CHAPTER III.—REPORTS ON THE TUBERCULOSIS OF SOUTH AFRICAN NATIVES PRIOR TO THE PRESENT ENQUIRY.

1. Individual and Non-official Reports on Tuberculosis.

While, as shown in the last Chapter, little or nothing is known as to the existence of tuberculosis amongst the Bantu tribes prior to their contact with the White races, and while there is considerable reason to think that the disease was either very rare or entirely unknown amongst them under their primitive conditions, the infection had already taken a firm hold amongst them in the first half of the nineteenth century, at least in those places where the existence of military, trading, missionary and other centres ensured close touch of Europeans with the Natives on the one hand and efficient means of recognizing tuberculosis on the other. Writing in 1908, Dr. Macvicar[27] quotes his predecessor, Dr. Stewart, of Lovedale, as follows : " Consumption was common in this district (Victoria East) 40 years ago," and he cites a letter from Dr. Girdwood, of Butterworth (1907), to the effect that when he came among the Kafirs in 1868, he saw " a good few cases of tuberculosis." In January, 1881, Dr. Nankevill, District Surgeon at Butterworth, mentions that out of 285 patients attended by him there were " eight cases of phthisis, three of scrofula and one of acute miliary tuberculosis." Sir William Bissett Berry is also quoted by Macvicar as saying, " When I came out in 1864 to Queen's Town, amongst my earliest patients were phthisical natives from the Mission Station of Lesseyton near Queen's Town."

Tuberculosis, including all forms of the disease, was made notifiable throughout Cape Colony in 1904, and " pulmonary tuberculosis " was scheduled as a notifiable disease in Natal in the same year.

To Dr. Gregory, the Medical Officer of Health of Cape Colony, belongs, perhaps, the credit for first calling public attention to the ravages of this disease. From 1895 onwards, basing his observations on the figures which became available after the registration of deaths had been made compulsory, he continued to refer to the spread of tuberculosis in his annual reports. " Of all the diseases attacking the Native and Coloured," he writes,[28] " tuberculosis is by far the most important and it is once more my duty to call attention to the ravages of the population it is causing, and to the extreme importance of taking public measures to restrain its further spread in South Africa."

In November, 1906, a conference of the Principal Medical Officers of Health of all the British South African Colonies and Territories, meeting at Cape Town, reported :—

" All the representatives at the Conference are unanimous in the opinion as to the gravity of the matter and, especially, as to the danger threatening the Native and Coloured races from the extension of tuberculosis . . . and there would appear to be no reason to doubt that the disease is steadily and, in many places, rapidly increasing."

Against this formidable spread of tuberculosis amongst the Natives was to be set, in sharp contrast, the relatively low incidence and mortality from the disease amongst Europeans in South Africa. The average tuberculosis mortality for the 35 chief cities and towns of the Colony for the three years 1903, 1904 and 1905 was estimated by Macvicar to be only 1·48 per 1,000, as compared to an average for the same years amongst Natives and Coloured of 7·20 per 1,000.

Further, the tuberculosis mortality for Europeans above given, low as compared to that in the Natives, was probably an over-estimate so far as the Colony itself was concerned.

Writing on this subject in 1896, Gregory[29] says : " Moreover, the death-rate among Europeans does not legitimately belong to our own population, much of it being due to deaths of phthisical persons coming to the country for relief from the disease. This fact becomes still more evident if the death-rates for the several towns of the Colony are examined separately ; for it is chiefly among those that we know to be usually selected for residence by the phthisical immigrant that the bulk of the mortality among Europeans occurs. Thus, the European death-rate from tuberculosis is in Cradock 6·24, in Beaufort West 7·86, and in Aliwal North 6·21 per 1,000." Mention has already been made of the bearing of this immigration of phthisical persons into South Africa upon the infection of the Natives (p. 35), but it must not be regarded as the chief or the earliest source of the disease.

Macvicar, referring to this point, says : " The stream of phthisical immigrants during recent years may, and very likely has, contributed to the spread of the disease, but it has not been its main source. . . . The Coloured people in many parts, at least of the Cape Colony, were suffering from tuberculosis previous to this time—about 1880, as far as I can learn—when consumptive patients began to arrive in numbers from Europe. I think, therefore, that if the White race is responsible for the introduction of tuberculosis among the Coloured people, the disease must have been largely introduced before the time when South Africa became widely recognized as a health resort."

This sounds to be good reasoning. There had been European settlers on the south and south-east coastal areas of Africa for over two hundred years before 1880, and these settlers must have had their consumptives, their chronic cases and their " carriers " from whom infection might spread through contact with servants, through the giving-out of laundry, through presents of discarded clothes, through sputum, and in the contact established in schools, churches and educational and trading establishments of all kinds.

But, although common amongst the Natives and the Coloured persons residing close to the areas with the largest European populations, the disease showed two characters suggestive of recent introduction. On the one hand, it was observed to be *increasing* near these populous centres and it was still rare in districts more remote from the Whites and with a more scattered population. Macvicar, whose classical thesis on " Tuberculosis among the South African Natives " was written

in 1907 at an appropriate moment for gathering together the views of experienced physicians still living and who had worked in the Colony during the latter half of the nineteenth century, testifies to the "increase of tuberculosis during recent years"; *e.g.*, Dr. Darley-Hartley began practice in East London, 1879, and had a considerable practice among both Europeans and Natives. For a number of years he does not remember to have seen any case of tuberculosis except imported cases (European). Dr. H. T. Bachelor, of Queenstown, after an experience of 25 years, has no hesitation in saying that the disease is getting increasingly common. Dr. H. Becker, of Grahamstown, writes: "When I arrived in the Eastern Province as District Surgeon of Bathurst and Alexandria combined, in 1870, there were very few cases of tuberculosis among the Natives. The Kafirs and Fingoes were then a race proof against the disease. During my district surgency of four years I do not remember a single case of tuberculosis among these people. It was different with the mixed races . . . tuberculosis was frequent among them."

Macvicar, discussing the Bantu tribes, reports in 1907 that "the Bechuana, including the Basuto, are still in most places comparatively free from the disease. Fifty years ago Livingstone found that the Bechuana among whom he lived and travelled were free from tuberculosis. . . . It seems almost certain that less than a century ago the Bechuana race was entirely free from tuberculosis. It is quite certain that during recent years the disease has been spreading among them and is now found where formerly it was absent."

Speaking of the Kafir-Zulu tribes, he writes:—

"Among certain of the tribes tuberculosis has been known for at least two generations. These include the Kafir tribes known as the Xosa and Galekas, the Fingoes and certain of the Zulus. On the other hand, certain other sections, as the Swazis and Zulus of the Wakkerstroom district of the Transvaal and the Zulus of the Vryheid district of Natal, are reported to be still free from the disease, except for occasional imported cases. . . . The most probable explanation . . . of this unequal distribution, a distribution so unlike what is met with in countries where tuberculosis has been known for centuries, is that the whole race was originally free from tuberculosis."

He believes, supporting his opinion by quotations from such authorities on the Bantu languages as Dr. Soga, that the Kafir tongue possesses no word for tuberculosis; strong evidence that the disease itself was unrecognized in ancient times.

For a précis of the opinions of district surgeons and other doctors as to the prevalence of tuberculosis among the Bantu, Macvicar's article, p. 12, should be consulted.

Dr. Grant Millar, District Surgeon and Justice of the Peace at Flagstaff, Pondoland, a district annexed to Cape Colony in 1894, writes[30] in 1908 as to the rapid extension of the disease amongst the Pondos as the result of infected mine boys returning from Johannesburg. "No one," he says, "who has lived in this country and seen nearly a

whole hut of Natives contract the disease one after the other could possibly have any doubt as to the infectiousness of tuberculosis. . . . Time and again, one Native returned from the mines infects almost the entire occupants of a hut previously quite healthy. . . . Nor is the spread of the disease confined to one hut or even one kraal, because it is the custom among the Natives to crowd together in the different stores, where they frequently spend half a day chatting and idling—and invariably spitting."

Macvicar, who gives a carefully traced series of 27 instances known to him suggesting the spread of tuberculosis in families, is not by any means so dogmatic about the rapid extension of the disease in the huts and kraals as is Dr. Grant Millar. He draws a clear contrast between the "slow spread by ordinary intercourse" and the "more rapid spread where there is extraordinary intercourse." With regard to the slow spread by ordinary intercourse, he writes :—

"Some of these (family) histories are bad enough and yet it seems to me that they contain an element of hope for the Bantu people. In spite of conditions that seem to be favourable to its spread, the tubercular infection, when introduced into a family, does not as a rule spread rapidly from person to person. In some families, while some members suffer, others escape, regardless, it would almost seem, of age. And in those who are attacked the period of incubation is often long—two years or even longer."

G. A. Turner,[31] writing of Portuguese East Africa, after a visit to investigate tuberculosis amongst the Natives, says, in 1906, that "it is a disease which is *certainly not* being spread throughout the country by labourers returning to the East Coast from the mines." Nor is he impressed, like Dr. Grant Millar, with the urgency of the hut infection by sputum. "As regards pulmonary tuberculosis," he writes, "certain cases are isolated in the bush by the Native doctors and are not permitted to enter the kraals proper." Again, "the attendants on a patient who, for some reason, has not been isolated in the bush, are careful in many cases to remove the sand of the floor on which the patient has been spitting, within a few minutes of it being contaminated, not only outside the hut but outside the kraal."

Probably these marked differences of opinion are due to the higher standards of cleanliness which appear to obtain among the M'Chopi and M'Shangaan tribes of Portuguese East Africa as compared to the Pondos. Great weight must be attached to the moderate and cautious yet convincing statement of Macvicar as to the relatively slow spread of the disease amongst the Natives "by ordinary intercourse."

Turning to the consideration of "the more rapid spread where there is extraordinary intercourse," he writes : "The presence of the White race in South Africa has brought the Native races into contact with one another in a greater degree than could have followed even the most violent of tribal disturbances in the old time. Missions, schools, railways, prisons, seaports and, above all, the mines, have brought Natives together in a way that has undoubtedly facilitated greatly the spread of tuberculosis."

The words of Macvicar " and, above all, the mines," should be noted. In spite of the views expressed by Dr. Turner, it is evidence that many experienced medical men were impressed, about this time, with the danger to the Native kraals from this source.

Dr. Macaulay,[32] waiting upon the Commissioner of Mines as a member of a deputation in 1906, says : " It is quite apparent to us from statistics which we have been able to gather, that tuberculosis has enormously increased on these fields, not only amongst the Whites, but largely amongst the Natives, and we feel that it is necessary that some provision should be made in the law to prevent the spread of the disease."

To the question of tuberculosis on the mines, however, attention will be given later, and this part of the summary is intended to deal rather with the disease amongst South African Natives as such than with occupational conditions and risks.

A suggestive paper by Maynard[33] in 1912, while treating chiefly of the general question of heredity in tuberculosis, to the " inherited disposition " theory of which the author gives his support, makes some interesting references to tuberculosis in Bantu races. " It does not follow," he writes, " of necessity that because tuberculosis runs a more rapid course in an adult Native than in a European of similar age that the Native constitution is therefore more susceptible to the disease. The European may and probably has been infected in childhood and has therefore acquired a partial immunity ; while the Native may not have had any previous chance of acquiring immunity."

Maynard went further and attempted to compare the degree of " tuberculization " as between " new " boys* arriving at the Rand from Nyassa and Mozambique, and " old " boys, that is to say boys with previous mine service from the same territories. To this end he employed Calmette's ophthalmo-reaction, a form of tuberculin test attracting attention at that time. The result was extremely interesting. Whereas in healthy European adults Calmette had recorded 18 per cent. of positive reactions, as compared with 92 per cent. in tuberculous patients, Maynard found only 2·4 per cent. of " positives " in 544 " new " boys, but 18 per cent. " positives," exactly Calmette's figure for healthy European adults, in the 115 " old " boys tested. Moreover, in 131 " tropical " boys returning home after one contract period of work in Johannesburg, he found that 19·8 per cent. reacted positively to the ophthalmic test. These observations suggested strongly that a large proportion of these highly susceptible " tropical " Natives arrived at the Rand free from any considerable contact with tuberculosis prior to their engagement.

At this point it is necessary to return to Macvicar's thesis, already freely quoted, since it constitutes by far the most important of the earlier contributions to this subject. Macvicar illustrates in his Tables III and IV, which should be consulted in the original, the inequality

* " Boy " as used here and as occurring frequently throughout this Report, has no implication of youthfulness. The word is used as it is employed colloquially, meaning merely a male Native of any age.

of the distribution of tuberculosis at that time, between the still largely "tribalized" Bantu communities and the urbanized Coloured population. He analyzed the mortality statistics of 35 towns in two groups, those lying east of a vertical line drawn on the map passing immediately to the east of Cradock, on the one hand, and those lying west of that line on the other. This line "coincides closely with the western limit of the great Bantu population of the Colony." And it is interesting to note that the average tuberculosis mortality to the west of the line is 6·69 per 1,000, that to the east of it 3·50 per 1,000.

He finds, too, that tuberculosis had led to a much higher mortality in towns having a Coloured population greatly exceeding the Bantu population than in towns where the Bantu population greatly outnumbered the Coloured.

In order to give a clear idea of the much greater death-rates amongst the Native and Coloured populations as compared with the European populations of the Cape at that time, Tables I and II of Macvicar's thesis are reproduced on the following page.

As to measures for dealing with the tuberculosis problem, Macvicar indicates two main lines along which action might be directed: "first, to do everything possible to prevent the further spread of the disease and, second, to improve the social condition of the people concerned." He is against compulsory segregation of tuberculosis patients, seeing clearly that there would be "great difficulty in carrying out such a system"; but he favours legislation which might "lead to a reduction of overcrowding and to the inspection and disinfection, where necessary, of premises used by employers of labour for their workmen." His experience having shown him that cases generally improve "in the open air on the verandah day and night, and with a liberal diet," he is in favour of sanatoria but realizes the difficulty of making such institutions popular amongst the Natives. "It would be quite possible, for example, to spend large sums of money upon consumptive sanatoria for Natives only to find in the end that for some unexpected reason the whole system was a failure. . . . The wisest course would be to begin the sanatorium treatment of Native phthisical cases in a tentative and experimental way in connection with hospitals which have already secured the confidence of the Natives and then, when a good working system has been found, to extend it as rapidly as possible." He realizes and calls attention to the difficulty and expense of suitably staffing such institutions. "It is truly said that Native sanatoria need not be provided with expensive buildings; tents, even, would do well." But "without skilled attendance, good results could not be hoped for." He has no use for the system of providing unskilled Natives to assist White nurses. Expense must be faced; a resident European medical superintendent is necessary; with the added cost of European nursing unless and until the real remedy be found, *i.e.*, "the employment of *thoroughly trained* Native nurses and orderlies." The treatment, too, should, he suggests, be given free to advanced cases, since the accommodation is not only in the interest of the sick Native but "chiefly for the sake of protecting others."

COMPARISON OF EUROPEAN WITH COLOURED AND BANTU DEATH-RATES FROM TUBERCULOSIS IN CAPE COLONY TOWNS (MACVICAR, 1908).

Town.	TABLE I.					TABLE II.				
	Estimated European Population Middle of 1904, Census, April, 1904.	European Death-rate from Tuberculosis per 1,000 of Population.				Estimated Coloured and Bantu Population, Middle of 1904, Census April, 1904.	Coloured and Bantu Death-rate from Tuberculosis per 1,000 of Population.			
		1903.	1904.	1904.	Average of the 3 years.		1903.	1904.	1905.	Average of the 3 years.
Cape Town	44,677	1·56	1·81	1·32	1·56	33,631	8·52	6·33	6·73	7·19
Six Suburban Municipalities	53,602	1·80	1·47	1·14	1·47	31,523	8·91	5·90	5·46	6·75
Green Point and Sea Point ...	7,654	·57	·91	·77	·75	1,380	3·03	4·35	2·17	3·18
Simonstown, etc.	7,076	1·06	1·70	·85	1·20	3,318	5·63	4·82	5·97	5·47
Kimberley	13,574	2·30	2·50	1·81	2·20	20,878	7·52	6·85	8·03	7·46
Beaconsfield	2,770	·70	1·44	·34	·82	10,990	15·04	5·19	6·82	9·05
Port Elizabeth	22,201	1·55	1·17	1·02	1·24	6,594	8·70	9·71	9·84	9·41
East London	14,995	·87	·80	1·14	·93	10,872	3·42	4·05	3·69	3·72
Grahamstown	7,336	1·26	1·23	·94	1·14	6,662	8·39	7·51	7·88	7·92
Uitenhage	6,777	·47	1·48	1·32	1·09	5,612	12·63	9·09	9·93	10·55
Paarl	5,090	·82	·59	·58	·66	6,289	5·86	6·84	4·25	5·65
Graaff-Reinet	4,083	·76	1·22	2·17	1·38	6,105	6·55	7·86	6·99	7·13
Kingwilliamstown	5,919	1·89	1·18	·83	1·30	3,639	2·56	5·77	6·47	4·93
Queenstown	4,209	3·75	3·09	2·59	3·14	5,570	3·31	3·41	4·26	3·66
Oudtshoorn	4,196	3·50	2·14	1·41	2·35	4,773	9·55	10·47	8·85	9·62
Worcester	3,626	·86	1·10	1·09	1·01	4,318	9·21	8·80	7·18	8·39
Cradock	3,087	3·38	3·24	2·58	3·06	4,760	5·27	6·93	6·71	6·30
Beaufort West	2,231	8·88	6·28	3·96	6·37	3,319	18·55	14·16	10·25	14·32
Aliwal North	1,779	2·95	2·25	2·23	2·47	3,900	3·10	2·05	4·22	3·12
Somerset East	1,866	1·12	1·07	1·05	1·08	3,410	4·92	8·80	12·22	8·64
Stellenbosch	2,530	·00	·39	1·09	·52	2,478	4·98	10·09	8·40	7·79
Wellington	2,437	·43	1·64	·82	·96	2,499	7·09	3·60	4·76	5·15
Mossel Bay	1,676	3·13	·60	2·36	2·03	2,588	6·98	9·27	7·29	7·84
Malmesbury	1,988	1·58	1·01	2·49	1·69	1,856	7·17	11·31	9·43	9·30
George	1,840	1·67	1·65	1·61	1·64	1,692	12·85	10·64	12·51	12·00
Robertson	2,054	2·01	·97	1·92	1·63	1,216	8·51	10·69	6·63	8·61
Burghersdorp	1,295	·80	3·09	·00	1·29	1,627	9·58	10·45	7·59	9·20
Swellendam	1,148	·00	·00	·85	·28	1,273	2·40	3·93	4·72	3·68
Prince Albert	1,037	1·99	·00	·95	·98	749	9·35	6·68	6·67	7·56
Averages	—	1·64	1·55	1·27	1·48	—	8·09	6·73	6·78	7·20

Other suggestions, which have since been met to a great extent, are the appointment of whole-time Medical Officers of Health for all the larger towns, and legislation to diminish the risk from immigration of European consumptives. He strongly advocates the education of the people in health matters. "After all, unless the people themselves become imbued with the spirit of progress, all efforts for their advancement will prove futile. . . . Here, in the schools, I believe, lies our great hope and our great opportunity."

In almost the same words, Grant Millar advocates health propaganda and education as the most important means towards the limiting of the spread of tuberculosis. "The only effective measures in the long run depend on the Natives themselves. To prevent the spread of tuberculosis the Native must be taught the evils of overcrowding and he must come to learn the dangers that arise from indiscriminate expectoration." He sees that, to overcome the overcrowding, at least, in Pondoland, a great many additional huts would have to be built. "This is a serious matter," he says, "because it means an increased payment by the Native in the shape of hut tax."

Doubtless some additional individual papers and reports bearing on the subject might be found and summarized if a complete review were here necessary; but as the intention is merely to lead up to the general Report by indicating the main features of the problem as envisaged in past years, a fuller treatment of the subject would occupy too much space.

2. OFFICIAL REPORTS.

Report of the Tuberculosis Commission, Union of South Africa,[34] *Cape Town,* 1914.

A Commission was appointed on February 25th, 1912—

(*a*) To enquire into and to take evidence for the purpose of ascertaining the extent and causes of the prevalence and spread of tuberculosis, in its various forms, among Europeans, Coloured persons, Natives and Asiatics in the different areas of the Union, etc., and

(*b*) To enquire into and take evidence for the purpose of ascertaining the extent and causes of the mortality of Natives employed on the Witwatersrand Mines, and their susceptibility to pneumonia, with special reference to those coming from tropical areas, and to make recommendations thereon.

The Commissioners were Drs. A. John Gregory, A. Jameson, T. te Water, Charles Porter and G. A. Turner.

It may be said at once that, although unfortunate differences of opinion amongst the Commissioners made it impossible to formulate unanimous conclusions or recommendations, the Report is of the highest value and provides a mine of information for all future students of tuberculosis in South Africa. It would be quite impossible to summarize a Report covering 352 closely printed pages, nor is this necessary,

as the original document is available for study. Here, however, it is desirable to quote verbatim a few paragraphs of the " Summary of the Facts concerning the Prevalence of Tuberculosis, as regards Natives," given on page 123 of the Report.

" 1. Tuberculosis is of comparatively recent introduction among he Bantu tribes.

" 2. We are satisfied that it has now become a most serious menace to the future of the Native races throughout the Union ; that it is increasing, and that unless effective measures are taken it is likely to materially increase.

" 3. The disease, however, prevails to a variable extent among the different Native tribes and communities, from a comparatively small degree in the raw Native who remains in his kraal and who has come into but little contact with civilization, up to a very large amount occurring among those brought under the influence of European industrialism and living under conditions, to the Native, of exceptional stress. There are many gradations between these extremes. No single term, therefore, will define the extent of its prevalence among the Natives.

" 4. The prevalence is in proportion to the degree and duration in which the following factors have operated :—

" (*a*) The adoption of civilized habits and modes of life as practised by the Natives, including clothing, housing and diet.

" (*b*) The change from the freedom and openness of kraal life to town locations, compounds, barracks, Kafir lodging-houses and other close aggregation.

" (*c*) The change from a leisurely life to one of continual labour under more or less arduous conditions.

" (*d*) The coming into contact with massive infection by association with the European and Coloured races.

" (*e*) The indulgence in deleterious kinds of alcoholic liquor.

" 7. Pulmonary and acute general tuberculosis predominate, more especially among adult males. Among females and children there is a large proportion of glandular cases, mostly cervical, especially among the less civilized and raw Natives.

" 8. Speaking generally, it is found to be least prevalent in Zululand and the Northern Transvaal, more so in Basutoland, still more in the Cape Native Territories, and most widespread among Natives in the settled districts of the Cape Province.

" 9. Tuberculosis is excessively prevalent among Natives working in the large industrial centres and especially on the mines—gold, diamond and mineral.

" 10. Owing to the extent to which the disease occurs on the mines and the large number of Natives employed thereon, together with their frequently changing personnel, the mining industry is one of the most important of all the factors in the cause and diffusion of the disease among the Native population.

" 15. There are special factors in operation on the mines which predispose to tuberculosis among mine workers." . . .

(Paras. 5, 6, 11, 12, 13 and 14 are here omitted but should be read in the original.)

The " special factors " referred to in para. 15 would appear to be those set out on page 208 of the Report, as follows :—

(*a*) The admission of tuberculous workers into the compounds and mines.

(*b*) Conditions of the compounds favouring the retention and diffusion of infection when introduced, *i.e.*, bad lighting, inefficient ventilation, uncleanliness.

(*c*) Overcrowding and other conditions bringing the healthy into contact with infection either already existing free or being given off by infective individuals.

The relatively slow spread of tuberculosis in the kraals, referred to in the Summaries of Reports by Macvicar and others (p. 41) is also noted by the Commissioners. " It has frequently been asked why—if such a large number of boys are being continuously returned from the mining and other industrial centres to their kraals suffering from . . . tuberculosis—we do not find many more cases in the kraals and see it spreading more than appears to be happening. But obviously, if cases rapidly succumb, there would never be at any one time many cases to be seen or to spread infection." They add : " It must not be forgotten that for every case which has become established and has developed to the extent of producing marked lesions and symptoms of tuberculosis, there must be many others who, having become infected, are still maintaining a successful resistance to the invasion, and for these the return to the open life of the kraal is their salvation . . . they are . . . the cases which would, if they were known, furnish a powerful argument for the system of short contracts and frequent returns to kraal life for all Native labourers on the mines and at labour centres. . . . The influence of the open life of the kraal suggests an explanation of the circumstance, so frequently referred to in this Report, that in the kraals of those suffering from tuberculosis so few women and children appear to be affected with the pulmonary and generalized forms of the disease, but that tuberculous glands seem to be the common manifestation. It is possible that the early limitation to the glands is because of the power of resistance not having been depressed by overstrain and unhealthy environment to which the men are exposed at labour centres."

The bearing of Borrel's observations on the Senegalese troops (p. 19) in France and his division of their tuberculosis into a preliminary " glandular " phase and, under the stress of military duty, a subsequent " generalized " stage, will be apparent in connexion with these remarks of the Commissioners.

Speaking of the disease, in relation to its type and course in the developed cases in Natives, they report as follows : " In its clinical and pathological characters, the disease in the Natives differs markedly

from that in the European. Post-mortem the infection is found usually to be more diffuse and to partake more of the nature of an acute general systemic infection. The tendency to limitation of the lesion . . . by the supervention of fibrotic and caseous and calcareous changes is not seen to any extent."

The conclusions of the Commissioners, while not unanimous, contain a long series of sound recommendations which do not lend themselves to summary and must be studied in their Report. They lay special emphasis on " the fact that measures for combating tuberculosis must begin with the prevention of cases, and that the way to effect this is by improving the conditions under which so large a proportion of the Coloured and Native population live in urban areas and by improving the conditions under which they work in the industrial centres, especially on the mines."

The Gorgas Report, 1914.

In 1914 was published in pamphlet form a " Recommendation as to Sanitation concerning Employees of the Mines on the Rand," by Surgeon-General W. C. Gorgas,[35] United States Army and Chief Sanitary Officer, Isthmian Canal Commission.

This brief but exceedingly valuable Report deals not only with tuberculosis but with health in general.

Gorgas, very rightly, approached the question of bacterial disease as, to some extent, a single problem.

" On analyzing the reports for 1912," he says, " we find that the total death-rate was 22·6 for diseases. The four highest diseases were pneumonia, phthisis, meningitis and enteric fever, giving us rates of 9·8, 5·4, 1·3 and 1·1. These four diseases are all more or less infectious and contractable. If they could be got rid of entirely, the death-rate for 1912 would be reduced to 5·0 for all causes. While entire eradication of these diseases cannot at present be accomplished in this or any other community, probably, by proper hygienic measures, a very appreciable reduction could be accomplished."

Turning to the specific form of tuberculosis, Gorgas thinks the incidence and mortality far too high amongst mine Natives. Allowing for error in diagnosis, he estimates the wastage from this disease as 10·87 per 1,000 in 1912 ; and records his opinion " that, for the future, present conditions continuing, tuberculosis will cause more trouble among Natives than pneumonia does at present." He points out that overcrowding " plays just as important a part in the spread of tuberculosis of types other than pulmonary tuberculosis as it does in the pulmonary types."

Careful routine medical examination should be made of the sick and, when one is found to have tuberculosis, he should be excluded from the mine. As far as the Native is concerned, the most important single measure is that recommended for pneumonia, that is, " scattering."

"No argument is necessary to prove that by reason of close personal contact, if we have 100 men in a room, with 25 feet of floor space, infection would spread more rapidly and generally than if we had 50 men in the same room having 50 feet of floor space."

"In general, the care of the compound yards showed everywhere neatness, cleanliness and commendable care and discipline. But when we came to examine the interior of the Native living quarters, the very opposite was the case. . .

"I have never seen so large a proportion of the ration supplied by one article as is here supplied by mealie meal. A Native labour force living with their families near the mine would be more stable and contented than the present force."

In conclusion, he reports as follows : "Of the sanitary recommendations, I consider that of increasing the floor space to about 50 feet the most important and pressing, and by far the best way of doing this to be the village hut system and the introduction of families. If this particular method cannot be carried out, to come as near as feasible. The second in importance I consider to be the improvement in the hospital system and the care of the sick. . . . The third in importance is the establishment of a central sanitary bureau or department under the Chamber of Mines—the head of this department to represent the mines on all sanitary questions."

Evidently Surgeon-General Gorgas laid great stress on the passing of tuberculous, as well as other bacterial infection, from man to man in the compounds. He suggested the division of the barracks, as he called the large rooms in the compounds, into smaller rooms to contain not more than 12 to 15 men, and he advised separate sheds for messing to avoid the collection of food and utensils in the sleeping rooms. It is evident that he had heard the argument, still frequently used, as to the fact that many of the old compounds compare favourably with the more modern and spacious ones in regard to disease production, for he adds :—

"There are a considerable number of compounds in which the death-rate has been low for a considerable number of years. They are frequently the old compounds which the Native prefers, and therefore they contain a larger number of old 'boys.'"

This question of the risk of personal contact of Native with Native in a crowded room is a serious one and raises problems as to the number of "tubercle bacillus carriers" at large in the compounds. On this point some valuable information was obtained by Watkins-Pitchford, A. J. Orenstein and W. Steuart[36] in 1916. These observers, in the course of an intensive examination of 400 Native mine workers, selected at random, and investigated by X-ray, clinical and laboratory methods, found "that the disease (tuberculosis) in its open or communicable stage is far less prevalent amongst Natives actually working on the mines than has been hitherto supposed ; only 1 case, out of 400 examined, has been detected."

Watkins-Pitchford, however, in a later paper,[37] reports that, in 1913, he examined "250 specimens of sputum which had been collected in various underground workings and found that 38 (15·2 per cent.) contained the infection of tuberculosis." To this observation further reference will be made later (see p. 151), but it is of much importance as it stands.

There are various important discussions on tuberculosis in the Proceedings of the Transvaal Mine Medical Officers' Association from 1921 onwards, but it is not proposed to attempt to summarize these, as discussions do not lend themselves to profitable condensation. The attention of readers is directed especially to Volume 11, No. 1, of May, 1922; No. 4, of August, 1922; No. 6, of October, 1922, and Nos. 9 and 10, of January-February, 1923.

Report of Tuberculosis Survey of the Union of South Africa, 1924, *by Peter Allan*,[38] *M.D., D.P.H., Medical Inspector, Department of Health.*

This valuable Report immediately preceded the formation of the Tuberculosis Research Committee and may almost be regarded as a part of the present enquiry, since Dr. Allan has continued his studies of tuberculosis in the Transkei and Ciskei for the Committee, and his completed observations form part of this Report. It is convenient, however, to quote a few of his conclusions, bearing on the picture of tuberculosis in the South African Native as it had taken shape previous to the initiation of the present enquiry.

After a preliminary survey of the Native territories, Dr. Allan was able to form the opinion that :—

(*a*) Tuberculosis is a common and widespread disease among the Natives of the Transkei and Ciskei.

(*b*) There is evidence that in their natural surroundings the Natives in these territories have a considerable degree of resistance to tuberculosis.

(*c*) As regards the fate of mine boys repatriated with tuberculosis, 112 were traced, of whom 65 were dead and 47 were still alive. Of the 47 still alive, 28 or 59·5 per cent. had recovered sufficiently to be able to work.

(*d*) It is difficult, without extensive examinations and diagnostic tests, to ascertain the extent to which infection from returned mine boys is affecting the general Native population. The small figures at present available indicate that about 25 per cent. of cases seen at the Holy Cross Mission in Pondoland either contracted the infection on the Rand or from relatives who had returned from the Rand.

Dr. Allan was evidently impressed with the part played by insufficient food in adding to the liability of infected persons to develop clinical tuberculosis ; and the tendency for tuberculosis incidence and mortality to fall when good and sufficient nourishment is available. He quoted Dr. Wildish, of Eshowe, and the members of the Norwegian Mission

at Entumeni to this effect. In resuming the results of his survey, he is able to point to a satisfactory fall in the tuberculosis death-rate in Whites in the Transvaal, the figures for 1921 reaching the very low levels of 74·4 per 100,000 males, and 21·66 per 100,000 females; an average of 49·16 per 100,000 for the total White population; and this in spite of the miners' phthisis, which helps to explain the higher mortality in males. While accurate figures for the Native population were unobtainable, the death-rate among the mixed Coloured in the Cape Province was found to be about five times greater than among Europeans, following, however, the curve of European tuberculosis in its general tendency to decrease. From these facts, Allan concludes that each race living under constant conditions as regards habits, work and chances of infection, etc., has its own index of tuberculosis mortality.

He considers that at least four factors influence this index, all these factors being inter-dependent. They are as follows:—

(*a*) Susceptibility of the different races and individuals to tuberculosis.

(*b*) Chances of infection and degrees of infection.

(*c*) Resistance of infected persons to disease.

(*d*) Economic conditions.

Dr. Allan's report is illustrated with interesting tables and graphs which must be studied in the original.

In 1926 appeared a valuable pamphlet, on popular lines, from Dr. J. A. Mitchell,[39] of the Department of Public Health of the Union of South Africa. This pamphlet, entitled "Tuberculosis: Summary of Causes and Preventive Measures," lays stress on "overcrowding and bad housing, leading to increased personal contact between and close association of the infected and healthy," as one of the principal factors causing the disease. It is mentioned here as an indication that the importance of educating the public in regard to tuberculosis is receiving official recognition.

There are also many references to tuberculosis in the numerous official reports on silicosis and miners' phthisis, such as the "Report of a Commission on Miners' Phthisis and Pulmonary Tuberculosis," Cape Town, 1912; the "Interim Report of the Miners' Phthisis Commission," 1921, and the successive Annual Reports of the Miners' Phthisis Board and Medical Bureau from 1917 onwards; but as these publications have special reference to the dust factor and, where they refer to tuberculosis, bear on this disease as a complicating element in the development of silicosis, they are not summarized here.

3. BOVINE TUBERCULOSIS.

Macvicar,[27] after a brief account of reports received by him from various sources in reply to his enquiries, sums up the situation, for 1907, as follows: "The evidence, then, of the veterinary surgeons goes to show that throughout the greater part of South Africa, bovine tuberculosis is absent except among imported cattle. The disease seems to

have become established among colonial-grown cattle only in the west of Cape Colony. This distribution is much less wide than that of tuberculosis among the Natives. There is danger of error in pressing a comparison like this, but I think it is a significant fact that a careful observer like Mr. Hutcheon (head of the Veterinary Department of Cape Colony) should not have met with any bovine tuberculosis in a district of the Colony in which, during the ten years of his residence and for long before, human tuberculosis is known to have been very common. On the other hand, it would appear that bovine tuberculosis is relatively more common in Madagascar than human tuberculosis and at Inhambane human tuberculosis is fairly common, although there are hardly any cattle in the locality."

After a careful analysis of the distribution of tabes mesenterica, which he regards as possibly an index of milk infection, Macvicar is forced to the conclusion that "in Cape Colony bovine tuberculosis has at the present time very little to do with the production of human tuberculosis."

The subject of bovine tuberculosis receives much attention in the report of the Tuberculosis Commission[34] of 1914, already referred to. Much evidence was taken and the subject evidently regarded as very important.

As to the early history of bovine tuberculosis in the Cape Province, the Chief Veterinary Surgeon of the Union, Mr. C. E. Gray, is quoted as stating that until 1905 he had held the opinion "that for all practical purposes this disease did not exist in South Africa," and this view was endorsed by Mr. J. D. Borthwick, an official of the Veterinary Department, who considered that it was not until 1904 that in the Cape the prevalence of tuberculosis in dairy herds began to attract serious attention.

"For many years, the Western Province of the Cape has been supplying colonial-bred breeding stock, much of it of the Friesland breed, to the rest of South Africa, and there is evidence that by this means the disease has been distributed in widely different parts of the Union." Speaking of Natal, the Commissioners report that "shortly after the (South African) war, considerable numbers of Madagascar cattle were imported. In 1906, out of a consignment of 64 such cattle landed at Durban, no fewer than 42 reacted to tuberculin, many of them being very severely affected with the disease. Also, 65 per cent. of Madagascar cattle imported through Port Elizabeth were found to be tuberculous."

"The testing of dairy herds in Natal has recently disclosed high percentages of animals to be infected. Thus, of 152 animals tested on account of the discovery of cases of tuberculosis, 43 reactors were discovered, slaughtered and proved tuberculous post-mortem, or 28·2 per cent. Of 56 tested without suspicion of tuberculosis, 14 reacted and were destroyed, or 25 per cent."

The findings at the municipal abattoirs at Johannesburg for 1910 to 1912 and 1912 to 1913 showed an increase of from 0·34 to 0·807 per 1,000 of tuberculosis in oxen ; and a rise from 7·19 to 9·99 in pigs. The Commissioners state that, in many cases, " the amount of tuberculosis in swine has increased enormously owing to the practice of feeding on the waste products of creameries."

Several instances are given of the tracing back of the infection discovered in oxen at the abattoirs to the dairy herds concerned ; in which subsequent tuberculin tests proved the herd to be seriously infected.

" The general opinion of all the expert witnesses examined by the Commission was to the effect that there was probably very little tuberculosis among the veld cattle of the Union. Also that there is not likely to be much among draught cattle. But among imported stock, among the better class of South African breeding stock and in dairy cattle, especially in the better-bred heavy milch cows, it probably exists to a very considerable extent." The Commissioners were impressed with the desirability of ascertaining " with some degree of certainty the extent of the evil that has to be dealt with." They point to the inadequacy of the Veterinary Staff for such an investigation and to the unsatisfactory state of the legal provisions and statutes relating to animal tuberculosis.

The report goes fully into the question of destruction of " reactors," the compensation for animals destroyed, and the duty of the Government in regard to the carrying out of testing and other measures ; and recommends the establishment of a State insurance fund ; and makes recommendations as to the control of milk supplies and of meat supplies —all of which deserve study in the original report.

P. Allan,[38] in his report of 1924 already referred to, lays much stress on the importance of prevention of infection from bovine sources as a measure for the combating of human tuberculosis in South Africa. He writes as follows : " A milk supply free from tuberculosis infection must be secured. There is reason to believe that tuberculosis is present to a considerable extent amongst cattle in the Union. Testing with tuberculin has not been carried out systematically, but in several instances . . . a high percentage of reactors has been found—as high as 73·9 per cent. in one dairy herd in the Cape Peninsula."

Sufficient has been said to show that, as appears to be the case with the Native races of man, so with the native cattle tuberculosis was rare or unknown until infected stock was introduced from other countries. And the danger to the indigenous stock appears to be in direct proportion to the degree of contact with foreign cattle to which they are exposed.

The latest information available as to the prevalence of bovine tuberculosis in South Africa is given in Appendix 10, which is a summary of information collected from various municipalities by the Committee.

The subject also receives some consideration in the bacteriological section of this Report (see p. 149).