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THE SOCIAL PATHOLOGY OF SYPHILIS IN AFRICANS

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The problem of syphilis in South Africa is so closely related to the development of the country that a study of the social factors responsible for its spread is likely to assist in its control. Few countries can have a higher incidence of the disease than has South Africa. Table I indicates the extent of the problem.

The data include sample studies of men, women, children and babies. They indicate the extent to which syphilis has spread in urban and rural areas. In the school children examined by Kark and le Riche[5] in 1938-1939, the incidence of definitely positive Wassermann tests in the total urban group was 23·6%, and in all rural areas it was 23·28%. Cluver's figures[2], as well as those of the Polela group[6], also indicate that syphilis is probably as widespread in rural areas as it is in urban areas.

Gale[10] estimated that the rate of infection per year in Pietermaritzburg Africans was 2,620 per 100,000 as judged by the occurrence of early cases under treatment. A sample study, carried out by the author at Polela[6] in 1942, indicated the annual rate of infection in adult women to be 3·27%, estimated by the incidence of known cases exhibiting primary and secondary manifestations, with a recent history of infection. At Springs[11] the rate of new cases coming to the notice of the Medical Officer of Health (1940) was 2,061 per 100,000, of which 577 per 100,000 were early cases.

Purcell[11], after briefly reviewing the incidence of syphilis in various groups of Europeans and non-Europeans in South Africa, indicated that ' the incidence of syphilis in the Union is enormous '. Our present review indicates that not only are we dealing with a large mass of latent syphilis in the African populations, but also with a very high incidence of new infections each year. This process is taking place in highly urbanized areas, as well as in the more remote rural districts.

A study of the social pathology of the disease must, therefore, include an historical analysis, as well as an assessment of present trends which are maintaining the spread of syphilis.

HISTORICAL

Before Europeans came to South Africa,* syphilis was unknown among the Africans.[12] The Zulu have no specific name for the disease, other than *isifo sabelungu* (disease of white men) or *isifo sedolopi* (disease of the town).

The first permanent European settlement in South Africa had very little close contact with Bantu-speaking Africans, and the contact for many years thereafter was casual and temporary.[13] [14] In spite of wars and repeated minor conflicts between frontier groups of Europeans and Africans, very close relations between masses of these two races did not develop until the discovery, in the last half of the last century, of diamonds at Kimberley and gold on the Witwatersrand. Large numbers of European and African immigrants were then attracted to these areas. From then on, syphilis became an ever-increasing problem, not only in these newly proclaimed mineral fields, but throughout the country. The two races worked together under conditions which were far from ideal.

Results of the Discovery of Diamonds at Kimberley in 1867. The diamond fields which developed, ushered in the Industrial Revolution of South Africa—a revolution which continues to the present day. By 1877, the population of Kimberley was 18,000 (8,000 Europeans and 10,000 non-Europeans). Within the short space of ten years, Kimberley, a relatively unpopulated and barren area, had become the second largest town in South Africa.

* Much of the historical material presented here has been obtained from C. W. de Kiewiet's *History of South Africa*[13] and S. T. van der Horst's *Native Labour in South Africa*.[14]

TABLE I

The Incidence of Syphilis in Various African Groups Studied in South Africa

Place	*Nature of Population Examined*	*Number Examined*	*Percentage Positive Wassermann Tests*	*Reporter*	*Date*
Flagstaff	Men at Chief's meeting	235	12·1	F. S. Drew[1]	1930
W.N.L.A. Examination of African Recruits for the Mines	Transvaal Basuto men	200	29·5	E. H. Cluver[2]	1930
	British Basuto men	200	25·5	,,	
	Bechuana men	100	22·0	,,	
	Pondo men	200	8·5	,,	
	Portuguese East African men	300	7·0	,,	
	Xhosa men	200	2·0	,,	
Germiston	Ante-natal cases	227	40·5	Rauch and Saayman[3]	1938
	Out-patient cases	712	44·4		
Pretoria	Sample of waiting out-patients and their friends	500	47·8	A. Pijper[4]	1921
Pretoria	Random sample of school children	65	13·85	Kark and le Riche[5]	1938-39
Witzieshoek	,, ,,	75	10·67	,, ,,	
Bloemfontein	,, ,,	80	42·50	,, ,,	
Qumbu	,, ,,	97	11·34	,, ,,	
Kentani	,, ,,	78	35·90	,, ,,	
Pietermaritzburg	,, ,,	105	15·24	,, ,,	
Nqutu	,, ,,	115	30·44	,, ,,	
Bochem	,, ,,	97	46·38	,, ,,	
Tzaneen	,, ,,	105	4·76	,, ,,	
Polela	Expectant mothers	930	35·27	Kark[6]	July 1941 to June 1946
	Congenital syphilis in babies of a sample community	146	20·55	,,	January 1941 to December 1944
Alexandra Township	School children	496	12·9	le Riche[7]	1943
Edendale	Sample population (163 families)	437 (i.e. 53·5% of sample)	27·46	Landau[8]	1946
	Ante-natal cases	715	20·1	,,	1946
Springs	Ante-natal	2,828	23·97	M.O.H. Reports, Springs[9]	1938-44
	African male adults (municipal employees)	4,011	26·50		

Some 10,000 Africans were employed on the mines each year, and between 1871 and 1895, about 100,000 came to the mines and returned to their homes. The men came as temporary unskilled labourers, leaving their families behind them. Migrant labour on a large scale had begun. This mass movement of population was far greater than anything South Africa had experienced before, as far as European-African contact was concerned. In terms of numbers of people involved, the Great Trek and the Voortrekker villages that resulted, were far smaller; e.g. in 1852 Bloemfontein, then the largest village north of the Orange River, had about 70 houses with some 300 Europeans; and Smithfield, the second biggest of these villages, had 42 homes and about 200 Europeans.

The living conditions of the Africans in the Kimberley area were conducive to the spread of syphilis. Drunkenness was common; compounds were often filthy and there was a rapid movement of men to and from the diggings. In the beginning they would remain for from three to five months and by 1889, up to nine or occasionally even 18 months. The striking feature was that a large group of men were living under abnormal social conditions, because very few, if any, had their wives and families with them. This resulted in promiscuity, prostitution and the sure spread of syphilis.

Some idea of how far the disease, contracted at Kimberley, could be spread, is obtained when one realises the extensive area from which this labour came. Van der Horst[14] quoting the Cape Blue Book on Native Affairs (1885), presents the following figures for 'new hands' registered at the Kimberley mines in 1884:—

Shangaans	681
British Basutos	195
Sekukuni Basutos	2,215
Zulus	815
Portuguese Zulus	446
Bakhatlas	56
Matabele	120
Colonials	375
Bakwenas	33
Batlapings	277
Swazis	11
Bamangwatos	56
Barolongs	115
Korannas	6
Griquas	3
Batlaros	21
Transvaal Basutos	47
West Coast	2
Dramara	1
Mosambiques	1
Total	5,476

These men from various tribes came from all parts of South Africa—the Cape Province, Natal, the Orange Free State, the Transvaal, Basutoland, Swaziland, Rhodesia and Portuguese East Africa.

The Results of the Discovery of Gold. A far more important factor in the spread of syphilis emerged soon after with the discovery of gold on the Witwatersrand in about 1884. Urbanization under abnormal social conditions which started at the diamond fields, continued on a far greater scale on the Witwatersrand. These social changes resulted not only from the direct recruitment of labour for the mines themselves, but the gold industry also became the main stimulus for the development of other industries, e.g. coal. It led to the development of ports such as Durban, Port Elizabeth, East London and Cape Town, for export and import, to satisfy the growing needs of the ever-increasing numbers of consumers in the mining areas. It gave rise to secondary industries for clothing, feeding and housing the population, and finally to the commercial and distributive enterprises needed for all these activities.

All these developments required labour, and the bulk of the unskilled labour was provided by African men.

From the beginning the main sources of labour were from the Native rural areas. The men who came to work left their homes in the rural areas. Their period of work was limited and they, as well as their employers, regarded their stay in the towns as temporary. After a variable time they would return to their homes.

Housing. Housing and other facilities necessary for the development of a family life and a stable community were not provided. The compound system prevailed. The development of family life, which leads to more stable sex relations between men and women, thus never became a feature of the gold mining industry. It is only in recent years that urban African family life has become an accepted fact in our towns; but such family life is dependent for its income on other fields of employment than the mining industry.

Table II indicates the number of African and other Coloured men concerned in the gold mining industry from the years 1904 to 1939.

All the areas of South Africa are involved to a varying extent, as well as the neighbouring territories of Basutoland, Swaziland, Bechuanaland, Portuguese East Africa and tropical areas such as the Rhodesias and Nyasaland. The migration of so many young adult men must necessarily disturb social conditions in the area to which they go, unless there is a very large stable population with facilities for social life. It becomes necessary, therefore, to analyse the distribution of population in the towns of this country to see whether there is any opportunity for this group of men to live a fairly normal social and sexual life.

Distribution of the African Population According to the 1936 Census.[17] This Census was the last full Union-wide census of which details are available. Table III indicates the urban and rural distribution of African and European populations as extracted from the 1936 Census.[15]

The proportion of total males to total females for Africans in Urban areas is greater than 2: 1; whereas this proportion for Europeans is a fraction under 1: 1. The proportions in rural areas are relatively normal for both groups. These figures, although they indicate an abnormal Bantu population distribution in towns,

TABLE II

The Number and Distribution (According to Area of Origin) of Men Employed in the Mining Industry of the Transvaal *

Year	*Number of Africans Employed*	*Areas from which the Men came (expressed as a percentage of the total)*								
		Cape Province	*Natal*	*O.F.S.*	*Transvaal*	*Basuto-land*	*Bechuana-land*	*Swazi-land*	*East Coast*	*Tropical*
1904 ..	77,425	12·7	3·49	0·30	6·96	2·91	0·69	0·64	66·23	5·91
1914 ..	179,837	24·97	5·96	0·48	7·76	7·44	1·87	2·89	47·71	0·99
1924 ..	191,355	33·05	2·43	0·43	7·59	9·15	1·18	2·19	43·88	0·18
1934 ..	269,547	41·96	4·62	1·23	8·60	13·03	2·48	2·60	24·67	0·80
1939 ..	348,048	33·92	4·88	1·49	7·82	14·98	2·72	2·07	26·11	6·01

* Table adapted from van der Horst's *Native Labour in South Africa*, pp. 216, 217.

TABLE III

Urban and Rural Distribution of Africans and Europeans of the Union of South Africa

	Africans		*European*	
	Male	*Female*	*Male*	*Female*
Total Urban	784,769	356,874	647,324	660,062
Total Rural	2,527,882	2,927,164	370,550	325,921

do not indicate the true state of affairs. Firstly, by taking the total of all age groups, the figures do not show the proportion of adult male to adult female. Secondly, they do not indicate the shifting nature of the African population. Thus there is no indication of the numbers who are permanent urban dwellers, as distinct from those who are temporarily in town, with their homes and families in the rural areas. A further analysis of these factors is indicated in Tables IV and V.

The greatest preponderance of males over females is during the most virile period of life, viz. the age group of 20-49 years. If the figures for some of the leading industrial areas are analysed, we find an even greater preponderance of males over females, as indicated in Table IV (*b*).

In none of these towns was the proportion less than 3: 1. The range for various age groups in Johannesburg was from about 3½ to over 4 men per adult woman; in Springs from 5-12 men: 1 adult woman; in Krugersdorp from about 4-9: 1 and in Durban from 3 to 7: 1. It is likely that this state of affairs in urban areas influences the position in rural areas.

Rural Areas. It has been noted above (Table III) that the total rural distribution of African males to females was a little less than 1: 1. Such a distribution would allow for a normal social life were it to obtain in all areas. These figures are, however, for the total rural areas of South Africa and do not necessarily express the state of affairs in various parts of the country.

Furthermore, the analysis is based on the figures for all age groups and does not, therefore, present a picture of the proportion of adult males to adult females in various areas. The distribution of Transkeian Territories indicates a different state of affairs from that which obtains in the general rural population (Table V).

The position in the Transkeian Territories is the reverse of that which exists in the urban areas. There is a relatively high proportion of women to men, rang-

TABLE IV

Proportion of Adult Males to Adult Females (Africans)

(*a*) All Urban Areas: The Proportion of African Male and Female Persons, According to Age, in the Urban Areas of South Africa

Age in Years	*Male*	*Female*	*Proportion of Males to Females*
0–9	73,545	78,973	0·9313: 1
10–14	38,463	35,943	1·070: 1
15–19	77,878	39,902	1·952: 1
20–29	263,138	82,458	3·192: 1
30–39	193,259	56,635	3·414: 1
40–49	91,311	31,568	2·892: 1
50–59	29,808	16,315	1·827: 1
60 and over ..	14,166	12,283	1·153: 1

(*b*) Leading Industrial Areas: The Distribution of African Males and Females, According to Age, in some Leading Industrial Areas

Age in Years	*Johannesburg*		*Springs*		*Krugersdorp*		*Durban*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
21–24	21,490	7,561	10,459	1,133	7,410	1,252	5,429	1,654
25–29	37,999	9,582	17,023	1,447	13,074	1,423	8,647	2,368
30–34	26,596	7,035	10,449	1,078	8,466	1,138	7,770	1,948
35–39	22,348	5,189	8,318	873	8,029	894	7,022	1,357
40–44	13,053	3,254	4,392	621	4,640	722	4,771	746
45–49	8,562	2,361	2,314	449	2,021	491	3,042	480

TABLE V

The Proportion of African Men and Women Between the Ages of 21 and 49 Years in the Transkeian Territories (According to the 1936 Census)

Age Group (in Years)	*Male*	*Female*	*Proportion of Males to Females*
21–24	17,915	45,649	1:2·548
25–29	24,554	58,957	1:2·401
30–34	22,429	51,658	1:2·303
35–39	21,926	39,012	1:1·780
40–44	18,446	32,933	1:1·779
45–49	15,385	20,886	1:1·358

ing from about 1·3 women to 1 man in the age group 45-49, to 2·5 women to 1 man in the 21-24 year group.

Conclusions. (*a*) In the urban areas there is a preponderance of adult males over females most marked in the age group 20-40, where it is over 3:1. In the more industrialized urban areas this preponderance is even greater.

(*b*) The effect on the rural African reserves is to upset the balance in the other direction, resulting in a preponderance of women over men.

THE SHIFTING NATURE OF THE POPULATION

The development of the diamond and the gold mines led to a considerable number of persons, more especially adult men, going to work in the towns and returning to their homes periodically. The census only shows the position at a particular moment in time and does not indicate the total turnover of population in various places. It thus excludes an important demographic problem in the study of syphilis, viz. movement of people. Table VI summarizes certain sample studies of the extent of migratory labour.

Conclusions. Very few adult men have not been away from their rural homes to work in some town or other. In a number of areas the majority of men are away during the course of each year. A number of them remain away for lengthy periods of two or even more years. While these figures do not adequately convey the exact picture in all rural and urban areas of the Union, they do indicate that at any one particular moment of time, some 40% to 50% of men are away from their homes and that during the course of a year, between 40% and 80% of the men might be away.

The Marital Status of Adult African Men and Women in Rural and Urban Areas. In terms of social relationships the data of Table VII indicate the following:—

Urban. The total number of unmarried men over 21 in urban areas is 218,400 (i.e. those never married, plus the widowed and divorced). It will also be noted that 346,281 men are stated to be married as compared with 119,682 married women. If we assume that all married women are with their husbands, then 226,599 men are married, but are not with their wives. By combining this figure (226,599) with that of the total number of unmarried men (218,400), we reach a figure of 444,999 unattached men in the towns. This gives a proportion of approximately 4 unattached men to each one attached.

TABLE VI

Summary of Sample Studies of the Extent of Migratory Labour in Various Areas of South Africa

Author	*Place*	*Result of Study*
Schapera[16]	Bakhatla Reserve (Bechuanaland)	40% of the adult men are away at work every year for six months or more. It is not uncommon for a man to stay away for two or even more years.
MacMillan[17]	Herschel, Ciskei (Cape Province)	75% of the adult men are away at work for at least six months every year.
Krige and Krige[18] ..	Balobedu Tribe (Transvaal), District Letaba	50% of males, 20-49 years of age, migrate to work.
Monica Hunter[19] ..	Pondoland (1939) ..	46·4% of adult men paid their taxes outside their home area.
Monica Hunter[19] ..	Mine workers from various Native Reserve areas	Referring to mine workers, the author states that the average man spends 10·88 months at the mines, followed by 8·1 months at home.
Basutoland Census (1936)[20]	Basutoland	Nearly 50% of the adult men were away at work at the time of the census.
van der Horst[14]	South African Reserves	One-third of the time of a Reserve Native is spent away from home.
S. L. Kark[6]	Polela, Natal	In a study of 132 families carried out over a 12-month period, it was found that 80% of the adult men in the age group 20-40 years were away for an average period of eight months during the year.

TABLE VII

Marital Status of Africans over 21 Years of Age (According to 1936 Census)

	Never Married		*Married*		*Widowed*		*Divorced*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
Urban	208,064	40,474	346,281	119,682	8,913	27,692	1,423	2,902
Rural	228,405	121,252	713,181	909,629	37,710	291,505	3,393	9,533

The total number of unmarried women over 21 was 71,068, a proportion of 1 unattached to 1·7 attached, assuming again that all the married women are living with their husbands in town. If the 119,682 married couples are accepted as being faithful to one another, there are 444,999 unattached men with only 71,068 unattached women, i.e. a proportion of over 6: 1.

Rural. The number of unmarried men over 21 is 299,508, a proportion of 1 unattached to 2·4 attached. The number of unmarried women over 21 is 422,290, of whom no fewer than 291,505 are widowed. There are also 909,629 married women and only 713,181 married men. There are, therefore, 196,448 women whose husbands are not with them. This figure excludes the incidence of polygamy. For purposes of this analysis it may be assumed that some 10% of adult women are in a state of polygamous marriage. That leaves a figure of approximately 175,000 temporarily unattached, married women. The total number of unattached women over 21 in the rural areas would therefore be 597,290, a proportion of 1 unattached to 1·2 attached. Assuming again that men and women, when together, are faithful to each other, there are 299,508 unattached men with 597,290 unattached women, i.e. a proportion of 1: 2 for all rural areas in South Africa. In the Transkei, this proportion is roughly 1: 7.

One further important comparative set of data is the proportion of never-married to married women over 21 years of age:—

In Towns: 40,474 to 119,682, i.e. about 1: 3.

In Rural Areas: 121,252 to 909,629, i.e. about 1: 7½.

The relatively high proportion of unmarried adult women in the towns should be noted.

Conclusions from these Data. In the towns the number of unattached men is four times greater than that of attached men, and six times greater than that of unattached women. Over and above this a large number of these unattached men are not permanent residents in the towns. Where there is such a high proportion of virile adult men as compared with women, the results are likely to be undesirable. The men will seek their social and sexual life in shebeens and brothels. Prostitution and alcoholism are well-established immediate causes of syphilis and require no further discussion. Furthermore, the temporary nature of the sojourn of these men in urban areas is not conducive to the development of a moral social code, which might influence behaviour, as it would be in the case of a stable community.

The additional factor to be dealt with in South Africa is the movement of men so infected in the towns, to their homes in the rural areas. In this way venereal disease has been brought to the most remote corners of the country. A limited study carried out in the Polela district indicates that this is the main source of infection of the rural population (Table VIII).

The Polela study indicates that the majority of married women (29 out of 32) patients were infected at home by their husbands, who had recently returned from work in a town. No fewer than 23 of the contacts who had infected these 32 women had been infected in town.

TABLE VIII

Epidemiological Study of 76 Cases of Primary and Secondary Syphilis and Acute Gonorrhoea (carried out at the Polela Health Unit in a Rural Area)

Marital Status of the Patients	*Number of Patients*	*Contact from whom the Patient Contracted the Infection*			*Place where the Patient Contracted the Infection*					*Place where Contact Contracted the Infection*			
		Married Partner	*Engaged to be Married*	*Temporary 'Love Affair'*	?	*Local*	*Town*	*Other*	?	*Local*	*Town*	*Other*	?
Married Women ..	32	29	—	2	1	27	4	—	1	6	23	1	2
Married Men ..	20	2	—	17 (plus 1 by his mistress)	—	10	8	2	—	4	10	4	2
Single Women and Girls	14	—	4	10	—	13	1	—	—	4	4	2	4
Single Men ..	10	—	—	10	—	3	6	1	—	—	7	2	1

The position of married men is somewhat different. Few (2 of 20 patients) were infected by their wives. The majority were infected during an extra-marital union. A number (10) were infected in their home area. Like the married men, single men are frequently infected while away from their homes (six out of ten cases).

The majority of girls and single women (13 of 14 patients) were infected in their home district by contacts who had contracted the disease in the area, as well as while away from the area. Not infrequently these contacts were married men.

GENERAL DISCUSSION AND CONCLUSIONS

Social pathology may result from two broad types of disorder.[21] In the one, the individual person may be so maladjusted that he is unable to order his life according to the folk ways and mores of his particular group. Such maladjustment may be due to an abnormal domestic life or to a disordered personality resulting from a multiplicity of causes. Whatever the cause may be, the maladjustment is essentially one of individual personality pathology and the therapy required is that for the individual. Should such a maladjusted person develop syphilis as a result of a licentious way of life, it becomes necessary to regard the syphilis as an expression of a personality disorder, and the diagnosis established, as well as the therapeutic programme developed, must include consideration of this social maladjustment.

The other type of disorder is that in which the pattern of society does not allow for the healthy development of the individual. Here we are dealing with a process in which the society itself is pathological. The disturbance in social relationship may not affect all groups or communities to the same degree, but the individuals belonging to the affected groups are likely to show evidence of this pathology.

The industrial revolution in South Africa, commencing with the discovery of diamonds and continued with the large-scale mining of gold, led to the development of an urban life which has profoundly disturbed the family stability and sexual mores of several million African people. Urbanization as a process is bound to disturb patterns of living which have been developed in a rural society, but urbanization in South Africa has taken a particularly disturbing direction as far as the African is concerned, as it has developed mainly on the basis of migratory labour. This system of migratory labour of adult men has led to instability and pathology in family relationships.

The code of morals of the men who have been to town appears to have arisen through the realization of a new, free, sexual life, one that does not regard sexual intercourse in a serious light, but as a cheap commodity for temporary pleasure. This results in adultery and intercourse with single girls at rural homes—a state of affairs which the work at Polela indicated to be not uncommon, despite the fact that the tribe as a group frowned upon such activities.

In addition, the very large number of widows (over a quarter of a million) and the many women whose usbands are away at work from the rural areas, comprise a group already used to sexual intercourse. In the old days a widow would become the 'wife' of her late husband's brother and have children with him. This still happens to-day (but not as often as before) and it is probable that this group of women will present an ever-increasing problem in the spread of syphilis. The other group, whose husbands leave them, will often also indulge in extra-marital intercourse, more especially if their husbands remain away for long periods. Examples of such cases grow more and more frequent in the African reserves. Details of a particular case study of this type have been reported.[22]

Thus we have on the one hand a set of conditions in urban areas ideal for the spread of syphilis, and on the other hand, a migrant labour force which successfully spreads this urban disease to the rural areas where social conditions are also suitable for its reception.

All this has been going on at an ever-increasing rate since the diamond digging days, producing great changes in Bantu social customs, breaking down a system of rigid moral standards, destroying the old concepts of right and wrong, cheapening relations between men and women and bringing with it syphilis.

Without an understanding of the economic factors involved and the historical development of the vast social pathological changes brought about during the last 70 years, no treatment will save the spread of syphilis in South Africa. Treatment of individual personality disorder or attempts to inculcate a re-orientation towards a healthy sexual and family life cannot succeed in any but a few cases. The first line of treatment must be to remedy the unhealthy social relationships which have emerged as the inevitable result of masses of men leaving their homes every year. This pathological process is at the root of the disturbed social relationships and successful therapy requires the establishment of African urban and rural communities based on a stable family life. With the development of such family life in our urban areas will emerge a set of mores which, among other benefits, will gradually control the spread of syphilis. In such ordered urbanization lies the answer to the problem of the social pathology of syphilis.

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ADULT AND INFANT PELLAGRA IN SOUTH AFRICAN BANTU.

A COMPARATIVE CLINICAL STUDY.

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The recognition of pellagra in Southern Africa has been greatly facilitated by the work of Stannus during the past thirty years. He analysed the clinical signs of a number of cases occurring among prisoners in Nyasaland (1912, 1913). These descriptions were the first detailed records of pellagra in Southern Africa. At more or less the same time outbreaks occurred among prisoners in the Victoria Gaol, Southern Rhodesia [Nightingale, 1912], and among patients of the Pretoria Mental Hospital in 1912 [Annual Report of the Public Health Department, 1928]. These three outbreaks were not the earliest, for Cluver [1929] reported that many cases occurred among Zulu prisoners of war [Haydon, 1906-7; Addison, 1906-7]. Cases had also been noted at Nqutu, Natal, by Knight, at about the time of the Zulu rebellion, and in Basutoland [Macfarlane, 1907].

Following the institutional outbreaks of 1912, occasional cases were reported in South Africa [Drummond, 1913, 1920, 1922; Anderson, 1913; Swift and Brown, 1914; Orenstein, 1927]. However, it was not until 1927 that further extensive outbreaks occurred in this country. Non-European inmates of three Durban prisons were affected [Cluver, 1929]. It is noteworthy that apart from the institutional outbreaks mentioned the disease was uncommon in this country. During the fourth decade, however, a number of workers reported on the increasing incidence of pellagra, and at present it is a very common disease in various parts of the country [Dyke, 1935; Macvicar, 1935; Heimann, 1936; Soga, 1938; Daneel, 1939; Mears, 1942; Suzman, 1942; records of the Non-European Hospital, Johannesburg; and reports of the King Edward VIII Hospital, Durban]. During the years 1938-42, the author has seen cases in Witzieshoek and Bloemfontein (O.F.S., 1938); Kentani and Qumbu (Transkei, 1939); Nqutu (Natal, 1939); Tzaneen, Bochem, Pretoria and Johannesburg (Transvaal, 1938-40); and in people of the Polela, Impendle, and Underberg districts of South Natal (1940-42). It is thus obvious that the adult type of the disease, which at one time was mainly confined to the inmates of various institutions, is now a common clinical entity.

Pellagra in infants and young children, commonly associated with nutritional oedema, has been described in various African and other territories. Procter [1926] appears to have been the first to refer to its existence in Africa, when he described the syndrome in Kenya infants and children. It has since been reported fairly commonly in most parts of the continent. Thus in East Africa (Kenya, Uganda) cases have been reported by Gillan [1934], Stones [1935], Carman [1935], Latham [1935], Dyce Sharp [1935] and Trowell [1937, 1940, 1941]. In Central Africa (Belgian Congo) cases have been recorded by Trolli [1938] and Von Daele [1938], while Williams [1933, 1935] has described cases occurring in the Gold Coast

(West Africa). In South Africa, cases of infantile pellagra have been described by Ross [1931] in the Ciskei, and by Suzman [1942] in Johannesburg. It has also been reported in various Central and South American States.

Not all of the above series were considered by the authors to be pellagra. As with many disorders of uncertain classification the names of various workers have been attached, *e.g.*, Gillan's oedema in East Africa, William's disease in West Africa, and Goenz's disease in Salvador. Descriptive names have also been applied, *e.g.*, "Cheveux blancs" (Belgian Congo), "Cachexie hydrique infantile tropicale" (Salvador), "Kwashiorkor" (Gold Coast). In addition it has also been referred to as pellagroid beri-beri, nutritional oedema, and Ross [1931] considered that the diagnosis of infantile scurvy satisfactorily described her cases. Stannus [1936], Trowell [1940-41], and Suzman [1942] considered it to be infantile pellagra.

The present analysis is a comparative study of adult and infantile cases seen by the author. Both conditions are very much more common among the Bantu of this country than the literature would suggest.

MATERIAL.

For the purposes of this study 96 cases seen by the author are considered; 62 of these were of the adult type and 34 occurred among infants and young children. However, as will be seen from the discussion following, no hard and fast division into age groups between the so-called adult and infant types of cases can be drawn. 53 of the 96 were from Johannesburg and surrounding urban districts, the remaining 43 being patients examined in the rural areas of Polela and Impendle, Natal.

CLINICAL PICTURE.

The outstanding features were usually to be found on superficial examination, the skin, mucous membranes, and muco-cutaneous junctions being the parts most commonly affected.

Skin lesions.

The characteristic dermatitis of pellagra was noted in 51 of the adults and older children. In nearly all of these it was of a dry, hyperpigmented, keratotic type, and was usually symmetrical. Peri-anal and scrotal dermatitis were not uncommon. In these regions the dermatitis tended to be moist, often exposing a raw surface. The commonest areas affected were the extensor surfaces of the extremities, the face, and the neck. In addition to this classical dermatitis there were other common skin lesions. A seborrhoeiform dermatitis of the face occurred in 14 of the 62 adult cases, being more marked in men than in women and older children. Phrynoderma (kerato-folliculitis), mainly affecting the anterior aspect of the thighs, dorsum of the arms and shoulders, buttocks and lower abdomen, was very common (45 of the 62 cases).

At first examination the picture presented by an advanced case in infancy appears very different from that described above. There is a sloughing dermatitis, most commonly noted in the body creases where approximation of two skin surfaces occurs. Thus it is not uncommon to find extensive raw areas in the perineum, groins, buttocks and between the lower jaw and neck. In a few cases similar lesions occurred either on the face or legs and thighs. There is a general pallor of the body,

most marked in the face, with which is associated a patchy distribution of black hyperpigmented, and pale hypopigmented areas. In many cases the hair is of a light brown colour.

No cases were noted to have phrynoderma or a seborrhoeiform dermatitis of the face.

While, therefore, infant and adult types are apparently different it must be noted that in both groups the lesions are usually symmetrical and they occur mainly in areas subjected to irritation such as pressure or exposure or in moist surfaces. In addition the common adult type is sometimes seen in babies, and, as mentioned before, a "wet" dermatitis is not uncommon in adult pellagrins. The following examples serve to illustrate this point:—

Case 1. Adult woman. Hyperpigmented, keratotic symmetrical dermatitis of shoulders, lateral aspect of elbows and face. There was also a complete band of dark pigmentation where her skirt was tightly tied round the abdomen.

Case 2. Adult man. Symmetrical seborrhoeiform dermatitis of the face; coal black pigmentation of the scrotum; peri-anal circumscribed sodden dermatitis.

Case 3. Adult woman. Symmetrical exfoliative dermatitis of dorsum of hands and forearms, and infrapatellar areas of both knees.

Case 4. Infant boy, aged two years. Legs: symmetrical raised blebs, with some of these ruptured. Thighs: extensive denuded area, surrounded by pitch black pigmentation on the right side. On the left thigh there was a patchy black pigmentation. Perineum and penis: the penis was completely denuded of skin, and there was a sodden, ulcerating, perianal dermatitis. There was no oedema at the time of examination.

Seen three days after the first examination, the ulcerating area had spread to the buttocks, having a continuous, symmetrical distribution from the thighs, through the perineum to the buttocks.

Case 5. Infant boy, aged seven months. Dry, hyperpigmented keratosis of the back, and on the legs (anterior aspect). Raw exfoliation of the neck and perineum, extending from the peri-anal region to the scrotum. Very slight oedema of legs.

Case 6. Girl, aged three years. Classical symmetrical dry dermatitis of the back, behind the ears, and the dorsum of the arms. Raw dermatitis round the anterior aspect of the neck. Marked oedema of face, hands and legs.

Case 7. Infant girl, aged ten months. Symmetrical hyperpigmented dermatitis of anterior aspect of thighs and legs. No oedema noted.

Cases 1-3 are fairly typical of the dermatitis seen in most adults. Case 4 presents a picture of very severe skin signs of pellagra in infancy. Cases 5 and 6, the former an infant and the latter a young child, present a mixed picture of typical dry dermatitis of pellagra on dry sites, such as the arms, legs, and the back, together with raw exfoliating lesions in moist areas, like the perineum and neck. Case 7, an infant of ten months only, evidenced the classical dry dermatitis.

It thus seems reasonable to conclude that the varying picture presented by the skin lesions is one of degree, ranging from a dry to a moist sloughing form of dermatitis, the nature of the lesion depending mainly on the site involved.

Lesions of the Mouth.

The main oral manifestations in all types of cases were stomatitis, glossitis and gingivitis.

Stomatitis. The lips and buccal mucous membranes were commonly affected.

The lips.

(a) The body of the lips may be involved, evidencing, in the earlier stages, a chapped appearance. In more advanced cases a raw cracked condition was common, the lower lip being the more severely affected in most cases. For purposes of distinction from (b) this lesion is referred to as "labial stomatitis."

(b) "Angular stomatitis" involves not only the mucous membrane of the lip, but encroaches to a varying extent on to the adjacent skin at the corners of the mouth. The angles of the lips may appear sodden, or more marked ulceration with fissure formation may be noted.

In the present series "labial stomatitis" was more common in adults than was "angular stomatitis," 45 of the 62 adults evidencing the former type, and 24 the latter. In infants and young children "angular stomatitis" was more frequent, being associated with flaming red lips, rather than cracked or ulcerating lips. In 19 infant cases seen in the Polela district, ten had a marked "angular stomatitis."

Buccal mucous membrane. The mucous membrane of the cheeks in both adults and children was commonly reddened, and a line of tooth imprints is frequently noted in adults. More advanced lesions were not seen in any adults of the present series, but two infants had ulcerating mouths.

In all, 52 of the 62 adult type cases and 32 out of the 34 infantile type evidenced one or more of the above forms of stomatitis.

Glossitis. The tongue manifestations present a varied picture. These may be briefly summarised as follows:—

(a) *Marginal glossitis*, which varied in severity from prominence of the papillae, which are often blue-black in appearance, to fiery redness with tooth indentations often giving the margin of the tongue a "chiselled" edge. The remainder of the dorsal surface in such cases was usually furred.

(b) *Glossitis involving the whole of the dorsum.* In mild cases there was only a prominence of the papillae, red and blue-black on a furred background. More common in the present series was a typical atrophic glossitis of a fiery appearance, or in a few cases extreme pallor. In only a few adults was the dorsum raw and cracked, giving rise to the "beefy tongue."

Both types of glossitis were common in adults. In infancy an atrophic glossitis involving the whole dorsum was the rule. In all there were 50 adults and 26 infant cases which manifested glossitis.

Gingivitis. Pyorrhoea and or swollen reddened gums occurred in 14 adults. In the infants there was usually a fiery redness of the gums; the gums were spongy or bleeding in five cases.

The general redness of the mouth was frequently accompanied by a very red throat, more especially in the infantile type.

It is thus seen that the lesions of the mouth in infants and adults are essentially similar.

Eye lesions.

Blepharitis was noted in many adult and infant cases. The blepharitis not uncommonly involved the muco-cutaneous junctions of the inner and outer canthi ("angular blepharitis"). This latter condition resembles other muco-cutaneous lesions, such as "angular stomatitis."

Acute conjunctivitis was associated with blepharitis in infant cases, but in the adult group a more chronic conjunctivitis, with keratitis in several, was more common than acute signs. The following figures indicate the incidence of these various signs:—

	Blepharitis.	Conjunctivitis.	Keratitis.	Total.
62 Adults	16	12	6	25
34 "Infants" ...	21	21 (all acute)	Nil	21

These figures show that eye signs were more common in the infant group than among adult cases. The differences between the two groups were mainly of degree, the infant cases being usually more acute.

Perineal lesions.

Dermatitis of the perineum has been mentioned above. Lesions of the mucous membranes and muco-cutaneous junctions of the vulva, vagina, uretha, and anus are essentially similar to those already described. The mucous membrane signs are the same as those of the mouth, and the muco-cutaneous changes are comparable with "angular stomatitis" and "angular blepharitis." In infancy the muco-cutaneous manifestations were usually more severe than in adults (cf. Cases 4 and 5 recorded above). While such extensive lesions are far less common in adults, one woman had ulceration of the labia extending across the perineum on to the buttocks.

The number of adult cases with one or more perineal lesions was 20 (14 women, 6 men), and of the 19 infant cases seen at Polela six had perineal involvement. In several cases perineal changes were the only classical dermal signs present, *e.g.*, a female, aged about 65 years, had the following clinical picture:—Cracked lips with "angular stomatitis," marked marginal glossitis, oral stomatitis, reddened gums, blepharitis, enlarged heart. The associated perineal lesions were a peri-anal sodden muco-dermatitis, reddened vulva with a purulent discharge per vaginam.

Oedema.

Oedema was an outstanding feature in many of the infant cases seen, no fewer than 20 of the 34 evidencing a very marked oedema. The main parts affected were the lower extremities, face, hands and, to a lesser extent, the forearms. In very severe cases it appeared to be generalised.

In adults only 12 of the 62 cases evidenced oedema. In no case was this extensive or very marked, being confined mainly to slight pitting on pressure of the legs and dorsum of the feet. The face was involved in a few cases, there being a puffiness of the eyelids. The severe oedema in infants and young children frequently so dominates the clinical picture that other more characteristic signs of pellagra are apt to be dwarfed, unless there is a co-existing sloughing dermatitis.

Nervous system.

In the majority of the adult cases seen, lesions of the nervous system were confined to a varying degree of mental depression, with the characteristic sad facies, and complaint of pain or burning sensation of the feet and legs. The latter condition of peripheral neuritis appears to become aggravated if the patient is treated with nicotinic acid only. When the main skin and mucous membrane lesions have resolved with treatment, the patient's dominating complaint is often that of pain, more especially of the lower extremities, which become tender, while the reflexes are absent or diminished. The patient also frequently complains of substernal aching. These signs usually improve with vitamin B_1 therapy, and are well recognised to be manifestations of a co-existing beri-beri.

In infants it was not possible to diagnose nervous system involvement with any degree of precision. The child was usually very irritable, except in the terminal stages, and there was sometimes marked resentment when legs and feet were

touched. The possibility of the irritability being analagous to mental changes seen in adults, and the tenderness of the extremities being a sign of a peripheral neuritis, cannot be excluded.

Diarrhoea and constipation.

No definite analysis of the incidence of diarrhoea and constipation can be given, as the patients discussed were not under the author's continuous observation. Their clinical histories in this respect are not considered reliable enough for analysis. The general rule was a complaint of diarrhoea with mucous and blood in the stools of the infant cases. The adult cases varied in their complaints; some had diarrhoea, some constipation, while others noticed no change. The fatty stool, described by Gillan [1934] and Trowell [1937], was seen in one infant case some 24 hours before death—a pale, very bulky, and extremely offensive motion, which on microscopic examination revealed a field covered with fat globules.

General clinical picture.

The above analysis indicates a fairly close resemblance of the adult and infant manifestations, the main difference being that the condition is usually more acute in infancy. Table I indicates the frequency of the various groups of signs in both types of the disease—adult and infant.

TABLE I.

Comparative incidence of signs in adult and infant cases of pellagra.

Signs.	Adult.	Infant.
Dermatitis.		
"Classical"	XXX	XXX
Phrynoderma	XX	—
Seborrhoeiform (face)	X	—
Mouth		
Gingivitis	X	X
Glossitis	XXX	XXX
Stomatitis	XXX	XXX
(a) Lips	XXX	XXX
(b) Buccal	X	XX
Eyes		
Blepharitis	XX	XXX
Conjunctivitis	X	XXX
Keratitis	X	—
Perineum		
Dermal and muco-cutaneous lesions	XX	XX
Oedema	X	XXX
Gastro-Intestinal		
Diarrhoea	X	XXX
Constipation	X	—
Nervous System		
Mental changes	XX	XXX (irritability)
Peripheral neuritis	XX	XX (tenderness)

XXX ... An outstanding feature—often very severe or extensive.
XX ... A very common but not usually a dominant feature.
X ... Not uncommonly present, but seldom the main feature.
— ... Not noted in the present series.

(For detailed figures and discussion of severity of these lesions see text).

DISCUSSION.

The adult type of the disease needs little comment. It resembles the classical picture seen in various countries, the main manifestations being those of the mucous membranes, muco-cutaneous junctions, and skin.

These are mainly curable by vitamin B_2 therapy, nicotinic acid most often resolving the outstanding features, but occasionally riboflavin is required for the seborrhoeiform dermatitis of the face, and rarely resistant mucous membrane lesions of the mouth. The latter is also useful for the cases with chronic conjuntivitis and keratitis [Kruse *et al.*, 1940]. The commonly associated peripheral neuritis is curable by administration of vitamin B_1. Other deficiency signs such as phrynoderma (possibly a vitamin A deficiency—Frazier and Hu [1931, 1936], Lowenthal [1933], Karunakaran and Krishnan-Nair [1940]), and oedema (probably related to a protein and vitamin B_1 deficiency) indicate that the adult syndrome is the result of a multiple deficiency. Furthermore, Azmy [1938] has brought fresh evidence indicating a protein deficiency being responsible by successfully treating several cases with larostidin and histophan (which contains histidine and tryptophane).

The infant type of the disease is still not generally accepted as being pellagra. Stannus [1934, 1935, 1936], Trowell [1937, 1940, 1941], and Suzman [1942] regard the disease as an infantile form of pellagra, but others such as Williams [1933, 1935], were unable to accept this as a satisfactory description. The main difficulties in accepting the condition to be pellagra appear to have been:—

1. The fact that in many areas where the infant syndrome is common, the adult type of the disease is extremely rare, *e.g.*, Uganda and Kenya. This difficulty does not hold for South Africa, as we see both types very commonly.

2. The occurrence of very marked oedema in infants. In our description of this sign we noted that oedema was found in some adult cases but that it was not as extensive nor as severe as in infants or young children. Comparison of other manifestations has indicated that the whole syndrome in the latter group is usually more acute than in adults. It would, likewise, seem that children in the age group of approximately one to five years are more prone to manifest oedema when the necessary protective foods are absent. In order to check this tentative suggestion, the case reports of 177 children, from birth to five years, recorded as cases of " malnutrition " are analysed. The records are those of the Johannesburg Non-European hospital in-patients during the years 1937-39. The results of this analysis are recorded in Table II.

TABLE II.

Incidence of oedema in "malnutrition" in Non-European children from birth to 5 years of age.

Age in months.	No. in group.	No. of cases with oedema.	Percentage incidence
0– 6	60	2	3·3
6–12	31	8	25·8
12–24	50	29	58·0
24–36	21	17	80·9
36–60	15	12	80·0

Suzman [1942] considers the oedema to be due to an associated vitamin B_1 deficiency. Castellanos [1937] named the syndrome "pellagroid-beri beri," and if the oedema can be definitely related to vitamin B_1 deficiency this name would probably be the most suitable. However, there is as yet no evidence that the oedema is solely due to this deficiency. The possibility of it being related to nutritional oedema of protein deficiency origin can be excluded.

3. The fact that the cases are usually acute, and the skin lesions do not resemble those of adult pellagra. The former was found to be the case with the present series of cases as well. It is felt, however, that this is essentially a matter of degree and that such quantitative differences do not weigh more than the striking resemblance which the infant form bears to the more classical adult syndrome. Similar remarks may be made regarding the skin manifestations. In the present analysis it has been shown that infants manifest various degrees of dermatitis, ranging from the more chronic adult type to a sloughing dermatitis. In fact, in several cases both are in evidence.

In our infant cases treated at the Polela Health Unit we have found that the mucous membrane lesions respond fairly well to nicotinic acid and in some cases to riboflavin. The skin not sloughing with superimposed infection, responds to nicotinic acid. Trowell found his cases responded better to marmite than to nicotinic acid alone. His finding is in accordance with what one would expect in a syndrome resulting from a multiple deficiency, more especially related to the various members of the vitamin B complex. It would thus appear that the infant syndrome resembles the adult type in this respect too.

SUMMARY.

1. 96 cases, 62 adult and 34 infant pellagra are analysed with a view to comparing the main clinical manifestations.

2. Both groups evidence lesions of the mucous membranes, muco-cutaneous junctions, and skin, with a striking resemblance of distribution.

3. Differences are discussed, and the opinion expressed that these are no more than differences of degree, the infant cases being usually more acute than the adult.

4. A brief discussion of etiology indicates that both are multiple deficiency states, with the vitamin B_2 group, and probably protein, mainly responsible. Associated vitamin B_1, and possibly vitamin A, deficiency often complicate the picture.

5. The adult and infant syndromes discussed are today very common entities in this country, and there is evidence to show that pellagra is definitely more common now than it was ten to twenty years ago.

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