THESIS

on

V A R I O L A

AS IT AFFECTS THE NATIVE RACES OF SOUTH AFRICA; WITH A DISCUSSION ON THE EXISTENCE OF "A M A A S" OR "K A F F I R P O X"

by

D. CAMPBELL WATT, M.B., C.M.

Glasgow, 1899

Western Typewriting & Shorthand Office,
118 West Regent St., Glasgow.

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AS IT AFFECTS THE NATIVE RACES OF SOUTH AFRICA; WITH A DISCUSSION ON THE EXISTENCE OF "A M A A S" OR "K A F F I R P O X"

The subject of variola among the native races inhabiting that portion of Africa lying south of the Zambesi River is one of peculiar interest, chiefly on account of the doubts which have existed as to the correct diagnosis of many epidemics, or at least of many cases in these epidemics, and the controversies which have resulted.

It is not merely a matter of private and individual interest as to whether a certain case is

small-pox, amaas, or some other disease; but the public bearing of the diagnosis of the case is of great importance. For instance, if an epidemic is diagnosed as small-pox, all the trouble and expense of quarantine, and guards, or isolation in a lazaretto, are entailed; and, in addition, an increased impetus is given to vaccination and re-vaccination. If, on the other hand, an epidemic is diagnosed amaas or chicken-pox no further notice of it is taken by the Government. A correct diagnosis is thus of far reaching importance.

The object of this paper is to collect from many sources, and focus and discuss the facts and opinions which form the experiences of South African medical practitioners of small-pox, and of the alleged disease amaas, regarding which latter all is vague, uncertain and conflicting.

Inhabiting the various regions of South Africa we find three distinct native races - Bushmen, Hottentots, and Bantus (or Kaffirs). The two

first are closely related racially, and inhabited the country long before the Bantus came as invaders from the north. The Bantus, of which the Zulus are a well known tribe, now predominate in numbers. Only a very few thousands of Bushmen and Hottentots survive - about 60,000 out of a total native population of about 4,600,000 inhabiting South Africa. In addition to these three races there are many thousands of the mixed races, white and other half breeds, Malays, etc., forming what is often called the "coloured" people, as distinguished from "natives;" also there are many East Indians.

The investigation upon which this thesis is based embraced the inhabitants of all parts of South Africa - Cape Colony, Natal, Rhodesia, The Orange Free State, The South African Republic, and the German possessions on the west, and the Portuguese possessions on the east coasts - and of these natives the Bantus almost exclusively. These Bantus are a dark-skinned, negroid race; whereas

the Bushmen and Hottentots are a yellowish race, allied to the Abatwa pigmies of Central Africa.

Small-pox is known to have existed among these races for several centuries, and in many instances the periodic outbreaks have assumed such a very mild or modified form that some medical men have spoken of them as "so-called small-pox," or as "Kaffir-pox," "bastard small-pox," etc. implying that they are not genuine variola; and to complicate the question still more a term "amaas" has been invented to designate a disease which is alleged to be neither variola, varicella, nor any other described disease. How far this differentiating of amaas is justifiable will be discussed later on.

As an example of the conflict of opinion, I may mention that in 1882 Dr. Wolff, then Resident of Kimberley Hospital, was implicated in a law suit for having failed to report and isolate a case of small-pox, followed by several others,

which occurred in that Hospital. He denied that the cases were small-pox, and his opinion was backed up by other medical evidence. Contradictory medical opinions, however, convinced the Magistrate that Dr. Wolff was wrong. The case was appealed and the decision of the Magistrate was set aside.

Dr. Balfe of Durban in a letter of 6th March 1899, states that in Zululand he had seen "many hundreds of cases of so-called small-pox, in which no doubt many deaths took place." The eruption in every case was discrete, and almost all the patients were unvaccinated. He said he reported these cases as "small-pox," (for administrative purposes, I presume) but was not fully persuaded they were such.

An epidemic broke out at Graaff-Reinet, Cape Colony, which was alleged to be amaas, and reported to Government as such. But, on investigation by the health officer, and others, and testing by

vaccination, it was proved to be small-pox.

These are a few examples of the difficulties of diagnosis and conflict of opinion which have existed on this subject.

As an example of those who are sceptical of the very existence of small-pox in South Africa, I may refer to the opinion of Dr. J. F. Allen, Health Officer of the City of Pietermaritzburg, Natal. In the "Natal Witness" of 7th September, 1898 he stated inter alia:- "All the cutaneous "infectious diseases are of a very mild type in "this country. . . . He (the native) does "not get these complaints with the same severity "(as the poor in Europe) . . . . Anyway, "diseases do not spread amongst them with the same "virulence . . . . I have never seen an "undoubted case of small-pox in South Africa . " . . . I have grave doubts that this dis-"ease, speaking generally, is small-pox. The "disease which is called small-pox in this country

"differs from the small-pox in Europe in many most "important points. First: Its death-rate is very "low. In Johannesburg where the so-called small- "pox is most prevalent, when deaths do occur, they "are, I believe, generally due to complications, "such as inflammation of the lungs. I think the "death-rate from the disease at Johannesburg is "something like five per cent. At home the death- "rate in small-pox is from eighteen to twenty per "cent. Then again I have seen persons who had "got the disease apparently very severely from "the marks upon their faces. But to my mind the "pitting they had, although very general over the "face, was not the pitting of small-pox. The pit "is very fine and very shallow; does not penetrate "through the skin, and does not excavate in the "way that true small-pox does. It much more re- "sembles the pit of chicken-pox. I have also no- "ticed that the disease we call chicken-pox when "it affects a Kaffir becomes greatly intensified " . . . . . When a disease of this

"nature passes from one creature to another it often "becomes intensified or attenuated . . . . "If the disease we have here called small-pox is the "true complaint, it is very different from small-pox "in other hot countries. Small-pox, for instance, "is very fatal in China. China, I believe, is the "home of small-pox. China has a hot climate; and "the strange thing is that here we have a hot climate "and mild small-pox . . . . . There are "two or three points which should be noted. One "would be proving that vaccination gives no protec- "tion . . . . The second is the death-rate " . . . . With vaccination offering no pro- "tection, and with a low death-rate, it is likely "that the disease is the milder complaint, and not "the graver, that it is chicken-pox."

Many of the points raised in the above statement will be dealt with further on; but there are several which might be more conveniently examined now.

Allen says that cutaneous infectious diseases are milder and less virulent in the South African natives than in Europe. Yet he argues, in spite of that, that the disease in question cannot be small-pox because of its comparative mildness, and of its low death-rate - one would naturally expect a low death-rate in a mild form of disease. Again, the pitting left is not so bad as in true small-pox: but more like chicken-pox. He apparently forgets that in small-pox there is a great variety in pitting, and sometimes none at all: besides, chicken-pox pitting is rare, and is the result of picking the spots: it is an accidental feature of the disease.

"Chicken-pox," he goes on to say, "becomes "greatly intensified" when it attacks the native, although he previously asserted that "all the cutaneous infectious diseases are of a very mild type." He evidently wishes us now to infer that what most medical men diagnose as mild small-pox is really greatly intensified chicken-pox.

Further, he states that China has a hot climate, and in China small-pox is very fatal; consequently South Africa having also a hot climate, small-pox should be very fatal there also. That need not follow if it is correct that "diseases "passing from one creature to another become inten- "sified or attenuated." May the South African natives' small-pox not be an example of attenuation, as compared with the Chinese? But evidently the hotness of a climate has really nothing to do with the disease, for he further on says that "the disease we call small-pox is most prevalent "here in winter."

In his newspaper statement Allen further says that "re-vaccination is not so necessary as is "generally supposed," and "with vaccination offer- "ing no protection, and a low death-rate, it is "likely the disease is not small-pox, but chicken- "pox." That is to say that vaccination in infancy ought to protect the individual until old age; and if an outbreak occurs amongst say a gang of

men all vaccinated in infancy, and none of them die, it cannot possibly be small-pox, but it is probably chicken-pox. He is in error in stating that re-vaccination is not of great importance, as witness the absence of small-pox from Germany where re-vaccination is carried out several times in each person. In South Africa and elsewhere small-pox frequently attacks persons vaccinated in infancy; and he makes no allowance for the feeble protection afforded by insufficient vaccination. That being so, his argument that if an adult vaccinated in childhood contracts a disease, it is not small-pox, falls to the ground.

Varioloid (or small-pox modified by vaccination) does not seem to have struck Allen as accounting for the low death-rate in many outbreaks. Taking his arguments so far, I think I have shown that his propositions are at variance with each other, and his conclusions not deducible from his premisses; and as to many of his alleged facts, many of them will be shown to be untrustworthy.

I have dealt at considerable length with Allen's statements for two reasons (1) his official positions as Health Officer for Pietermaritzburg, and Surgeon to the Hospital, and (2) he may be taken as fairly representative of the section of the medical profession who still question the existence of genuine variola in South Africa.

NATIVE NAMES: There are several names for small-pox in use among the natives of different parts. For example, in Basutoland it is called "Sikholepana;" in Natal, "Incobongo;" in Cape Colony, "Hashilala (or Rashilala)," which also means measles; while in various parts the term "Imazi" is used to denote small-pox, chicken-pox and measles.

HISTORY: The history of small-pox in the country is of considerable interest; but with reference to some parts much obscurity and vagueness prevails.

Regarding CAPE COLONY, G. M. Theal in his "History of South Africa," founded on researches in the colonial archives etc. says that small-pox first appeared in South Africa in March 1713. There is reason to believe, however, that the disease existed in the territories of South Africa to the north of Cape Colony at an earlier date, and gained access from the north or from the sea-board on the north-east.

The epidemic of 1713 was due to a vessel from the East Indies having had a portion of her crew ill with small-pox on the voyage; and their clothing transmitted the disease to the people at a Cape Town wash-house belonging to the East India Company. Out of five hundred of their black slaves (mostly East Indians, Malagasy and African Negroes) two hundred died in six months of the disease. Europeans and natives (Hottentots) in town were also attacked, and in about two months Cape Town was decimated. The disease spread to the

surrounding country inhabited by the Hottentots, and for them to be attacked meant to die. Many of the natives fled further inland; but their brethren there in their alarm either killed them or drove them back; but the disease crept on. Many tribes were utterly destroyed. The Bushmen in the north were not affected to any extent. This epidemic gradually died down and finally disappeared.

Forty-two years later, in the early winter of 1755, the second epidemic appeared. This time it came from Ceylon. At that remote period, as now, history tells us that the epidemic assumed different forms among distant Hottentot tribes, and varied so much from the classic description of the disease that it was in some instances called "Gall-sickness" by the Europeans. This epidemic was very fatal amongst the Hottentots, lasted for nine months, and spread further inland than the first, reaching as far north as Great Namaqualand on the

west coast, and to the Great Fish River in the east, distances of about three hundred and five hundred miles respectively.

All this infected territory was occupied by Hottentots and Bushmen, the Bantus not having descended further south by that time than the Great Fish River, and the probability is that this epidemic (which was the one that reached furthest north of any from 1713 to 1812) did not affect the last named race. Of the black races inhabiting Table Valley alone, no fewer than eleven hundred and nine perished between 1st May and 31st October 1755.

The disease was again introduced by a Danish homeward bound ship in 1767 (twelve years after the second epidemic). On this occasion the outbreak was slight, and did not extend beyond Cape Town, and its immediate vicinity. The period of the greatest intensity was from May till November,

but it lingered on for two years until April 1769, when it finally disappeared. Only eighteen hundred and fifty persons of all colours were attacked, with five hundred and seventy-five deaths (the latter made up as follows - one hundred and seventy-nine Europeans, one hundred and forty-five free blacks, and two hundred and fifty-one slaves), the death-rate being thirty-one per cent.

A period of forty years elapsed from the introduction of the last outbreak before the re-appearance of small-pox in Cape Town. On 16th June 1807 it broke out in prison on a Hottentot who had come by sea from Algoa Bay (Port Elizabeth) about four hundred miles eastwards of Cape Town. The disease spread to other two Hottentots. All were isolated on Paarden Island, and recovered. No further cases occurred.

Three years afterwards, on 5th March 1812 small-pox again appeared. This time a slave land-

ed from a Portuguese ship developed it in the house where he lived. The inmates of the house became infected, and it spread to other houses. Each infected house was marked by a white flag, and persons issuing from these houses wore a white armband to warn people off. Government ordered "innoculation," and the disease disappeared in six months' time. Altogether there were only a few hundred cases, and but few deaths.

No other epidemic or case appeared in Cape Colony within at least twenty-two years thereafter.

The outbreak of 1807 is stated by Mr. Theal to have been due to a Hottentot from Algoa Bay. This Bay is about one hundred miles nearer Cape Town than the Great Fish River to which the great epidemic of 1755 reached. The 1755 epidemic it is said died out in nine months, and the question is from where did this Hottentot get the infection? There are two obvious sources: (1) He was infected

on board ship; or (2) on land at Algoa Bay. If the former then the disease was probably carried from some country further off - Lorenço Marques, for example. If the latter, then (a) the disease came down from the north overland, or was brought by sea to the Bay; or (b) it had lingered on in that part of the Colony unknown to the authorities at Cape Town since 1755 - 52 years previously.

South African history dates back to the year 1486; yet it was not until the year 1713 - two hundred and twenty-seven years afterwards when the trade with the east by the Cape route had been fully established - that small-pox was introduced at Cape Town. Then, as has been seen, within the following one hundred and twenty-one years no fewer than five outbreaks occurred - in 1713, 1755, 1767, 1807, and 1812. Each seems to have come from the east, but only in two (1713 and 1755) is it definitely stated from what country, and these were from East Indies and Ceylon.

It is worthy of note that in all the five outbreaks the season of the introduction of the disease was from the end of the hot season (or summer) to midwinter. In 1713 and 1812 the month was March; in 1767 May; in 1807 June; and in 1755 in early winter - probably May.

As regards the severity of these epidemics; the 1713 and 1755 outbreaks were the worst, and the fatality evidently the greatest. It was, of course, impossible to form, especially in those days, even the remotest estimate of the number of cases, and of deaths, when the outbreaks spread among the savages inland, over whom there was practically no oversight of any kind soever. Of the black slaves at Cape Town who were affected in 1713, there was a death rate of 40 per cent. In 1767 when the disease was confined entirely within a limited area statistics were possible, and these show the death-rate to have been thirty-one per cent. The two last outbreaks, 1807 and 1812,

were evidently mild. The same phenomena has thus occurred in South Africa as in many other countries where the earliest introductions of this disease almost decimated the population: whereas in succeeding outbreaks the mortality became reduced - the people becoming immunized by heredity, or by previous attacks of the disease personally.

The above is what might be termed the early history of variola at the Cape. Since then repeated epidemics have occurred in many parts of the Colony, and been carried from one part to another. Hardly a year elapses without fresh outbreaks: and a large number of district surgeons and other medical men now in practice have seen the disease.

Although history shows that small-pox (since the advent of the European at the Cape of Good Hope) was first introduced in 1713; still it was the opinion of the late Reverend Mr. Hahn, a missionary of long experience in Great Namaqualand, that

it existed among the natives of that part of South Africa long before the advent of the white man in the country (the Cape or elsewhere). Assuming that to have been so, then the disease in all probability came down from the north overland.

Regarding NATAL, the history of small-pox, so far as I have been able to trace it, dates from before the arrival of the earliest European settlers. Natal was first settled by a small band of hunters in 1823, while the disease is known to have occurred there about 1813.

Dr. Sutherland, late Chairman of the old Medical Board, states that when vaccinating the natives in the Klip River Division in 1863 he came across two old men who were pitted by small-pox, and on interrogating them he learned that both had small-pox about the year 1813 in that Division. They stated that the epidemic of 1813 came down from the Portuguese territory Lorenço Marques overland. It will be remembered that the Cape out-

break of 1812 was introduced from a Portuguese ship: and it is not improbable that the latter outbreak came also from Lorenço Marques, and was an offshoot of the epidemic there which next year reached Natal. There is every likelihood that smallpox existed in those Portuguese possessions before the date of the first Cape epidemic, considering for one thing that that nation had a regular calling station north of Delagoa Bay at Sofala for ships from the east, in the fifteenth century - long before the Cape became a regular calling station. There is no history of any epidemic reaching Natal from the Cape prior to, or for long after, 1813. The 1755 epidemic only reached the Great Fish River, about 300 miles short of Natal.

With regard to the Natal epidemic of 1813, the two old natives said that the people isolated the sick by sending them down into a valley, and cutting off all communication. A large number were attacked, and many deaths occurred. These

men described to Sutherland cases of typical, discrete and confluent variola so accurately that no doubt was left in his mind of the nature of the disease.

A period of fifty years elapsed before Natal was visited by another epidemic. It occurred in March 1863, when the European population was about nine thousand, and the natives two hundred thousand. These natives were Bantus - the same race as now inhabit the Colony. This 1863 outbreak took place also at Klip River; and was introduced by a native who came overland from Lorenço Marques also - as in the 1813 outbreak. He developed the disease after arrival at a kraal in the Klip River Division. All the forty-one inhabitants of that kraal became infected; and all but one died. Other kraals became infected, with the result that there were one hundred and fifty cases in all, with fifty-five deaths - a death-rate of 36.6 per cent. One European was also attacked. The local district

surgeon reported that outbreak as small-pox, and the Government sent Sutherland to investigate it. He confirmed the diagnosis, and identified the disease as the same as he had seen in Caithness, Scotland in 1832. Quarantine was established over the infected kraals and the disease speedily disappeared from the locality.

In the month of May following, however, a native from the infected area came down to a kraal near Edendale - a native mission village seven miles from Pietermaritzburg. Six of the inmates (mostly children) of that kraal contracted the disease in a mild form, and no deaths occurred. District Surgeon Gower had reported these Edendale cases as chicken-pox, and Sutherland was again sent to investigate, and pronounced the cases to be small-pox. One point he took especial note of, and that was the vesicles were all multilocular; and generally the same features were present (in a mild form) as he saw in the Klip River cases. It

may be remarked in justice to Dr. Gower that he had not seen small-pox before. The disease spread no further.

The Government of Natal thereupon, and for the first time, ordered the vaccination of the native population, with the result that by the end of August of the same year the various district surgeons had vaccinated about 70,000 natives; and the vaccination has been kept up ever since.

About four years afterwards - in 1867 - the same Division was again visited by the disease, conveyed, like the others, from Lorenço Marques. This outbreak was much milder than the last.

Since 1867 Natal has never been long free from small-pox. Many of the outbreaks have been traced to Zululand; others more recently to the Transvaal - as their sources - both places being to the north and nearer Lorenço Marques. In

Sutherland's experience small-pox never came from Cape Colony in the south.

BASUTOLAND is a territory bounding Natal on the west, and there we have a history of small-pox dating further back than the 1813 Natal epidemic. An old Basuto chief who was born last century informed Dr. Daumas of Pietermaritzburg that small-pox always existed in that country, coming in epidemics; and that prior to the introduction of vaccination by the missionaries about 1837, the natives practised innoculation, the virus being introduced at the centre of the forehead. The old chief himself had a well marked innoculation scar; and the operation is still performed in that country. His grandfather told him that as far back as he could remember (and that would be well towards the beginning of the eighteenth century) the people used innoculation. We may safely conclude that small-pox would certainly be in the country some considerable time before the people (especially

barbarians) would take to the practice of inoculation as a prophylactic measure; therefore, small-pox was probably introduced into Basutoland not later than the seventeenth century. Daumas thinks it was in the sixteenth century at the latest. Before vaccination was generally enforced the death-rate in small-pox was about sixty per cent. As regards treatment, the Basutoland natives, like those of Natal, isolated the sick - often in caves up the mountains.

With reference to the source of the disease in Basutoland the old chief said it generally came from the interior. During the past forty years small-pox is known to have visited the Barotse country to the north of the Zambesi River; and it spread southwards, probably to Basutoland, and maybe to Lorenço Marques in the south east also, from whence the early Natal epidemics came.

In Daumas' opinion both small-pox and inoculation entered the Barotse country from the north, and

probably down from Egypt as a starting point in Africa.

It is extremely likely that these early (sixteenth century) epidemics in Basutoland spread to Natal in some instances. But evidently they never went south into the territory of the Cape Government, the history of the Cape dating back to 1486, and the first outbreak in 1713 having been introduced by sea direct from the East Indies.

So far as I have been able to discover, smallpox was introduced in early times into South Africa by two routes (1) from the interior in the north, and (2) from the East Indies and other eastern countries direct to Cape Town, and probably through the Portuguese ports up the east coast.

DESCRIPTION OF SMALL-POX

Having now discussed the general question as to the existence of variola in South Africa, and as far as possible traced its early history, we may now consider the disease as it is found to affect the natives of South Africa.

The following outline will deal with points of outstanding interest, and is based on my personal experience of outbreaks in the Umgeni Division, Natal, of which I am District Surgeon, and an inspection of the cases in the small-pox lazaretto, Johannesburg, and on the experience, communicated to me, of over fifteen thousand cases seen by about eighty medical practitioners in all parts of South Africa. Any point of apparently outstanding importance attributable to any one in particular shall be ascribed to him; but where the points are common

this will for convenience be omitted. A list of those practitioners, and others, to whom I am indebted, will be added as an appendix. As an appendix will also be added a number of photographs, and temperature charts of cases.

ETIOLOGY

Into the question of the etiology of the disease I shall not enter, as it must of necessity be identical in all races and individuals affected.

GENERAL CHARACTERISTICS

It is as elsewhere an infectious disease, chiefly marked by an initial and a secondary rise of temperature, and the presence of a cutaneous eruption, appearing at a certain period of the illness and passing through certain definite stages correlated to the temperature.

The disease chiefly affects the natives, both relatively to the native as against the European population, and absolutely as well. This greater prevalence of small-pox among the natives is due to two chief causes (1) the Europeans, Indians etc. being more generally vaccinated and re-vaccinated, and (2) the greater promptitude in isolating the earliest cases in an outbreak among the Europeans and other newcomers. Natives, as a rule, do not report cases until they are well on in the vesicular stage by which time other persons have been infected, and no isolating is in many cases established until the Government establishes quarantine round the infected kraal.

INCUBATION

As regards the incubation period, there is evidence to show that it is identical with small-pox as it is known in other races in South Africa and elsewhere. For example, the following cases

were observed by Turner:-

A native, W. Samuels, developed the eruption at Port Elizabeth ten days after he had left Graaff-Reinet, the only infected area he had been in. The incubation, therefore, must be longer, he says, than ten days. While M. Mahela visited at Graaff-Reinet (from Uitenhage) on 31st December, and the eruption appeared on 12th January, therefore, the period in this case, he says, was not longer than thirteen days (See Turner's Report to the Cape Government, of 19th March 1896, p. XXV, Appendix II). Dr. Welchman observed the period to be not longer than thirteen days in the case of three European children named Loubstier at Graaff-Reinet; while Brown on 25th November 1895 vaccinated three Indian children unsuccessfully, and on 8th December the eruption appeared. These children "must have "contracted the disease within four days of their "being vaccinated, and the first papules appeared "on the fourteenth day after the operation." (See Article by Dr. W. Croumbie Brown in "The South

"African Medical Journal" September 1896, p. 106). Dr. V. Werdmuller of Hoopstad, in a letter to me of 15th April 1899 stated he invariably found the incubation period between ten and fourteen days; and in one of my own cases the eruption appeared on the tenth day after I had successfully vaccinated him.

PRODROMATA

The early symptoms of the disease are generally well marked in cases unmodified by vaccination. Occasionally cases occur in which they are so slight as to cause the patient little inconvenience.

Chief among these prodromal symptoms is a febrile temperature, often preceded by a rigor. It is seldom or never absent. I have met with temperatures at this stage of from 100° to 103.5° Fah. Headache is almost constantly complained of. Pain in the back is common. Pain in the limbs is also present in many cases. In my experience vomiting

is not at all common. Brown found it in rather less than half his cases. Another seat of pain I have frequently observed to be in the epigastric region, with or without vomiting. Many patients complain of pain all over the body. It is difficult to estimate the comparative amount of pain a native suffers, as he generally bears it in a quiet dogged manner; but even if he is suffering little he is sure to say he is very bad. A degree of lassitude, often considerable, is associated with these other symptoms; and anorexia, thirst and insomnia are commonly to be found. In severe cases there may be haemorrhages, diarrhoea, angina or bronchitis, or the spleen may be affected conspicuously.

ERUPTION

These prodromal symptoms continue in their degree of intensity until the eruption is well out, when they rapidly decline more or less; some dis-

appearing altogether. As a rule the eruption appears during the third day of the manifestation of sickness; but cases are to be met with in which it comes out a day earlier or later. With young children it is often difficult to obtain a clear account from the parents, especially in slight cases.

The eruption generally begins to show itself first on the brow. In the majority of my cases it appeared at the same time on the front of the wrists. From the brow it gradually extends downwards to the body and limbs. The eruption does not seem to spread much up the arms from the wrists. In about forty-eight hours the eruption has covered the whole of the skin more or less thickly. In the case of a child I have seen the eruption appearing on the buttocks before the face; and the eruption there did not spread, the spreading only taking place from the face.

The usual three stages are generally present

consecutively - papular, vesicular then pustular - followed by scabbing. I have never seen an initial erythema or roseola among the natives. It does occur (Martins of Lorenço Marques having observed it); but most cases are not seen until the typical papular or vesicular stage has appeared; and even in cases seen earlier, a slight rash would be scarcely apparent on the dark skin.

The papules have the usual more or less "shotty" character when developing. But, according to Werdmuller, when the disease aborted in the papular stage the papules were soft and not shotty. A certain amount of inflammatory thickening surrounds each papule, particularly on the face, but not much change of colour is found. The eruption is almost always most abundant on the face. By the third day of the eruption it has become vesicular, the top of each papule first having showed the change; and the change travels down the body just as the papules did. The vesicles rapidly grow in size until they are about as large as a

split pea, and mostly umbilicated. The umbilication varies in depth in the same patient often, and it is occasionally quite absent in some of his vesicles. To judge by external appearances the multilocular character of the vesicle is badly marked. On opening the vesicle, however, that characteristic is apparent; the vesicle does not collapse on the emission of the fluid, and the trabeculae are seen. On attaining maturity the contents of the vesicles become turbid, followed, in the majority of cases, by the true pustular condition. In a few days the pustules begin to dry in, and general scabbing follows. The pustular stage begins about the sixth day of the eruption; and the scabs are usually off by the fourth week. Considerable infiltration surrounds the pustules, causing much swelling, especially of the face. In many cases the mass of scabs on the face (especially in a confluent case) is the last to separate from the skin. At the site occupied by each scab a pale patch is left, accompanied in the great majority of cases with pitting of the face. In the

course of time the pale patches regain their pigment, and return to their normal dark hue. In some cases where the destructive process is so slight as not to destroy the pigment cells the patch occupied by the scab remains of a darkened hue due to the irritation of these cells. This also disappears in time. A peculiar odour has been noted from the patient in the pustular stage.

The pitting of the face is somewhat peculiar as a rule, differing from the usually described large circular depression as seen in the European and Indian. On close inspection of the pits they are seen to be small, shallow and varied in outline. The three chief shapes seen are circular, linear and irregular or starred, the stars being formed by two or more linear ones intersecting. The linear pit might be described as a trench of from 1/16 to 1/8 of an inch in length, with somewhat perpendicular sides. The circular pits are also usually small and shallow. All these varieties are often seen on the one face, and in numerous cases

the linear and starred forms occur exclusively. The comparative slightness of pitting has been accounted for generally by the high state of vitality and functional activity of the native's skin, indicating great powers of resistance and of repair. The condition may also be assisted by the darkness of the interior of native huts, and by the habit the sick have of smearing their faces with moist red clay.

The pitting persists for a long period of years, persons attacked in childhood still showing marks in old age.

There is one feature of the eruption deserving of special mention - that is its occurring on the palms of the hands and on the soles of the feet. This feature has been present in all my cases, and has also been noticed by Turner, Brown, and Mehliss of Johannesburg lazaretto. Brown puts a very high value on this feature; he says "its presence "there is almost pathognomonic of small-pox - path- "ognomonic to this extent at least that a disease

"characterised by this feature may be variola, it "cannot be varicella." (See South African Medical Journal, September 1896 p. 108).

Without admitting that this feature distinguishes variola from varicella absolutely, still it is a general distinction betwixt them; and is of importance in the diagnosis of certain cases alleged to be amaas; and in connection with a group of cases occurring among Lascars and treated by Drs R. S. Thomson and John Brownlee, which will be referred to later on.

The eruption also affects the buccal mucous membrane in some cases; the voice is often hoarse from extension to the larynx, and the conjunctiva is frequently congested, and often ulcerated; while much pain accompanies the eruption in all these situations as well as on the skin generally.

The spots are almost invariably more thickly placed on the face than on other parts, even in the discrete form of the disease. Confluent smallpox is common; and in both forms the parts of the

face most commonly pitted are the nose and over the malar bones.

The haemorrhagic and purpuric forms of the disease occasionally are met with in the unvaccinated. Both are of grave import. In the former, bleeding occurs early in the course of the disease, and a fatal termination speedily sets in.

Cases of varioloid are very common, the eruption aborting either in the papular or vesicular stage. I had two such cases - one aborting in each stage.

TEMPERATURE

The primary fever has already been alluded to, and the fact that it drops on the development of the eruption. The fever remains abated until the vesicles become pustular when secondary fever sets in, sometimes accompanied by delirium and complications. This recrudescence varies much in degree,

and length of existence. In cases of varioloid this secondary fever does not occur, while, if complications appear, it may be indefinitely prolonged.

An interesting statement was made to me by Mehliss of Johannesburg, he stated that he had met with a tertiary attack of fever in some cases of small-pox just when scabbing had supervened. It only lasted a short time, and on close investigation no local cause, such as abscess, pulmonary affections or the like, could be found to account for it. He, therefore, was of opinion that it was due in some way to the transition of the pustule into the scab. I cannot vouch for the accuracy of Dr. Mehliss' observations, but they merit further investigation.

COMPLICATIONS

The most common complications affecting cases of small-pox are affections of the eye. In some cases nothing more than a slight amount of conjunctiv-

itis occurs; ulcers of the cornea are common; while occasionally severe inflammation of the deeper structures occur, and lead to total destruction of sight. Not infrequently the mucous membrane of the mouth, pharynx and larynx become greatly inflamed, accompanied by much pain, salivation and change of voice. Broncho-pneumonia and bronchitis form frequent sources of danger. Ulcers (bed-sores and other) and abscess are sometimes very troublesome. Alopecia occasionally occurs, also otitis, orchitis and cystitis and intestinal disorders. Septicaemia occasionally arises. Acute nephritis with or without total suppression of urine is somewhat frequent. Epistaxis, and haemorrhages from mucous surfaces generally, are often of the gravest import, but happen rarely. Pregnant women are apt to abort. Heart failure is a condition which is often conspicuous, especially in the old, feeble or badly treated; and chronic endocarditis is sometimes induced.

ERRORS IN DIAGNOSIS

The disease with which small-pox has most commonly been confounded is chicken-pox, a mild attack of small-pox being mistaken for a severe form of chicken-pox, and vice versa, especially by medical men who never saw small-pox previously, whose knowledge of the native language is scanty, and whose patient gives a very hazy history of his illness, and exhibits evidence of vaccination.

Cases of measles and scurvy are occasionally sent into hospital from the mines as small-pox. The rash in measles is sometimes not unlike the early manifestation of the small-pox papular eruption, and the pustules occurring in scurvy simulating the pustular stage of small-pox. These pustules of scurvy may even occur on the ball of the thumb, but never (according to Mehliss) in the centre of the palm as in small-pox. Syphilitic eruptions are occasionally confounded with small-pox.

Many mild or modified cases of small-pox have also been diagnosed as "amaas," regarding which more will be said later on in this thesis.

VACCINATION

Among the natives vaccination is compulsory; and is systematically carried on. They have not yet commenced agitating against it. Occasionally a few are charged before a Resident Magistrate with evading the regulations, but "conscientious objectors" are conspicuous by their absence. Personally, I have vaccinated over five thousand natives, and have met with nothing more than a desire on the part of an over-solicitous mother that her child may have two marks only. More objection is made against taking lymph from an arm, it being supposed by some natives that in doing so the benefit of the vaccination is destroyed. A slight monetary consideration generally convinces them to the contrary. It is, however, very seldom that good vesicles can be obtained for this purpose, as most large vesicles

get ruptured, either accidentally or by design.

The number of marks made is, in Natal at any rate, left to the discretion of each operator. I, and many others, make three. Many natives are to be met with having only one or two scars, but whether the lymph was introduced oftener and one or two places failed to take, I am not prepared to say. In some parts of the country lay vaccinators have been allowed where the district surgeon would be unable to overtake his division satisfactorily.

Owing to the difficulty of relying on vesicles to carry on the system of arm to arm vaccination, most of my cases have been done with lymph from the Cape Bacteriological Laboratory, Grahamstown, or French, or glycerinated English calf lymph; and in my experience the French lymph is the most generally reliable. Within the past few months the chief veterinary surgeon of Natal has been producing calf lymph, but of its quality I have had no experience.

The method adopted by me (and most others) in

carrying out my vaccination duties is as follows:- Two native constables are despatched about one week in advance to warn all unvaccinated persons to be in attendance at some farm or kraal on a certain day. People living within a radius of seven or eight miles of that place are expected to come. The vaccinator attends at the time and place appointed and vaccinates. Occasionally, several hundred persons may be operated upon in one day. A note of the name of the heads of the kraals, their chiefs, and the number of persons vaccinated living in each kraal, and the sex, and approximate age of each, are taken at the same time. These people are then warned to return the following week to report. The vaccinator attends at one place so long as a sufficient number present themselves for vaccination - two or three times as a rule: then he moves on to the next station, having sent on his native constables in advance as before, and so on until he exhausts his division. I generally vaccinated once a week, and went through my division in fifteen or sixteen months. Lists of successful

vaccinations are rendered monthly to Government. An interval of about twelve months was then allowed to elapse before beginning the vaccination again.

The natives are not re-vaccinated except when the Government sanctions the operation in the immediate neighbourhood of an area infected with small-pox.

It is unnecessary here to say much on the protection afforded by vaccination. The same principle holds good among these natives as among other races. The great majority of cases of small-pox occurs among unvaccinated people, or old people vaccinated in infancy. Some natives comparatively recently vaccinated contract the disease, which at first sight is distinctly disappointing; but these are almost invariably persons in whom vaccination took slightly, and the consequent protection feeble: and in such cases the attack of small-pox is modified. In one kraal in the Umgeni district under my observation, a father, mother and baby had small-pox. I saw them in convalescence, but had no

doubt as to the nature of the disease, small-pox being in the neighbourhood: and the history given to me of their illness indicated that disease. The man was pitted slightly, and he had been vaccinated when young: the woman and child were not pitted at all and they were alleged to have been vaccinated a few months before. In their cases the vaccination scars were slight.

Regarding the vaccination scar among natives, I have very seldom seen a typical one. As a rule, the natives either accidentally or from design break the vesicles, the result being a suppurating, long continued ulcerated surface, and the ultimate formation of smooth glazed scar tissue instead of the typical foveated surface. This renders it difficult to affirm that a given scar indicates vaccination: and such an affirmation is rendered still more difficult by the native custom of burning the arms for the sake of the scar left, which is regarded as highly ornamental. This scar is usually circular, and about the size of an ordinary vaccination scar. I have been quite unable to distinguish be-

tween a vaccination mark on one upper arm, and an ornamental one on the other of the same child, both marks being near the insertion of the deltoid, the spot usually chosen for vaccination.

The protection afforded by vaccination differs in individuals. Even thorough vaccination in infancy will not confer complete protection in old age, much less will indifferent vaccination. Nor will vaccination protect if performed when small-pox is incubating in the individual. I vaccinated seven natives of a gang of fifteen, one of whom had developed small-pox: and of those seven natives two developed small-pox within ten days thereafter.

As to the protection conferred by small-pox against vaccination there is a series of twenty natives vaccinated unsuccessfully during convalescence from small-pox, and of these twenty no less than thirteen had never been vaccinated before. (See Dr. Turner's Report of 19th March 1896 p. XXVIII, already referred to.) To which evidence I may add the fact that on the boy of the gang

previously mentioned who first developed small-pox, I performed vaccination on his recovery, and it was quite unsuccessful in spite of the admirable quality of the lymph as tested on about other fifty natives about the same time without a failure. This boy had never been vaccinated before. I also vaccinated unsuccessfully other two natives who had had small-pox one and two years previously.

These facts are of diagnostic value. Given an unvaccinated person who has had small-pox, he cannot be successfully vaccinated for some years at least. If he be vaccinated successfully shortly after recovery, the disease cannot have been small-pox; if the vaccination be unsuccessful, it may have been small-pox.

Another way in which vaccination is of aid in the diagnosis of doubtful cases of small-pox is of importance. It is a well established fact that the more thorough the vaccination (the more numerous and distinctly marked the scars) the greater the protection. That being so, I know from personal obser-

vation that a large number of natives have obtained but slight protection owing to their vaccination having been only feebly marked, and in one or two places. It follows that such persons are still largely susceptible to an attack of small-pox; and to argue as some do, that because patients show marks of vaccination said to have been made within a few years previously, therefore the disease is not small-pox, is to run the risk of error in diagnosis, for it is well known that persons recently but feebly vaccinated are susceptible to small-pox more or less modified.

As instances of the protective influence of vaccination, I shall quote three groups of cases:- (1) At one kraal seen by Henderson in Zululand, of eighty-three natives, thirty-nine were unvaccinated. All these thirty-nine were attacked by small-pox, while only three of the forty-four vaccinated natives contracted it. (2) In the Lancet of 11th September 1898, p. 679, a correspondent states that in November 1897 six small-pox cases broke out at

huts in Zululand, and he vaccinated and re-vaccinated all the unprotected persons. Some of the vaccinations were unsuccessful, and these persons also contracted the disease. None of the successfully vaccinated persons suffered, although living and sleeping in the same huts as the sick, and in one instance a vaccinated baby was nursed by a sick mother and got smeared with lymph and pus. This outbreak occurred about the time when Balfe was seeing his hundreds of cases of "so-called small-pox" in unvaccinated people in the same part of the country. (3) At Graaff-Reinet fifty-two persons living in eight house were (according to Turner's Report) exposed to the disease. In each house the vaccinated and unvaccinated lived together, and not one of the twenty-two vaccinated persons became infected, while all the thirty unvaccinated persons were infected. Among other twenty-four cases at the same place only six had been previously vaccinated.

It has been repeatedly observed that the severest cases occur amongst unvaccinated persons,

and next in old people who had been vaccinated in childhood: also that the slightest cases occurred among those persons more recently vaccinated.

DEATH-RATE

The effect of vaccination on the death-rate is very striking; and as indicating the beneficial effects of vaccination I shall contrast the statements made regarding the early pre-vaccination history of the disease with epidemics occurring since the introduction of vaccination among communities protected more or less by it. For example, in the 1713 Cape epidemic Cape Town was "decimated," and for the Hottentots to be attacked meant death, while many tribes were utterly destroyed, and among five hundred slaves attacked the death-rate was forty per cent. In 1755 the disease was very fatal. It was severe - thirty-one per cent. - in 1767. In 1812 the deaths were few. Many deaths occurred in the 1813 Natal outbreak, and in 1863

the rate was 36.6 per cent. Daumas estimates that prior to the introduction of vaccination the general death-rate was sixty per cent. Then with reference to recent post-vaccination outbreaks: from lack of exact information in the whole fifteen thousand cases reported on to me, I cannot give the rate of mortality; but in 10,753 of them there were 2,084 deaths, which gives a death-rate of 19.3 per cent. In Natal alone from 1st July 1898 to 11th May 1899 there were six hundred and fifty-one cases with ninety deaths, giving a rate of 13.8 per cent. Among my own forty-one cases there were seven deaths, showing a rate of 17 per cent. In Turner's sixty-four cases, nearly 6 per cent. In Brown's eighty-nine cases, 5.6 per cent. Isaac of Malteno gives 2.5 per cent. as the rate in his cases. Hayes of Mafeking 6 per cent. Wier of Engcobo 5 per cent. Holding of Maclear 5 per cent. among Bantus, Hottentots 8 per cent. and Europeans 10 per cent. In Uitenhage lazaretto in 1884 it was 33 per cent. owing to exceptional circumstances. Carte of Richmond gives 12 per cent. Currie of Pietermaritzburg

Small figures not comparable with large

18.1 per cent. Craister of Xalanga saw thousands of cases with a mortality of .1 per cent. In the Portuguese lazaretto at Lorenço Marques, between 1st May 1898 and 31st January 1899, two hundred and twenty-three cases were treated, with one hundred and twenty-five deaths - a death-rate of 56 per cent. while in the whole province of Lorenço Marques there were approximately 2,000 cases and 600 deaths, giving a rate of 30 per cent. Johannesburg lazaretto 27.4 per cent. It is a striking fact that the highest rates are mostly in hospital cases - Lorenço Marques 56 per cent., Uitenhage 33, Johannesburg 27.4; i.e. since vaccination was introduced. The above recent figures include both vaccinated and unvaccinated persons. To show the difference in rate between these two classes, note the following figures . Among my forty-one cases, seven had been vaccinated and thirty-four had not. No deaths occurred among the seven, but seven deaths occurred among the thirty-four - a death-rate among unvaccinated cases of 20.5 per cent. as against nil among the vaccinated. Regarding the Natal cases

above quoted definite details could only be obtained in one hundred and two cases, and these are as follows:- sixty-nine cases were previously vaccinated, deaths nil; thirty-three cases unvaccinated, deaths five - equal to a rate of 15.1 per cent. among the unvaccinated as against nil among the vaccinated. Taking the statistics of the Johannesburg lazaretto we find that in four thousand cases there is an average death-rate of 27.4 per cent. over all, and separating one class of cases from another we find in purpura variola the rate is 100 per cent., in variola haemorrhagica 98.8 per cent., in variola confluens 60 per cent., while as regards vaccination there have been no deaths at that lazaretto among cases sufficiently vaccinated within twenty-six years previously, and persons more recently vaccinated merely have modified attacks of small-pox; and no cases of small-pox have occurred at all in persons vaccinated with three good marks within the past eight years; but cases have occurred in those indifferently vaccinated (i.e. with one or two faint scars) within that time.

From the considerations mentioned above, it is evident (1) that the general death-rate from small-pox has dropped considerably since the adoption of universal vaccination amongst the natives; (2) the death-rate among vaccinated cases is much lower than among the unvaccinated, and (3) the rate of mortality in different outbreaks presents a wide difference, just as is experienced in other parts of the world. It has, I think, been thus fairly established that vaccination has a distinctly beneficial effect in protecting the native against small-pox, and in greatly diminishing his risk of death if attacked.

Another point worthy of note is that in Johannesburg the death rate among natives is much the same as among European cases - natives 27.4 per cent., Europeans 25.4 per cent., the former being 2 per cent. higher than the latter.

CAUSES OF DEATH

Many deaths occur from asthenia induced by a severe attack in the old or feeble. Of deaths due to complications, the most numerous are from pneumonia and bronchial affections. Acute nephritis also accounts for a large number. Cerebral meningitis and pyaemia are also occasional causes, and septicaemia, also endocarditis and pericarditis.

TREATMENT

The treatment of outbreaks of small-pox differs largely in different places. For example, in Johannesburg and vicinity all cases - European as well as native etc. - are removed to the Government lazaretto, a large and well equipped establishment, eight miles out of town, with a visiting and a resident physician, a superintendent and a staff of nurses. There, and in a few other such places in South Africa, treatment is conducted on the most

elaborate and careful lines.

It is otherwise, however, in the country districts where the natives are living in a barbarous state, and often remote of access. Given a case the natives believe to be small-pox, information is generally sooner or later conveyed to the local magistrate who instructs the district surgeon to visit and report. If he diagnoses small-pox he at once proceeds to vaccinate or re-vaccinate all the natives of the infected and surrounding kraals. Leaving orders with the head of the kraal that he must consider his kraal in quarantine, the district surgeon reports to the magistrate, mentioning the number of cases, the number of huts composing the infected kraal, and of persons inhabiting it. Two white and four native police are at once dispatched on quarantine duty, taking with them a set of flags, tents, provisions, antiseptics, baths, medicines, medical comforts etc. On arrival an area is marked off with the infected kraal as a centre, the boundary being at least two hundred

yards distant from the kraal in all directions. If possible, the garden and watering place are included within the area. The guards' tents are pitched on a coign of vantage a short distance outside the boundary; all intercourse being conducted from a distance between the guards and the inmates of the kraal, and all provisions etc. being left at the boundary. The guards are divided into watches, and patrol the boundary, no one being allowed to enter or leave the area, except the district surgeon, or with his sanction, until (in Natal at least) twenty-four days after the last symptom has disappeared from the last case within the area.

The nursing of the sick is undertaken by the inmates of the kraal, no direct control being exercised over them, and no isolation of the sick from the other inmates of the kraal is customary. The Government feed the quarantined people on their customary diet - mealie (Indian corn) meal, and sugar, and meat once a week. For the sick, cornflour, meat extracts, milk, brandy etc., and such

medicines as the leading symptoms may demand, are supplied.

The visits of the district surgeon vary very much in frequency according to the distance and other circumstances. In many instances he only sees the cases once, the future management being left with the guards who instruct those attending to the sick in the methods of administering medicine etc., and the guards obtain information regarding the condition of the sick, and the general requirements of the people, then forward periodic reports to the Magistrate and Surgeon.

In the event of a death the natives bury the body in the usual way, at some spot close by the kraal. The grave is five or six feet deep with sometimes a recess to the side at the bottom to hold the body. The body is buried in its clothing over which is wrapped a blanket tied on with grass ropes. As a rule, the body is not straightened out, but is buried in the attitude at death, and is laid on its back in the grave. During the

course of filling in the grave aromatic leaves and branches are thrown in: and the grave diggers stop their nostrils with the same sort of leaves.

On the expiration of the quarantine period the guards enter the area, and remove all the people to one or two of the huts, and in each of the other huts about two lbs. of sulphur are ignited and the doors closed. Next morning the fumigated huts are entered, and all their contents removed to the open air and sunshine, and the floors of the huts are swilled out with an antiseptic (Jey's) solution. The furniture of the huts is washed with, or soaked in the antiseptic solution, and the rubbish from inside, and of the yard round the huts, is collected and set fire to. The people are then stripped and bathed in the Jey's solution, and their clothing, blankets and mats are soaked in it for several hours, each native being supplied with a blanket as a temporary covering. The natives are then allowed to enter the fumigated huts, and the huts they occupied the previous night are disinfect-

ed in the manner above described. The guards then disinfect themselves and clothing, and quarantine is raised. It is very seldom much trouble is experienced in these matters from the natives as they appear to realize that they are done for their benefit.

The above is the method adopted in my division, and the same is used in other divisions, with to some extent no doubt a difference in detail.

Occasionally the huts are burned down, particularly where the whole family have perished, as happened once with me to a family of four unvaccinated persons.

I have never known the disease to break out again in a kraal treated as above described.

AMAAS

The importance of discussing the question of amaas arises from the fact that, although nothing

definite is generally known about its alleged existence, a number of medical men regard it as a distinct disease, some from personal observation, but most from report only; and the reality of its existence has been taken for granted in the medical journals by some speakers and writers. Brownlee of Glasgow, in the Transactions of the Medico-Chirurgical Society of Glasgow, Session 1898-99, refers to a disease known in South Africa as "Kaffir Small-pox," when speaking of a similar disease in Indian lascars; and a speaker at a recent meeting of the British Medical Association made a similar remark.

The term "amaas" is synonymous with "Kaffir small-pox," "Kaffir-pox," and "water-pox," and is said by some to be a corruption of the native word "Imazi," applied by some natives to small-pox, chicken-pox and measles; others say it is the native word "amaas" meaning sour milk. The former is the more likely.

No classic or systematic description of this

alleged disease has yet appeared, although repeatedly called for; and many practitioners in South Africa never heard of it before. In the "Notes" edited by Dr. Long, Principal Medical Officer of Basutoland, in the "South African Medical Journal" of August 1896, there is the most detailed and authoritative account of the disease yet given, and it merely consists of the differential diagnosis between it and small-pox. The points appear in the following manner:-

	"SMALL-POX	AMAAS
"ERUPTION	Three well-marked stages recognised characterised by the development of papules, vesicles and pustules.	Vesicular from the beginning. Contents of vesicles become milky followed by scabbing; only rarely pustular
	The various stages are reached simultaneously by the entire eruption.	Eruption appears in successive crops so that fresh vesicles are often seen side by side with scabs.

	"SMALL-POX Contd.	"AMAAS Contd.
"SCARRING	More or less deep circular pits.	Linear scars about a line in depth accompanied by much discolouration of the skin.
"FEBRILE SYMPTOMS	Initial fever often high and accompanied by vomiting and severe pain in back.	Vomiting never occurs, general malaise and slight fever. Backache seldom complained of.
"SECONDARY FEVER	Often severe about tenth day.	Convalescence is generally established at this period.
"MORTALITY IN THE UNVACCINATED	Inversely proportionate to the age. Generally high."	Directly proportionate to age. Practically nil in children: about 1 per 1,000 in adults."

In an article on "The differential diagnosis of small-pox in recent epidemics in the Cape Colony," by Dr. W. Croumbie Brown, which appeared in the "South African Medical Journal" of September 1896, he says, p. 108, "With regard to amaas, no "definite statements have ever been expressed as

"to its peculiarities, so far as one knows; but "it is said to differ from small-pox in that there "is no fever, the spots are monolocular, and appear "sooner after the prodromata than in small-pox, no "pitting follows the falling off of the scabs, but "dark spots remain, the mortality is low, and the "disease is confined to natives." This description of Brown's was written in ignorance of Long's of the previous month.

Bowker of Port Shepstone, Natal, states that the "pustular stage invariably present," and not "rare" as Long stated.

Leicester of Port Elizabeth (formerly of Basutoland) stated at a meeting of the Natal Branch of the British Medical Association that he had seen amaas, and it was a distinct disease, but admitted that vaccination protects against it.

In Turner's Report of March 1896 already referred to he states "As far as I can discover the "diagnosis of 'amaas' is based upon the following

"points:- (1) That the eruption, after the scabs "have fallen, leaves pigmented marks and does not "pit. (2) Great stress is laid upon the undoubted "fact that few of the sufferers were pitted, as if "this were strong evidence that the disease was "not small-pox: (3) That the eruption appeared "sooner after the commencement of the prodromata "than would be the case in small-pox, in which dis- "ease it is stated the eruption generally appears "on the fourth day: (4) The death-rate low: (5) "Finally, it has been stated that this Kaffir-pox, "'Amaas' does not attack Europeans."

It ought to be clearly understood that neither Turner nor Brown believesthat the existence of amaas as a distinct disease has been proved: but for convenience of reference the descriptions they furnish will be called by their names.

Dr. Frank Arnold in the Report for the year 1897-8 of the Hospital at Buluwayo, Rhodesia (See Lancet, 17th September 1898, p. 773) states that

"a Kaffir small-pox occurs here. One such case "developed in hospital with the usual premonitory "symptoms of ordinary small-pox. The eruption "which appeared on the 4th day was vesicular, with "some umbilicated and shotty spots, and were dis- "tributed over the face and body generally. It "is a disputed point whether such cases are genu- "ine small-pox, or an aggravated chicken-pox. The "disease runs riot amongst the natives, and some- "times leaves scars. It is apparently not com- "municated to Europeans. It is very rapid in the "development of the eruption, and it is not very "fatal. From the character of the eruption alone, "apart from other considerations, it is impossible "to distinguish it from European small-pox."

The above statement of the leading features in the symptomatology of this Kaffir-pox, accord- ing to Arnold, is rather confusing. He says "the "eruption, which appeared on the fourth day was "vesicular with some umbilicated and shotty spots:" and then, "From the character of the eruption alone

" . . . . it is impossible to distinguish "it from European small-pox." Now, European small-pox appears as distinct papules, and not as "vesicles "with some umbilicated and shotty spots" - (whatever that may mean). I think, under the circumstances of the above confusion of words, we are justified in assuming that Arnold intends to say that the eruption in this Kaffir small-pox was first papular, then vesicular, followed by pustules just as in true variola. His description of the eruption as it appeared on the case in Hospital is too loose to be adopted as against his general statement of the character of the eruption. An eruption could not both appear as "vesicles with some umbilicated "and shotty spots," and yet be like the eruption in small-pox in character.

In addition to these several descriptions I may add that of Dr. Werdmuller of Hoopstad. In April 1899, in reply to my letter in which I practically gave him Long's description of amaas, he said that in many of his cases he had been doubtful

at the time, but called them "modified small-pox." Now he thinks "the facts relate to 'amaas' more than to small-pox proper." His cases, he says, presented the following features "Initial Stage - "Lassitude, pains in back, fever and headache. "Vomiting rare. Eruption - Monolocular, mostly "discrete (about ten confluent) sometimes appear- "ing on first or second day. Eruption went through "all stages mostly, but ran a too rapid course for "small-pox. In some it was not hard and shotty, "and faded after second or third day. Secondary "Fever - Markedly absent. Complications - Debil- "ity, catarrh of lungs in severe cases. Duration - "Most cases practically over in nine or ten days. "Pitting - Mostly linear and irregular, and leav- "ing a faint pigmented cicatrix. Death-Rate - "5.7 per cent. Causes of Death - In three (in- "fants) virulency of attack, one (adult) congestion "of lungs, other three unknown. Vaccination - "Those with good marks, or recent (within five "years) vaccination, only had initial symptoms, "perhaps a few slight papules fading in a day or

"two. Those who had had small-pox escaped alto-
"gether, and those previously vaccinated either
"escaped altogether or contracted it in a very
"mild form." And in addition to the above state-
ment, I find on consulting his (Werdmuller's) draft
official Reports and letter that the infection was
brought down from Basutoland, that in some cases he
noticed the incubation period was ten to fourteen
days; that the eruption had begun on the face;
that in some cases the desquamation was not com-
plete till about the sixth week; and that spots
appeared on the palate, and in many cases the eyes
were affected. So far as I could discover, the
Reports themselves were silent with regard to the
absence of secondary fever, and as to the locula-
tion of the vesicles.

Let us gather together for convenience sake the descriptions of Long, Turner, Brown, Arnold, Leicester and Bowker and observe their agreement and differences; then compare and contrast them with Werdmuller's cases which he first diagnosed as small-pox in 1896,

and as more like amaas in 1899.

Amaas, then, according to Long and these others, is said to possess the following characteristics, viz:-

PRODROMAL STAGE: General malaise and slight fever; there is seldom any backache, and never any vomiting (Long).

There is no fever (Brown).

This stage is as in ordinary small-pox (Arnold).

This stage is present (Turner).

ERUPTION: It appears sooner after the onset of the disease than in small-pox (Turner and Brown).

Its course and development are rapid. In his case it appeared on the fourth day. In character it is like European small-pox (Arnold).

It is vesicular from the beginning, and appears in successive crops: the contents become milky, and only rarely pustular (Long).

The pustular stage is invariably present (Bowker).

The spots are monolocular (Brown).

Scabbing follows (Long, Turner and Brown).

SECONDARY FEVER: No fever (Brown).

If pustular stage present there should be secondary fever (Arnold and Bowker admit the pustular stage: Long admits it occasionally).

CONVALESCENCE: Generally established about the tenth day (Long).

PITTING: Linear scars remain about a line in depth accompanied by much discolouration of the skin (Long).

Sometimes leaves scars (Arnold).

But few are pitted, but have pigmented marks (Turner).

No pitting follows, but dark spots remains (Brown).

MORTALITY: It is in the unvaccinated practically nil in children, and one per thousand in adults (Long).

It is low (Turner and Brown).

It is not very fatal (Arnold).

RACE: It is confined to natives (Brown, Arnold and Turner).

VACCINATION: Protects against it (Leicester).

In some points of the symptomatology these various descriptions agree together: in many they

go beyond each other; while in not a few they are contradictory, and that in the following points:-

(1) TEMPERATURE: Long states that there is fever in prodromal stage: according to Brown there is none.

(2) ERUPTION: Brown states the vesicles are monolocular: while Arnold states the eruption is identical with European small-pox; and Long says it is vesicular from the beginning.

As to pustular stage Long states it is rare, Bowker that it is always present, and Arnold's statement supports Bowker's.

(3) PITTING: Long, Arnold and Turner say it occurs; Brown that it never occurs.

Let us assume, however, that there is some prodromal fever, that the eruption is vesicular from the beginning and monolocular, that pustulation may occur, and pitting.

Comparing the above with Werdmuller's description, there is an agreement as to the prodromata. In the eruption there is a difference: in amaas it is vesicular from the beginning, and changing into the pustular stage sometimes at least; while

in Werdmuller's cases the papular, vesicular and pustular stages were all invariably present. Both agree in that the spots are monolocular; and in that generally there is no secondary fever; and as to their being only a short duration to the illness - about ten days. Both agree as to the pitting generally. Coming to the death-rate, Werdmuller's is higher, fifty-seven per thousand as against one per thousand in adults with amaas, and nil in children (Long). Regarding the effect of vaccination they are in agreement.

It would thus appear that the only outstanding difference between amaas (according to Long etc.) and Werdmuller's cases, as far as the points mentioned by both are concerned, is as regards the stages of the eruption; and the difference is such a serious one that to my mind it ought to have formed an insuperable bar against him altering his diagnosis from small-pox to amaas. In fact, the only point of much importance which should have created doubt in Werdmuller's mind that his cases were not small-pox is the question of the loculation of the

vesicles.

I have assumed that in amaas the spots are monolocular on Brown's hearsay evidence, in spite of Arnold's statement that the eruption is identical with European small-pox. One would like to be positively assured that the vesicles were examined internally as well as externally by Werdmuller for their locular character. I may say that in the communication I sent to Werdmuller and others, I stated in the description of amaas that the vesicles were monolocular. The only other support lent to this monolocular theory were the replies of several men -(Dr. Schmauser of Woolmaranstad, Dr. Stroud of Pretoria, Dr. Cheeseman of Pearson, Dr. Carte of Nondweni, Dr. Tannoch of East London, Dr. Martins of Lorenço Marques) who in their communications stated generally that they had seen cases <u>like</u> amaas, but none of them had met with amaas itself. These cases were mostly diagnosed small-pox; the remainder as chicken-pox. None of these replies contained any specific statement re the loculation of the vesicles.

This feature of amaas, therefore, rests on very indirect and doubtful evidence.

It is difficult to tell in many cases whether a vesicle is multilocular or unilocular from external inspection alone: the interior must be explored to ascertain the presence or absence of trabeculae, and its collapsability.

Coming down to the points on which amaas is said to differ absolutely from small-pox we are confronted with two, both connected with the eruption - videlicet (1) The stages in small-pox are three in number - papular, vesicular, and pustular; in amaas never papular, but vesicular coming out in crops and sometimes pustular; and (2) The vesicles are multilocular in small-pox: in amaas they are unilocular. All other alleged dissimilarities are merely questions of degree, and not of kind, and not sufficient to constitute a differential diagnosis.

We now come to the consideration of a very important series of cases in which a diagnosis of amaas had been made by some local practitioners:

and thereafter Drs. Turner and Brown, before referred to, investigated them and pronounced them undoubted small-pox. These cases constitute one of the few outbreaks in connection with which a diagnosis of amaas has been put to the proof by independent medical men of official standing; and I believe it is the most noteworthy of any. We are at a disadvantage in not having at our disposal a report upon the cases by those who diagnosed them amaas: and I understand no detailed report was ever made - at least Turner and Brown were evidently ignorant of it. They were even ignorant of the diagnostic features of amaas, and had to get hold of an indefinite kind of description as the only one to be got.

This epidemic occurred in Graaff-Reinet, Cape Colony, and neighbourhood, during the latter months of 1895 and beginning of 1896, and was officially reported as "amaas." At the same time other reports arrived from surrounding districts intimating that cases of small-pox were breaking out, the infection having been brought from Graaff-Reinet.

This all seems to be taken
from a report by Turner - Brown.
Mr. Lucas to include the photographs.
see page 87 et seq.

Turner and Brown began their investigation on behalf of the Government towards the end of January 1896 at Port Elizabeth where they saw two cases - a white woman (S. Harris) and a male native (W. Samuels), the former having been infected at Pietersburg, and the latter at Graaff-Reinet. The woman had a multilocular, umbilicated, discrete eruption on the face, body and limbs, and palms and soles, and had three small vaccination marks. Brown re-vaccinated her unsuccessfully. The man had a copious, discrete, pustular eruption on the point of scabbing, with the peculiar small-pox smell. The eruption was also upon his palms, soles and palate. He had been ill before the eruption appeared, with lassitude and headache on the tenth, the eruption appearing on the twelfth January; and he had not been previously vaccinated. Brown vaccinated him unsuccessfully. The scabbing was beginning on the thirteenth day of the eruption.

On the same day (27th January) at Uitenhage they saw a coloured girl (M. Mahela) who had been

infected at Graaff-Reinet. Her illness began on the 10th, and the eruption appeared on the 12th, and on the day they saw her she had a pustular eruption on face, body, and limbs and palms, fairly copious on the face. She said she had been vaccinated years before, but no marks could be found. Brown vaccinated her unsuccessfully. These cases were seen by several medical men who unanimously pronounced them small-pox - the first by Drs. Appleby, Harris, Brown and Turner, and the last by Drs. Lamb, Macpherson, Brown and Turner.

Investigations were begun at Graaff-Reinet itself on 30th January on a case (Adam Boezac, coloured) reported to be suffering from confluent small-pox in Craddock Street. He had the eruption all over the body, including palms and soles and pharynx. His illness had begun on the 20th with severe headache, backache and vomiting. On the third day the eruption appeared, and he then felt so much better that he rose and walked about, but afterwards went to bed again. He had never been vaccinated (See his photograph No. / taken on the

31st - eleventh day of illness). In the same house Jacob Verdriet (50 years and coloured) had a scanty pustular eruption on the face, arms and chest. He had been vaccinated when a baby, and re-vaccinated, and showed two marks. Brown re-vaccinated him unsuccessfully (See his photograph No. 2 taken on the fifteenth day of illness). Also in the same house was seen Rachael Africa who fell ill about the 20th January with headache, backache and vomiting. On the 22nd a very discrete eruption appeared on her face, limbs, palms and soles. She had been vaccinated in childhood. Brown re-vaccinated her unsuccessfully (See her photograph No. 3 taken on eleventh day of illness). Other eleven cases were subsequently discovered in the same court in Craddock Street. The first to take ill had been Sanna Mahela (mother of M. Mahela seen at Ditenhage, and who had nursed Sanna in her illness). She had fallen ill a few days after Christmas, and in two days the eruption had appeared, and the marks of it were seen on her face, chest and limbs, and were the same as those left by small-

pox in coloured people. She had been vaccinated in one place in childhood. She was then re-vaccinated unsuccessfully.

Enquiries in the locality from which W. Samuels (seen at Port Elizabeth) had come brought to light several cases:-

Jacob McQuanda (coloured) fell ill on 11th January, and on the second day a plentiful eruption appeared, and on the twenty-fourth day of illness the scabs were falling. A man named Coos had also fallen ill on 12th January, and on the second day a discrete eruption had appeared; and by the end of the month he went back to work. In Coos' house Dinah Hermanns was seen with a very discrete eruption on the face and arms, a few spots on the body, and one on left palm. It was newly vesicular, and the vesicles were multilocular. She had been vaccinated in childhood, and had two bad marks. Turner re-vaccinated her unsuccessfully. She said she had headache and vomiting on 1st February, and the eruption appeared on the same day.

Numerous cases of small-pox were then seen at Pietersburg (the village from which the European Mrs. Harris had come). Peter Prince had brought it from Mount Pleasant to the next house to Mrs. Harris at Pietersburg, and had died of it. When the man Prince arrived at Pietersburg a policeman reported him at Graaff-Reinet as suffering from "small-pox," but he was told it was "only amaas." On Prince's death he certified it as small-pox, but was instructed to alter it to amaas. A Mrs. Abraham, who lived in the house Mrs. Harris had left, fell ill on 21st January, and on the 23rd a discrete eruption appeared. She had been vaccinated in childhood. Her baby fell ill on the 27th and a discrete eruption appeared on the 30th. Turner and Brown have no doubt that these two cases (seen by them) were small-pox. They also saw cases of undoubted small-pox at Mount Pleasant where Prince had come from, and Turner does not hesitate to affirm that Prince had, and died of, small-pox, and not amaas.

At Camdeboo several people (both white and

coloured) were seen with small-pox. On 29th January they saw a coloured woman (Doortje Menaar) who was said to be suffering from amaas. She had been ill since 11th January, had the usual premonitory symptoms of small-pox. The eruption appeared on the 13th and on the 29th the scabs were falling off. She had never been vaccinated, and she had "evidently suffered from a fairly "severe attack of unmodified, discrete small-pox." Her two vaccinated children escaped the disease; but her unvaccinated husband Jan Bester was on 29th January suffering from headache and pains in back and limbs: temperature 104.4° Fah., and he seemed very ill, although the eruption came out very discrete and trivial. The eruption appeared on the palms and soles; and it went through the papular, vesicular and pustular stages. The temperature fell on the appearance of the eruption, and he rose from bed. Secondary fever set in, with tightness of skin of the face, stiffness of fingers, and pains of the soles (See Photograph No. 5 and chart of temperature). Jan Bester's case had been notified as "Amaas."

At the farms Pietersburg, Groenkloof, Mount Pleasant, Apieskloof, Welteverde, Niet-te-na, Slegtgennoeg and Milk River thirty-eight cases were seen, and about twenty more heard of. Among these two deaths had taken place, four cases of blindness, and several were pitted on the face. The disease had existed about these farms since June 1895, and had been the subject of much official correspondence.

Dr. Turner was unable to trace these outbreaks all to the one source, but he was able to trace the line of infection in several instances from place to place: and he says an absolute diagnosis being established at any one point "it "may be taken as an indication of the nature of "those cases of which fuller information could "not be obtained."

The above account of the investigations of Turner and Brown is taken, in a condensed form, from Turner's Report of 19th March 1896 pp. XXI - XXV; and on page XXVIII of his Report, Turner

gives a summary of the conclusions he draws from a consideration of the above cases, as follows videlicet:-

"SUMMARY: Thus we have to do with a disease "which is:

"(a) Infectious

"(b) To which vaccinated people are not so "susceptible as the unvaccinated, and "from which they do not suffer so se- "verely.

"(c) After suffering from the disease the "patient is not susceptible to vac- "cination.

"(d) In those cases in which we were able to "ascertain the incubation period it "was shown to be more than ten, and "not more than thirteen days.

"(e) The prodromata are headache, pain in "limbs and especially in the back, "vomiting and fever. They last from "forty-eight to seventy-two hours.

"(f) The fever and other symptoms abate when "the eruption appears.

"(g) The eruption is generally most abundant "on the face, and appears there soon- "er than elsewhere. It was seen on "the palms of the hands and soles of "the feet in all cases inspected by "us. It also appears on the phar- "ynx.

"(h) The eruption is first papular, then "vesicular and multilocular, and "lastly pustular or aborts.

"(i) When the vesicles mature the fever "lights up again, and the patient "complains often of tightness of "the skin. The movements of the "fingers are impeded, and some- "times there is pain on walking.

"(k) In the case we saw in which the erup- "tion on the face was profuse, the "eyelids were so swollen that the "patient had a difficulty in opening "them.

"(l) The eyes were affected in four instan- "ces, in two the eyes were probably "irretrievably lost.

"(m) One man afterwards suffered from ab- "scesses.

"(n) When the scabs fell they either left "pigmented marks or pitted the skin.

"Now, any disease which presents all these "characteristics can be nothing but discrete small- "pox."

In some cases, as I have previously indicated, mistakes in diagnosis are likely to occur in investigating diseases among ignorant natives. As an instance Turner states that Dr. Hudson reported, in regard to a particular case, that the eruption ap-

peared simultaneously with the premonitory symptoms: whereas the patient's friends informed Turner that the eruption came out on the third day. In a mild case with a sparse eruption just developed and the temperature about normal, and the patient very vague and unsatisfactory regarding his illness and its symptoms, many a man might hesitate, on one inspection only, to give a diagnosis of such a reputedly severe disease as small-pox with all the official trouble and cost that such a diagnosis would entail: and in a great majority of cases the surgeon must make his diagnosis from one inspection only.

Many practitioners do not hesitate to affirm that cases of mild or modified small-pox have been diagnosed (or at least officially regarded) as amaas in order to avoid the odium incurred, by attending cases of small-pox, in the eyes of private patients, and to avoid the cost, and trouble to the Government, magistrates, and others, of quarantine.

Be that as it may, other diseases besides small

pox have been diagnosed amaas - for example, chicken-pox, scurvy and pemphygus. In fact, amaas seems to be the designation given to cases with vesicular eruptions of doubtful diagnosis.

Dr. Brown (who was associated with Turner at Graaff Reinet) had some months previously seen an outbreak in the East London Division which the people described as "water-pox" common in the Transkei, and distinct from small-pox. Then in Kimberley and Beaconsfield he afterwards saw the same disease which several practitioners diagnosed as chicken-pox. On investigating the Graaff-Reinet cases with Turner he found the identical disease. At Graaff-Reinet it had first been diagnosed chicken-pox, but afterwards this diagnosis was altered to "amaas" and said to be identical with the kaffir or water-pox of the East London Division. Brown states the mortality to be 5.6 per cent., and that this low death rate but followed the example of the outbreaks at Kimberley and East London, at Bloemfontein (recorded by Scott as small-

pox), and at Jacobsdal (recorded by Caiger as small-pox). Brown, then, in the "South African Medical Journal," September 1896 gives the following summary of his experience of these epidemics, called variously amaas, kaffir-pox or water-pox, at East London, Kimberley, Beaconsfield, Graaff-Reinet etc. (see pp. 107, 108, of "The South African Medical Journal" September 1896):-

"SUMMARY: Thus in these recent epidemics one "has to deal with an infectious disease, having an "incubation period of not less then ten, nor more "than thirteen days, and with certain prodromata "lasting about fifty-six hours on an average, pains "in the head, back and limbs, nausea and vomiting. "During the prodromal stage the disease is marked by "high fever, which disappears with the onset of the "eruption. This eruption is characterised in its "appearing simultaneously, and not in successive "crops - in having a definite distribution, and in "running a definite course through papules, vesicles "and pustules and scabs. With the formation of the

"pustules there is a secondary rise of temperature, "the fever abating as the scabs form. After the "falling off of the scabs, dark pigment spots, or "lighter masses of scar tissue with subsequent "pitting follow, according to the severity of the "suppuration. The disease attacks unvaccinated "persons of all ages or more rarely those success- "fully vaccinated some years before: it is less "serious in the latter cases: and those who have "been recently attacked cannot be successfully "vaccinated afterwards. Any disease which pre- "sents all these characteristics can be nothing "save discrete small-pox, variola discreta."

Brown's summary agrees with Turner's on all points; and it would be interesting to compare their summary with the description of amaas Brown picked up in the district. (1) Amaas is said to have no fever. Turner and Brown find both primary and secondary fever. (2) In amaas the vesicles are monolocular: Turner and Brown find them multilocular. (3) In amaas the eruption is said to appear sooner after the prodromata than in small-

pox: Turner finds it appears from forty-eight to seventy-two hours after the illness begins, and Brown gives the average as fifty-six hours. (4) In amaas there is no pitting: Turner and Brown find pitting. (5) In amaas the disease is confined to natives: Turner and Brown both saw Europeans attacked.

Thus an examination of many cases of an epidemic officially recognised as "amaas," proves that they do not correspond to the description given of that disease in the same district: and that the cases were not examples of so-called amaas, but of undoubted small-pox.

The question then remains - What is amaas? We have for an answer to fall back on Arnold and Long.

Arnold's statement may be divided into two parts (1) a general one of the disease, and (2) a particular one regarding his case.

(1) He says the eruption is identical with

that of European small-pox, and it is rapid in development and course, and sometimes leaves scars. The disease only differs from small-pox in points other than the eruption. It runs riot among natives, and is apparently not communicable to Europeans. It is not very fatal, and it is a disputed point whether kaffir small-pox is genuine small-pox or aggravated chicken-pox; and

(2) His case had the usual prodromal symptoms of ordinary small-pox: the eruption appeared on the fourth day, was vesicular with some umbilicated and shotty spots, and was distributed over the face and body generally.

As I have already indicated this statement is self contradictory regarding the eruption, and that we may fairly infer that in his "kaffir small-pox" it is papular, vesicular and pustular successively.

Arnold states his issue in an extremely inconsequential manner. He states that the diagnosis lies between small-pox and severe chicken-pox, while at the same time (a) he calls the condi-

tion "kaffir small-pox," implying that it is some variety of small-pox, yet not genuine small-pox; and (b) he attempts to differentiate it from European small-pox, and infers it may be severe chicken-pox, but from his own description this kaffir small-pox is further removed symptomatically from chicken-pox than it is from small-pox. It thus appears to be a matter of doubt with Arnold as regards the nosology of these cases.

The only symptoms stated on which his differential diagnosis of "kaffir small-pox" from small-pox is founded are (1) the eruption is rapid in development and course; (2) non-communicability to Europeans; and (3) low mortality.

In Long's case there is unfortunately no account of any independent and thorough investigation as in the Graaff-Reinet outbreak, and he relates no histories of cases nor gives other evidence in support of his description of the disease. His description in short is - amaas is vesicular only, the vesicles coming out in crops: prodromal stage slight: convalescence established about tenth day: shallow

linear pits are left and the death rate is at most 1 per 1,000.

Analysing the above description by Long by the method previously used we find (1) points where amaas is said to differ absolutely from small-pox - (a) eruption vesicular only, and (b) coming out in crops; and (2) points where it is only milder in degree. Regarding the latter points, we find the prodromata are slight in amaas. It is quite an ordinary occurrence to find cases of small-pox in which these are so, especially in cases modified by previous vaccination. Long is silent on the effect of vaccination on amaas. I believe, however, that the Basutoland natives are fairly well vaccinated, and Leicester holds that vaccination is a prophylactic against amaas: therefore it may be that the slight character of the prodromata is due to antecedent vaccination. But even among the unvaccinated there are epidemics where this and all other stages are mild: and the same with regard to the death-rate. The relation of the mortality in small-pox in unvaccinated Euro-

peans is, as Long states, inverse to age, and the fact that in amaas it is in direct proportion to age - "practically nil in children, about 1 per "1,000 in adults" is of some value, although the difference between his children and adults is trifling.

The general death-rate from small-pox in South Africa, irrespective of age, varies much in different outbreaks. In the 1713 Cape epidemic, Cape Town was decimated: while in the one of 1812 among several hundred cases the deaths were but few. In Sutherland's Natal cases of 1863 in one kraal of forty-one cases the rate was 975 per 1,000, and in the other one hundred and nine cases of that outbreak the rate was only 137 per 1,000. Coming to more recent years in South Africa there is, as I have previously stated as regards death-rate, a great diversity in the mortality as experienced by different practitioners at different places and times; for example, at the Lorenço Marques lazaretto it was 560 per 1,000. Isaac of Malteno had 25 per 1,000, and Craister of

Xalanga 1 per 1,000 (and he says he does not believe in amaas). Sydenham referring to the London epidemic 1667-1669 states "as the disease of that "period was normal in character and of a mild sort, "it killed but few compared with the enormous number "of sufferers from it." ("Sydenham Med. Obs." Sec. III. Cap. 1, § 2.) We thus see that both before and after the introduction of vaccination, epidemics of the disease swept along, often leaving but a small death roll in their wake: and even supposing Long's cases were of unvaccinated people the death-rate among them although low is still consistent with their being small-pox.

With reference to the duration of the attack in amaas - "Convalescence generally established about tenth day," it is nothing uncommon to find the secondary fever in small-pox extending over the ninth day only; and by next morning the temperature has been normal, and the patient felt better - in a sense the convalescence had been begun. This, for example, occurred in Turner's case of Dinah Hermanns. But coupling Long's statement

re the duration of the attack with the other that the eruption in "amaas" is only rarely pustular, and what do we find? We find here the peculiarity to be met with in abortive forms of small-pox. The case aborts in the vesicular stage, and convalescence is correspondingly early. Yet, occasionally the pustular stage occurred in Long's amaas, and the cases then approached more closely to typical small-pox.

As regards the pitting there is nothing peculiar in it. The slight linear scar is a common feature in small-pox of the natives of South Africa and has been frequently observed by many.

The two points of cardinal distinction are of greater moment - the vesicular eruption in successive crops. With respect to the eruption appearing in successive crops, this is undoubtedly not of frequent occurrence in small-pox, but it does occasionally occur. If, however, one meets with an outbreak where the vesicles come out in successive crops invariably, it would go a long way to negative

a diagnosis of small-pox: and the total absence of a papular stage (as in Long's amaas) would immensely strengthen the negation - in fact absolutely exclude small-pox. Without desiring to discredit Dr. Long's observation in connection with this point, I might suggest that, as I have previously stated, it is extremely easy to be misled by the natives in this connection. As a rule a district surgeon seldom has a chance to see the case in its papular stage owing to delay in reporting the case, unless more than one has become infected at a few days' interval after each other, and he might easily be led to believe by the natives that the eruption came out as it then appeared in character.

Regarding the points of differentiation mentioned by Arnold, I have already shown that a rapid course and development of eruption (which I take to mean a speedy termination seeing that it does not come out till the fourth day or so) and a low mortality are not sufficient to constitute a differentiation, and that the disease is not confined to natives,

Europeans having been attacked. We may, therefore, safely conclude that he has failed to state any sufficient grounds for holding that the disease is not true variola.

Arnold even negatives the points on which Long's differentiation absolutely relies - an eruption vesicular from the beginning - by stating that "from the "character of the eruption alone . . . . it "is impossible to distinguish it from European small-"pox;" and whatever may be the value of Long's description of amaas it is materially reduced by his letter to me of 6th April 1899 in which he states that "the records at my disposal are not sufficiently "accurate to make my opinion on the subject you are "investigating of any value."

So far, I have, with reference to amaas, discussed the question from a broad and liberal standpoint: but if the various descriptions of the disease were treated from a severer standpoint, and by a stricter method, the case for amaas would be found

all the weaker. Assuming that each of the descriptions has as much claim to accuracy as the others, we ought to expect that they would coincide in their most important features at any rate; but is it so? Each description is a differential diagnosis between small-pox and amaas. In a differential diagnosis only those points of difference are mentioned: all other points, not stated, are assumed to be the same in the two diseases contrasted. On examining these descriptions of amaas in the light of this acknowledged general principle, we find the only points mentioned in agreement by all are (1) that the disease amaas has a prodromal stage, (2) an eruption with at least a vesicular stage, and (3) that there is a low mortality - rather a poor foundation upon which to build up a new disease differentiated from small-pox.

Taking the whole circumstances of the case into consideration, I believe I am entitled to maintain that up till now the case for the existence of amaas or kaffir-pox as a distinct disease has been

not proven.

In connection with this subject of amaas it is of interest to note a series of cases published in the "Lancet" of 22nd October 1898, p. 1054, by Drs. R. S. Thomson and J. Brownlee of Glasgow as proving the existence of "an infectious disease in Lascars, "having close relations with variola and varicella," and they refer to a paper appearing in the Transactions of the Epidemiological Society of London in 1867 by Dr. Izett Anderson on a similar disease in Jamaica.

Thomson and Brownlee describe the disease which occurred in sixteen Lascar sailors from India who were removed to the Fever Hospital in Glasgow for treatment. They base the differentiation of this disease from small-pox on the following grounds:- "(1) The coincidence of the rash with the onset of "the general symptoms, the temperature rising and "advancing to some extent at least with the develop- "ment of the eruption. (2) The entire absence of "anything like a secondary fever, such as we find

"even in some cases of modified small-pox. (3) The "absence of any special predilection of the eruption "for the face and scalp, the bulk of the rash appear- "ing mostly on the back, chest and arms. (4) The "entire absence of eruption from the palms and soles "in every case observed. (5) The rapid transfor- "mation of the papules in certain cases into vesicles, "the latter being occasionally present even on the "first day of the illness. (6) True pustules were "not seen in any instance." A certain amount of weight was also given to the fact that three of the patients had had small-pox (two recently), four were successfully re-vaccinated during the crusting stage of this new disease, while the others had been successfully revaccinated within two to four weeks previous to this disease appearing. All recovered.

Thomson, Brownlee and Anderson all consider they have described the same disease although the description by Anderson differs in some points from the other.

A remark by Brownlee is of some importance to

the subject in hand: he says "It is interesting, in "this connection, to note a reference in the Report "of the Buluwayo Hospital in South Africa to a dis- "ease known as 'kaffir small-pox.' This, it was "said, did not attack Europeans, and the opinion of "the local medical men seemed to waver between the "diagnoses of modified small-pox and severe chicken- "pox. Though this disease might not be identical "with that which Dr. Thomson has just described, "yet the fact of this notice in the Buluwayo Report "showed that there was some element of difficulty. "He had also recently met a physician who had re- "turned from Natal, who mentioned he had seen such "a disease, which, there was no doubt, was not small- "pox, but regarding its place in the nosology there "was a difference of opinion as to whether it was "severe chicken-pox or a third disease. It was "not at all impossible reasoning from analogy that "there might be a disease allied to small-pox con- "fined to one race of mankind alone. Sheep-pox, "for instance, attacked sheep alone, and could not

"be communicated even to the most closely allied "species." (See Transactions of the Medico-Chirurgical Society of Glasgow, Session 1898-99.)

Assuming that this disease described by Thomson and Brownlee is identical with Anderson's and with amaas, it would thus not be "confined to one race of mankind alone" for the Indian Lascars, Jamaica Negroes and the South African Kaffirs are not one race: and the racial theory advanced like the same theory regarding amaas thus falls to the ground. Anderson states, in the Lancet 19th November 1898 p.1363, that he had attended "not only blacks, but whites and many of the mixed races," for this disease.

We will find it interesting to compare and contrast Long's amaas with Drs. Thomson and Brownlee's cases - (1) In amaas the eruption is vesicular from the beginning, and it comes out in successive crops; in Thomson's cases the papular stage was quite distinct, in the great majority of cases at least, and it was in one crop. (2) In amaas,

linear scars about a line in depth accompanied by much discolouration were left: in Thomson's cases the scars left were free from pigment, and had a very close resemblance to fresh small-pox scars. (3) In amaas vomiting never occurs: in Thomson's cases this symptom was present. (4) In amaas convalescence is generally established about tenth day; in Thomson's cases the temperature dropped to normal on the fifth or sixth day. (5) In amaas the death rate is practically nil in children, and about 1 in 1,000 in adults; in Thomson's cases it was nil. As regards behaviour to vaccination Long is silent, but Leicester, lately one of his colleagues, (and, as I already stated, believed in amaas) stated that vaccination protects against amaas: on the other hand Thomson's cases were uninfluenced by vaccination - so were Anderson's.

It will be observed from the above comparison that Long's amaas differs so materially from Thomson's cases as to make it highly improbable they are describing the same disease.

If Thomson's cases are compared with Brown's amaas several points of similarity of importance will be found, namely (1) short prodromal stage; (2) monolocular spots; (3) low mortality; and (4) disease confined to natives. The points of difference are (1) no fever in amaas: the Lascars had fever; (2) no pitting in amaas: the Lascars were scarred or pitted.

Thomson's cases thus approach more closely to amaas as described on hearsay by Brown, than as described by Long. But the difficulty in drawing any conclusion as to the identity between Thomson's cases and Brown's amaas arises from the fact that Brown found that the description of amaas he got did not correspond at all to the cases diagnosed as amaas by others in the same districts. Brown's amaas is therefore as yet entirely unsupported by clinical evidence, if not completely controverted by the cases cited in support of it turning out to be undoubted small-pox: and comparing Thomson's cases with Brown's amaas is comparing

them with an apocryphal disease.

As regards the identity of Thomson's cases with Arnold's amaas, there is very little to go upon to prove it. The features stated, rather point to dissimilarity - (1) In Arnold's amaas there is a distinct prodromal stage; while in Thomson's cases the rash appeared at the onset of the illness. (2) In Arnold's disease the eruption was identical with small-pox eruption; while Thomson states many differences. The points of approaching similarity are (1) a rapid course of eruption; and (2) a low death-rate in Arnold's, and nil in Thomson's.

The question has been raised by Thomson as to the identity of his cases with many epidemics in India and Japan in which neither previous small-pox, innoculation nor vaccination seemed to afford much protection. On such a hypothesis he suggests might be explained the occasional enormous death-rate from small-pox among persons previously supposed to be protected by small-pox, innoculation

or vaccination. He suggests that in some cases the first attack might not have been small-pox at all, but this other disease he describes, and that others were not innoculated or vaccinated with small-pox virus, but with the other virus; or on the other hand, observers had been misled by the people regarding their previous attack or innoculation etc.

It is worthy of note that neither as regards previous small-pox, innoculation nor vaccination, has any such widespread irregularity been alleged as regards South Africa. Of course, small-pox does, as is commonly observed, attack persons previously vaccinated; but the relation between vaccination and small-pox among the native races of South Africa, as I have shown, points clearly to the prophylactic effect of the one upon the other, just as has been demonstrated in other parts of the world.

I have in this paper striven to contrast and

compare, from all points of view, the alleged disease amaas with small-pox. I have not sought to compare amaas with chicken-pox: but I may say this much that if the main points of distinction insisted on by the supporters of amaas, for example, a monolocular eruption, vesicular from the beginning, and coming out in crops, have any existence in fact, of which there is no evidence, then it will be necessary to differentiate amaas from the well known disease which possesses these characteristics - chicken-pox.

The onus of proof of the existence of amaas lies with its supporters, and our attitude is that of the mind open to conviction by the production of conclusive clinical evidence.

A P P E N D I X A

The following medical gentlemen have kindly placed the results of their experience at my disposal:-

Dr.	A. J. Abraham,	Dundee
	F. T. Anders,	Rustenburg
	W. M. Beor,	Harrismith
	Bowker,	Port Shepstone
	W. Black,	Weenew
	Blaud,	Harding
	J. H. Balfe,	Durban
	J. B. Brewitt,	Estcourt
	J. E. Briscoe,	Charlestown
	C. B. Browne,	Jamestown
	H. Caiger,	Burgersdorp
	Percy Carte,	Nondweni
	A. E. Carte,	Richmond
	G. A. Culligan,	Tabankulu
	R. Craister,	Xalanga
	J. H. Cox,	Cape Town
	G. H. Clifton,	Knysna
	H. Cheesman,	Pearson
	Coates,	Venterstad
	F. C. Daumas,	Pietermaritzburg
	Arthur Douglas,	Alexandra
	K. J. Dekema,	Nylstrom
	Charles Gordon,	Pietermaritzburg
	B. J. Guillemard,	Aliwal North
	J. B. Greathead,	Grahamstown
	J. S. Gibbons,	Prieska
	J. N. C. Holding,	Maclear
	E. A. Hardwicke,	Polela
	G. H. Hollander,	Smaldiel
	R. N. Howard,	Port Nolloth

Dr.	R. H. H. Hayden,	Sutherland
	W. A. Hayes,	Mafeking
	M. C. Hopkins,	Hope Town
	G. C. Henderson,	Eshowe
	C. H. Herbert,	New Hanover
	H. W. Jones,	Stanger
	Isaacs,	Monteno
	B. O. Kellner,	Bloemfontein
	Lautre,	Smithfield
	E. C. Long,	Basutoland
	C. A. Lumley,	Idutywa
	R. J. Lamb,	Uitenhage
	Joao (Augusto) Martins,	Lorenco Marques
	D. C. McArthur,	Namaqualand
	N. M. MacFarlane,	Mlotse Heights
	G. E. Michie,	Jagersfontein
	R. W. Middleton,	Mapumulo
	W. A. Mengershausen,	Howick
	L. W. Van der Merwe,	Krugersdorp
	P. Marshall,	East Griqualand
	D. Melville,	do
	Max Mehliss,	Johannesburg
	J. D. Nankivell,	Butterworth
	Nugent,	Vryburg
	H. J. Peirce,	Johannesburg
	T. D. Perkins,	Herschel
	L. L. Proksch,	Krantzkop
	C. Proctor,	~~Kroonstad~~ Ladysmith
	P. C. Sutherland,	Pietermaritzburg
	C. Orivon Snow,	George
	J. W. Stroud,	Pretoria
	J. Schmauser,	Wolmaranstad
	J. P. Tannoch,	East London
	G. B. Thompson,	Kenani
	H. S. Taylor,	Ficksburg
	W. H. B. Vanes,	Humansdorp
	F. W. Walters,	Nongoma
	C. Ward,	Pietermaritzburg
	P. H. Walker,	Mganduli
	John W. Weir,	Engcobo
	V. Werdmuller,	Hoopstad
	E. Symond,	Kroonstad.

I am also indebted for information to

Rev. G. John Pugh, Cato Ridge
C. Hugo Hahn, Paarl

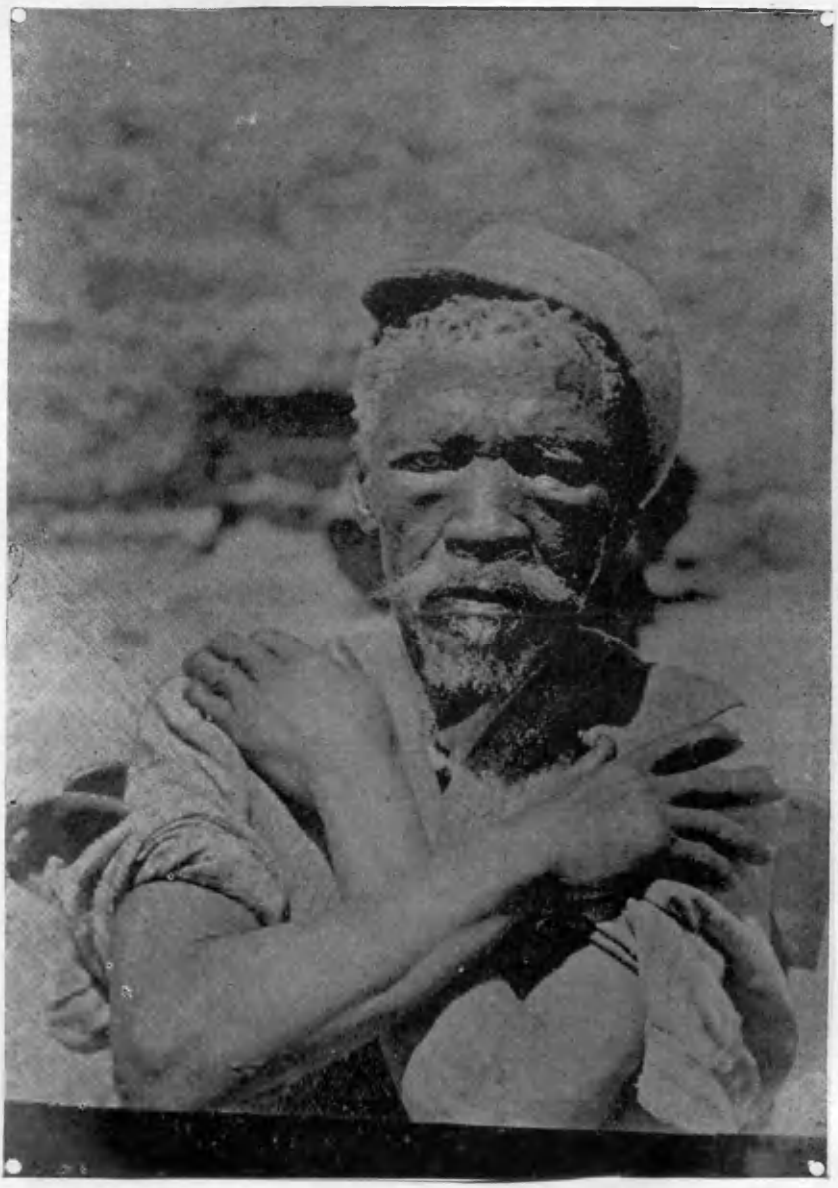
A P P E N D I X B

N°1

Adam Boezaac, Graaff-Reinet
11th day of illness

See p. 82

N° 2



Jacob Verdriet. Griqua-Basuto
15th day of illness.

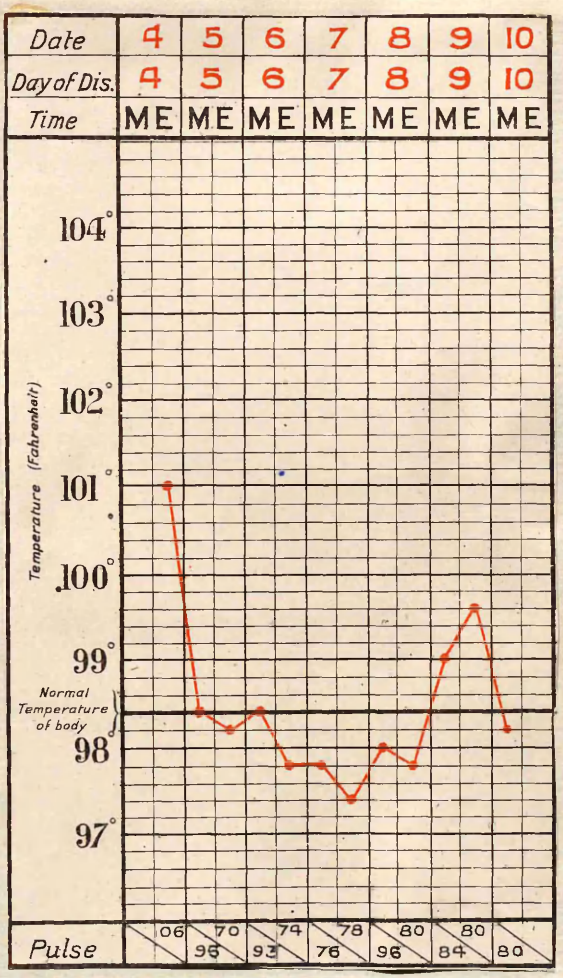
See p - 8B

No. 3

Rachall Africa. Graaff-Reinet
11th day of illness

See p. 83

No 4

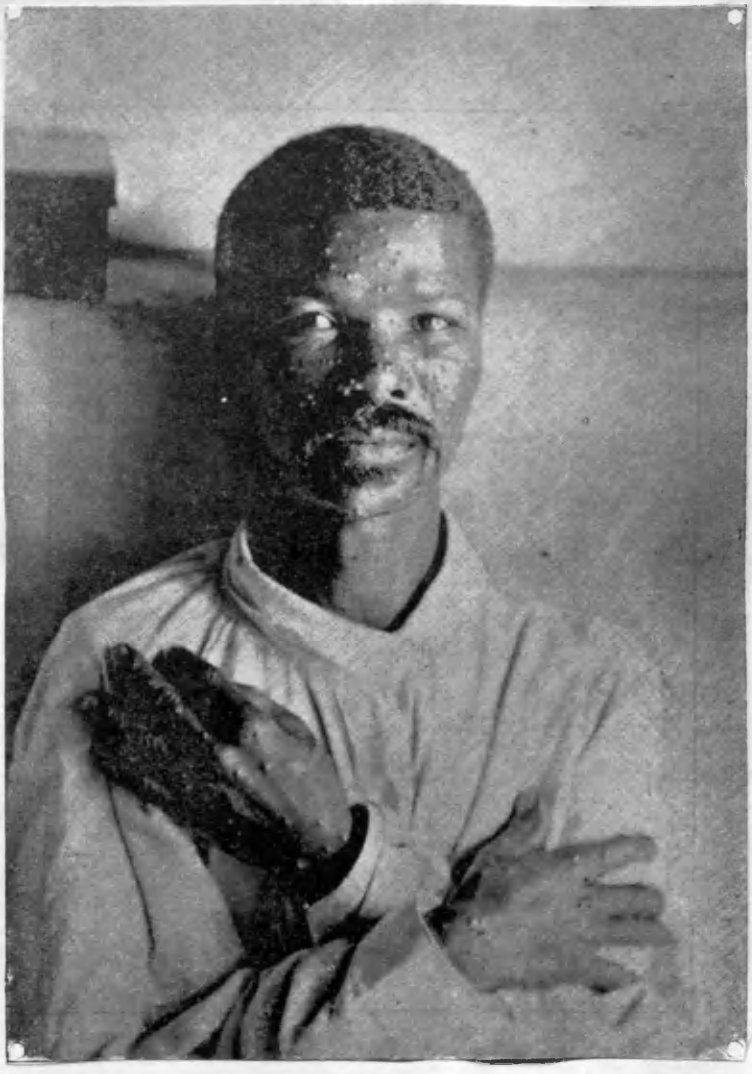


Dinah Hermanus.

Discrete Smallpox

See p. 84

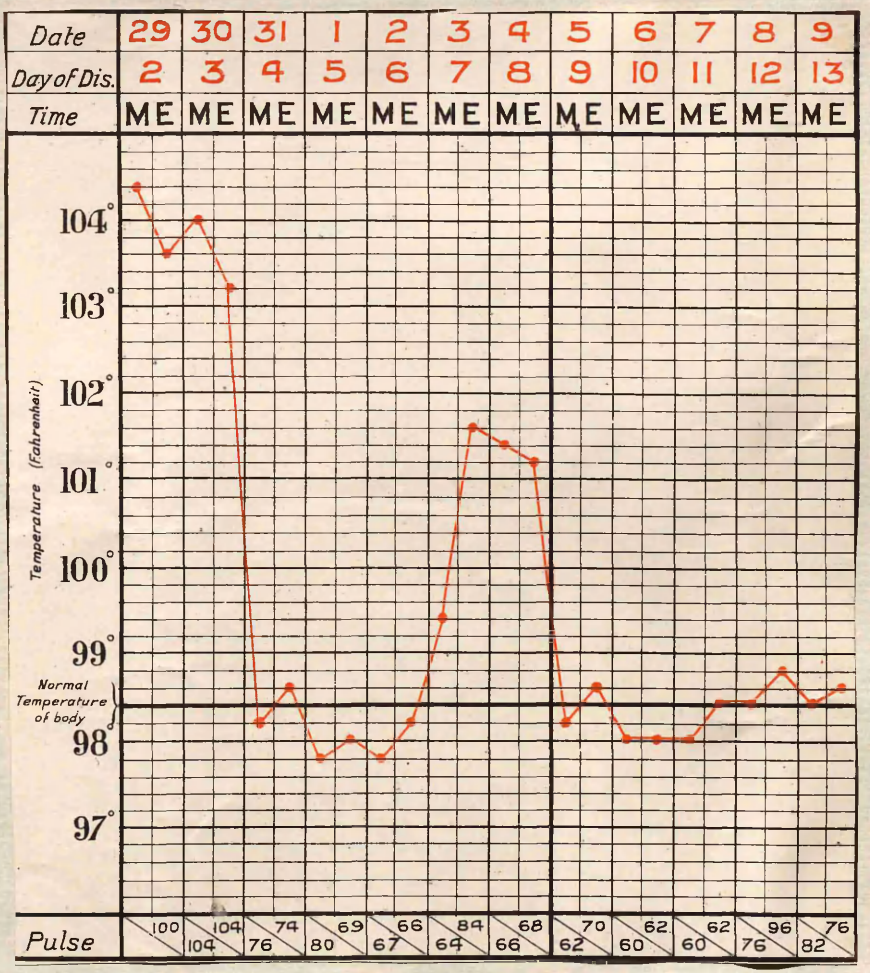
No. 5



Jan Bester, Graaff-Reinet

See p 86 & chart-on next page.

N° 6



Jan Bester

Discrete Smallpox

(See photo preceding page)

See p. 86

No 4

Case occurring at Kimberley 1882.

N°8

Umtotshwa. Inanda, Natal.
About 16th day.
Never Vaccinated
See photo N°9

No. 9

Same as No. 8

N°. 10

Case in Inanda, Natal. 1898
Taken 4th or 5th day of eruption
Was vaccinated in 1882.

N° 11

Child 3 months of age. Nanda.
5th day of eruption.
never vaccinated

No 12

Case of Fatal Confluent Smallpox
at Charlestown Lazaretto, Natal.
1899.