke is.

Qumbu en Witzieshoek

Die parasiet wat in hierdie twee streke verreweg mees algemeen voorgekom het, was *Giardia*. Die twyfelagtige uitwerking van hierdie organisme is reeds bespreek. Die feit dat daar uit die honderd monsters uit die Qumbu-streek by ondersoek drie gevind is wat met *Taenia*-eiers besmet was, dui daarop dat verder ondersoek aan die lig mag bring dat hierdie parasiet algemeen in die streek aangetref word.

Pretoria en Bloemfontein

In hierdie twee stedelike gebiede het die voorkoms van parasiete ooreengestem. Mees algemeen was *Hymenolepis nana* en *Giardia*.

Pietermaritzburg

By hierdie kinders was *Ascaris*-besmetting meer algemeen as in enigeen van die ander twee stedelike gebiede, en die feit dat hierdie parasiet in byna tien persent van die ondersoekte monsters aangetref was, is 'n aanduiding daarvan dat dit algemeen genoeg voorkom om 'n belangrike uitwerking op die kinders se gesondheid te kon gehad het. Mees algemeen was *Giardia*-besmetting, en die omvang was soortgelyk aan dié te Pretoria en Bloemfontein.

Kentani

The very common finding of ova of Ascaris lumbricoides in specimens of this area (25.84 per cent.) leaves no doubt that intestinal parasitic infection was a major cause of the poor nutritional state of the children.

Letaba

There can be no other conclusion but that Schistosoma mansoni, which was the commonest parasite reported, was a very important contributory factor in the production of the high incidence of poorly developed and sick children of this area. More particularly do these remarks apply to the "Mohlaba" children.

While there is this considerable variety both of types of parasites and the extent of their infestation in the different districts, the findings indicate that in all areas, with the possible exception of Bochem, intestinal parasitic infections are common enough to adversely affect the health and nutrition of the children.

CHAPTER XI

EXAMINATION OF THE URINE

THE specimens of urine collected were examined at the end of each day's work. Tests for albumin, sugar and acetone were carried out by the Bantu assistant to the team (J. L. Sibanyoni) under the direction of the medical officer, and microscopic examination of all sediments were undertaken by the latter, assisted in the Letaba area by Mr. Jacobs of the Malaria Research Station, who examined the bulk of the specimens in the Shilubane and Mohlaba districts. The samples were obtained from a random selection of boys only, as the method of collection had necessarily to be as simple and time saving as possible. The boys were given urine funnel-shaped glasses and as many glasses as were available would contain specimens for examination within a few minutes. As in all cases where laboratory samples were collected, there was no selection of children other than that stated. These examinations were only started after the first three districts visited, namely Pretoria, Witzieshoek and Bloemfontein, had been completed. The findings are thus restricted to the boys of the other six areas. The analysis of the results in these districts revealed the following facts:—

Qumbu

Of 83 specimens examined, 2 (2.41 per cent.) evidenced a trace of albumin. No other abnormal findings were

Kentani

Die baie algemene aanwesigheid van die eiers van *Ascaris lumbricoides* in die monsters uit hierdie streek (25.84 persent) laat geen twyfel dat parasitêre ingewandsbesmetting een van die hooforsake van die swak voedingstoestand van hierdie kinders was nie.

Letaba

In hierdie streek kon daar slegs tot een gevolgtrekking gekom word, naamlik dat *Schistosoma mansoni*, wat die mees algemeen aangetroffe parasiet was, 'n baie belangrike bydraende faktor was wat gehelp het om die persentasie swak ontwikkelde en siek kinders in hierdie gebied so hoog te maak. Hierdie opmerkings geld veral ten opsigte van die kinders van Mohlaba.

Hoewel daar dus 'n hele aantal parasiet-tipes aangetref is en die omvang van besmetting in die verskillende gebiede heelwat wissel, dui die bevindings in alle gebiede (met die moontlike uitsondering van Bochem) daarop dat parasitêre ingewandsbesmetting algemeen genoeg voorkom om 'n nadelige uitwerking op die gesondheid en voeding van die kinders te hê.

HOOFSTUK XI

URINE-ONDERSOEK

DIE urine-monsters is aan die end van elke dag se werk ondersoek. Toetse vir eiwit, suiker en aseton is deur die Bantoe-assistent van die span (J. L. Sibanyoni) onder toesig van die geneeskundige uitgevoer; laasgenoemde het alle neerslae mikroskopies ondersoek. In die Letaba-streek is hy bygestaan deur mnr. Jacobs van die Malaria-navorsingstasie, wat die grootste persentasie van die monsters uit die Shilubane- en Mohlaba-streke ondersoek het. Die monsters is lukraak geneem slegs van seuns, aangesien die metode van monsterneming noodwendig so eenvoudig en tydbesparend as moontlik moes wees. Aan die seuns is tregtervormige urineglase gegee en binne enkele minute het elke beskikbare glas sy monster bevat. Soos in alle gevalle waar laboratoriummonsters geneem is, was daar geen verdere seleksie van kinders behalwe soos hierbo vermeld nie. Daar is met hierdie ondersoeke 'n begin gemaak eers nadat die drie streke wat die eerste besoek is (Pretoria, Witzieshoek en Bloemfontein) reeds afgehandel is. Die bevindings het dus betrekking slegs op die seuns van die ander ses streke. Uit 'n ontleding van die resultate in hierdie streke verkry, het onderstaande feite aan die lig gekom:——

Qumbu

Uit 83 monsters wat ondersoek is, het twee, d.w.s. 2.41 persent, spore van albumine getoon. Geen ander

noted. The District Surgeon, Dr. Stafford, gave information to the effect that bilharziasis was found in certain districts of Qumbu, but these were not among the centres visited by the team.

Kentani

91 Specimens were examined both chemically and microscopically. Ova of Schistosoma haematobium were present in 14 (15.38 per cent.) and a further 12 (13.19 per cent.) had red and/or white blood corpuscles without ova. These latter may be reasonably assumed to result from Bilharzia, the incidence of which would thus be estimated to be 28.57 per cent. of the boys examined. Albumin was detected in 21 of the specimens and sugar in 5. No cases of acetonuria were found. Albuminuria was no doubt due to bilharzial infection. The significance of the glycosuria is discussed together with the findings of the Letaba district.

Pietermaritzburg

18 Urines with Schistosoma haematobium ova (7.69 per cent.) and a further 13 (5.56 per cent.) with red or white blood cells were found among the 231 specimens examined. The total probable schistosomal rate was, therefore, 13.25 per cent. There were 33 cases of albuminuria and 3 of glycosuria. No specimens examined were found to have acetone.

Nqutu

Of the 189 specimens examined, Schistosoma ova were found in 14 (7.41 per cent.) and with an additional two in which white blood cells were found, the total probable bilharzia rate was 8.46 per cent. Positive albumin tests were recorded in 23 specimens. There were 5 cases of glycosuria and none with acetonuria.

Letaba

The number of specimens microscopically examined was 321, of which 188 (58.57 per cent.) had bilharzia ova and an additional 39 (12.15 per cent.) showed blood and pus cells. The high infestation rate of 70.72 per cent. is thus probable. As was found to be the case in the analysis of the incidence of tropical ulcer, malaria and intestinal bilharzia (Chapters I, VIII and X) the mountainous Medingen area was considerably less affected than were the children of the other two districts. These differences are summarised in the following table (Table 23).

abnormaliteite is teëgekom nie. Die distriksgeneesheer, dr. Stafford, het verklaar dat bilharzia in sekere wyke van Qumbu aangetref is, dog dit was buite die gebiede wat deur die span besoek is.

Kentani

Hier is 91 monsters gekies en mikroskopies ondersoek. Die eiers van *Schistosoma haematobium* is in 14 gevind (15.38 persent), en in nog twaalf (13.19 persent) was daar rooi en/of wit bloedliggaampies sonder eiers. Laasgenoemde verskynsel kan redelik veronderstel word die gevolg te wees van bilharzia-besmetting, met die gevolg dat hierdie siekte by 28.57 persent van die ondersoekte seuns aangetref is. Albumine is in 21 van die monsters aangetref en suiker in 5. Geen gevalle van asetonurie is ontdek nie. Albuminurie is ongetwyfeld deur bilharzia-besmetting veroorsaak. Die betekenis van die glycosurie word tesame met die bevindings van die distrik Letaba bespreek.

Pietermaritzburg

Van die 231 monsters wat ondersoek is, was daar 18 met eiers van *Schistosoma haematobium* (7.69 persent), en 'n verdere 13 (5.56 persent) met rooi of wit bloedliggaampies. Die totale waarskynlike *Schistosoma*-besmetting was derhalwe 13.25 persent. Daar was 33 gevalle van albuminurie en drie van glycosurie. Nie een van die ondersoekte monsters het aseton bevat nie.

Nqutu

In 14 uit die 189 ondersoekte monsters is *Schistosoma-eiers* gevind (7.41 persent). Tesame met die twee gevalle waarin wit bloedliggaampies aangetref is, kom die totale waarskynlike bilharzia-besmetting op 8.46 persent te staan. In 23 monsters was die albuminetoets positief. Daar was vyf gevalle van glycosurie en geen geval van asetonurie nie.

Letaba

Hier is 321 monsters mikroskopies ondersoek. In 188 (58.57 persent) was daar bilharzia-eiers en in 'n verdere 39 (12.15 persent) monsters was daar bloed- en etterselle. Die waarskynlike besmettingspersentasie was dus 70.72 persent wat baie hoog is. Soos ook geblyk het by die ontleding van die persentasievoorkoms van tropiese sweer, malaria en ingewandsbilharzia (hoofstukke I, VIII en X) was daar aansienlik minder besmetting in die bergagtige Medingen-wyk as in die ander twee streke. Hierdie verskille word in onderstaande tabel 23 saamgevat.

TABLE 23.—THE INCIDENCE OF URINARY BILHARZIA IN THE LETABA BOYS.
TABEL 23.—VOORKOMS VAN URINÊRE BILHARZIA ONDER SEUNS TE LETABA.

District. Wyk.	Number of Specimens Examined. Aantal monsters ondersoek.	Sch. h. Ova Detected. Sch. h.-ova aangetref.		Blood and Pus Cells without Ova. Bloed- en etterselle sonder eiers.		Total Probable Bilharzia Rate. Totale waarskynlike billharziapersentasie.
		Number of Cases. Aantal Gevalle.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases. Aantal gevalle.	Percentage Incidence. Persentasie-voorkoms.	Percentage Incidence. Persentasie-voorkoms.
Medingen...	70	18	25·71	3	4·29	30·00
Mohlaba....	100	68	68·00	14	14·00	82·00
Shilubane...	151	102	67·54	22	14·56	82·10

123 Specimens were chemically examined, 76 being found to have albumin (63.23 per cent.), 17 sugar (13.82 per cent.) and 8 acetone (6.5 per cent.). The high incidence of glycosuria and acetonuria is possibly due to liver damage resulting from a combination of factors, the most important of which are no doubt chronic malaria, and both the mansoni and haemotobium forms of bilharzia. A more intensive study of these findings would no doubt throw considerable light on the effect of these diseases on nutrition in its relation to the metabolism of foodstuffs.

Bochem

Of the 118 specimens examined in this area, 2 were found to contain ova of Schistosoma haematobium, and 2 others demonstrated pus cells and red corpuscles only. The probable schistosoma rate is, therefore, 3.35 per cent.

Albumin was detected in 5 of these 118 specimens and sugar in 3. No cases of acetonuria occurred.

Table 24 is a summary of the abnormalities noted in the various districts. The total number of specimens examined for bilharzia ova was 1,033, and of these 835 were tested for albumin, sugar and acetone. The difference is due to the large number of microscopic examinations carried out by Mr. Jacobs in the Letaba area.

Van die 123 monsters wat chemies ondersoek is, was daar 76 met albumine (63.23 persent), 17 met suiker (13.82 persent) en 8 met aseton (6.50 persent). Die hoë persentasievoorkoms van glycosurie en asetonurie is moontlik die gevolg van beskadiging van die lewer wat deur 'n kombinasie van faktore veroorsaak is, waaronder chroniese malaria en sowel die *mansoni*- as *haematobium*-vorms van bilharzia ongetwyfeld die belangrikste is. 'n Meer intensiewe bestudering van hierdie bevinding sal ongetwyfeld heelwat lig werp op die uitwerking wat hierdie siektes op voeding het ten opsigte veral van die metabolisme van voedingstowwe.

Bochem

Van die 118 monsters wat in hierdie streek ondersoek is, was daar twee met eiers van *Schistosoma haematobium* en twee ander met etterselle en slegs rooi bloedliggaampies. Die waarskynlike *Schistosoma*-besmetting kom derhalwe op 3.35 persent te staan.

In vyf uit hierdie 118 monsters is albumen en in drie is suiker aangetref. Daar was geen gevalle van asetonurie nie.

Tabel 24 gee 'n samevatting van die abnormaliteite wat in die verskillende streke aangeteken is. Altesame is 1,033 monsters vir bilharzia-eiers ondersoek, en hiervan is 835 vir albumine, suiker en aseton getoets. Die verskil is toe te skryf aan die groot aantal mikroskopiese ondersoeke wat mnr. Jacobs in die Letaba-streek uitgevoer het.

TABLE 24.—SUMMARY OF THE INCIDENCE OF ABNORMALITIES FOUND IN THE URINE OF BOYS.
TABEL 24.—SAMEVATTING VAN DIE PERSENTASIEVOORKOMS VAN ABNORMALITEITE IN DIE URINE VAN SEUNS.

Districts. Arranged in Order of Increasing Frequency for Bilharzia. Streek. Gerangskik in volgorde van toenemende voorkoms vir bilharzia.	Bilharzia. Percentage Incidence.* Persentasie-voorkoms.*	Albuminuria. Percentage Incidence. Persentasie-voorkoms.	Glycosuria. Percentage Incidence. Persentasie-voorkoms.	Acetonuria. Percentage Incidence. Persentasie-voorkoms.
Qumbu	0·00	2·41	0·00	0·00
Bochem	3·35	4·24	2·54	0·00
Nqutu	8·46	12·17	2·66	0·00
Pietermaritzburg	13·25	14·10	1·28	0·00
Kentani	28·57	23·08	5·50	0·00
Letaba	70·72	63·23	13·82	6·54

* For the actual figurs on which these percentages are based refer to the text.
* Vir die werklike syfers waarop hierdie persentasie gebaseer is, moet die teks geraadpleeg word.

It will thus be seen that Schistosoma haematobium infection was found in 5 of the 6 areas in which examinations were made. There is a considerable difference in the incidence among the children of these areas and the influence of this disease on the extent of ill-health and malnutrition must be assumed to vary according to its occurrence. This, as will be noted from examination of Table 24, is common enough in four of the areas to have been a very important adverse influence.

CHAPTER XII

SYPHILIS

THE common occurrence of syphilis among the Bantu of South Africa is well known. With this knowledge, and the fact that syphilis may manifest itself in so many ways resembling other disease signs, it was decided to investigate the incidence of this disease among the children examined.

Had clinical examination alone been relied upon to furnish an idea of the incidence of syphilis, very few definite cases would have been reported. The close resemblance which syphilitic manifestations have to various lesions, such as the mucous membrane and skeletal abnormalities, resulting from specific diet deficiencies, would have vitiated all our results unless a more definite knowledge of the occurrence of syphilis was obtained. It was, therefore, determined that the Wasserman reaction of an unselected sample of each group of children visited should be examined. The South African Institute for Medical Research, Johannesburg, cooperated in this work and samples of separated sera were sent to this institute from each area. Tables 25A and B indicate the detailed results reported and the syphilis rate respectively.

Dit blyk dus dat *Schistosoma haematobium*-besmetting in 5 uit die 6 gebiede waarin ondersoeke uitgevoer is, aangetref is. Daar is aansienlike skommeling wat betref die persentasievoorkoms onder die kinders in hierdie streke, en daar moet veronderstel word dat die uitwerking van hierdie siekte op die omvang van ongesondheid en ondervoeding sal wissel in verhouding met die omvang van sy voorkoms. Soos uit tabel 24 blyk, kom die abnormaliteite in vier van die gebiede algemeen genoeg voor om 'n baie belangrik nadelige uitwerking te gehad het.

HOOFSTUK XII
SIFILIS

DIT is algemeen bekend dat sifilis wyd verspreid onder die Bantoes van Suid-Afrika voorkom. Met die oog hierop en gesien die feit dat sifilis in so baie opsigte in sy voorkoms op ander siektes lyk, is daar besluit om ondersoek in te stel na die omvang waarin hierdie siekte onder die ondersoekte kinders voorkom.

Het die navorsers slegs op kliniese ondersoek gesteun ten einde 'n begrip te kry van die omvang waarin sifilis voorkom, sou baie min besliste gevalle gerapporteer gewees het. Die feit dat sifilitiese verskynsels so baie lyk op verskeie ander letsels soos byv. die abnormaliteite van die slymvliese en die skelet wat die gevolg van spesifieke diëettekorte is, sou al ons resultate waardeloos gemaak het tensy daar op 'n ander wyse meer bepaalde kennis van die aanwesigheid van sifilis verkry is. Daar is dus besluit dat die Wasserman-reaksie van 'n lukraak gekose monster uit elke groep kinders wat besoek is, ondersoek sou word. Met hierdie werk het die Suid-Afrikaanse Instituut vir Mediese Navorsing, Johannesburg, sy medewerking geskenk en is monsters van afgeskeide serums uit elke gebied daarheen gestuur. In tabelle 25A en 25B verskyn die besonderhede van die resultate en die respektiewe persentasievoorkoms van sifilis.

TABLE 25 A.—THE RESULTS OF EXAMINATION OF 817 BLOOD SPECIMENS.
TABEL 25 A.—RESULTATE VAN ONDERSOEK VAN 817 BLOEDMONSTERS.

Districts. Streek.	Wasserman Strongly Positive. Wasserman sterk positief. (++)	Wasserman Positive. Wasserman positief. (+)	Wasserman Negative. Wasserman negatief. (—)	Blood Anti-Complementary. Bloed anti-komplementêr.	Wasserman Doubtful. Wasserman twyfelagtig.	Total Number Examined. Totale getal ondersoek.
	Number of Cases. Aantal gevalle.	Number of Cases. Aantal gevalle.	Number of Cases. Aantal gevalle.	Number of Cases. Aantal gevalle.	Number of Cases. Aantal gevalle.	
Pretoria.....	8	1	55	0	1	65
Witzieshoek.....	7	1	56	2	9	75
Qumbu.....	5	6	67	5	14	97
Kentani.....	14	14	24	3	23	78
Pietermaritzburg	12	4	64	0	25	105
Nqutu.....	24	11	58	0	22	115
Bloemfontein....	31	3	43	2	1	80
Letaba.....	3	2	84	1	15	105
Bochem.....	40	5	42	0	10	97

The high number of reports—Wasserman reaction — Doubtful is noticed, but these figures have not been included in assessing the incidence of syphilis. Furthermore, it will be noted that not a few reports were returned as anti-complementary. These cases have not been deducted from the total number in estimating the syphilis rate. Table 25B indicates the percentage of + + and + Positive Wasserman reactions (columns 1 and 2, Table 25A) of the total number of sera examined (column 6, Table 25A). It is thus a conservative estimate of the actual state of affairs.

TABLE 25 B.—THE INCIDENCE OF SYPHILIS

Districts Arranged in Order of Increasing Frequency.	Percentage of Children with Syphilis. (Table 25 A and Text).
Letaba	4·76
Witzieshoek	10·67
Qumbu	11·34
Pretoria	13·85
Pietermaritzburg	15·24
Nqutu	30·44
Kentani	35·90
Bloemfontein	42·50
Bochem	46·38

These figures require very little comment. They would be more than tragic were they the results of tests on a young adult population exposed to infection, but when it is remembered that they are the findings in children, the vast majority of whom were between the ages of 7 and 14 years, the degree to which the Bantu have been "syphilised" will be appreciated.

Fairly considerable differences in incidence are found. The comparison of our urban and rural results are, however, of interest in view of the prevailing belief that the urban Bantu are far more commonly affected than are the rural. The following figures indicate that there is no difference in incidence between total urban and rural groups examined.

Urban (Pretoria, Pietermaritzburg and Bloemfontein).—59 out of 250 blood specimens tested gave ++ or + positive Wasserman reaction. Incidence=23·60 per cent.

Rural (Witzieshoek, Qumbu, Kentani, Nqutu, Bochem and Letaba).—132 tests of 567 gave ++ or + positive Wasserman reaction. Incidence=23·28 per cent.

It may be reasonably concluded that the rural communities are as much a reservoir of the disease as are the towns.

Daar sal gelet word op die groot aantal twyfelagtige uitslae (vir sover dit die Wasserman-reaksie betref), maar hierdie syfers is buite rekening gelaat by die bepaling van die persentasievoorkoms van sifilis. Daar sal ook opgelet word dat 'n hele aantal uitslae anti-komplementêr was. Hierdie gevalle is nie by die berekening van die sifilis-persentasie van die totale getal afgetrek nie. In tabel 25B verskyn die persentasie van ++ en + positiewe Wasserman-reaksies (kolomme 1 en 2, tabel 25A) van die totale aantal serums wat ondersoek is (kolom 6, tabel 25A). Dit kom dus neer op 'n konserwatiewe berekening van die werklike toestand wat daar heers.

TABEL 25 B.—PERSENTASIEVOORKOMS VAN SIFILIS.

Streek. Gerangskik in volgorde van toenemde voorkoms.	Persentasie kinders met sifilis. (Tabel 25 A en teks).
Letaba	4·76
Witzieshoek	10·67
Qumbu	11·34
Pretoria	13·85
Pietermaritzburg	15·24
Nqutu	30·44
Kentani	35·90
Bloemfontein	42·50
Bochem	46·38

Hierdie syfers is vanselfsprekend. Hulle sou meer as tragies wees as hulle die resultaat was van toetse uitgevoer op 'n jong volwasse bevolking wat aan besmetting blootgestel is, maar as daar onthou word dat hulle slaan op kinders van wie die oorgrote meerderheid tussen 7 en 14 jaar oud is, gee dit 'n mens 'n treffende beeld van die omvang waarin sifilis onder die Bantoes voorkom.

Verskille in die persentasie-voorkoms is in sommige gevalle aansienlik. 'n Vergelyking van ons stedelike en landelike gebiede is egter van belang met die oog op die algemene mening dat die stedelike Bantoe veel meer algemeen as die landelike Bantoe aangetas is. Uit onderstaande syfers blyk dat daar in hierdie opsig geen verskil tussen die totale groepe stedelikes en landelikes wat ondersoek is, bestaan nie.

Stedelikes (Pretoria, Pietermaritzburg en Bloemfontein).—59 uit die 250 bloedmonsters wat getoets is, het ++ of + positiewe Wasserman-reaksies opgelewer. Persentasievoorkoms is derhalwe 23.60.

Landelikes (Witzieshoek, Qumbu, Kentani, Nqutu, Bochem en Letaba).—Uit 567 monsters het 132 ++ of + positiewe Wasserman-reaksies opgelewer. Persentasievoorkoms was derhalwe 23.28.

Daar kan dus redelikerwys tot die gevolgtrekking gekom word dat die landelike gemeenskap net so 'n vrugbare kweekbodem vir die siekte is as die dorpe.

The very high incidence of syphilis found during the survey is an indication that syphilis no doubt played a large part in determining the high incidence of various abnormalities discussed in previous sections of this report. Its influence on such conditions as bony deformities, poor posture, as well as abnormalities of the mouth, teeth, tonsils, cervical glands, eyes and enlargement of the liver, has been considered in the chapters dealing with these findings. Little useful purpose would be served in repeating these in this chapter.

Dat sifilis blykens hierdie opname so baie algemeen voorkom, is 'n aanduiding daarvan dat hierdie siekte ongetwyfeld 'n belangrike rol gespeel het by die veroorsaking van die talryke verskillende abnormaliteite wat in voorafgaande afdelings van hierdie verslag bespreek is. Sy uitwerking ten opsigte van toestande soos wanvormighede van die bene, swak posture, abnormaliteite van die mond, tande, mangels, cervikale kliere, oë en vergroting van die lewer, is reeds in vorige hoofstukke behandel en hoef dus nie hier weer bespreek te word nie.

CHAPTER XIII

GOITRE

THE relationship of the function of the thyroid gland to the intake of iodine in the food and water is well established. The thyroid gland is dependent on an adequate intake of this substance for its normal activity, and iodine deficiency has been shown to be the major cause of simple goitre, also called endemic goitre.

While endemic goitre has only been studied in one area of South Africa, namely, the Langkloof Valley (Blom, 1934, and Buttner, 1935), it is found commonly in other areas along the Drakensberg range of mountains on both the east and west sides of South African territory bordering on Basutoland.

Of the nine areas visited during the course of this survey, Witzieshoek was the only one in which endemic goitre was found to be very common. Witzieshoek is a mountainous area. It lies on the Orange Free State side of the Drakensberg high peak range of mountains, included among which is the holiday resort of Mont-aux-Sources. The high incidence of goitre in this area is comparable with similar findings in other parts of Africa and other countries, where it has been commonly described in mountainous areas.

The age and sex distribution of goitrous children in this district is summarised in Table 26. It will be noted that girls are far more commonly affected than boys in all age groups. While it is not uncommon in young children under the age of eight years, there is a definite increase in incidence in the older children.

HOOFSTUK XIII

GOITRE

DIE verband waarin die skildklier in sy funksie staan teenoor die opname van jodium in die voedsel en water is duidelik bepaal. Die skildklier is vir normale werking afhanklik van 'n toereikende inname van hierdie stof, en daar is bewys dat 'n jodiumtekort die hoofoorsaak van eenvoudige goitre, ook bekend as endemiese goitre, is.

Hoewel endemiese goitre slegs in een streek van Suid-Afrika bestudeer is, naamlik die Langkloof-vallei (Blom, 1934, en Buttner, 1935), kom dit algemeen in ander gebiede voor, soos in die streke wat oos en wes van die Drakensberge aan Basoetoland grens.

Van die nege streke wat in die loop van hierdie opname besoek is, was Witzieshoek die enigste waarin endemiese goitre geblyk het baie algemeen voor te kom. Witzieshoek is 'n bergagtige streek. Dit lê in die Oranje-Vrystaat aan die rand van die hoë Drakensberge naby die vakansieoord Mont-aux-Sources. Dat goitre in hierdie streek so algemeen aangetref word, stem ooreen met soortgelyke bevindings in ander dele van Afrika en ander lande, waar dit algemeen beskryf word in bergagtige streke.

Die leeftyds- en geslagsverspreiding van kinders met goitre in hierdie streek verskyn in tabel 26. Daar sal opgelet word dat meisies veel meer dikwels as seuns aangetas word, in alle leeftydsgroepe. Hoewel dit dikwels by jong kinders onder die ouderdom van agt jaar voorkom, word dit beslis meer dikwels by ouer kinders aangetref.

TABLE 26.—THE AGE AND SEX INCIDENCE OF GOITRE IN THE WITZIESHOEK AREA.
TABEL 26.—LEEFTYD EN GESLAG VAN KINDERS MET GOITRE IN DIE WITZIESHOEK-STREEK.

Age Groups. Leeftydsgroepe.	Boys. Seuns.		Girls. Meisies.	
	Number of Goitrous Cases. Aantal goitre-gevalle.	Percentage Incidence. Persentasie-voorkoms.	Number of Goitrous Cases. Aantal goitre-gevalle.	Percentage Incidence. Persentasie-voorkoms.
8 Years Old and Under..... 8 jaar oud en daaronder....	1	3·57	17	24·29
9 and 10 Years Old..... 9 en 10 jaar oud.....	3	8·57	31	26·50
11 and 12 Years Old..... 11 en 12 jaar oud.....	11	16·66	47	33·34
13 and 14 Years Old..... 13 en 14 jaar oud.....	11	18·33	77	58·33
15 and 16 Years Old..... 15 en 16 jaar oud.....	5	13·52	33	67·35
TOTAL TOTAAL.....	31	13·72	205	40·28

All the cases seen were of the nature of simple goitre. Repeated questioning regarding the incidence of deaf mutism and cretinism gave negative results, but more intensive studies would be of great interest in this regard.

Endemic goitre must be regarded as being largely a nutritional deficiency disease. The main deficiency, as previously stated, is an inadequate quantity of iodine in the soil and water. Such deficiency does not, however, completely explain the incidence of goitre in certain areas. It is not intended to discuss other possible causes in any great detail, but among the etiological factors which might play a part are (1) the occurrence of a relatively low iodine content in the soil and a high calcium content (Wahlberg, 1938); (2) a high arsenical content of food and water and a relatively low iodine content (Scott, 1938).

In addition to these local geological factors there is also an economic aspect of the problem. The people of the Witzieshoek area depend for their food supplies on what they can eke out of the soil. Their limited financial resources do not allow of the importation of foodstuffs which could remedy the defect. Refined mealie meal is no doubt imported from other areas through the medium of the local traders, but mealies in this highly refined state are devoid of iodine content. Other foods such as sugar and refined salt, which are also imported, are very poor providers of iodine. An improved economic status, associated with educational measures, would no doubt considerably alleviate this endemic disease by allowing the people to import a greater quantity of iodine-containing foodstuffs. The author has commenced a study of endemic goitre

Al die gevalle wat opgemerk is, was van eenvoudige aard. Hoewel herhaalde ondervraging betreffende die voorkoms van doofstomheid en kretinisme negatiewe resultate afgewerp het, sou meer intensiewe studies in hierdie rigting van groot belang wees.

Endemiese goitre moet grotendeels as voedingsgebreksiekte beskou word. Soos reeds gemeld, is die hoofgebrek 'n ontoereikende hoeveelheid jodium in die grond en water, dog so 'n tekort verklaar nog nie in alle opsigte die voorkoms van goitre in sekere streke nie. Dit is nie die bedoeling om hier die ander moontlike oorsake uitvoerig te bespreek nie, maar onder die etiologiese faktore wat 'n rol mag speel, tel (1) die voorkoms van 'n betreklik lae jodiumgehalte van die grond tesame met 'n hoë kalsiumgehalte (Wahlberg, 1938), en (2) 'n hoë arseengehalte van voedsel en water tesame met 'n betreklik lae jodiumgehalte (Scott, 1938).

Benewens hierdie plaaslike geologiese faktore is daar ook 'n ekonomiese aspek van die saak. Die bewoners van die Witzieshoek-streek is vir hul voedselvoorraad afhanklik van wat hulle uit die grond kan haal. Hulle beperkte geldelike vermoë laat nie toe dat hulle voedselware wat die tekort sou kan aanvul, invoer nie. Fyn mieliemeel word ongetwyfeld deur bemiddeling van die plaaslike handelaars uit ander gebiede ingebring, maar mielies in hierdie geraffineerde toestand bevat geen jodium nie. Ander voedselware soos suiker en fyn sout wat ook ingevoer word, bevat ook baie min jodium. 'n Verbetering in die ekonomiese status, tesame met opvoedingsmaatreëls, sou ongetwyfeld die toestand ten opsigte van die voorkoms van hierdie endemiese siekte grootliks verlig deurdat die mense daardeur in staat gestel sou word om groter hoeveelhede jodiumhoudende voedsel te bekom. Skrywer hiervan het 'n begin gemaak met 'n studie van endemiese

in its relation to economic status in the Polela district of Natal, in which area goitre is also common among the Bantu.

The most progressive step so far undertaken for the prevention of this condition has been the supplying of iodised salt in the place of ordinary refined salt. This has been found to be effective in America, Switzerland, Poland and other countries in which it has been attempted. In all cases, however, it requires State assistance and guidance.

In other areas occasional cases of enlargement of the thyroid gland were noted, but in none was there a sufficient number to consider that area to be one of endemicity. An interesting condition of familial toxic goitre was noted in the Qumbu district. Two sisters, aged 9 and 11 years, having a European father and a Pondo mother, were found to have considerable thyroid enlargement. They were both highly strung children with a suggestion of exophthalmos. There was an obvious fine tremor of the fingers on testing and the pulse rate was rapid throughout the examination. Information obtained later from the District Surgeon added to the familial occurrence. An elder sister of approximately 15 or 16 years old was in congestive cardiac failure following a history of several years of toxic goitre. There were no other children with any evidence of toxic goitre in this district, while there were only 7 girls and 2 boys who had a simple enlargement.

Dormer has described goitre in the Estcourt district of Natal (1940), and in addition to the high incidence of this deficiency state in the Witzieshoek area, the author has noted it to be very common in the Polela, Impendhle and Underberg districts of Natal. These facts, which no doubt represent but a small portion of the actual areas of South Africa in which endemic goitre is prevalent, indicate that goitre is an important nutritional problem in this country.

CHAPTER XIV

PELLAGRA AND PELLAGRA-LIKE DISEASES

THE common occurrence of various pellagra-like signs which were seen in children examined during this survey led the author to investigate the clinical appearance of Bantu pellagrins in the Non-European Hospital, Johannesburg. Examination of these cases was undertaken at various times during the course of the survey and these repeated visits enabled a

goitre in sy verband tot ekonomiese status in die Polela-streek van Natal, waar goitre ook algemeen onder die Bantoes voorkom.

Die mees progressiewe stap wat tot dusver gedoen is ter voorkoming van hierdie toestand was die verskaffing van gejodiseerde sout in die plek van gewone geraffineerde sout. In Amerika en in Switzerland, Pole en ander lande waar hierdie maatreëls toegepas is, het dit doeltreffend geblyk. In alle geval verg dit egter Staatshulp en -leiding.

In ander gebiede is af en toe gevalle van vergroting van die skildklier aangetref, maar in geen gebied was daar genoeg gevalle om tot die gevolgtrekking te lei dat goitre daar endemies is nie. In die Qumbu-streek is 'n interessante toestand van familiale toxiese goitre teëgekom. Daar is gevind dat twee susters, nege en elf jaar oud, met 'n blanke vader en Pondo-moeder, elk 'n aansienlik vergrote skildklier gehad het. Albei kinders was hooggespanne en het ligte tekens van exoftalmie vertoon. 'n Toets het aan die lig gebring dat daar 'n klaarblyklike fyn trilling van die vingers aanwesig was, en dat die pols gedurende die hele tydperk van die ondersoek snel was. Later is van die distriksgeneesheer inligting verkry wat die familiale aard van hierdie geval beklemtoon het. n Ouer suster van ongeveer vyftien of sestien jaar het gely aan kongestiewe hartverlamming nadat sy verskeie jare 'n toxiese goitre gehad het. In hierdie distrik was daar geen ander kinders met tekens van toxiese goitre nie en slegs sewe meisies en twee seuns met eenvoudige vergroting van die skildklier.

Dormer het goitre in die distrik Estcourt, Natal, beskryf (1940), en skrywer hiervan het ook gemerk dat dit nie net in die Witzieshoek-streek baie algemeen voorkom nie, maar ook in die distrikte Polela, Impendhle en Underberg van Natal. Uit hierdie feite, wat ongetwyfeld maar 'n klein gedeelte van die werklike gebiede van Suid-Afrika waarin die endemiese goitre voorkom, verteenwoordig, blyk dat hierdie aandoening 'n belangrike voedingsprobleem in ons land daarstel.

HOOFSTUK XIV

PELLAGRA EN PELLAGRA-AGTIGE SIEKTES

DIE algemene voorkoms van verskeie pellagra-agtige verskynsels by kinders wat gedurende hierdie opname besoek is, het skrywer hiervan daartoe gelei om ondersoek in te stel na die kliniese voorkoms van Bantoepellagralyers in die hospitaal vir nieblankes op Johannesburg. Hierdie gevalle is op verskillende tydstippe in die loop van die opname ondersoek en hierdie herhaalde besoeke het die navorser in staat gestel om die gevor-

constant comparison to be made between these advanced cases and the appearance of less severe lesions in the school children of the different districts. An analysis of the findings in the hospitalised cases (unpublished data) indicated that the manifestations of pellagra in the South African Bantu do not differ in any important respect from classical pellagra as described in other countries. The main lesions were:—

(*a*) Characteristic dermatitis.

(*b*) Mucous membrane changes, such as glossitis, buccal stomatitis. Lesions of the muco-cutaneous junctions of the vulva, anus and urethra were also noted. In addition conjunctivitis, blepharitis and a few cases of keratitis were found. Diarrhoea and constipation were common.

(*c*) Abnormalities of the nervous system included dementia and peripheral neuritis.

(*d*) Oedema, more particularly of the eyelids and legs, wat not uncommon. Many other features were noted but the above include the outstanding signs of the majority of cases.

The etiological factors involved are multiple. Nicotinic acid cures the dermatitis, dementia, and some of the mucous membrane lesions such as glossitis, stomatitis, diarrhoea and perineal abnormalities (Spies and associates, and many other workers). Riboflavin deficiency has been shown to produce certain lesions which on clinical examination are indistinguishable from those found in pellagra; among these is the characteristic angular stomatitis. Various eye changes, such as conjunctivitis and keratitis have been cured by administration of this vitamin (see Chapter VI). The peripheral neuritis responds to vitamin B_1 therapy and must therefore be considered analogous to the peripheral neuritis of beri-beri (Spies et al). The occurrence of oedema has as yet not been accurately explained but possible causes are the so-called "beri-beri heart failure" due to vitamin B_1 deficiency, and protein deficiency.

It is not necessary in a report of this nature to discuss the various signs and their etiology in any great detail. The above summary, however, indicates that it is not only a disease of protein manifestations but that the cause is not limited to a deficiency of one food factor. Among the more important deficiencies involved are the vitamin B_2 complex (more particularly nicotinic acid and riboflavin), vitamin B_1 and protein.

The dermatitis of pellagra is characteristic and when present removes any doubt as to the diagnosis

derde gevalle gedurig te vergelyk met die voorkoms van die minder ernstige letsels onder die skoolkinders van die verskillende distrikte. 'n Ontleding van die bevindings in die hospitaalgevalle (ongepubliseerde gegewens) dui daarop dat die pellagra-verskynsels by die Suid-Afrikaanse Bantoe nie in enige belangrike opsig verskil van dié van klassieke pellagra soos dit in ander lande beskryf word nie. Die vernaamste letsels was:—

(*a*) Kenmerkende dermatitis.

(*b*) Veranderings van die slymvlies, soos glossitis en buccale stomatitis. Letsels van die muco-cutaneuse aansluitings van die vulva, anus en ureter is ook opgemerk. Daarbenewens is ook gevalle van conjunctivitis, blefaritis en enkele gevalle van keratitis aangetref. Diarree en hardlywigheid was algemeen.

(*c*) Abnormaliteite van die senugestel het dementia en periferale neuritis ingesluit.

(*d*) Edeem, en veral van die ooglede en bene, het taamlik algemeen voorgekom. Talle ander verskynsels is aangeteken, maar in die meeste gevalle was bostaande die opvallendste.

Veelvuldige etiologiese faktore is hierby betrokke. Nikotiensuur is 'n geneesmiddel vir dermatitis, dementia en sommige van die slymvliesletsels soos glossitis, stomatitis, diarree en perineale abnormaliteite (Spies en medewerkers, en talle ander navorsers). Daar is bewys dat 'n riboflavine-tekort sekere letsels te voorskyn roep wat by kliniese ondersoek nie van pellagra-letsels onderskei kan word nie, en waaronder die kenmerkende angulêre stomatitis tel. Verskillende oogletsels soos conjunctivitis en keratitis is genees deur aanwending van hierdie vitamine (hoofstuk VI). Periferale neuritis reageer goed op vitamine B_1-terapie en moet derhalwe as analoog met die periferale neuritis van beri-beri beskou word (Spies en ander). Die voorkoms van edeem is tot dusver nog nie presies verklaar nie, dog moontlike oorsake is die sogenaamde „beri-beri"-hartverlamming wat deur 'n vitamine B_1-tekort veroorsaak word, en 'n proteïne-tekort.

In 'n verslag van hierdie aard is dit onnodig om die verskillende siektetekens en hulle etiologie breedvoerig te bespreek. Uit bostaande opsomming blyk egter dat dit nie slegs 'n siekte van proteïneverskynsels is nie dog dat die oorsaak daarby nie tot 'n tekort aan een voedselfaktor beperk is nie. Onder die belangrikste tekorte wat hierby op die spel is, is 'n tekort aan die vitamine B_2-kompleks (veral nikotiensuur en riboflavine), vitamine B_1 en proteïne.

Die dermititis van pellagra is karakteristiek en waar dit aangetref word, bly daar geen twyfel betreffende

of the disease. The lesions as first noticed by the patient are usually sensations of burning and itching of the affected areas. Examination of these sites reveals an erythema, which on a dark brown skin appears darker than the surrounding area and on light brown skins as coppery red. Symmetry of distribution is highly characteristic, but on rare occasions a certain amount of asymmetry is noted. The next stages vary considerably in appearance. The commonest in advanced hospital patients is a coal-blackness of the sites involved. In others blebs appear early, followed by irregular peeling. More chronic cases evidence a symmetrical hyperkeratosis with a varying degree of cracking of the skin and pigmentation. In the present survey, more particularly in the children of the Bochem area, a very common picture was a marked hyperkeratosis of the dorsum of the hands extending to a variable extent onto the forearms. The flexures of the elbows were less commonly involved as were the dorsum of the feet and legs.

The following table (Table 27) lists the incidence of this chronic pellagra-like dermatitis:—

TABLE 27.—THE INCIDENCE OF PELLAGRA-LIKE DERMATITIS.

Districts.	No. of Cases.	Percentage Incidence.
Pietermaritzburg.....	0	0·00
Letaba.....	1	0·12
Pretoria.....	1	0·12
Nqutu.....	1	0·13
Witzieshoek.....	1	0·14
Qumbu.....	2	0·24
Bloemfontein.....	3	0·36
Kentani.....	5	0·62
Bochem.....	117	14·83

The incidence of mouth and eye lesions has been discussed in Chapters II and VI respectively and reference to these sections indicates that the type of lesions met with in the various districts resemble very clearly those described in pellagra. This statement applies more particularly to those cases of glossitis and buccal and lip stomatitis, including angular stomatitis.

No cases of oedema were noted. This negative finding would be expected in a school-going group of children, who are still well enough to attend classes.

Examination of the nervous system and the perineal mucocutaneous junctions was not carried out in the routine followed during the survey and no history was obtained as to the occurrence of diarrhoea and constipa-

die diagnose van die siekte nie. Die letsels wat die eerste deur die pasiënt opgemerk word, is gewoonlik 'n gebrand en gejeuk van aangetaste oppervlaktes. By ondersoek word daar op hierdie plekke 'n eritheem ontdek, wat op 'n donkerbruin vel donkerder as die omliggende vel voorkom en op ligte bruin velle koperrooi skyn. Die verspreiding is simmetries en dit is 'n baie sterk kenmerk, hoewel daar in seldsame gevalle 'n mate van asimmetrie opgemerk word. Die volgende stadiums wissel heelwat ten opsigte van hul voorkoms. In gevorderde hospitaalgevalle word die aangetaste gedeeltes gitswart—dit is die mees algemene voorkoms. In ander gevalle verskyn daar spoedig blase waarna die vel in onreëlmatige kolle afkom. Meer chroniese gevalle vertoon simmetriese hiperkeratose en barste in die vel met wisselende grade van hewigheid, en pigmentasie. Gedurende die huidige opname het daar, veral by die kinders van die Bochem-streek, 'n opvallende hiperkeratose van die handrug baie algemeen voorgekom en het die siekte in wisselende mate oor die onderarms versprei. Minder algemeen is die buiging van die elmboog aangetas en ook die dorsum van voete en bene.

In onderstaande tabel 27 word die omvang waarin hierdie chroniese pellagra-agtige dermatitis voorgekom het, weergegee:—

TABEL 27.—VOORKOMS VAN PELLAGRA-AGTIGE DERMATITIS.

Streek.	Aantal gevalle.	Persentasie-voorkoms.
Pietermaritzburg.....	0	0·00
Letaba.....	1	0·12
Pretoria.....	1	0·12
Nqutu.....	1	0·13
Witzieshoek.....	1	0·14
Qumbu.....	2	0·24
Bloemfontein.....	3	0·36
Kentani.....	5	0·62
Bochem.....	117	14·83

Die aanwesigheid van mond- en oogletsels is in onderskeidelik hoofstukke II en VI bespreek en verwysing na daardie afdelings is 'n aanduiding daarvan dat die soort letsel wat in die verskillende streke teëgekom is, baie duidelik lyk op dié wat onder die hoof pellagra beskryf is. Hierdie stelling is veral van toepassing op gevalle van glossitis en buccale en lip-stomatitis, met inbegrip van angulêre stomatitis.

Geen geval van edeem is aangeteken nie. Hierdie negatiewe bevinding is te verwagte in 'n groep skoolgaande kinders wat nog gesond genoeg is om klas by te woon.

Ondersoek van die senuweestelsel en die perineale mucocutaneuse aansluitings het nie deel uitgemaak van die roetine wat gedurende die opname toegepas is nie, en geen besonderhede is in verband met die voorkoms van diarree en hardlywigheid ingewin nie.

tion. These signs are therefore not included in the subsequent discussion.

Consideration of the lesions of the skin and mouth, and to a less extent of the eyes, indicates that pellagra signs were not uncommon in all the areas visited. However, for the purposes of diagnosis of this disease it has been decided to include only those children who manifested a suggestive dermatitis or who presented a group of signs which so closely resembled pellagra that they were clinically indistinguishable from its appearance in the early stages.

Bochem

The very common occurrence of this disease among the Bochem school children warrants a more detailed analysis. There were 117 children who evidenced the pellagra-like chronic dermatitis (14·83 per cent., Table 27). Reference to Tables 5 and 6 (Chapter II) indicates that no fewer than 105 boys (22·73 per cent.) and 41 girls (12·54 per cent.) had stomatitis and that 62 boys (13·42 per cent.) and 28 girls (8·57 per cent.) evidenced glossitis. The 117 cases of dermatitis did not always manifest those other lesions and similarly the latter were not always found together. It has, therefore, been decided to analyse the main features of those cases with dermatitis with a view to presenting the extent to which this complex deficiency disease was present among the children of this district. Table 28 indicates the incidence of various signs associated with this dermatitis.

The majority of these associated signs have been fully described in previous sections of this report and reference may be made to the relative chapters for discussion on their significance.

Analysis of the sex and age distribution of these 117 cases of pellagra indicates that boys were far more commonly affected than girls, a difference which has been found to occur in many of the deficiency signs already reported. Both sexes, however, are more commonly affected in the lower age groups. The difference in age incidence may not be a reflection of the state of affairs among the general community, for it must be remembered that there is a fairly intensive selection of school-going children which becomes progressively severe as age advances. In Chapter II of the Introduction to this report (Section A) this selection is discussed. Table 29 summarises the sex and age incidence of these cases.

Hierdie tekens is derhalwe nie in onderstaande bespreking ingesluit nie.

Uit 'n oorweging van die letsels van die vel en mond, en in mindere mate van die oë, blyk dat pellagra-tekens in al die besoekte streke nie 'n ongewone verskynsel is nie. Vir die doel van diagnose van hierdie siekte is daar egter besluit om slegs die kinders wat 'n verdagte vorm van dermatitis vertoon het of by wie 'n groep tekens aangetref is, wat so opvallend op pellagra lyk dat hulle in die vroeë stadiums nie klinies daarvan onderskei kon word nie, in te sluit.

Bochem

Die feit dat hierlie siekte so algemeen onder die skoolkinders te Bochem voorkom, regverdig 'n meer diepgaande ontleding. By 117 kinders is die pellagra-agtige chroniese dermatitis aangetref (14.83 persent, tabel 27). Verwysing na tabelle 5 en 6, hoofstuk II, bring aan die lig dat nie minder as 105 seuns (22.73 persent) en 41 meisies (12.54 persent) aan stomatitis en 62 seuns (13.42 persent) en 28 meisies (8.57 persent) aan glossitis gely het nie. In die 117 gevalle van dermatitis was die ander letsels nie altyd aanwesig nie en so ook is laasgenoemde nie altyd tesame aangetref nie. Daar is derhalwe besluit om die vernaamste verskynsels van daardie dermatitis-gevalle te ontleed ten einde te bepaal in watter mate hierdie komplekse gebreksiekte onder die kinders van hierdie streek aangetref word. In tabel 28 word die omvang waarin die verskillende verskynsels wat met hierdie vorms van dermatitis geassosieer is, daar voorkom.

Die meeste van hierdie geassosieerde tekens is reeds in vorige afdelings van hierdie verslag volledig beskryf en die leser kan dus na die betrokke hoofstukke verwys vir bespreking van hul betekenisvolheid.

'n Ontleding van die geslags- en leeftydsverspreiding van hierdie 117 gevalle van pellagra bring aan die lig dat seuns veel meer algemeen as meisies aangetas word, 'n verskil wat ook teëgekom is by die behandeling van talle ander tekortsimptome wat alreeds behandel is. Albei geslagte word egter meer dikwels aangetas in die lae as in die hoë leeftydsgroepe. Die verskil in die omvang waarin in die siekte voorkom vir sover dit leeftyd betref is miskien nie 'n weergawe van die toedrag van sake in die algemene samelewing nie, want daar moet onthou word dat daar 'n betreklik intensiewe seleksie van skoolgaande kinders plaasvind—'n proses wat strenger toegepas word met toenemende leeftyd. Hierdie keuring word in hoofstuk II van die inleiding van hierdie verslag (Afdeling A) bespreek. In tabel 29 word die persentasievoorkoms onder die geslagte op verskillende leeftye saamgevat.

TABLE 28.—THE INCIDENCE OF VARIOUS ABNORMALITIES ASSOCIATED WITH PELLAGRA-LIKE DERMATITIS IN THE BOCHEM DISTRICT.
TABEL 28.—VOORKOMS VAN VERSKILLENDE ABNORMALITEITE WAT MET PELLARGA-AGTIGE DERMATITIS GEASSOSIEER IS, IN DIE BOCHEM-STREEK.

	Boys. Seuns. Number of Cases. Aantal gevalle.	Girls. Meisies. Number of Cases. Aantal gevalle.	Total. Totaal. Number of Cases. Aantal gevalle.
Total Number of Children with Dermatitis (Pellagra-like) Totale aantal kinders met dermatitis (pellagra-agtige)	85	30	117*
Other skin manifestations: — Ander velverskynsels :— Phrynoderma (follicular keratosis) Phrynoderma (follikulêre keratose)	39	12	51
Scabies and/or chronic impetigo Skurfte en/of chroniese impetigo	27	5	32
Dull, dry, skins with minor manifestations of malnutrition Dowwe, droë vel met geringer verskynsels van ondervoeding	85	30	117
Lesions of the mouth and nose :— Letsels van die mond en neus :—			
Stomatitis	46	14	60
Glossitis	17	3	20
Soft spongy gums Sagte sponsagtige tandvleis	11	0	11
Pyorrhoea	4	0	4
Irregularities of the teeth Onreëlmatighede van die tande	23	5	28
Carious Teeth Verrotte tande	7	4	11
Excoriation of the external nares Excoriasie van neusvleuels (uitwendig)	18	2	20
Eye Lesions :— Oogletsels :— Blepharitis Blefaritis	24	16	40
Conjunctivitis	8	8	16
Keratitis	9	3	12
Strabismus	0	2	2
Enlarged and/or septic tonsils Vergrote en/of septiese mangels	30	12	42
Palpable cervical glands Palpeerbare cervikale kliere	74	26	100
Discharging ears Ore wat dra	1	0	1
Abnormalitis of posture :— Abnormaliteite van postuur :— The "fatigue" posture of extreme malnutrition Die vermoeienis-postuur van uiterste ondervoeding	80	28	108
Knock knee. X-bene	26	6	32
Bow leg Bakbene	6	1	7
Pigeon chest associated with asymmetry Hoenderbors geassosieer met asimmmetrie	1	0	1
Abnormal Lung Signs :— Abnormale longtekens :— Rhonchi and/or crepitations Rhonchi en/of geruise	3	1	4
Enlargement of the spleen Vergroting van die milt	26	5	31
Enlargement of the liver Vergroting van die lewer	27	9	36

* The total of 117 cases is made up of 85 boys. 35 girls and 2 others in whom the sex was not recorded when extracting these findings.

* Die totale aantal gevalle, 117, bestaan uit 85 seuns, 35 meisies en 2 ander van wie die geslag nie opgeteken is by die nagaan van hierdie bevindings nie.

TABLE 29.—AGE AND SEX DISTRIBUTION OF 115 CASES OF PROBABLE PELLAGRA IN THE BOCHEM DISTRICT.
TABEL 29.—LEEFTYDS- EN GESLAGSVERSPREIDING VAN 115 GEVALLE VAN WAARSKYNLIKE PELLAGRA IN DIE BOCHEM-STREEK.

Age Groups. Leeftydsgroepe.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases. Aantal gevalle.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases. Aantal gevalle.	Percentage Incidence. Persentasie-voorkoms.
8 Years Old and Under 8 jaar oud en daaronder	15	31·92	4	11·11
9 and 10 Years Old 9 en 10 jaar oud	19	26·03	16	21·33
11 and 12 Years Old. 11 en 12 jaar oud	24	22·86	8	11·77
13 and 14 Years Old 13 en 14 jaar oud	20	18·35	2	2·47
15 and 16 Years Old 15 en 16 jaar oud	7	5·47	0	0·00

The following examples of a few cases illustrate the severity of the illness in Bochem children:—

Case 1

Boy, aged 11 years.—Symmetrical dermatitis of dorsum hands, forearms, feet and legs. Very thin, extreme "fatigue" posture. Chronic conjunctivitis and keratitis with corneal opacities. Angular stomatitis. Discharging ears.

Case 2

Boy, aged 12 years.—Symmetrical dermatitis of dorsum hands and forearms. Phrynoderma (follicular keratosis). Very poor posture, "extreme fatigue". Knock knees. Angular stomatitis and lower lip raw and cracked. Soft spongy gums.

Case 3

Boy, aged 8 years.—Symmetrical dermatitis of forearms and hands on dorsum, as well as flexor aspect of elbow joints. Scabies and chronic impetigo. Very thin, "fatigue" posture. Angular and buccal stomatitis. Glossitis of atrophic type—smooth, shiny red dorsum.

These three cases in no way exaggerate the picture presented by the 117 cases which have been considered to be pellagrous in this area. The majority of the remaining children presented one or other of the early stigmata of this disease and the area can, therefore, be truly described as one of endemic pellagra and pellagra-like deficiency diseases.

While no other district evidenced pellagra-like deficiency syndromes to the same extent as did the Bochem children, typical cases were noted in all with the exception of Pietermaritzburg. The following is a summary of the number of cases which could be

Onderstaande voorbeelde van 'n paar gevalle weerspieël die strafheid van die siekte by Bochem-kinders:—

Geval 1

Seun, 11 jaar oud.—Simmetriese dermatitis van dorsum van hande, onderarms, voete en bene. Baie maer, postuur van uiterste vermoeienis. Chroniese conjunctivitis en keratitis met corneale ondeursigtighede. Angulêre stomatitis. Draende ore.

Geval 2

Seun, twaalf jaar oud.—Simmetriese dermatitis van dorsum van hande en onderarms. Phrynoderma (Follikulêre keratose). Baie swak postuur, „uiterste vermoeinis". X-bene. Angulêre stomatitis, en onderlip rou en gebars. Sagte sponsagtige tandvleis.

Geval 3

Seun, agt jaar oud.—Simmetriese dermatitis van onderarms en dorsum van hande, asook aan flexor-aspek van elmbooggewrigte. Scabies en chroniese impetigo. Baie maer, postuur van vermoeienis. Angulêre en buccale stomatitis. Glossitis van atrofiese tipe—glad, blinkrooi dorsum.

Hierdie drie gevalle gee geen oordrewe beeld van die gesamentlike indruk geskep deur die 117 gevalle wat in hierdie streek as pellagralyers beskou is nie. Die meeste van die orige kinders het een of ander van die vroeë stigmata van hierdie siekte vertoon en die streek kan derhalwe met sekerheid beskryf word as een waarin pellagra en pellagra-agtige gebreksiektes endemies voorkom.

Hoewel geen ander distrik in so'n mate as Bochem die sindrome van pellagra-agtige gebreksiektes opgelewer het nie, is tipiese gevalle in al die streke behalwe Pietermaritzburg opgemerk. Onderstaande is 'n samevatting van die aantal gevalle wat by ander

definitely diagnosed as pellagra or pellagra-like in children other than those seen in the Bochem district:—

Districts.	No. of Cases.	Percentage Incidence.
Pietermaritzburg.....	0	0·00
Pretoria.....	1	0·12
Nqutu.....	1	0·13
Letaba.....	2	0·24
Qumbu.....	3	0·36
Bloemfontein.....	4	0·49
Kentani.....	12	1·48

It is not intended to discuss these at any great length for they resemble the findings in the Bochem children above. The following case summaries are illustrative:—

Case 1

Boy, aged 11 years (Kentani).—Hyperkeratosis with increased pigmentation of dorsum of hands and feet. Scabies. Very poor musculature and posture. Patchy denudation of the dorsum of the tongue. Excoriation of external nares. "Angular" blepharitis.

Case 2

Boy, aged 9 years (Kentani).—Very dull witted. Dry skin with "flour" facies, phrynoderma and chronic impetigo superimposed on scabies. Angular stomatitis and cracking of lower lip especially. Glossitis—denuded and shiny dorsum of tongue.

Case 3

Boy, aged 13 years (Kentani).—Keratosis and hyperpigmentation of elbow flexures and volar surface of forearm. Phrynoderma. Raw, red lips with angular stomatitis. Marginal glossitis with enlarged blue-black papillae of dorsum of tongue. Blepharitis. Discharging ears.

Case 4

Boy, aged ? (Nqutu).—Very dry skin with characteristic pellagra dermatitis of anterior aspect of thighs. Angular stomatitis. Excoriation of external nares.

Case 5

Boy, aged 10 (Letaba).—Pellagra dermatitis of dorsum hands and feet. Tropical ulcer of leg. Stomatitis of lips. Atrophic glossitis with smooth shining appearance. Blepharitis with ulcerating canthi (angular blepharitis). Excoriation of external nares. Very thin, pot bellied child, with enlarged liver and spleen.

Case 6

Girl, age unknown (Bloemfontein).—Marked thickening and hyperpigmentation of the skin on the dorsal aspect of the arms. Phrynoderma. "Fatigue" posture and large umbilical hernia.

kinders as diê van die Bochem-streek beslis as pellagra- of pellagra-agtige siektes gediagnoseer kon word:—

Streek.	Getal gevalle.	Persentasie-voorkoms.
Pietermartizburg.....	0	0·00
Pretoria.....	1	0·12
Nqutu.....	1	0·13
Letaba.....	2	0·24
Qumbu.....	3	0·36
Bloemfontein.....	4	0·49
Kentani.....	12.	1·48

Dit is nie die bedoeling om hierdie syfers breedvoerig te bespreek nie, aangesien daar groot ooreenkoms tussen hulle en diê van die Bochem-kinders is. Onderstaande gevalle is kensketsend:—

Geval 1

Seun, 11 jaar oud (Kentani).—Hiperkeratose met verhoogde pigmentasie van dorsum van hande en voete. Scabies. Uiters swak spierstelsel en postuur. Kolagtige denudasie van die dorsum van die tong. Excoriasie van die uitwendige neusvleuels. Angulêre blefaritis.

Geval 2

Seun, 9 jaar oud (Kentani).—Baie stompsinnig. Droë vel met meelagtige facies, en superponering van phrynoderma en chroniese impetigo oor scabies. Angulêre stomatitis en barste veral in onderlip. Glossitis—denudasie van dorsum van tong, wat blink vertoon.

Geval 3

Seun, 13 jaar oud (Kentani).—Keratose en hiperpigmentasie van elmboogflexure en volêre oppervlakte van onderarm. Phrynoderma. Rou rooi lippe met angulêre stomatitis. Marginale glossitis met vergrote blou-swart papelle van dorsum van tong. Blefaritis en draende ore.

Geval 4

Seun, 7 jaar oud (Nqutu).—Uiters droë vel met kenmerkende pellagra-dermatitis van anterieure aspek van dye. Angulêre stomatitis. Excoriasie van uitwendige neusvleuels.

Geval 5

Seun, 10 jaar oud (Letaba).—Pellagra-dermatitis van dorsum van hande en voete. Tropiese sweer aan been. Stomatitis van lippe. Atrofiese glossitis met gladde blink voorkoms. Blefaritis. Ulcereuse canthi (angulêre blefaritis). Excoriasie van uitwendige neusvleuels. Uiters maer, dikmaag-kind met vergrote lewer en milt.

Geval 6

Meisie, ouderdom onbekend (Bloemfontein).—Opvallende verdikking en hiperpigmentasie van die vel op die dorsale aspek van die arms. Phrynoderma. Postuur van vermoeienis en groot nawelbreuk.

Including the 117 Bochem cases, there were 140 children who were diagnosed as having pellagra. These findings, considered together with the common occurrence of isolated pellagra-like signs in all the districts visited, indicate that pellagra and other deficiency diseases resembling it have become prevalent in the South African Bantu. A brief review of the history of the clinical recognition of this disease in the Bantu illustrates the fact.

The work of Stannus during the past 30 years has greatly facilitated the recognition of pellagra in Southern Africa. In 1912 he described an outbreak of a disease among the inmates of the Zomba Prison, Nyasaland, which he recgonised to be pellagra, and remarked, "As far as I am aware, with the exception of Lower Egypt, Algiers and the Red Sea Coast, pellagra has been practically unknown in Africa". Following this, he published a second communication which described in detail the signs and symptoms of 131 cases which had come under his care (Stannus, 1913). His description of these cases remains the most detailed and accurate analysis of classical pellagra in Africans.

At more or less the same time as Stannus diagnosed pellagra in Nyasaland, Nightingale (1913) noted a condition, which he called "zeism", occurring amongst prisoners in the Victoria Gaol, Southern Rhodesia. While he did not consider the disease to be pellagra, his description and illustrations leave no doubt that he was dealing with an outbreak of classical pellagra.

Shortly following these outbreaks, a third institutional series of cases occurred. The Annual Report of the Department of Public Health of South Africa (1928) reported that an outbreak of pellagra had occurred in the Pretoria Mental Hospital, Transvaal, in 1912.

The disease had occurred in various parts of the Southern Continent previous to 1912. Sandwith (1912) is reported to have seen a few cases among the lepers on Robben Island. Cluver (1929), however, questioned the diagnosis of pellagra in those cases. During the Zulu Rebellion (1906-7) Haydon and Addison are reported to have seen many cases in Zulu prisoners of war. At about the same time several pellagrins were diagnosed in Basutoland (McFarlane) and Knight saw some at Nqutu, Natal, in Bantu who had come from the Tugela Valley at the time of the Zulu Rebellion.

Following the reports of Stannus and Nightingale, occasional cases were reported more and more frequently in

Met inbegrip van die 117 gevalle te Bochem was daar 140 kinders by wie pellagra gediagnoseer is. Tesame met die algemene voorkoms van sporadiese pellagra-agtige siektetekens in al die besoekte streke is hierdie bevindings 'n aanduiding daarvan dat pellagra en ander gebreksiektes wat daarop lyk onder die Suid-Afrikaanse Bantoes heersend geword het. Hierdie feit blyk duidelik uit 'n kort oorsig van die geskiedenis van die kliniese uitkenning van hierdie siekte onder die Bantoes.

Die werk van Stannus gedurende die afgelope dertig jaar het die uitkenning van pellagra in Suidelike Afrika grootliks vergemaklik. In 1912 het hy 'n beskrywing gegee van die uitbreek van 'n siekte onder die gevangenes in die tronk te Zomba, Niassaland, wat hy as pellagra herken het. Hy verklaar: „Vir sover my bekend, was pellagra feitlik onbekend in Afrika behalwe in Onder-Egipte, Algiers en die kus van die Rooi See." Daarop het hy 'n tweede mededeling gepubliseer waarin hy die siektetekens en simptome van 131 gevalle wat onder sy sorg was, breedvoerig beskryf (Stannus, 1913). Sy beskrywing van hierdie gevalle bly nog steeds die uitvoerigste en akkuraatste ontleding van klassieke pellagra by die naturel.

Op ongeveer dieselfde tyd as wat Stannus in Niassaland pellagra gediagnoseer het, het Nightingale (1913) onder gevangenes in die Victoria-tronk, Suid-Rhodesië, 'n toestand opgemerk wat hy „Zeïsme" genoem het. Hoewel hy nie gemeen het dat die siekte pellagra was nie, laat sy beskrywing en illustrasies nie die minste twyfel dat hy daar met 'n uitbreek van klassieke pellagra te doen gehad het nie.

Kort na hierdie uitbreek het 'n derde reeks gevalle in 'n inrigting voorgekom. In die jaarverslag van die Departement van Volksgesondheid van Suid-Afrika (1928), word gemeld dat 'n uitbreek van pellagra in 1912 in die sielsiekegestig te Pretoria plaasgevind het.

Voor 1912 het die siekte reeds in verskeie dele van Suidelike Afrika voorgekom. Daar is gerapporteer dat Sandwith (1912) onder die melaatses op Robbeneiland 'n paar gevalle aangetref het. Cluver (1929) het egter die diagnose van pellagra in daardie gevalle in twyfel getrek. Gedurende die Zoeloe-rebellie van 1906-7 is gerapporteer dat Haydon en Addison talryke gevalle onder Zoeloekrygsgevangenes gesien het. Omtrent daardie selfde tyd is verskeie pellagralyers in Basoetoland aangetref (McFarlane) en Knight het 'n paar gevalle aangetref te Nqutu onder Bantoes wat tyden die Zoeloe-rebellie van die Toegela-vallei daarheen gekom het.

Nadat die geskrifte van Stannus en Nightingale verskyn het, is sporadiese gevalle al hoe meer dikwels in Suid-

South Africa. Hower, it was not until 1927 that a further extensive outbreak of the disease occurred in this country. Again the outbreak was institutional —64 non-European cases occurred in three separate Durban prisons in 1927-28. In reporting this outbreak, Cluver (1929) stressed the low incidence of the disease in this country and there can be no doubt that at that time pellagra was seldom diagnosed. Inability to recognise the conditions cannot be held to be responsible for the rarity with which it was reported, for there were many who were cognisant of its appearance and would no doubt have recognised the classical syndrome.

During the fourth decade, however, pellagra appears to have increased considerably. Heimann (1936) in reviewing the incidence of diseases in non-European patients admitted to the Johannesburg Hospital, stated "Examples of malnutritional oedema have been seen in both adults and children. Vitamin deficiency diseases occur. Scurvy has become uncommon latterly, but several cases of pellagra have been seen during the year". In analysing the records of this same hospital, the author found the following numbers of cases whose recorded clinical appearance leaves no doubt as to the diagnosis of pellagra:—

1937—23 cases.
1938—40 cases.
1939—66 cases.

These are but a small fraction of the actual number of pellagrins admitted, as a strict test was applied to the records and many case histories of pellagra were discarded in this process as they were inadequately reported.

Similar findings are recorded in Basutoland. Dyke (1935) reported that since McFarlane's recognition of the disease in 1907, sporadic cases had been reported from time to time in North Basutoland, but until 1934 no cases had been seen in the Southern Districts. The first case to be reported from this area was at the Mafeteng Dispensary in 1934, and during the following year 45 cases were seen at this dispensary. The Basutoland Annual Medical and Sanitary Report for 1935 indicated the increasing recognition of the disease throughout the territory, the following list being a summary of the number

Afrika aangetref. Dit was egter eers in 1927 dat 'n verdere uitgebreide uitbreking van die siekte in ons land plaasgevind het. Weereens het dit in 'n inrigting plaasgevind—64 gevalle van nie-blankes het gedurende 1927-28 in drie afsonderlike tronke te Durban voorgekom. In sy verslag oor hierdie uitbreking het Cluver (1929) die lae voorkomssyfer van die siekte in Suid-Afrika beklemtoon, en dit lyk ook geen twyfel dat pellagra destyds selde gediagnoseer is nie. Onvermoë om die siekte uit te ken kan ook nie aangegee word as die rede waarom dit so selde gerapporteer is nie, want daar was talle wat met die voorkoms van die siekte bekend was en ongetwyfeld die klassieke sindroom sou herken het.

Dit skyn asof pellagra gedurende die vierde dekade van hierdie eeu aansienlik toegeneem het. Waar Heimann (1936) 'n oorsig gee van die aanwesigheid van siektes by nieblanke pasiënte in die Johannesburgse hospitaal, verklaar hy: „Voorbeelde van edeem deur ondervoeding veroorsaak, is by sowel volwassenes as kinders aangetref. Vitamine-gebrekziektes kom voor. Gedurende die afgelope tyd het skeurbuik seldsaam geword, dog gedurende die jaar was daar verskeie gevalle van pellagra." Skrywer hiervan het die aantekenings van dieselfde hospitaal nagegaan en onderstaande gevalle gevind waarvan die opgetekende kliniese voorkoms nie die minste twyfel laat dat dit pellagra was nie:—

1937—23 gevalle.
1938—40 gevalle.
1939—66 gevalle.

Hierdie syfers maak slegs 'n klein breukdeel uit van die werklike aantal pellagralyers wat tot die hospitaal toegelaat is, aangesien daar 'n streng toets by die nagaan van die syfers toegepas is en talle verslae van die verloop van pellagra verwerp is omdat die gevalle nie volledig genoeg gerapporteer is nie.

In Basoetoland is soortgelyke bevindings opgeteken. Dyke (1935) het gerapporteer dat daar, sedert McFarlane die siekte in 1907 herken het, van tyd tot tyd sporadiese gevalle uit Noord-Basoetoland gerapporteer is, dog dat daar tot in 1934 geen gevalle in die suidelike streke aangetref is nie. Die eerste geval wat uit hierdie gebiede gerapporteer is, is by die apteek te Mafeteng in 1934 gediagnoseer, en gedurende die daaropvolgende jaar is 45 gevalle by daardie apteek gesien. Uit die „Basutoland Annual Medical and Sanitary Report", 1935, blyk dat die siekte deur die hele gebied heen meer algemeen aangetref is. Onderstaande is 'n opsomming van die aantal

of pellagrins treated at various dispensaries:—

1933—3 cases.
1934—87 cases.
1935—198 cases.

Soga (1938) considered the disease to be common in the Idutywa district of the Transkei. After many years of work in the Ciskei, MacVicar first noticed pellagra in the years 1935-6. Cases of pellagra have been mistakenly diagnosed for venereal disease with the result that many are referred to the Rietfontein Hospital for Infectious Diseases (Daneel, 1939). Several cases have been found among Bantu of the Paul Roux district, Orange Free State (Kristal, 1939). Dormer (1939) and Murray (1939) have informed the author that the disease is not uncommonly seen in various non-European hospitals in Durban. In addition to the cases recorded during the present survey the author has examined pellagrins in Witzieshoek, Bloemfontein, Johannesburg, Durban and Polela, Natal.

It is thus evident that pellagra, which for many years was mainly a disease of institutional life, such as prisons, hospitals and war-prison camps, has become very common among both the rural and urban Bantu of this country. The findings of the present survey indicate that the complete syndrome (as well as many pellagra-like signs) is a prevalent disease of Bantu school children. As a single entity it was the commonest deficiency disease noted.

CHAPTER XV

RICKETS

(This chapter has been written in collaboration with H. le Riche.)

CHAPTER V indicates that many signs which are associated with rickets were met with during the course of this survey, and an opinion was expressed to the effect that this disease was probably not as uncommon among the Bantu of this country as was generally believed. Medical literature has so far contained few, if any references to its existence in South Africa. For these reasons it has been decided to include a more detailed discussion in this report than the relative incidence during the survey might otherwise have warranted. Various etiological factors and the clinical and radiographic appearance of several cases are considered.

pellagralyers wat by die verskillende apteke behandel is:—

1933—3 gevalle.
1934—87 gevalle.
1935—198 gevalle.

Soga (1938) was van mening dat die siekte algemeen in die distrik Idutywa voorgekom het. Na baie jare se werk in Ciskei het MacVicar vir die eerste keer gedurende 1935-36 pellagra daar aangetref. Gevalle van pellagra is in die verlede verkeerd gediagnoseer met die gevolg dat baie pellagralyers as lyers aan veneriese siekte na die Rietfontein-hospitaal vir Aansteeklike Siektes verwys is (Daneel, 1939).

In die distrik Paul Roux (O.V.S.) is verskeie gevalle onder die Bantoes aangetref (Kristal, 1939). Dormer (1939) en Murray (1939) het skrywer hiervan vertel dat die siekte dikwels in die verskillende nie-blanke hospitale van Durban aangetref word. Benewens die gevalle wat gedurende die huidige opname opgeteken is, het skrywer pellagralyers ondersoek te Witzieshoek, Bloemfontein, Johannesburg, Durban and Polela, Natal.

Dit is dus duidelik dat pellagra, wat vir baie jare lank hoofsaaklik 'n siekte was wat in inrigtings soos tronke, hospitale en krygsgevangenekampe aangetref is, tans baie algemeen onder sowel landelike as stedelike Bantoes in Suid-Afrika voorkom. Uit die bevindings van die huidige opname blyk dat die volledige sindroom (asook talryke pellagra-agtige tekens) 'n heersende siekte onder Bantoeskoolkinders is. Dit was die mees algemene gebreksiekte wat die ondersoek aan die lig gebring het.

HOOFSTUK XV

RHACHITIS

(Hierdie hoofsuk is in samewerking met H. le Riche geskryf.)

Uit wat in hoofstuk V gesê is, is dit duidelik dat talryke siektetekens wat met rhachitis geassosieer word, gedurende die loop van hierdie opname teëgekom is, en die mening is uitgespreek dat hierdie siekte waarskynlik nie so ongewoon onder die Bantoes van Suid-Afrika is as wat algemeen geglo word nie. Die mediese literatuur het tot dusver min, so nie geen, verwysings na die bestaan daarvan in Suid-Afrika gehad. Om hierdie redes is daar besluit om 'n meer uitgebreide bespreking as wat die betreklike omvang waarin die siekte blykens die opname voorkom andersins sou geregverdig het, in hierdie verslag op te neem. Hier word verskeie etiologiese faktore en die kliniese en radiografiese voorkoms van verskillende gevalle behandel.

Influence of Industrialisation and Standard of Living

Drummond and Wilbraham (1939) in an excellent review of five centuries of English diet, summarise this consideration as follows:—

"There is surprisingly little information about the prevalence of rickets in England in the eighteenth century, in spite of the probability that it became very common in the larger towns in the second half, when industrialisation was rapidly spreading and when the standard of living was falling. When we come to the first half of the nineteenth century we are left in no doubt. There is clear evidence that the disease was terribly rife in all the poorer parts of the towns." It appears to have taken the medical profession many years to realise the enormous incidence of the disease and "a certain amount of uneasiness about the situation led the Medical Congress of 1884 to promote a survey of the distribution of rickety children. . . . A map of its distribution over the whole of England was, in fact, a map showing the density of the industrial population".

A similar process of industrialisation of the population is now in progress in South Afrca. Marquard and Standing (1939) draw attention to the fact that "between 1921 and 1936 the Bantu population in the towns has more than doubled itself, and in 1936 there were just over 1,000,000 Bantu people in the European towns and on the mines". Until very recently the Bantu were only partially industrialised and urbanised. They would leave their "reserves" temporarily to seek employment in the towns and thus supplement their meagre income from their exploitation of the land. This method of labour is still the major form among the Bantu. There is, however, an increasing number who become permanent residents in the towns; the rapid increase of non-European location buildings in various towns being evidence of this march to complete industrialisation. More and more Bantu children are being born in the cities, where they subsequently receive their education and are eventually absorbed into various forms of urban employment. It would, therefore, not be surprising to find an increasing incidence of rickets in various towns of the Union, more particularly among the lowly paid workers, of whom the Bantu people

Invloed van industrialisasie en die lewenstandaard

In 'n uitstekende oorsig oor die diëet van die Engelse bevolking gedurende 'n tydperk van vyf eeue vat Drummond en Wilbraham (1939) hierdie oorweging as volg saam:—

„Daar is verbasend min inligting rakende die algemene voorkoms van rhachitis in Engeland gedurende die 18de eeu, ten spyte daarvan dat dit waarskynlik gedurende die tweede helfte baie algemeen in die groter dorpe aangetref is, op 'n tydstip toe industrialisasie vinnig aan die uitbrei was en die lewenstandaard besig was om te daal. Ten opsigte van die eerste helfte van die negentiende eeu verkeer ons in geen twyfel nie. Daar is duidelike bewyse dat die siekte ontsettend algemeen in al die arm gedeeltes van die dorpe geheers het." Dit skyn die mediese professie baie jare te geneem het om 'n besef te kry van die geweldige omvang waarin die siekte voorgekom het en „'n sekere mate van verontrusting in verband met die toestand het daartoe gelei dat die Mediese Kongres van 1884 'n opname van die verspreiding van kinders wat aan hierdie siekte ly, bewerkstellig het. . . . 'n Kaart van die verspreiding van die siekte oor die hele Engeland was inderdaad 'n kaart wat die digtheid van die industriële bevolking aangedui het".

'n Soortgelyke proses van industrialisering van die bevolking is vandag in Suid-Afrika aan die gang. Marquard en Standing (1939) vestig die aandag op die feit dat „die Bantoe-bevolking van die dorpe tussen 1921 en 1936 meer as verdubbel is en dat daar in 1936 net meer as 1,000,000 Bantoes in die dorpe van die blankes en by die myne was". Tot heeltemal onlangs was die Bantoes maar gedeeltelik geïndustrialiseerd en verstedelik. Hulle was gewoond daaraan om hulle „Reserwes" tydelik te verlaat om in die dorpe werk te soek ten einde hulle skrale leeftog, verkry deur ontginning van die grond, aan te vul. Hierdie arbeidsmetode is nog steeds die belangrikste onder die Bantoes. Daar is egter 'n toenemende aantal wat hulle permanent in die dorpe vestig, en die snelle toename van die aantal geboue in die nie-blanke lokasies van die dorpe lewer bewys van hierdie beweging in die rigting van volledige industrialisasie. Al hoe meer Bantoe-kinders word in die stede gebore, waar hulle later hul opvoeding ontvang en uiteindelik in verskillende vorms van stedelike arbeid opgeneem word. Dit sou 'n mens derhalwe nie verbaas om te vind dat rhachitis in die verskillende stede van die Unie meer algemeen voorkom nie, veral onder die laagbesoldigde arbeiders van wie Bantoes 'n nie onaansienlike meerderheid

form a not inconsiderable majority. The industrialised Negro of America suffers from this disease and together with the Italians of that country are the worst afflicted (Holt and Hobhouse, 1931; Hess and Unger, 1918).

Industrialisation and its sequel of permanent urbanisation under modern conditions of poverty creates a set of circumstances conducive to the development of rickets, for it influences dietetic and other factors which tend to prevent the occurrence of this disease in rural areas. Some of these factors will be briefly discussed in the succeeding paragraphs.

In a summary of literature in the Medical Research Council Report on studies of rickets in Vienna, 1919-22, the following causative factors are discussed:—

1. *Hygiene:* including the influence of sunlight, fresh air and exercise.

2. *Diet:* deficiency or imbalance in the diet of such essentials as calcium, phosphorus and the Vitamin D complex.

3. *Acidosis:* the influence of long standing acidosis on the absorption of calcium.

4. *Hormones:* e.g., the influence of the function of the adrenals (Stoelzner), the thymus (Bosch), and the parathyroids (Erdheim).

5. *Infections.*

The present state of knowledge suggests that all of the above probably play a part, but stated in its simplest form, rickets is a disease resulting from disturbance in the balance of vitamin D, calcium and phosphorus in metabolism.

Calcium and Phosphorus

The extent to which these substances are absorbed from the intestine depends largely on the following conditions:—

I. The total amounts ingested.

II. Calcium and phosphorus balance.

III. The state of chemical combination in the foodstuffs.

IV. The reaction of the gastro-intestinal tract.

We need not enlarge on I for it is obvious that were insufficient calcium and phosphorus to be ingested the succeeding conditions would not be of great importance.

II. The degree of rickets in a rachitic animal depends not only on the absolute amounts of calcium and phosphorus ingested, but also on the Ca/P ratio. Rickets may be produced by a high calcium-low phosphorus

uitmaak. Die geïndustrialiseerde neger van Amerika ly aan hierdie siekte en is, tesame met die Italianers van daardie land, die ergste daardeur aangetas (Holt en Hobhouse, 1931; Hess en Unger, 1918).

Industrialisasie en die daaruit voortspruitende permanente verstedeliking onder moderne toestande van armoede skep tesame 'n sameloop van omstandighede wat vir die ontwikkeling van rhachitis bevorderlik is, omdat dit 'n uitwerking het op die dieët en op ander faktore wat in landelike streke daartoe bydra om die verskyning van hierdie siekte teë te werk. In onderstaande paragrawe sal sommige van hierdie faktore kortliks bespreek word.

In 'n opsomming van literatuur in die verslag van die Mediese Navorsingsraad insake studies in verband met rhachitis in Wene (1919-22) word onderstaande oorsaaklike faktore bespreek:—

1. *Higiëne,* met inbegrip van die uitwerking van sonlig, vars lug en oefening.

2. *Dieët:* Tekorte aan of gebrekkige balans ten opsigte van essensiële voedingstowwe soos kalsium, fosfor en die Vitamin D-kompleks.

3. *Acidose:* Die uitwerking van langdurige acidose op die opname van kalsium.

4. *Hormone,* byv. watter invloed die werking van die byniere (Stoelzner), die thymus (Bosch) en die byskildkliere (Erdheim) het.

5. *Besmettings.*

Die hedendaagse kennis skyn daarop te dui dat al bostaande faktore waarskynlik 'n rol speel, dog nietemin is rhachitis, om dit op die eenvoudigste manier te stel, 'n siekte wat veroorsaak word deur 'n versteuring van die ewewig tussen vitamine D, kalsium en fosfor in die stofwisseling.

Kalsium en fosfor.—Die omvang waarin hierdie stowwe uit die ingewande geabsorbeer word, hang grotendeels van onderstaande toestande af:—

I. Die totale hoeveelhede wat ingeneem word.

II. Die kalsium-fosfor-ewewig.

III. Die toestand van chemiese verbinding in die voedingstowwe.

IV. Die reaksie van die gastro-intestinale kanaal.

Dit is onnodig om oor I uit te wei, aangesien dit klaarblyklik is dat waar daar te min kalsium en fosfor ingeneem word, die gevolglike toestande van geen groot belang kan wees nie.

II. Die graad van rhachitis in 'n aangetaste dier hang nie alleen van die absolute hoeveelhede kalsium en fosfor wat ingeneem word, af nie, maar ook van die Ca/P-verhouding. Rhachitis kan die gevolg wees waar die dieët hoog in kalsium en laag in

diet (e.g., Ca/P—4/1) or by a low calcium-high phosphorus diet (Shohl, 1937). It may be that Ca/P imbalance produces an osteoporosis more frequently than it does rickets in Bantu children. Elliot (1933) found this to be the case in Puerto Rico children.

Du Toit and Malan (1937) have reported on the production of rickets in certain domestic animals with a phosphorus deficient diet in the presence of abundant Vitamin D. On the other hand, a deficiency of calcium does not produce rickets, but osteodystrophia fibrosa. The workers conclude that when enough Vitamin D is present, a deficiency of phosphorus in the diet of cattle, sheep, goats and pigs produces rickets only, whereas a deficiency of dietary calcium produces osteofibrosis uncomplicated by rickets, certainly in cattle and horses and probably also in pigs and goats.

The state of chemical combination of phosphorus in the food would appear to be of great importance. It has been shown that the availability of phosphorus depends upon its source. When it is combined in the form of phytins it is not well absorbed without the presence of phytase, an enzyme which splits the phytin, liberating phosphorus. Giri (1938) found that raw vegetables contain considerable quantities of phytase.

Sundarajan (1938) has found that while in tender (green) maize the phosphorus as phytin is only 8·25 per cent., in mature maize 97·14 per cent. is thus combined. Mature maize is, therefore, not an entirely satisfactory means of supplying the body needs for phosphorus unless combined with such foods as raw vegetables which are rich in phytase. Maize in its mature form is a staple article of diet of the urbanised Bantu and is seldom combined with a sufficiency of raw vegetables.

On the other hand, more recent work (Palmer and Mottram, 1939), on Wistar rats shows that the tendency of cereals to produce rickets resides in their low Ca and high P contents, and that this tendency can be entirely counteracted by adding calcium lactate so as to make the Ca/P ratio 1:0.5. Harrison and Mellanby (1939) in working with puppies suggest that the rachitogenic action of cereals is normally due not, as has often been suggested, to the unavailability of their P, but to the action of the cereal phytic acid in inhibiting the absorption of calcium from the alimentary canal. On the

fosfor is (byv. Ca/P=4/1) of waar die dieët laag in kalsium en hoog in fosfor is. (Shohl, 1937.) Dit kan wees dat 'n versteuring van die Ca/P-ewewig meer dikwels by Bantoekinders tot osteoporose as tot rhachitis lei. Elliot het in 1933 gevind dat dit die geval is by kinders te Puerto Rico.

Du Toit en Malan (1937) het verslag gedoen betreffende die veroorsaking van rhachitis by sekere huisdiere deur voeding van 'n fosfor-arme dieët waarin oorvloedige hoeveelhede vitamine D was. Daarenteen veroorsaak 'n kalsiumtekort nie rhachitis nie maar *osteodystrophia fibrosa.* Die navorsers kom tot die gevolgtrekking dat wanneer daar genoeg vitamine D is, 'n tekort aan fosfor in die dieët van beeste, skape, bokke en perde slegs rhachitis veroorsaak, terwyl 'n tekort aan kalsium in die dieët lei tot osteofibrose sonder die komplikasie van rhachitis—sekerlik by beeste en perde en waarskynlik ook by varke en bokke.

Die toestand van chemiese verbinding waarin fosfor in die voedsel voorkom, skyn van groot belang te wees. Daar is bewys dat die toeganklikheid van fosfor afhang van die bron waaruit dit verkry word. Wanneer dit in verbinding voorkom in die vorm van plantaardige materiaal word dit nie goed geabsorbeer nie behalwe in die aanwesigheid van phytase, 'n ensime wat die phytine opbreek en die fosfor vrystel. Giri (1938) het gevind dat rou groentesoorte aansienlike hoeveelhede phytase bevat.

Sundarajan (1938) het gevind dat hoewel sagte groenmielies slegs 8.25 persent fosfor in die vorm van phytine bevat, ryp mielies 97.14 persent bevat. Ryp mielies is derhalwe nie 'n heeltemal bevredigende voedsel met die oog op fosforverskaffing nie, tensy dit saam geëet word met voedselsoorte soos rou groente wat ryk aan phytase is. Ryp mielies is 'n stapelvoedsel van die stedelike Bantoe en word selde saam met genoeg rou groente geëet.

Daarenteen blyk uit meer onlangse werk in verband met Wistar-rotte (Palmer en Mottram, 1939) dat die neiging om rhachitis te veroorsaak wat by graansoorte aangetref word in hulle lae kalsium- en hoë fosforgehalte gesoek moet word, en dat hierdie neiging volkome geneutraliseer kan word deur soveel kalsiumlaktaat by te voeg as wat nodig is om 'n Ca/P-verhouding van 1:0.5 tot stand te bring. In verband met hulle werk met jong hondjies spreek Harrison en Mellanby (1939) die mening uit dat die rachtitogeniese uitwerking van graansoorte normalerwys nie, soos dikwels gemeen is, aan die ontoeganklikheid van hulle fosfor toe te skryf is nie, maar aan die uitwerking van die graanphytinesuur wat die absorpsie van kalsium uit die spysverteringskanaal teëwerk. Op grond van hierdie proewe

basis of these animal experiments it would appear that rickets in Bantu children may be due to Ca deficiency, either absolutely, or deficiency in absorption, as a result of excess phytic acid.

An acid reaction of the food in the upper intestine is necessary for the absorption of both calcium and phosphorus. Normally the acidified gastric contents upon passing into the upper intestine keep the reaction relatively acid, and it is under these favourable circumstances that most of the calcium is absorbed in the upper intestine (McCollum et al, 1939).

Moderate amounts of fat appear to assist in maintaining a favourable state of intestinal acidity.

Vitamn D would also appear to influence the absorption of these two substances, for it has been shown that administration of this substance to rachitic animals causes the reaction of the faeces to become acid (Shohl, 1939).

Vitamin D

The main action of vitamin D is to increase the absorption of calcium and phosphorus or to diminish their intestinal excretion. The vitamin is obtained mainly in food and as a result of the effect of ultraviolet light on a sterol derivative in the cutaneous tissue. This latter method of producing a vitamin D-like substance is of extreme interest in this country, for it is usually considered that dark skinned people are more susceptible to rickets on account of the pigmentation preventing the penetration of ultraviolet light. Hess (1922) found that black pigmented rats were not protected from developing rickets when given the same doses of ultraviolet light, which protected white rats on the same diet. If darkly pigmented peoples are similarly less benefited by the protective rays they must receive either more exposure or else the necessary vitamin must be contained in their food.

South Africa has always been thought to be a country which is blessed with adequate sunshine. We are also fortunate in having an abundance of ultraviolet light (Riemerschmid, 1936; Osborn, 1929; Osborn and Raftery, 1932). The fact that rickets exists in this country, in spite of this high ultraviolet light content, indicates that adequate amounts of vitamin D are not supplied by this means or by food intake, or else one or other deficiency dicussed above is involved.

Clinical and Radiographic Report on four Cases of Rickets Seen in School Children of Pietermaritzburg.

The clinical diagnosis of rickets has frequently been found not to corres-

met diere wil dit ons voorkom asof rhachitis by Bantoekinders toegeskryf moet word aan 'n kalsiumtekort—òf 'n absolute te kort òf 'n absorpsietekort weens oorvloed van phytinesuur.

'n Suur reaksie van die voedsel in die boonste dermkanaal is noodsaaklik vir die absorpsie van sowel kalsium as fosfor. Onder normale toestande hou die versuurde maaginhoud, wanneer dit in die boonste dermkanaal kom, die reaksie betreklik suur, en dit is onder hierdie gunstige toestande dat die meeste kalsium in die boonste dermkanaal geabsorbeer word (McCollum en ander, 1939).

Matige hoeveelhede vet skyn daartoe by te dra om 'n gunstige graad van suurheid in die dermkanaal te bewaar.

Vitamine D skyn ook die absorpsie van hierdie twee stowwe te beïnvloed, want daar is bewys dat die toediening van hierdie stof aan diere wat aan rhachitis ly, die reaksie van die fekalieë suur maak (Shohl, 1939).

Vitamine D.

Die vernaamste uitwerking van vitamine D is om die opname van kalsium en fosfor te verhoog of om intestinale uitskeiding daarvan te verminder. Die vitamine word hoofsaaklik verkry uit voedsel en as gevolg van die uitwerking van ultravioletlig op 'n sterol-derivaat in die velweefsel. Laasgenoemde metode vir die verkryging van vitamine D-agtige stof is van die allergrootste belang in ons land, aangesien dit gewoonlik geglo word dat mense met donker velle meer vatbaar is vir rhachitis omdat die huidpigmentasie die nodige deurdringing van ultravioletlig belet. Hess (1922) het gevind dat rotte met swart pigment nie teen rhachitis beskerm is nie wanneer hulle dieselfde dosisse ultravioletlig ontvang as wat wit rotte, met dieselfde dieet, wel beskerm het. As mense met donker velle ook minder voordeel trek uit hierdie beskermende strale dan moet hulle òf meer daaraan blootgestel word òf die nodige vitamines in hulle voedsel kry.

Daar is altyd geglo dat Suid-Afrika 'n land met genoeg sonlig is. Ons het gelukkig ook oorvloed van ultravioletlig (Riemerschmid, 1936; Osborn, 1939; Osborn en Raftery, 1932). Die feit dat rhachitis wel in ons land bestaan, en dit ten spyte van hierdie oorvloed van ultravioletlig, is 'n aanduiding daarvan dat daar nie op hierdie manier of deur middel van die voedsel toereikende hoeveelhede vitamine D verskaf word nie, of anders dat daar een of ander van bogenoemde tekorte daarby betrokke is.

Kliniese en radiografiese verslag oor vier gevalle van rhachitis aangetref onder skoolkinders te Pietermaritzburg

Daar is dikwels gevind dat die kliniese diagnose van rhachitis nie met

pond with that of radiological interpretation. In a survey in Puerto Rico, Elliot (1933) found that many of the children she had suspected of having mild forms of rickets, were not found to have this condition by X-Ray examination. The skeletal signs used as a basis for diagnosis were as follows:—

(*a*) Enlarged costochondral junctions.
(*b*) Enlarged epiphyses at wrist.
(*c*) Bow-legs.
(*d*) Knock-knees.
(*e*) Harrison's groove.
(*f*) Pigeon chest.
(*g*) Moderate enlargement of:—
Either frontal or parietal bosses.
Both frontal and parietal bosses.
(*h*) Asymmetry of head.
(*i*) Craniotabes.

It is obvious that minor degrees of many of the above are likely to be seen in children in whom such states may well be within normal limits. For this reason various minor abnormalities similar to the above which have been discussed in Chapter II of this report are not further analysed here. Rickets caused severe crippling in six children in the Pietermaritzburg series, four of whom were X-rayed. The following is a summary of the main clinical features of these four cases together with the reports of the radiographs, kindly interpreted by Dr. O. Hugo, Radiologist, Grey's Hospital, Pietermaritzburg:—

Case 1.—Zulu boy, aged 9 years, with marked antero-lateral bowing of femora.

Radiological Report.—*Both femora* show marked bowing of the shafts especially lower down above condylar levels. The bony structures about knee joints appear of excess width.

Both wrists show excess calcium deposit along diaphyseal margin at the epiphyses of radius and ulna with increase of width at these sites. Epiphyseal demarcation is very clear cut except medially in radius where there is some residual erosion indicative of healing rickets.

Case 2.—Zulu boy, aged 9 years, with very marked bilateral knock-knee and enlarged, slightly irregular radial epiphyses.

Radiological Report.—*At both wrists*—Excess calcium deposit, diaphyseal widening at epiphyses and

die radiologiese interpretasie ooreenstem nie. Gedurende 'n opname te Puerto Rico het Elliot (1933) gevind dat baie van die kinders wat volgens haar mening aan ligte vorms van rhachitis gely het, by X-straalondersoek nie daaraan gely het nie. Die skelet-simptome wat as basis vir die diagnose gebruik is, was as volg:—

(*a*) Vergrote costo-chondrale aansluitings.
(*b*) Vergrote epifises van handgewrig.
(*c*) Bakbene.
(*d*) X-bene.
(*e*) Groef van Harrison.
(*f*) Hoenderbors.
(*g*) Matige vergroting van—
óf frontale óf pariëtale verdikkings, óf sowel frontale as pariëtale verdikkings.
(*h*) Asimmętrie van kop.
(*i*) Craniotabes.

Klaarblyklik is dit 'n waarskynlikheid dat baie van bostaande toestande in ligte graad by kinders aangetref mag word en dat sulke toestande moontlik binne normale perke kan val. Om hierdie rede word verskillende geringer abnormaliteite, soortgelyk aan bostaande, wat in hoofstuk II van hierdie verslag bespreek is, hier nie verder ontleed nie. Rhachitis het by ses kinders in die Pietermaritzburgse reeks ernstige gebreklikheid veroorsaak; vier van hierdie kinders is onder die X-straal gebring. Onderstaande is 'n opsomming van die belangrikste kliniese verskynsels in hierdie twee gevalle, tesame met die verslae oor die radiogramme wat vriendelik deur dr. O. Hugo, radioloog te Grey's Hospitaal, Pietermaritzburg, vertolk is:—

Geval 1.—Zoeloe-seun, nege jaar oud, met opvallende antero-laterale kromming van femora.

Radiologiese verslag.—*Albei femora* vertoon opvallende kromming van die pype, veral in die laer gedeeltes bo die hoogte van die dybeenknoppe. Die beenstruktuur bo die kniegewrigte skyn te breed te wees.

Albei handgewrigte vertoon oortollige kalsium-ophoping langs rand van diafysis by die epifises van radius en ulna, met vergroting in die breedte op hierdie punte. Epifiseale demarkasie is baie skerp, behalwe mediaal in die radius waar daar nog 'n mate van oorblywende erosie aanwesig is—'n aanduiding van rhachitis wat aan die herstel is.

Geval 2.—Zoeloe-seun, nege jaar oud, met baie opvallende bilaterale X-bene en vergrote, ietwat onreëlmatige, radiale epifises.

Radiologiese verslag.—*Albei gewrigte*—oortollige kalsium-ophoping, diafiseale verbreding by epifises en bakvormigheid van diafiseale uiteinde met duidelike demarkasie—

cupping of diaphyseal ends with clear demarcation, indicate residual changes compatible with rickets.

Left ulna—shows a small erosion patch dorsally two inches from elbow joint.

Case 3.—Zulu boy, aged 7 years, with knock-knees, especially the right knee; bowing of the right forearm; enlargement both radial epiphyses and enlargement of frontal bosses.

Radiological Report.—Wrists—both show similar changes at the distal epiphyseal lines of radius and ulna. The diaphyseal ends are sclerosed along the epiphyseal surface which is concave and wider than normal. Right ulna is bowed and radial shaft to a greater degree. These appearances are indicative of healed rickets; the present changes being residual.

Case 4.—Zulu boy, aged 6 years, with very marked knock-knee of the right side, scoliosis and tilting of the pelvis. Enlarged radial epiphyses.

Radiological Report.— Wrists—both show similar changes, viz., diaphyseal widening at distal epiphyseal lines of radius and ulna. There is excess calcium deposit along epiphyseal lines of diaphyses but lack of clear demarcation suggests presence of some residual inflammatory process found in rickets, which in this case has nearly healed.

At both knees.—Similar changes are noted in tibiae and femora, and here the inflammatory state is more active still than in the wrists. Femoral bowing is present.

aanduidings van residuale veranderings verenigbaar met die aanwesigheid van rhachitis.

Linker-ulna—vertoon 'n klein dorsale erosiekol twee duim van elmbooggewrig.

Geval 3.—Zoeloe-seun, sewe jaar oud, met X-bene, veral die regterknie; kromming van regteronderarm; vergroting van albei radiale epifises en vergroting van frontale beenverdikkings.

Radiologiese verslag.—Handgewrigte—albei vertoon soortgelyke veranderings langs die distale epifiseale lyne van radius en ulna. Die diafiseale uiteindes vertoon sklerose langs die epifiscale oppervlakte wat konkaaf is en breër as normaal. Regter-ulna verkromd en radiuspyp nog meer. Hierdie verskynsels dui op genese geval van rhachitis; die huidige veranderings is residuaal van aard.

Geval 4.—Zoeloe-seun, ses jaar oud, met baie opvallende X-been aan regterkant. Scoliose en skuins posisie van bekken. Vergrote radiale epifises.

Radiologiese verslag.—Handgewrigte—vertoon soortgelyke veranderings, d.w.s. diafiseale verbreding langs distale epifiseale lyne van radius en ulna. Daar is oortollige kalsium-ophoping langs epifiseale lyne van die diafises, maar gebrek aan duidelike demarkasie skyn die aanwesigheid aan te dui van 'n mate van residuale ontstekingsproses, gewoonlik aanwesig in gevalle van rhachitis, wat in hierdie geval byna genees was.

Albei knieë.—Soortgelyke veranderings waarneembaar in tibiae en femora, en hier is die toestand van ontsteking nog meer aktief as in handgewrigte. Daar is femorale kromming waarneembaar.

CHAPTER XVI

CLINICAL INDICES OF THE STATE OF NUTRITION AND HEALTH

THE incidence of various lesions as discussed in the previous chapters does not indicate the extent to which each child was affected by a combination of these abnormalities. Nor does it demonstrate the number of children who were not only free of all these stigmata of malnutrition and ill-health but who were also in a state of physical fitness. A crippled child may be found to have other abnormalities such as stomatitis, blepharitis, enlarged spleen, abnormal lung signs and so on. In our previous discussion each one of these items has been analysed as a separate entity in its respective section. While an attempt was made to point out certain relation-

HOOFSTUK XVI

KLINIESE MAATSTAWWE VAN DIE TOESTAND VAN VOEDING EN GESONDHEID

DIE aanwesigheid van verskeie letsels, soos in voorafgaande hoofstukke bespreek, gee nog geen aanduiding van die mate waarin elke kind deur 'n kombinasie van hierdie abnormaliteite aangetas was nie. Verder is dit ook nie 'n weergawe van die aantal kinders wat nie alleen vry van al hierdie stigmata van ondervoeding en ongesondheid was nie maar wat ook in 'n toestand van liggaamlike geskiktheid was. 'n Gebreklike kind mag ook ander abnormaliteite vertoon soos stomatitis, blefaritis, vergrote milt, longabnormaliteite, ens. In ons voorafgaande bespreking is elkeen van hierdie items as 'n afsonderlike entiteit in sy respektiewe afdeling ontleed, en hoewel 'n poging aangewend is om op sekere verhou-

ships between the frequency with which several of these abnormalities occurred together, it cannot be claimed that a completely satisfactory picture has been presented. The use of a simple clinical test to supplement the study of various lesions was decided upon. The well-known and extensively used Dunfermline Scale was employed at the outset. By this method each child's condition is assessed after clinical examination, and as a result of this judgment the child is placed in one of four categories:—

1. General condition excellent.
2. General condition good.
3. General condition slightly abnormal, requiring supervision.
4. General condition bad, requiring treatment.

It was soon found that the fine distinctions involved in such an assessment required a degree of clinical precision which was well beyond the powers of the author. The necessity for having four groups was doubtful in view of the fact that the method in itself is crude and vague. In order not to give a false impression of the degree of accuracy obtainable it has been decided to present the findings in three categories, viz.:—

1. Good nutrition and health.
2. Sub-normal in one or more respects.
3. Grossly abnormal, requiring early medical treatment.

These groups do not include the supplementary laboratory examinations, such as Wasserman reactions, intestinal and urinary parasitic infections and haemoglobin determinations. The children were placed in one of the three cagtegories immediately after the clinical examination was completed. Using this clinical scale, Table 30 summarises the findings in the various groups examined.

dings te wys rakende die herhaalde gesamentlike aanwesigheid van verskeie van hierdie abnormaliteite, kan ons nie daarop aanspraak maak dat daar op dié wyse 'n heeltemal bevredigende beeld van die toestand saamgestel is nie. Daar is toe besluit om 'n eenvoudige kliniese toets uit te voer ter aanvulling van die studie van hierdie verskillende letsels. Die bekende en algemeen gebruiklike Dunfermline-skaal is aanvanklik aangewend. Volgens hierdie metode word elke kind se kondisie bepaal na kliniese ondersoek en word die kind as gevolg van die uitspraak hierop in een van vier kategorieë geplaas:—

1. Algemene toestand uitstekend.
2. Algemene toestand goed.
3. Algemene toestand ietwat abnormaal; toesig nodig.
4. Algemene toestand swak; behandeling nodig.

Dit het egter spoedig geblyk dat die fyn onderskeidings wat sodanige bepalings meebring, 'n graad van kliniese juistheid verg wat heeltemal bo die vermoë van die skrywer was. Dit was twyfelagtig of dit nodig was om vier groepe te hê, aangesien die metode self lomp en vaag is. Ten einde geen valse indruk betreffende die mate van juistheid wat hiermee verkrygbaar is, te gee nie, is daar besluit om die bevindings in drie kategorieë weer te gee:—

1. Goeie voeding en gesondheid.
2. Subnormaal in een of meer opsigte.
3. Erg abnormaal; behoefte aan onverwylde mediese behandeling.

By die opstelling van hierdie groepe is die resultate van aanvullende laboratorium-ondersoeke soos dié vir Wasserman-reaksies, parasitêre ingewands- en urinêre besmettings, en haemoglobinebepalings buite berekening gelaat. Die kinders is in een van die drie kategorieë geplaas onmiddellik nadat die kliniese ondersoek voltooi is. Op die basis van hierdie kliniese skaal is tabel 30 'n samevatting van die bevindings in die verskillende ondersoekte groepe.

TABLE 30.—AN ASSESSMENT OF THE HEALTH AND NUTRITION OF BANTU SCHOOL-CHILDREN AS JUDGED BY AN ARBITRARY CLINICAL SCALE (SEE TEXT).
TABEL 30.—DIE GESONDHEIDS- EN VOEDINGSTOESTAND VAN BANTOESKOOLKINDERS, BEPAAL OOREENKOMSTIG 'N ARBITRÊRE KLINIESE SKAAL (SIEN TEKS).

Districts. Arranged in Approximate Increasing Frequency of Sub-normal Children. Streek. Gerangskik in volgorde van toenemende voorkoms van subnormale kinders.	Boys. Seuns.			Girls. Meisies.		
	Group 1. Groep 1.	Group 2. Groep 2.	Group 3. Groep 3.	Group 1. Groep 1.	Group 2. Groep 2.	Graup 3 Groep 3.
Pietermaritzburg	2·4	74·2	23·4	1·8	77·9	20·3
Qumbu	3·0	66·3	30·7	4·8	71·7	23·5
Pretoria	2·3	58·5	39·2	4·5	73·2	22·3
Nqutu	0·4	57·2	42·4	2·8	65·3	31·9
Bloemfontein	0·5	47·0	52·5	0·7	50·6	48·7
Witzieshoek	1·3	40·7	58·0	0·4	52·7	46·9
Kentani	0·2	36·5	63·3	0·3	47·7	52·0
Letaba	0·4	34·4	65·2	0·3	41·6	58·1
Bochem	0·8	23·6	75·6	1·2	34·0	64·8

Reviewing the use of simple clinical tests for the Technical Commission of Nutrition of the League of Nations Health Organisation, Bigwood (1939) makes the following remarks:—

"The chief drawback of a very simple clinical classification based on ill-defined considerations is that the findings are not comparable *inter se*. Two kinds of difficulties have been observed:—

(1) A number of investigating physicians working simultaneously among the same group of persons have not always classified the children in the same way, some being more optimistic or more pessimistic than others in their estimate.

(2) Further, such investigations are necessarily not comparable *inter se* for another reason: the general condition of a given child may appear relatively satisfactory if he is examined in a group of children whose average general condition is only fair, whereas he himself might have been classified only as fair had he been examined in a group whose average condition was good.

In a word, there are no precise or objective standards of reference, and attempts to remedy this defect have not always been effective."

These criticisms are of more than academic interest. They strike at the very roots of the system of employing clinical scales in assessing the nutritional state of groups of children, and it cannot be too strongly urged that the figures given in this section be viewed with considerable skepticism. Comparison of the findings in the Bantu school children examined during this survey with those of other workers among other groups in this or other countries would be false if restricted to data of the nature of clinical scales.

Thus, while an exact method of clinical assessment still remains to be determined, one cannot help but feel that the Dunfermline Scale or the modification used in Table 30 leave so much to be desired that those interested in the health and nutritional state of populations gain but little information from such figures.

In an attempt to overcome this deficiency the author has attempted an analysis based on groups of clinical abnormalities noted in the preceding chapters. The various lesions found

In 'n oorsig oor die gebruik van eenvoudige kliniese toetse, vir die Tegniese Kommissie insake Voeding van die Gesondheidsorganisasie van die Volkebond, maak Bigwood (1939) onderstaande opmerkings:—

„Die vernaamste swakheid van 'n baie eenvoudige kliniese klassifikasie wat op swak gedefinieerde oorwegings gebaseer is, is dat die bevindings nie *inter se* vergelyk kan word nie. Twee soorte moeilikhede is opgemerk:—

(1) 'n Aantal ondersoekende geneeskundiges wat gelyktydig dieselfde groep persone geklassifiseer het, het nie altyd die kinders op dieselfde wyse geklassifiseer nie, omdat sommige meer optimisties en ander weer meer pessimisties in hulle oordeel was.

(2) Ook is sulke ondersoeke om 'n ander rede noodwendig nie *inter se* vergelykbaar nie: Die algemene toestand van 'n bepaalde kind kan betreklik bevredigend lyk as hy ondersoek word tussen 'n groep kinders wie se algemene toestand maar middelmatig is, terwyl hy slegs as middelmatig geklassifiseer sou geword het indien die ondersoek 'n groep ingesluit het van wie die gemiddelde toestand goed was.

Met een woord—daar is geen juiste of objektiewe verwysingstandaarde nie, en pogings om hierdie leemte aan te vul, het nie altyd doelmatig geblyk nie."

Hierdie kritiek is van meer as akademiese belang. Dit raak die wortels van die stelsel waarby van kliniese skale gebruik gemaak word by die bepaling van die voedingstoestand van die groepe kinders, en daar kan nie te sterk op aangedring word nie dat die syfers wat in hierdie afdeling aangehaal word, met heelwat skeptisisme betrag moet word. 'n Vergelyking van die bevindings ten opsigte van die Bantoeskoolkinders wat gedurende hierdie opname ondersoek is, met dié van ander navorsers onder ander groepe in Suid-Afrika of in ander lande sou onjuis wees as dit beperk word tot gegewens van die aard van kliniese skale.

Terwyl 'n presiese metode van kliniese bepaling derhalwe nog ontwerp moet word, kan 'n mens nie anders nie as om te voel dat die Dunfermline-skaal of die gewysigde vorm daarvan (tabel 30) soveel te wense oorlaat dat diegene wat in die gesondheids- en voedingstoestand van bevolkings belangstel maar weinig inligting uit sulke syfers kan kry.

In 'n poging om hierdie tekortkoming uit die weg te ruim, het skrywer hiervan 'n ontleding probeer bewerkstellig wat gebaseer is op groepe kliniese abnormaliteite wat in die voorgaande hoofstukke opgeteken is.

have been grouped into 10 main categories, viz.:—

(1) Diseases of the skin (see Chapter I).

(2) Diseases of the mouth, excluding the teeth (see Chapter II).

(3) Caries or irregularities of the teeth (see Chapter II).

(4) Discharging ears (see Chapter III).

(5) Abnormal lung signs (see Chapter IV).

(6) Grossly defective posture and crippling (see Chapter V).

(7) Diseases of the eyes (see Chapter VI).

(8) Heart diseases (see Chapter VII).

(9) Abdominal abnormalities—enlargement of liver and/or spleen (see Chapter VIII).

(10) Other disorders — goitre (see Chapter XIII).

Enlarged tonsils have not been included in the above groupings for as previously discussed (Chapter III) there is such considerable variation in what is considered to be an enlargement that little definite information can be gained by inclusion. The palpability of cervical glands depends to a considerable extent on lesions of the mouth such as glossitis, stomatitis, gingivitis and carious teeth, as well as on infectious diseases of the skin of the head, face and neck, such as impetigo and pediculosis. Other lesions might also have caused enlargement of these glands, e.g., syphilis, tonsillitis, otorrhoea. In the main, however, including this abnormality in the above groups would be a repetition of many of these findings, for it is so often a secondary result of the lesions specified in several of the considered groups of signs.

It would have been desirable to include the incidence of anaemia, faecal and urinary parasites, positive Wasserman reaction rates, etc., but as these were determined in only a percentage of the cases seen they are necessarily excluded.

Each child's clinical chart has been analysed and the number of group abnormalities listed. The following is an illustrative example of the method employed. A child suffering from the following abnormalities is considered to have involvement of three of the 10 groups specified above—blepharitis, corneal scarring, glossitis, soft spongy gums, phrynoderma and chronic impetigo. The three groups involved are obviously the skin, the mouth excluding the teeth, and the eyes, i.e., numbers 1, 2 and 7 of the specified categories.

In spite of the defects of this method, and it is recognised that they are not a few, it is felt that it will

Die verskillende letsels is in tien hoofkategorieë ingedeel, d.w.s.:—

(1) Siektes van die vel (hoofst. I).

(2) Siektes van die mond, tande uitgesonderd (hoofst. II).

(3) Verrotting of onreëlmatighede van die tande (hoofst. II).

(4) Draende ore (hoofst. III).

(5) Abnormale longtekens (hoofst. IV).

(6) Ernstig gebrekkige postuur en belemmering (hoofst. V).

(7) Siektes van die oë (hoofst. VI).

(8) Siektes van die hart (hoofst. VII).

(9) Abdominale abnormaliteite—vergroting van lewer en/of milt (hoofst. VIII).

(10) Ander ongesteldhede — goitre (hoofst. XIII).

Vergrote mangels is nie by bostaande groeperings ingesluit nie omdat daar, soos reeds verduidelik (hoofstuk III), so 'n aansienlike meningsverskil is ten opsigte van wat ons as 'n vergroting moet opvat dat daar min bepaalde inligting verkry kan word deur hierdie item in te sluit. Die palpeerbaarheid van cervikale kliere hang in aansienlike mate af van letsels van die mond soos glossitis, stomatitis, gingivitis en tandeverrotting, asook van aansteeklike siektes van die vel van die kop, gesig en mond, soos impetigo en pedikulose. Ander letsels kan ook vergroting van hierdie kliere veroorsaak het, byv. sifilis, tonsillitis, otorrhoea. Algemeen gesproke, sou insluiting van hierdie abnormaliteit in bostaande groep op 'n herhaling van baie van hierdie bevindings neerkom, aangesien dit so dikwels 'n sekondêre gevolg is van die letsels wat in verskeie van die behandelde groepe siektetekens voorkom.

Dit sou wenslik gewees het om die omvang van die voorkoms van anemie, faecale en urinêre parasiete, en positiewe Wasserman-reaksiesyfers, ens., in te sluit, dog aangesien hierdie items slegs in sommige van die gevalle bepaal is, was so iets onmoontlik.

Elke kind se kliniese kaart is ontleed en die aantal groep-abnormaliteite opgeteken. Onderstaande is 'n voorbeeld van die metode wat toegepas is: 'n Kind wat aan onderstaande abnormaliteite ly, word geag betrokke te wees in drie uit die tien bogemelde groepe—blefaritis, corneale littekens, glossitis, sagte sponsagtige tandvleis, phrynoderma en chroniese impetigo. Die drie groepe wat hierby betrokke is, is klaarblyklik die vel, die mond (met uitsluiting van die tande) en die oë, d.w.s. groepe 1, 2 en 7 van die bepaalde kategorieë.

Ten spyte van die gebreke wat hierdie metode aankleef, en daar word erken dat daar meer as een is, word

help to give a far clearer and more accurate picture than either the Dunfermline scale or the simple clinical estimate discussed in the earlier paragraphs of this chapter. The following figures indicate the results of this analysis (Tables 31A and B):—

daar tog gevoel dat dit daartoe sal bydra om 'n veel duideliker en juister beeld weer te gee as die Dunfermlineskaal of die eenvoudige kliniese bepaling wat in die inleidende paragrawe van hierdie hoofstuk bespreek is. In onderstaande tabelle 31A en 31B verskyn die resultate van hierdie ontleding.

TABLE 31 A.—THE NUMBER OF CHILDREN PRESENTING NO ABNORMALITIES OF THE CLINICAL GROUPS OF SIGNS CLASSIFIED (SEE TEXT).
TABEL 31 A.—GETAL KINDERS SONDER DIE ABNORMALITEITE VAN DIE GEKLASSIFISEERDE KLINIESE GROEPE TEKENS (SIEN TEKS).

Districts. Arranged in Order of Decreasing Incidence. Streke. Gerangskik in volgorde van afnemende voorkoms.	Boys. Seuns.		Girls. Meisies.	
	Number of Cases. Aantal gevalle.	Percentage Incidence. Persentasie-voorkoms.	Number of Cases. Aantal gevalle.	Percentage Incidence. Persentasie-voorkoms.
Pietermaritzburg	212	55·49	227	57·03
Qumbu	154	44·25	241	49·90
Nqutu	121	42·61	231	49·37
Pretoria	97	27·87	184	39·31
Kentani	91	21·01	113	29·50
Bloemfontein	93	23·19	102	24·40
Witzieshoek	50	22·13	98	19·25
Bochem	52	11·20	52	15·81
Letaba	49	9·57	50	16·40

The absence of any abnormalities of the various groups of lesions does not indicate a positive state of health, but is rather a negative indication of the number of children who did not present anv gross sign of disease on clinical examination. Viewed in this light the figures of Table 31A reveal that a considerable minority of children seen during the course of this survey were free of one or more lesions indicating obvious malnutrition and/or ill-health. The distribution of the various abnormalities noted is given in Table 31B.

Table 31B indicates that not only did a considerable number of children evidence one or other abnormality, but that many exhibited several "groups" of clinical signs indicative of disease. In a *comparatively* healthy group, such as the Pietermaritzburg children, among whom 55·49 per cent. boys and 57·03 per cent. girls showed no gross abnormality included in the clinical groups, the number of children with more than one "group" involved is very high. No fewer than 11·52 per cent. of boys and 7·03 of girls had signs of disease in three or more classified categories. While in an unhealthy area, such as Bochem, these figures for corresponding degree of abnormality (viz., three or more "groups" involved) were 51·31 per cent. boys and 37·38 per cent. girls. Figures 7a, 7b, 7c, 7d, illustrate these findings more adequately than can words.

Die afwesigheid van abnormaliteite van die verskillende letselgroepe is nie 'n aanduiding van 'n positiewe gesondheidstoestand nie; eerder is dit 'n negatiewe aanduiding van die aantal kinders wat geen ernstige siektetekens gedurende kliniese ondersoek vertoon het nie. In hierdie lig beskou, blyk uit die syfers van tabel 31A dat 'n aansienlike minderheid van die kinders wat gedurende die loop van hierdie opname gesien is, vry was van een of meer letsels wat die aanwesigheid van klaarblyklike ondervoeding en/of ongesondheid verraai. In tabel 31B word die verspreiding van die verskillende abnormaliteite wat opgeteken is, weergegee.

Uit tabel 31B blyk dat daar nie alleen 'n aansienlike aantal kinders was wat een of ander abnormaliteit vertoon het nie, dog dat baie van hulle tekens vertoon het van verskillende groepe kliniese siektetekens. In 'n *betreklik* gesonde groep soos die Pietermaritzburg-kinders van wie 55.49 persent van die seuns en 57.03 persent van die meisies geen growwe abnormaliteit van dié wat in die kliniese groepe ingesluit is, vertoon het nie, is die aantal kinders met meer as een groep se abnormaliteite baie groot. Nie minder as 11.52 persent van die seuns en 7.03 persent van die meisies het siektetekens uit drie of meer van die geklassifiseerde kategorieë gehad nie. In 'n ongesonde streek soos Bochem is hierdie syfers vir ooreenstemmende grade van abnormaliteit, d.w.s. drie of meer groepe abnormaliteite, 51.31 persent seuns en 37.38 meisies. Figure 7a, 7b, 7c en 7d weerspieël hierdie bevindings op meer doeltreffende wyse as woorde.

TABLE 31 B.—THE NUMBER OF ABNORMAL CLINICAL GROUPS MANIFESTED.
(See Text for Nature of these Groups.)

TABEL 31 B.—AANTAL ABNORMALE KLINIESE GROEPE BETROKKE.
(Sien teks vir aard van hierdie groepe.)

(1) BOYS—SEUNS.

Number of Abnormal Groups Manifested. Aantal abnormale Groepe betrokke.	Pietermaritzburg.		Qumbu.		Ngutu.		Pretoria.		Kentani.		Bloemfontein.		Witzieshoek.		Bochem.		Letaba.	
	Number of Cases. Aantal gevalle.	Percentage of Total. Persentasie van totaal.	Number of Cases. Aantal gevalle.	Percentage of Total. Persentasie van totaal.	Number of Cases. Aantal gevalle.	Percentage of Total. Persentasie van totaal.	Number of Cases. Aantal gevalle.	Percentage of Total. Persentasie van totaal.	Number of Cases. Aantal gevalle.	Percentage of Total. Persentasie van totaal.	Number of Cases. Aantal gevalle.	Percentage of Total. Persentasie van totaal.	Number of Cases. Aantal gevalle.	Percentage of Tatal. Persentasie van totaal.	Number of Cases. Aantal gevalle.	Percentage of Total. Persentasie van totaal.	Number of Cases. Aantal gevalle.	Percentage of Total. Persentasie van totaal.
1	92	24·08	103	29·59	56	19·72	113	32·47	89	20·55	105	26·19	56	24·78	68	14·66	97	18·94
2	34	8·90	59	16·95	41	14·44	88	25·28	95	21·94	77	19·21	57	25·23	92	19·83	95	18·56
3	26	6·81	23	6·61	42	14·79	45	12·93	82	18·93	85	21·19	37	16·37	122	26·29	124	24·22
4	13	3·40	7	2·01	20	7·04	4	1·15	53	12·24	35	8·73	25	11·06	85	18·32	101	19·72
5	5	1·31	1	0·29	2	0·70	1	0·29	17	3·93	5	1·25	1	0·44	31	6·68	41	8·01
6	—	—	1	0·29	2	0·70	—	—	6	1·39	1	0·25	—	—	13	2·80	4	0·78
7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	0·22	1	0·20

(2) GIRLS—MEISIES.

1	105	26·38	154	31·88	116	24·79	173	36·97	106	27·68	135	32·29	167	32·81	66	20·05	60	19·67
2	38	9·55	62	12·83	63	13·46	89	19·02	75	19·58	96	22·97	130	25·54	88	26·75	56	18·36
3	20	5·02	18	3·73	43	9·19	21	4·49	51	13·31	63	15·07	83	16·31	63	19·14	69	22·62
4	7	1·76	6	1·24	14	2·99	1	0·21	30	7·83	17	4·06	28	5·50	48	14·59	52	17·05
5	1	0·25	2	0·41	1	0·21	—	—	6	1·57	5	1·20	2	0·39	10	3·04	16	5·25
6	—	—	—	—	—	—	—	—	2	0·52	—	—	1	0·20	2	0·61	2	0·66

The method of analysis used does not indicate the severity of any particular lesion, but it demonstrates a fact of even more importance in a survey of this nature. It shows clearly that the results of ill-health and malnutrition are rarely confined to expression in one system. An area in which skin disease, for example, is common, will be found to manifest other abnormalities which result either from the same cause or from associated factors. It was a very rare sight to find a child with marked phrynoderma without any other abnormality. The more severe any single pathological entity appeared, the more likely was it that other manifestations of disease would be found. More particularly was this the case with regard to those signs which are the results of various dietetic deficiencies. The present analysis reveals that this multiplicity of abnormal findings was common in all areas, although varying considerably in extent from district to district. The perfectly healthy child was a very rare sight, while the majority of children had definite clinical evidence of ill-health.

CHAPTER XVII

CONCLUSIONS

THIS survey conclusively demonstrates that there are a multiplicity of factors which adversely influence the health and nutrition of Bantu school children. The main influences responsible are briefly discussed in this concluding chapter.

Diet Deficiency Disease

Children of all districts manifested signs which are known to result from specific food factor deficiencies. The main signs noted which indicate diet deficiency are:—

Diseases of the Skin (Chapter I)

(*a*) Dull, dry skins associated with one or more early manifestations of malnutrition, such as icthyosis of the legs, cutis anserina and mild exfoliation.

(*b*) Phrynoderma, of which "cutis anserina" is an early stage, was found in all areas. The evidence that this follicular keratosis results from vitamin A deficiency has been discussed.

(*c*) Tropical ulcer was only found in children of one district visited, namely, Letaba. The relationship of this disease to a diet lacking in animal foodstuffs has been indicated. It is not claimed

Die ontledingsmetode wat hier gebruik is, gee geen aanduiding van die strafheid van enige besondere letsel nie, dog dit werp lig op 'n feit wat in 'n opname van hierdie aard van nog groter belang is. Dit bewys baie duidelik dat die, gevolge van ongesondheid en ondervoeding selde beperk bly tot verskynsels in slegs een stelsel. In 'n streek waarin huidaandoenings byv. algemeen voorkom, sal ook ander abnormaliteite wat óf deur dieselfde faktor óf deur geassosieerde faktore veroorsaak word, aangetref word. Dit het baie selde gebeur dat daar 'n kind gevind is met opvallende phrynoderma en tog sonder enige ander abnormaliteite. Hoe strawwer die mate waarin enige enkele patologiese entiteit voorgekom het, hoe meer waarskynlik was dit dat daar ander siekteverskynsels aangetref sou word. Veral was dit die geval met betrekking tot daardie siektetekens wat die gevolge is van verskillende dieëttekorte. Die huidige ontleding bring aan die lig dat hierdie veelvuldigheid van abnormale bevindings in alle streke algemeen was, hoewel die omvang waarin hulle voorgekom het van streek tot streek aansienlik gewissel het. Uiters selde is 'n volkome gesonde kind teëgekom; die meeste kinders het besliste kliniese tekens van ongesondheid vertoon.

HOOFSTUK XVII

GEVOLGTREKKINGS

HIERDIE opname lewer afdoende bewys dat daar veelvuldige faktore is wat die gesondheid en voeding van Bantoeskoolkinders nadelig raak. Die belangrikste invloede in hierdie opsig word kortliks in hierdie slotafdeling bespreek.

Dieëtgebreksiektes.

Kinders in alle besoekte streke het tekens vertoon wat, na bekend is, die gevolg is van spesifieke voedselfaktoretekorte. Die belangrikste waargenome tekens van dieëtgebreke is:—

Siektes van die vel (hoofstuk I)

(*a*) Dowwe, droë vel geassosieer met een of meer vroeë verskynsels van ondervoeding soos ichthyose van die bene, *cutis anserina* en ligte eksfoliasie.

(*b*) Phrynoderma, waarvan *cutis anserina* 'n vroeë stadium uitmaak, is in alle gebiede aangetref. Die bewyse dat hierdie vorm van follikulêre keratose 'n uitvloeisel van vitamine A-tekort is, is reeds bespreek.

(*c*) Tropiese sweer is slegs in een van die besoekte streke aangetref, d.w.s. onder die kinders te Letaba. Daar is gewys op die feit dat hierdie siekte veroorsaak kan word deur 'n dieët wat laag is in dierlike voedingstowwe. Daar word nie beweer dat dit die enigste oor-

that this is the sole cause, but the evidence that is available is very suggestive that such deficiency plays no small part in assisting the spread of the disease.

(*d*) Dermatitis, similar to that of pellagra, was very common in Bochem children and was also found in other areas with the exception of Pietermaritzburg. The deficiencies involved are mainly those of the Vitamin B_2 complex, nicotinic acid being a specific cure for the characteristic dermatitis. The probability of protein deficiency being a factor cannot at present be excluded.

Diseases of the Mouth (Chapter II)

(*a*) The common occurrence of various degrees of glossitis, buccal and labial stomatitis (including the "angular stomatitis") in all areas is evidence of widespread deficiency. The relationship of these signs to various deficiencies has been discussed, and the opinion expressed that the vitamin B_2 group was mainly responsible, more particularly riboflavin and nicotinic acid.

(*b*) The only indicator of probable vitamin C deficiency was the occurrence of soft spongy gums which were bleeding or which bled easily on pressure. These abnormalities were noted in all areas.

(*c*) The relationship of carious and irregular teeth to various vitamin and mineral deficiencies has been discussed. The opinion has been expressed that the incidence of caries among the South African Bantu depends to a considerable extent on the use made of "shop" foods, such as refined cereals, sugar and sugar products such as sweets, as well as biscuits. No parallelism in the incidence of caries and irregularities was noted.

Diseases of the Eye (Chapter VI)

The relationship of such common abnormalities as blepharitis, chronic conjunctivitis and keratitis to vitamin deficiency has been reviewed. No attempt is made to exclude the effect of congenital syphilis and trachoma, but the discussion indicates that vitamin A deficiency and even more important a riboflavin lack cannot be overlooked as causes.

Skeletal Abnormalities (Chapter V)

The occurrence of knock-knee, bow leg, pigeon chest and other abnormalities of chest shape, ensaak is nie, dog die beskikbare gegewens skyn baie sterk daarop te dui dat 'n tekort van hierdie aard 'n belangrike rol by die verspreiding van die siekte speel.

(*d*) Dermatitis soortgelyk aan dié van pellagra het baie algemeen onder die kinders te Bochem voorgekom en is ook in ander gebiede, met uitsondering van Pietermaritzburg, aangetref. Die betrokke tekorte is hoofsaaklik dié aan die vitamine B-kompleks. Nikotiensuur is die spesifieke geneesmiddel vir hierdie kenmerkende dermatitis. Op die huidige tydstip kan die waarskynlikheid dat 'n proteïnetekort 'n faktor is, nie uitgesluit word nie.

Siektes van die mond (hoofstuk II)

(*a*) Die veelvuldige voorkoms van verskillende grade van glossitis, en buccale en labiale stomatitis (met inbegrip van angulêre stomatitis) in alle gebiede, lewer bewys van wydverspreide voedingstekorte. Die verband waarin hierdie siektetekens tot verskillende voedingstekorte staan, is behandel en die mening uitgespreek dat 'n tekort aan die vitamine B_2-groep in die eerste plek verantwoordelik is, veral gebrek aan riboflavine en nikotiensuur.

(*b*) Die enigste aanduiding van 'n waarskynlike vitamine C-tekort is gevind in die sagte sponsagtige tandvleis wat óf aan die bloei was óf maklik begin bloei het as daarop gedruk word. Hierdie abnormaliteite is in alle gebiede teëgekom.

(*c*) Die verband tussen verrotte en onreëlmatige tande en verskillende vitamine- en mineraaltekorte is bespreek. Die mening is uitgespreek dat die omvang waarin tandbederf by die Suid-Afrikaanse Bantoe voorkom, in aansienlike mate afhang van hoeveel gebruik gemaak word van „winkelkos" soos verfynde graanprodukte, suiker en suikerprodukte soos lekkers, en ook beskuitjies. Daar is geen parallelisme tussen die voorkoms van tandbederf en onreëlmatighede van die tande opgemerk nie.

Siektes van die oë (hoofstuk VI)

Die verband van sulke algemene abnormaliteite as blefaritis, chroniese conjunctivitis en keratitis tot vitaminetekorte is behandel. Geen poging word aangewend om die uitwerking van aangebore sifilis en trachoma uit te sluit nie, dog die bespreking dui daarop dat 'n vitamine A-tekort en, meer belangrik nog, 'n riboflavinetekort nie as oorsake oor die hoof gesien mag word nie.

Skeletale abnormaliteite (hoofstuk V)

Die aanwesigheid van X-bene, bakbene, hoenderbors en ander abnormaliteite van die fatsoen van

larged and irregular radial epiphyses all indicate that rachitic disease is probably not uncommon. Several cases of advanced rickets are described. This disease can result from several food deficiencies and the part played by calcium, phosphorus and vitamin D is reviewed.

Goitre (Chapter XIII)

Simple goitre was found to be very common in only one district visited—Witzieshoek. The probable cause is an actual or relative deficiency of iodine in the soil and water. The fact that this endemic form of goitre is not uncommon in South African Bantu living on the highlands on either side of the Drakensberg Mountains makes it an important nutritional problem in this country.

There is thus evidence that avitaminoses and mineral deficiency diseases are common. Clinical abnormalities resulting from vitamin A and B_1 groups were undoubtedly the commonest specific signs noted. With regard to the latter there is considerable evidence that ariboflavinosis is a very prevalent deficiency disease among the Bantu of this country. Pellagra and pellagra-like disease is discussed at some length (Chapter XIV), for it is felt that this group of diseases is on the increase and that they are already a major nutritional and public health problem in this country.

This summary of food deficiency signs noted would be incomplete were the more general signs of such lack not mentioned. The thin, round shouldered, flat chested, pot bellied child with spindly legs was such a common sight that it can only be concluded that many were on the borders of starvation. The problem is thus not only one of providing this or that particular food factor, but rather a need for a general increase of all foodstuffs which will tend to build up a healthy Bantu population, averting starvation as well as the many more specific deficiency diseases.

Other Factors Detrimental to Health

It would be incorrect to believe that all the malnutrition and ill-health observed was due to poor diet alone. The common occurrence of other preventable disease, very often in one and the same child, makes it impossible to dogmatise about the influence of each of these factors. The main diseases,

die bors, en vergrote en onreëlmatige radiale epifises dui daarop dat rhachitis waarskynlik algemeen voorkom. Verskeie gevalle van gevorderde rhachitis word beskryf. Hierdie siekte kan veroorsaak word deur verskillende voedseltekorte en die rol wat kalsium, fosfor en vitamine D speel, word behandel.

Goitre (hoofstuk XIII)

Daar is gevind dat eenvoudige goitre in slegs een besoekte streek algemeen voorkom, naamlik Witzieshoek. Die waarskynlike oorsaak is 'n aktuele of 'n betreklike tekort aan iodium in die grond en water. Die feit dat hierdie endemiese vorm van goitre algemeen voorkom onder Suid-Afrikaanse Bantoes wat in die hooggeleë streke aan albei kante van die Drakensberge woon, maak hierdie siekte tot 'n belangrike voedingsprobleem in ons land.

Daar is dus bewys dat avitaminose en mineraalgebreksiektes algemeen voorkom. Kliniese abnormaliteite wat ontstaan het uit tekorte aan die vitamine A- en B_1-groepe was ongetwyfeld die mees algemene spesifieke siektetekens wat opgeteken is. Met betrekking tot laasgenoemde groep is daar heelwat bewyse dat ariboflavinose 'n baie algemene gebreksiekte onder die Bantoes van Suid-Afrika is. Pellagra en pellagra-agtige siektes word in hoofstuk XIV taamlik breedvoerig bespreek, aangesien daar gevoel word dat hierdie groep siektes aan die toeneem is en alreeds 'n ernstige voedings- en volksgesondheidsvraagstuk in ons land daarstel.

Hierdie opsomming van voedseltekorttekens wat die navorsers teëgekom het, sou onvolledig wees sonder melding van die meer algemene aanduidings van sodanige tekort. Die maer kind met ronde skouers, plat borskas, dik magie en dun beentjies was so 'n algemene gesig dat daar slegs tot een gevolgtrekking geraak kon word, naamlik dat baie van hulle op die rand van verhongering was. Dit is dus nie slegs 'n kwessie van die verskaffing van een of ander besondere voedselfaktor nie, maar eerder 'n behoefte aan 'n algemene vermeerdering van alle voedselsoorte wat daartoe sal bydra om 'n gesonde Bantoebevolking op te bou, en wat nie net die talle spesifieke gebreksiektes uit die weg sal ruim nie, maar ook hongersnood sal voorkom.

Ander faktore wat vir die gesondheid nadelig is

Dit sou verkeerd wees om aan te neem dat al die ondervoeding en ongesondheid wat teëgekom is, slegs aan swak dieët toegeskryf moet word. Die algemene voorkoms van ander voorkombare siektes, baie dikwels by een en dieselfde kind, maak dat dit onmoontlik is om oor die uitwerking van elkeen van hierdie faktore te dogmatiseer. Die vernaamste siektes

other than those resulting from lack of food, are briefly summarised as follows:—

Syphilis (Chapter XII)

All areas evidenced a considerable incidence of this disease. As a whole there was no difference between urban and rural children. The mean percentage incidence of all nine areas was over 23 per cent. of the children tested. Comment on this alarming proportion affected by syphilis is almost unnecessary. The effects were well in evidence throughout the survey and it is no exaggeration to say that syphilis forms the biggest single public health problem facing those interested in the welfare of this country.

Malaria (Chapter VIII)

Chronic malaria was very common in the Letaba children examined. While less frequent in the Bochem area it forms a major defect in the children seen. The comparatively low incidence in Nqutu children should not encourage the belief that it is no longer a problem in this area; only a continuation of the utmost vigilance will keep this area relatively free from malaria. Unlike syphilis, malaria is confined to certain areas of the country, but in these districts its influence on the nutritional state of the population is considerable.

The Low Sanitary Standard of Living is well indicated by the common occurrence of various parasitic diseases (Chapter X and XI). While there is a very interesting group of differences between the children of the various areas, the high incidence of one or other infestation is an indicator of serious defects in the disposal of excreta and refuse, more particularly human excreta. Urinary bilharzia was common in five of the six areas in which tests were carried out. Rectal bilharzia, caused mainly by Schistosoma mansoni, was found in the district of Letaba. Ascaris infection was very common in Kentani and Pietermaritzburg children, and was also found in specimens from Pretoria and Nqutu. In spite of well recognised difficulties in examination, tapeworm eggs were found in no fewer that seven of the nine districts visited. Other parasites noted were Oxyuris, Trichuris and Giardia, the last mentioned being found in all areas.

Personal Hygiene as judged by the very common sight of scabies with superimposed impetigo (Chapter I) is not of a very high standard. Of

wat nie uit voedselgebrek ontstaan nie, kan kortliks as volg saamgevat word:—

Sifilis (hoofstuk XII)

In al die besoekte streke het hierdie siekte op aansienlike skaal voorgekom. Oor die algemeen is daar geen verskil tussen stedelike en landelike kinders nie. Vir al nege besoekte gebiede het die gemiddelde persentasievoorkoms ten opsigte van getoetste kinders op meer as 23 persent te staan gekom. Kommentaar in verband met hierdie ontstellende syfers is byna oorbodig. Dit uitwerking van hierdie siekte kon dwarsdeur die hele opname heen duidelik gesien word en dit is geen oordrywing as verklaar word dat sifilis die grootste enkele volksgesondheidsvraagstuk is waarteen diegene wat in die welsyn van ons land belangstel, te staan kom nie.

Malaria (hoofstuk VIII)

Onder die kinders wat te Letaba ondersoek is, het chroniese malaria baie algemeen voorgekom. Hoewel dit onder die Bochem-kinders minder algemeen aangetref is, maak dit nogtans 'n ernstige swakte onder hulle uit. Die betreklik lae voorkomssyfer onder Nqutu-kinders behoort nie beskou te word as 'n aanduiding daarvan dat hierdie siekte in dié gebied nie meer 'n vraagstuk daarstel nie; slegs volharding in die uiterste waaksaamheid sal hierdie gebied betreklik vry van malaria hou. In teenstelling met sifilis is malaria tot sekere streke van Suid-Afrika beperk, dog in daardie gebiede is sy uitwerking op die voedingstoestand van die bevolking aansienlik.

Die lae sanitêre lewenstandaard blyk baie duidelik uit die algemene voorkoms van verskillende parasitêre siektes (hoofstukke X en XI). Hoewel daar 'n baie interessante groep verskille tussen die kinders van die verskillende gebiede bestaan, is die hoë voorkomssyfer van een of ander besmetting 'n aanduiding van ernstige leemtes in die metode waarvolgens uitwerpsels en afval, en veral menslike uitwerpsels, weggeruim word. Urinêre bilharzia het algemeen voorgekom in vyf uit die ses streke waarin toetse uitgevoer is. Rectale bilharzia, hoofsaaklik deur *Schistosoma mansoni* veroorsaak, is in die distrik Letaba aangetref. *Ascaris*-besmetting het baie algemeen onder kinders te Kentani en te Pietermaritzburg voorgekom, en is ook by monsters uit Pretoria en Nqutu aangetref. Ten spyte van bekende moeilikhede in die weg van ondersoeke, is lintwurmeiers in sewe uit die nege besoekte streke aangetref. Ander parasiete wat teëgekom is, was *Oxyuris, Trichuris* en *Giardia,* waarvan laasgenoemde in alle streke gevind is.

Persoonlike higiëne, vir sover uit die baie algemene voorkoms van scabies met superponering van impetigo. (hoofstuk I) geroordeel kan

interest is the very much higher incidence of these diseases in the rural areas as compared to the urban groups. The clothing, especially that of the boys, was tattered, torn and often unclean, and was but another indication of the poverty of the mass of the children examined.

Chronic Lung Disease and Signs of Tuberculosis (Chapter IV) were not uncommon in the areas of Kentani and Qumbu, and their incidence in Pietermaritzburg was an indication that the health of the children in this area, too, is adversely influenced by these abnormalities.

Trachoma (Chapter VI) was a probable cause of eye disease in a few Letaba children and in many of the Bochem area.

Preventable Crippling was found in all areas (Chapter V).

Anaemia (Chapter IX)—as determined by haemoglobin estimations, was not as common as might be expected from the multiplicity of diseases which affected the children in most areas.

It is not intended to discuss further the many other abnormalities noted, such as discharging ears, enlarged tonsils, palpable cervical glands, enlarged livers, etc., for the aim of these concluding paragraphs is to indicate the main factors responsible for all the abnormalities noted.

Diet deficiency diseases, syphilis, malaria, bilharzia, tuberculosis, scabies and impetigo, roundworm and tapeworm infestation, trachoma, preventable crippling, and many other less severe or less common diseases, form no small array of factors which are contrary to the maintenance of good health and nutrition. No amount of juggling can succeed in separating the influence of one as opposed to the others where they so commonly occur together. The outstanding fact is that they are all preventable. Science has given the necessary knowledge to eradicate, or at the very least to considerably reduce the occurrence of these diseases. The ravages following upon rapid soil erosion, overcrowding, ignorance and poverty are all within the bounds of control, but it is beyond the terms of reference of this report to consider the social application of this abundance of knowledge.

Personal Acknowledgements

In addition to various acknowledgements made in the introductory section of this report, the author of this section would like to acknowledge the assistance of his wife, Dr. Emily

word, is nie van 'n baie hoë peil nie. Dit is interessant om daarop te let dat hierdie siektes baie meer algemeen in die landelike stereke as onder stedelike groepe voorkom. Die klere, veral van die seuns, was verflenterd, stukkend en dikwels vuil en was maar net nog 'n aanduiding van die armoede waarin die grootste gros van die ondersoekte kinders lewe.

Chroniese longsiekte en tekens van tuberkulose (hoof IV) was nie 'n ongewone verskynsel in die Kentani- en die Qumbu-streek nie, en dat hulle in Pietermaritzburg aangetref is, was 'n aanduiding daarvan dat die gesondheid ook van kinders in hierdie gebied deur hierdie abnormaliteite aangetas is.

Trachoma (hoofstuk VI) is 'n waarskynlike oorsaak van oogsiektes by enkele Letaba-kinders en by talle Bochem-kinders.

Voorkombare liggaamlike belemmering is in alle gebiede aangetref (hoofstuk V).

Anemie (hoofstuk IX).—Uit haemoglobinebepalings blyk dat bloedarmoede nie so algemeen voorkom as wat uit die aanwesigheid van soveel siektes onder die kinders van die meeste streke afgelei kon word nie.

Ons is nie van plan om die talryke ander waargenome abnormaliteite soos draende ore, vergrote mangels, palpeerbare cervikale kliere, vergrote lewer, ens., verder te bespreek nie, aangesien dit die bedoeling is om in hierdie slotparagrawe slegs op die hoofaktore wat al die waargenome abnormaliteite veroorsaak, te wys.

Dieëtgebreksiektes, sifilis, malaria, bilharzia, tuberkulose, scabies en impetigo, rondewurm- en lintwurmbesmetting, trachoma, voorkombare liggaamlike belemmering en talle ander minder ernstige of minder algemene siektes, maak tesame 'n baie groot groep faktore uit wat die instandhouding van goeie gesondheid en voeding bemoeilik. Geen verduideliking kan die invloed van enigeen van hierdie siektes uitskakel nie, aangesien hulle so dikwels saam aangetref word. Een feit staan soos 'n paal bo water—en dit is dat al hierdie siektes voorkombaar is. Die wetenskap het ons die nodige kennis gegee waarmee hierdie siektes uitgeroei of op sy minste grootliks teëgewerk kan word. Die verwoesting wat voortvloei uit snelle gronderosie, oorbevolking, onkunde en armoede kan met welslae bestry word, maar oorweging van die wyse waarop hierdie oorvloedige kennis maatskaplik toegepas kan word, val buite die bestek van hierdie verslag.

Persoonlike dankbetuigings

By die verskillende dankbetuigings wat in die inleiding van hierdie verslag opgeneem is, wil die skrywer van hierdie afdeling graag nog sy dank voeg vir die hulp verleen deur sy vrou,

Kark, in the presentation of the data and checking of the figures used. The help of several Bantu members of the Polela Health Unit Staff with the diagrams, figures and copying of the text is also gratefully acknowledged. In addition, the following are thanked for their criticism of the text: Dr. P. Allan, Professors Brock and Irving, Dr. B. A. Dormer.

The author of Section B is indebted to Mrs. M. M. Suzman for help with the calculations of statistics in his section of the report.

As some time elapsed between the completion and publication of this report it will be realised that some of the references are not up to date.

APPENDIX I—SECTION C

All percentages used in the text were calculated with the use of logarithmic tables, and expressed to the nearest second decimal place. More detailed statistical analysis was not attempted for this report.

The number of children examined clinically during the course of the survey is given in the following tables, which include details of the age and sex distribution in each district:—

dr. Emily Kark, by die rangskikking van die gegewens en die nagaan van die syfers. Hy is ook dank verskuldig teenoor verskeie Bantoelede van die personeel van die Polela-gesondheidseenheid by die opstel van diagramme en figure, en kopiëring van die teks. Ook word dr. P. Allan, professore Brock en Irving en dr. B. A. Dormer bedank vir kritiese beskouing van die teks.

Skrywer van Afdeling B van die rapport is mev. M. M. Suzman baie dank verskuldig vir haar hulp met die statistieke.

Aangesien hierdie verslag eers geruime tyd na voltooiing daarvan gepubliseer kon word, sal die leser besef dat sommige van die verwysings nie van die allerjongste is nie.

AANHANGSEL I, AFDELING C

Alle persentasies wat in die teks verskyn, is met behulp van logaritmetabelle bereken en is weergegee tot die naaste tweede desimale plek. Daar is nie gepoog om in hierdie verslag 'n meer gedetaileerde statistiese ontleding uit te voer nie.

In onderstaande tabel verskyn die getalle van die kinders wat gedurende die loop van die opname klinies ondersoek is, tesame met besonderhede van leeftyds- en geslagsverspreiding in elke distrik.

TABLE A.—THE AGE DISTRIBUTION OF BOYS EXAMINED.
TABEL A.—LEEFTYDSVERSPREIDING VAN ONDERSOEKTE SEUNS.

District. Streek.	Years of Age. Leeftyd.												
	Under Onder 6	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–	16 and over. en ouer.	Total. Totaal.
Pretoria	0	0	10	19	32	39	38	50	51	53	27	29	348
Witzieshoek	3	1	9	15	15	20	27	39	22	38	12	25	226
Bloemfontein	0	13	25	35	34	44	50	83	49	45	19	9	406
Qumbu	5	13	17	23	23	61	28	45	28	36	26	35	340
Kentani	5	27	32	45	41	67	56	41	34	35	25	25	433
Pietermaritzburg	7	23	23	36	26	40	29	55	49	35	29	29	381
Nqutu	0	2	11	13	23	19	38	42	38	48	18	32	284
Letaba	0	0	5	10	29	54	61	68	53	69	52	111	512
Bochem	0	1	13	33	22	51	43	62	47	62	34	94	462
Total All Districts Totaal van al die streke	20	80	145	229	245	395	370	485	371	421	242	389	3,392

TABLE B.—THE AGE DISTRIBUTION OF GIRLS EXAMINED.
TABEL B.—LEEFTYDSVERSPREIDING VAN ONDERSOEKTE MEISIES.

District. Streek.	Years of Age. Leeftyd.												
	Under. Onder 6	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–	16 and over. en ouer.	Total. Totaal.
Pretoria	1	3	17	29	39	53	77	78	66	61	31	11	466
Witzieshoek	6	9	25	30	42	75	55	86	73	59	34	15	509
Bloemfontein	2	18	23	39	42	59	61	59	52	28	24	10	417
Qumbu	7	21	29	34	35	54	47	73	52	43	45	44	484
Kentani	4	12	27	40	51	53	36	56	30	30	18	22	379
Pietermaritzburg	9	19	22	32	40	52	50	53	47	33	33	8	398
Nqutu	1	4	13	31	33	55	51	71	78	61	37	33	468
Letaba	0	0	8	13	20	27	45	49	33	48	41	31	315
Bochem	0	2	10	24	36	39	38	30	31	50	33	34	327
Total All Districts Totaal van al die streke	30	88	174	272	338	467	460	555	462	413	296	208	3,673

Total Boys and Girls Examined: 7,155.
Totale aantal seuns en meisies ondersoek: 7,155

APPENDIX II

SECTION C

Graphic Charts of the Incidence of Various Important Abnormalities

Legend to Figures 1 to 7 (d) inclusive.

AANHANGSEL II

AFDELING C

Grafiese kaarte met opgawe van voorkoms van verskillende belangrike abnormaliteite.

Byskrif by Figure 1 tot en met 7 (d).

Figures 1-6 Boys. Girls.
Figure 1-6 Seuns. Dogters.

Figure 7 (*a-d*) Boys. Girls.
Figuur 7 (*a-d*) Seuns. Dogters.

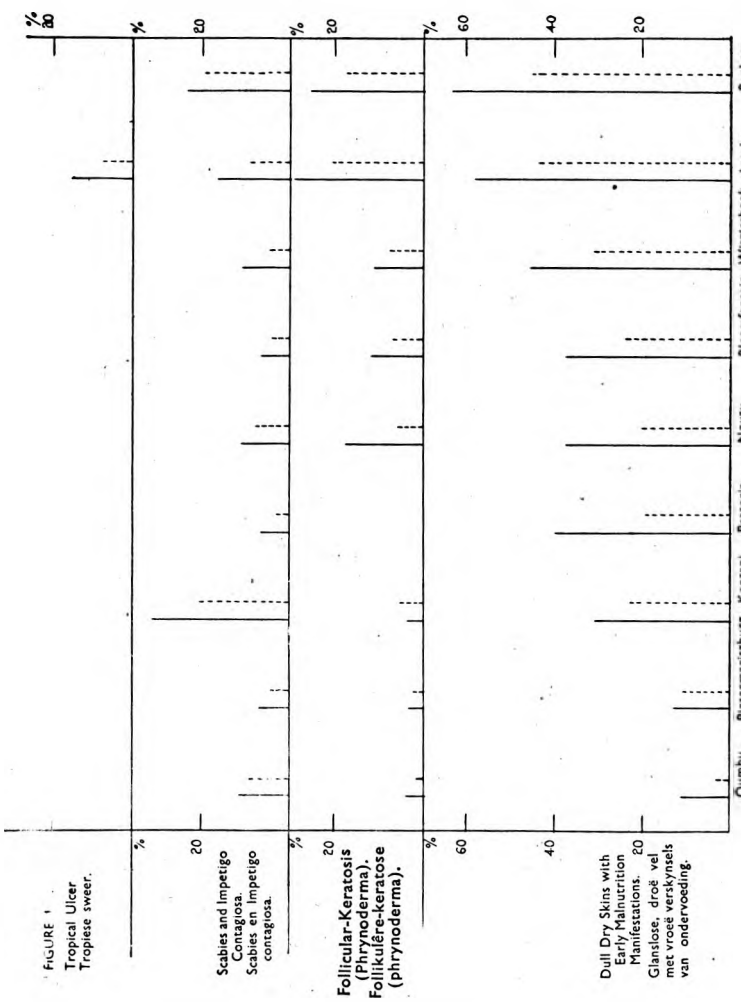


FIG. 1.—The Incidence of Common Skin Lesions.
FIG. 1.—Voorkoms van gewone huidletsels.

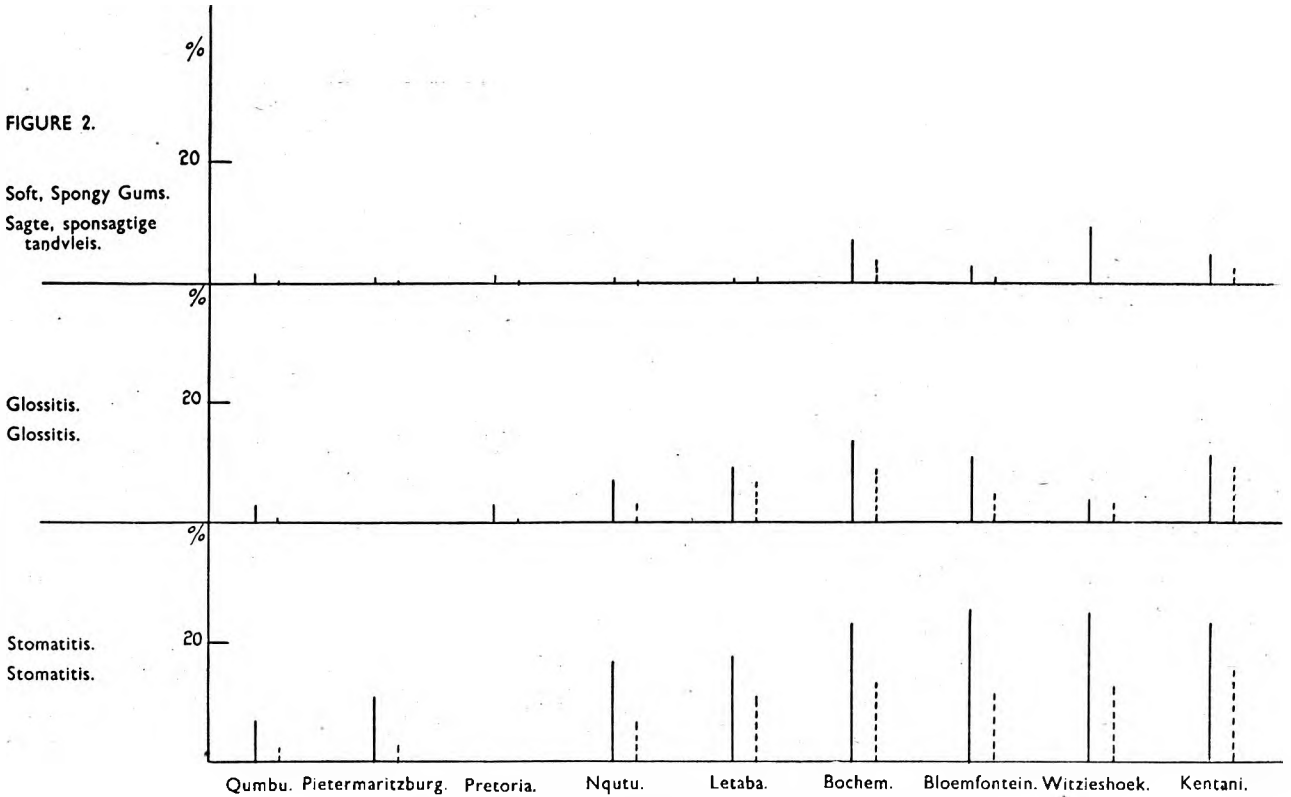


FIG. 2.—The Incidence of Stomatitis, Glossitis and Soft Spongy Gums.
FIG. 2.—Voorkoms van stomatitis, glossitis, en sagte sponsagtige tandvleis.

FIGURE 3.

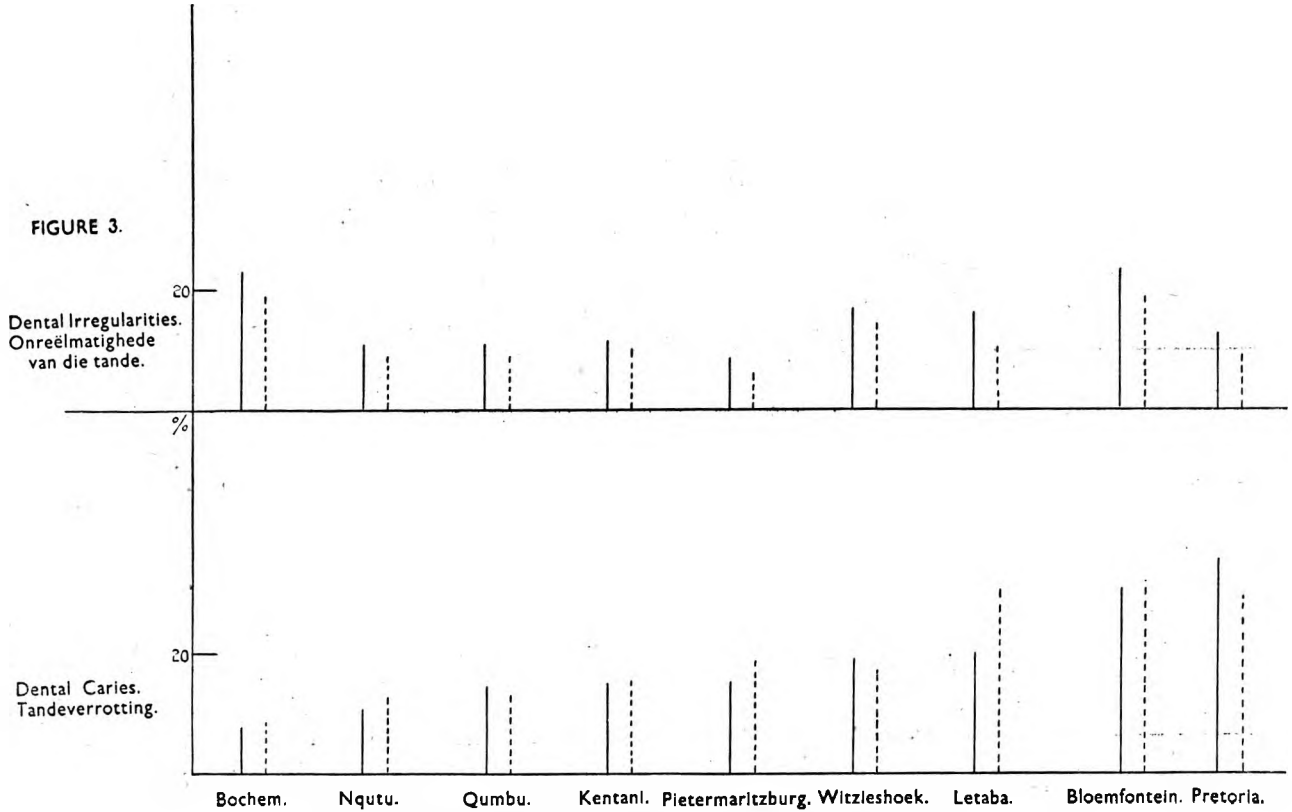


FIG. 3.—The Incidence of Carious and Irregular Teeth.
FIG. 3.—Voorkoms van tandeverrotting en onreëlmatigheid van tande.

FIGURE 4.

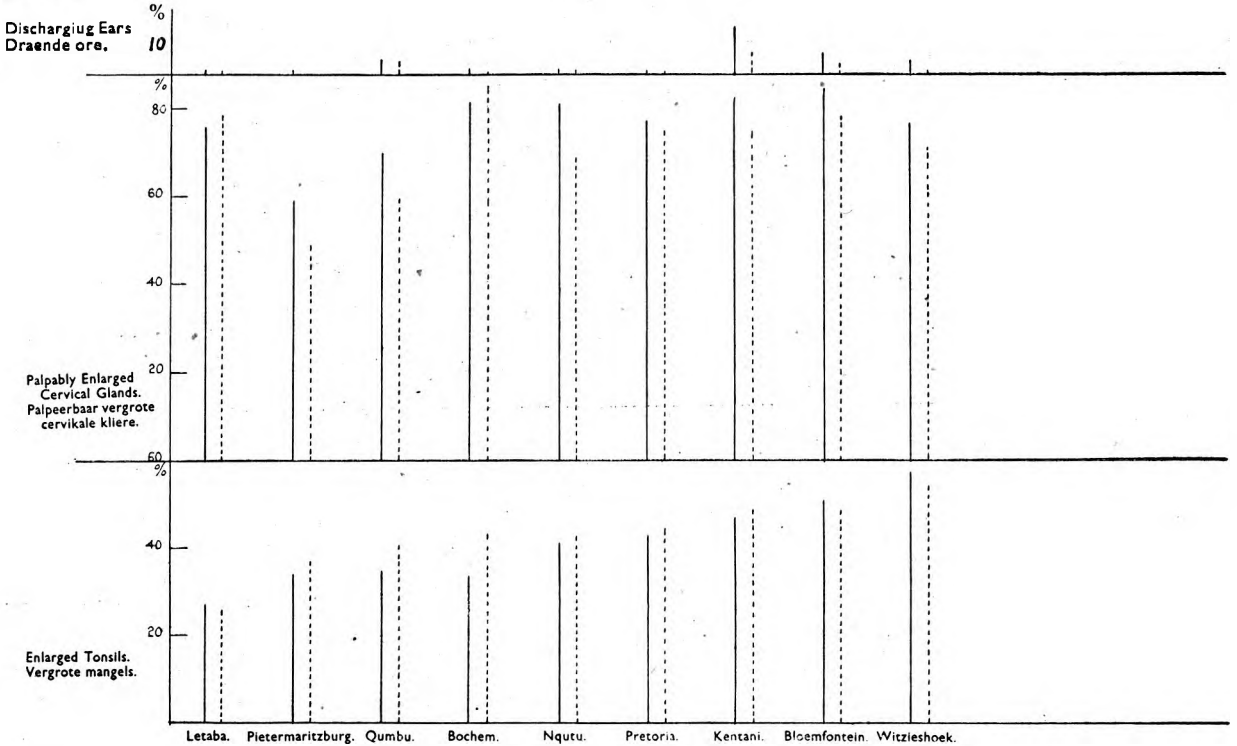
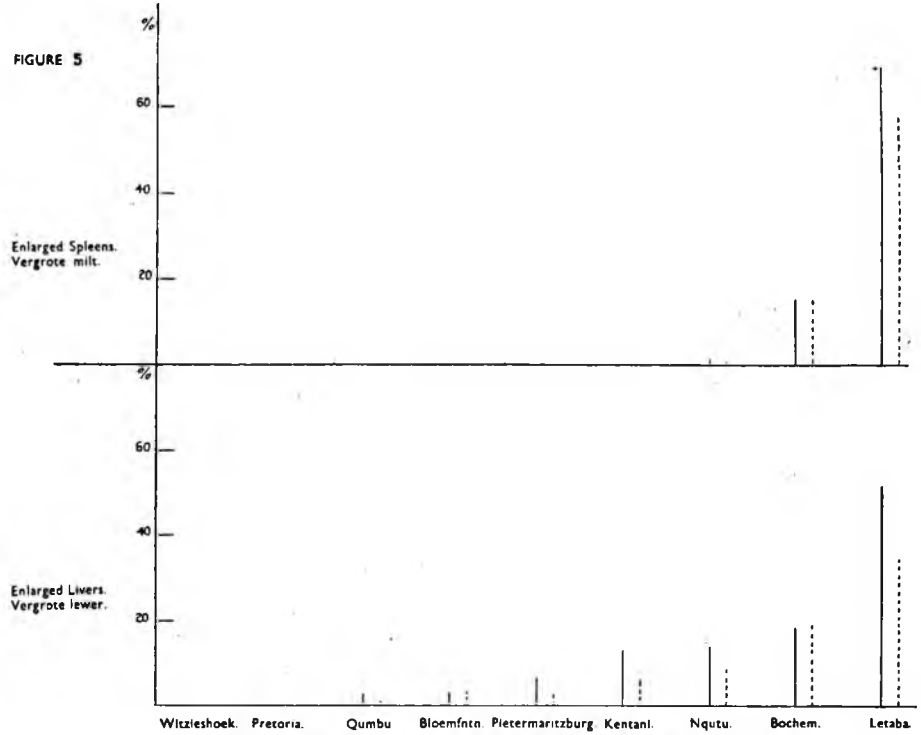


FIG. 4.—The Incidence of Enlarged Tonsils, Palpable Cervicle Glands and Dishcarging Ears.
FIG. 4.—Voorkoms van vergrote mangels, palpeerbare cervikale kliere en draende ore.

FIGURE 5



G. 5.—The Incidence of Enlarged Spleens and Livers.
FIG. 5.—Voorkoms van vergrote milt en lewer.

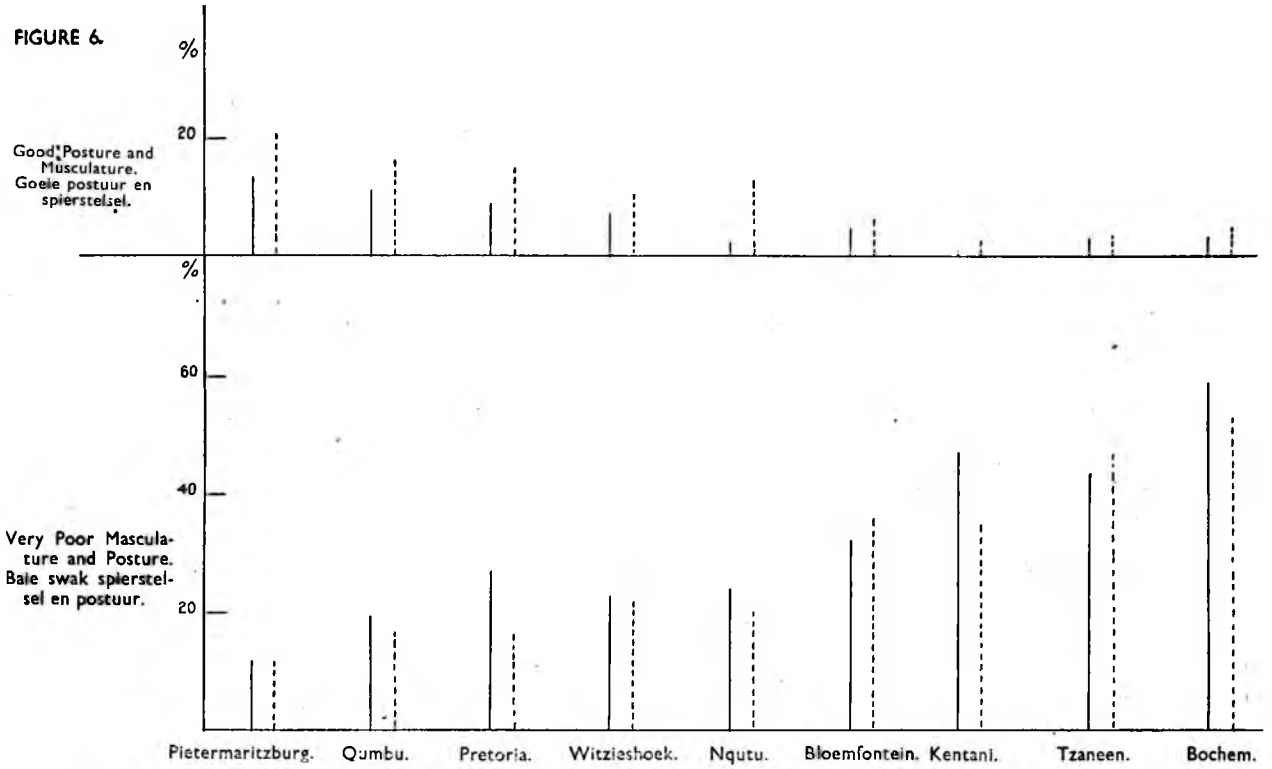


FIG. 6.—The Incidence of the Extremes of Posture—Very Good Posture and Very Poor Musculature and Posture.
FIG. 6.—Voorkoms van uiterstes t.o.v. postuur—baie goeie postuur en baie swak spierstelsel en postuur.

FIGURES 7 (*a*) TO 7 (*d*).—THE INCIDENCE OF VARIOUS GROUPS OF CLINICAL ABNORMALITIES. (VIDE CHAPTER 16.)
FIGURE 7 (*a*) TOT 7 (*d*).—VOORKOMS VAN VERSKILLENDE GROEPE KLINIESE ABNORMALITEITE. (VOLGENS HOOFSTUK 16.)

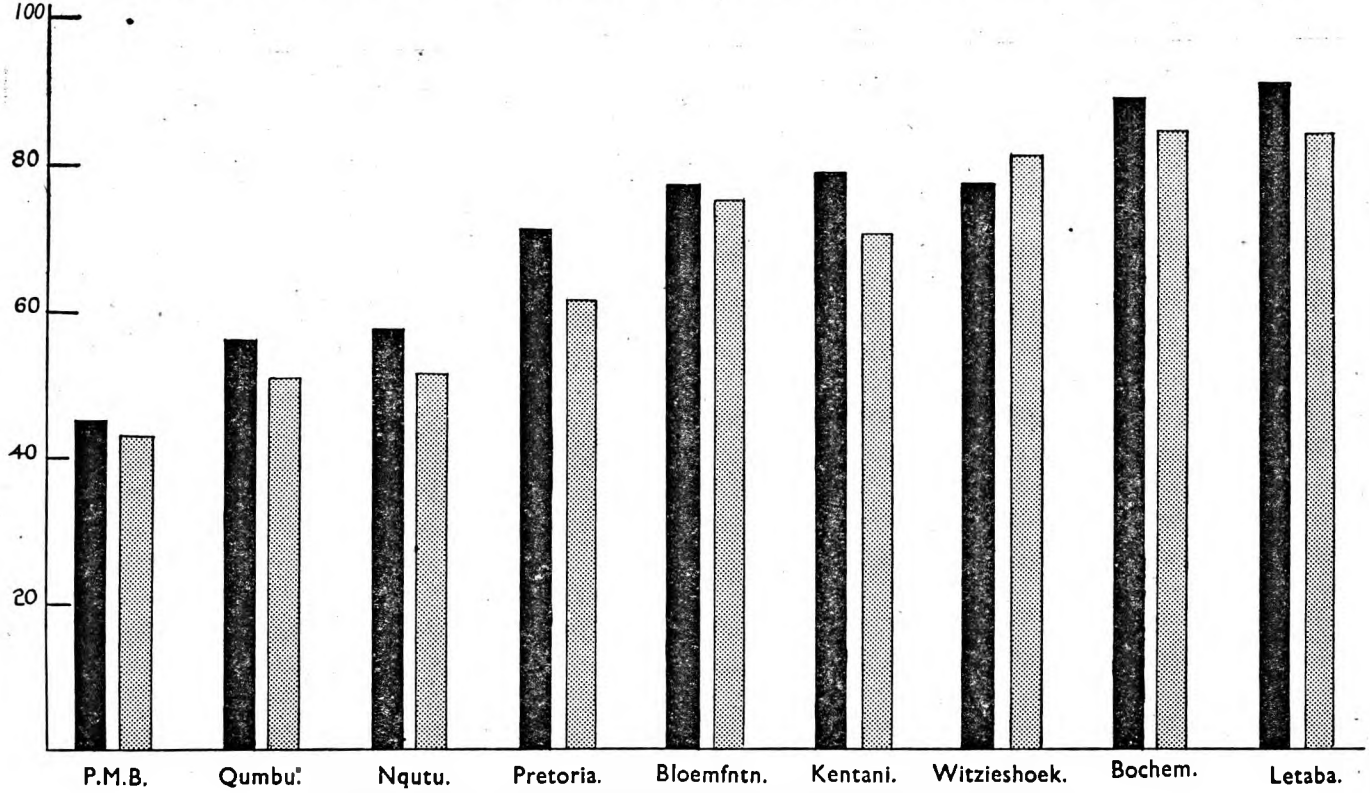


FIG. 7 (*a*)—The Percentage of Children with One or More Groups of Clinical Abnormalities.
FIG. 7 (*a*)—Persentasie kinders met een of meer groepe kliniese abnormaliteite.

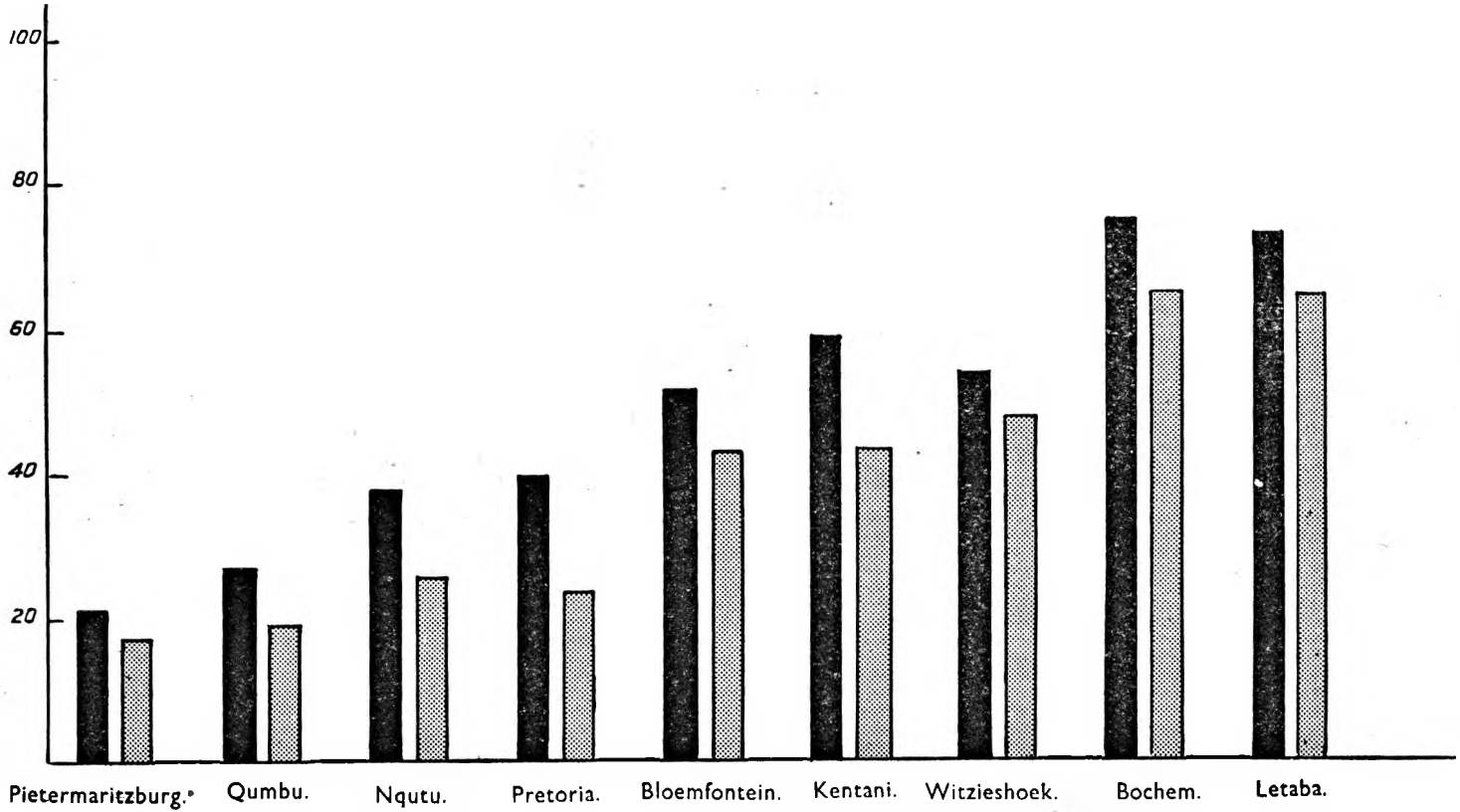


FIG. 7 (*b*)—The Percentage of Children with Two or More Groups of Clinical Abnormalities.
FIG. 7 (*b*)—Persentasie kinders met twee of meer groepe kliniese abnormaliteite.

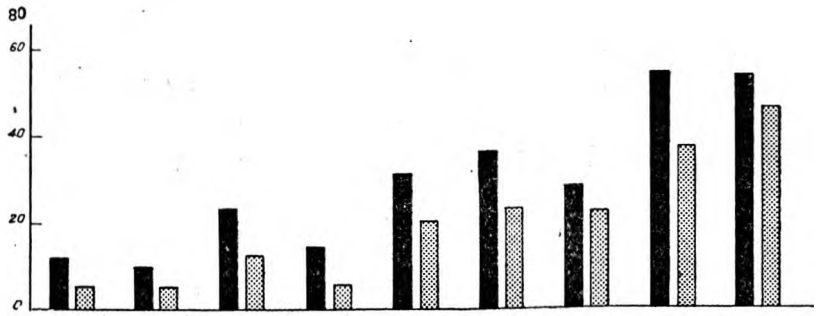


FIG. 7 (*c*)—The Percentage of Children with Three or More Groups of Clinical Abnormalities.
FIG 7 (*c*)—Persentasie kinders met drie of meer groepe kliniese abnormaliteite.

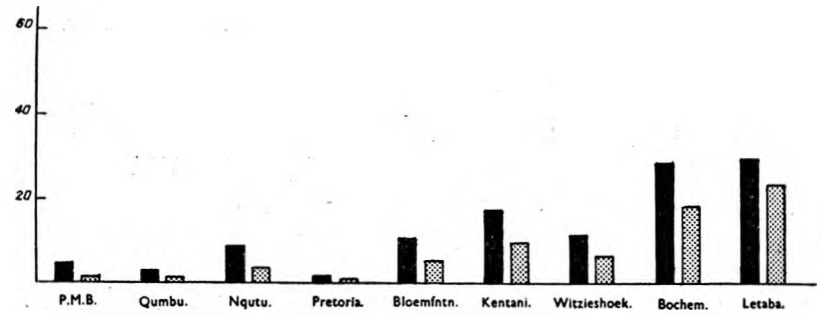


FIG. 7 (*d*)—The Percentage of Children with Four or More Groups of clinical abnormalities.
FIG. 7 (*d*)—Persentasie kinders met vier of meer groepe kliniese abnormaliteite.

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