

Report of the Medical Officer of Health on the public health and sanitary circumstances of Johannesburg.

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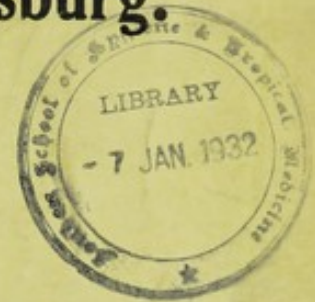
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Municipal Council of Johannesburg.



REPORT of the MEDICAL OFFICER OF HEALTH on the PUBLIC HEALTH and SANITARY CIRCUMSTANCES of JOHANNESBURG during the Three Years, 1st JULY 1916—30th JUNE 1919.

CHARLES PORTER M.D., D.P.H., *Barrister-at-Law,*

*Medical Officer of Health; Hon. Cons. Medical Officer to the Rand Water Board
and to the Rand Central School Board; Medical Officer under Native
Labour Regulations, Johannesburg Mining District.*

JOHANNESBURG,
JUNE, 1920.



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SUMMARY OF STATISTICS

M.O.H. 1916-19.

FOR THE

MUNICIPALITY OF JOHANNESBURG.

Latitude.—26 degrees 11 minutes 44 seconds South.

Longitude.—1 hour 52 minutes 10 seconds East.

Altitude.—The population of Johannesburg resides at a mean elevation of 5,850 feet.

Area.—The area of the Municipality of Johannesburg is 52,330 acres (*vide Government Gazette*, October, 1903); the extreme length, 11½ miles; extreme breadth, 9½ miles; extent of perimeter, 41½ miles.

Houses.—At the Census in May, 1911, there were within this area 27,285 occupied houses. There were also 1,074 unoccupied houses and 412 in course of erection.

Annual Rateable Value.—The annual rateable value of property within the Municipality of Johannesburg, as assessed in accordance with Ordinance 43 of 1903, and representing "the full and fair price or sum which the same " would realise if brought at the time of valuation to voluntary sale," was in 1917-18, £31,312,622.

The Town Council can impose a rate not exceeding 7d. in the £. The rate for 1917-18 was 4d. in the £ on land and 1½d. on buildings. Rate produced £362,082.

In 1918-19, the valuation was: Land, £14,101,139; rate imposed, 7d. in the £ and an additional rate of 6d. in the £ on mining improvements. Amount produced, £426,642 4s. 8d.

POPULATION.	Whites.	Natives.	Eurafricans.	Asiatics.	Total Persons.
1918 Government Census (5th May, 1918) ...	140,750	—	—	—	—
Estimated for 1916-19 ...	140,750	105,520	18,610	—	264,880

	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19
MARRIAGES ...	1,646	1,535	1,721	1,630	1,531	1,655
PERSONS MARRIED ...	3,292	3,070	3,442	3,260	3,062	3,310
MARRIAGE-RATE per 1,000 population (white) ...	24.56	22.91	24.58	23.16	21.75	23.51
BIRTHS (white) ...	4,271	4,103	4,157	4,124	4,195	4,176
BIRTH-RATE per 1,000 population (white) ...	31.87	30.61	29.69	29.30	29.80	29.66

DEATH-RATES.	Whites.		Natives.	Eurafricans.	Asiatics.	All Persons.
	Gross.	*Corrected for Age and Sex distrib.				
1903-4 ...	17.2	—	—	32.4	19.5	23.9
1904-5 ...	15.2	21.12	—	29.3	7.3	20.8
1905-6 ...	17.5	24.3	—	32.4	11.3	22.9
1906-7 ...	13.0	—	—	28.6	24.4	20.8
1907-8 ...	12.6	—	—	29.3	24.1	21.0
1908-9 ...	14.1	—	—	31.3	14.7	22.1
1909-10 ...	11.3	12.9972	24.5	25.2	18.5	18.3
1910-11 ...	13.3	15.2976	33.6	31.1	19.7	23.4
1911-12 ...	11.6	13.3423	25.5	24.4	—	18.9
1912-13 ...	10.52	12.10	27.63	23.21	—	18.68
1913-14 ...	8.98	10.32	16.34	21.19	—	12.66
1914-15 ...	10.84	†	18.00	28.11	—	14.39
1915-16 ...	9.55	—	19.95	21.81	—	14.32
1916-17 ...	12.04	—	16.73	23.21	—	14.69
1917-18 ...	10.55	—	14.14	20.25	—	12.69
1918-19 ...	16.06	—	25.94	38.15	—	21.94

* Factor for correction 1.1502.

† No factor available (see page 6).

30th June, 1920.

TO HIS WORSHIP THE MAYOR OF JOHANNESBURG.

MR. MAYOR,—I have the honour to present herewith my Report for the official Triennium 1916-19, the belated appearance of which is, in some respects, due to war conditions during the years under notice, and subsequent personal pressure of routine work.

The *birth-rate* amongst Whites for each of the three years under review was between 29 and 30 per 1,000 of population, which is a high figure.

The *death-rate* amongst White residents was 12.04, 10.55 and 16.06 respectively for these three years, the influenza mortality being responsible for the high figure for 1918-19.

The *White infantile mortality-rates* were respectively 108.8, 81.0 and 89.79, the two latter figures being comparatively satisfactory.

As regards infectious disease, the principal events were a severe epidemic of scarlet fever in June, July and August 1918, an outbreak of infantile paralysis in the later months of 1917 and the early months of 1918, and the influenza epidemic of October 1918. A few cases of the mysterious malady known as encephalitis lethargica (sometimes called "sleeping palsy") also occurred. Its nature and its relation to infantile paralysis and epidemic influenza are referred to at pages 28 and 29.

Smallpox infection was repeatedly introduced in 1916-17 by natives from Mafeking, with a serious resulting spread to Coloured, and afterwards to White, residents of this community. Further outbreaks occurred in 1918-19, the circumstances of which emphasised the necessity of systematic vaccination of native women and children, as has long been enforced in regard to native males.

In August 1916, I presented a Special Report to the Council on Venereal Disease and a scheme for its prevention, but, for various reasons, no practical effect was given thereto for the period under notice.

Your attention is invited to the sections of this Report dealing with:—

- (1) Infantile Mortality and Child Welfare (p. 9, etc.).
- (2) Infantile Paralysis Outbreak (p. 24).
- (3) Dr. Milne's Report on the Influenza Epidemic (p. 25).
- (4) The Work of Outside Dairy Inspection (p. 30).
- (5) *Résumé* of the History and Present Condition of your Sewage Farm, with much of which many members of the present Council are unfamiliar (p. 33).
- (6) Record of Mines Sanitation Work (p. 35).
- (7) Question of Further Closure of Slum Property (p. 37).
- (8) Report on the Malay Location (p. 38).

My grateful acknowledgments are again due to Dr. Watkins Pitchford (Director of the South African Institute for Medical Research) and to Dr. McCrae (Government Analyst) for continued unfailing assistance and most kindly co-operation. I am also indebted to my colleagues, the Heads and Sub-Heads of Departments.

I have the honour to be,

MR. MAYOR,

Your obedient servant,

CHARLES PORTER,

Medical Officer of Health.

30th June, 1920.

REPORT

OF

MEDICAL OFFICER OF HEALTH

For Period from 1st July, 1916, to 30th June, 1919.

POPULATION.

WHITES (<i>as at Government Census, 5th May, 1918</i>):			
Males, 71,174; Females, 69,576; Persons	...	...	140,750
NATIVES (<i>estimate based largely on Native Affairs returns</i>)			105,520
EURAFRICANS AND ASIATICS (<i>estimate</i>)	...	...	18,610
Total	...		<u>264,880</u>

MARRIAGES.

For the three years 1st July, 1916, to 30th June, 1919, the White marriage-rate was 23.16, 21.75 and 23.51 per 1,000. For the triennium, the rate was 22.45. In 1919, the figure for London was 24.9 and for England and Wales 19.7. For the three-year period ending 30th June, 1914, the Johannesburg rate was 24.27.

BIRTHS.

From 1st July, 1916, to 30th June, 1917, the number of White births registered was 4,124; from 1st July, 1917, to 30th June, 1918, 4,195; and from 1st July, 1918, to 30th June, 1919, 4,176.

The White birth-rate was high, being equal to 29.30 per 1,000 for 1916-17, 29.80 in 1917-18 and 29.66 in 1918-19. For "The 96 Great Towns" of England and Wales, in 1919 the birth-rate was 19.05.

White Illegitimate Births.—These numbered 145, 141 and 152 for the three years under review, and during these periods constituted about 3.5 per cent. of all births, as against 5.9 in England and Wales in 1919.

The native and coloured births registered during 1916-17, 1917-18 and 1918-19 numbered respectively 1,206, 1,315 and 1,239. But as the ratio of females to males in the native and coloured population is only about 1 to 15, it would merely mislead to strike a birth-rate.

In the consideration of vital statistics, a correct appreciation of the influence of birth-rate upon death-rate is essential. In large towns, "high death-rates go with high birth-rates. High death-rates, however, are not the result of high birth-rates—they are more generally caused by bad sanitary conditions. Populations having a continuously high birth-rate should (sanitary conditions being equal) have lower death-rates than populations having low birth-rates; for if, year by year, the births exceed the deaths amongst a population, not only are additional children under 5 years of age, whose mortality is high, added to the population, but a still larger increase of those between 10 and 40, whose mortality is low, takes place, and counterbalances the other: whilst the proportion of old people over 55 to the total population is diminished. Conversely, a continuously low birth-rate means a small proportion of young adults and a large proportion of old people, and is therefore unfavourable to a low death-rate."—(*Newsholme*.)

M.O.H. 1916-19.

DEATHS AND DEATH-RATES.

The deaths herein referred to are those of persons who died within the extended Municipal Area as defined by Proclamations 13 of 1902 and 46 of 1903.

RACE.	DEATHS.		DEATH-RATE per 1,000.	
	Total.	Of Non-Residents.	Gross Recorded.	Excluding Non-Residents.
1916-17—				
Whites	1,852	156	13·15	12·04
Natives	2,061	295	19·53	16·73
Eurafricans	324	22	27·50	23·21
Asiatics	132	3	16·49	14·69
All Persons	4,369	476		
1917-18—				
Whites	1,661	174	11·80	10·55
Natives	1,737	244	16·46	14·14
Eurafricans	273	9	21·01	20·25
Asiatics	118	5	14·30	12·69
All Persons	3,789	432		
1918-19—				
Whites	2,261	215	17·59	16·06
Natives	2,843	369	30·43	26·94
Eurafricans	447	10	38·85	38·15
Asiatics	263	3	21·20	21·94
All Persons	5,814	597		

FACTORS FOR CORRECTION.

These "factors" have not been applied in this Report, for the reasons stated at p. 8 of Medical Officer of Health's Report, 1914-15.

INFANTILE MORTALITY, i.e., deaths of infants under 1 year per each 1,000 births registered:—

RACE.	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19
Whites	84·99	105·28	79·62	108·87	81·04	89·79
Natives and Euraficans	267·15	340·31	330·55	334·96	298·50	401·37
Asiatics	385·54	289·85	192·85	197·80	225·70	227·27

DEATH-RATE IN BRITISH, COLONIAL AND FOREIGN CITIES.—Appended, for purposes of comparison, are particulars as to the "Death-rate per 1,000 from All Causes" in large cities in other parts of the world:—

Greater London (i.e., Metropolitan and City Police Districts) ...	13·4 (1919)	Pretoria	20·18 (1918-19)
"96 Great Towns" of England and Wales	13·8 ..	New Orleans	18·2 (1919)
Bombay (including plague deaths)	70·1 ..	New York	12·4 (1919)
Madras do. do.	—	JOHANNESBURG—	
Paris	15·9	Whites	12·04 (1916-17) 10·55 (1917-18) 16·06 (1918-19)
Calcutta	42·6	Natives	16·73 (1916-17) 14·14 (1917-18) 26·94 (1918-19)
East London	15·4 (1918-19)	Coloured and Asiatics	23·21 (1916-17) 20·25 (1917-18) 38·15 (1918-19)
Durban	9·8 (1917-18)	All Persons...	14·69 (1916-17) 12·69 (1917-18) 21·94 (1918-19)
Kimberley	49·1 (1918)		
Capetown	26·0 (1918-19)		

Except in regard to South African Towns, these figures are taken from the Quarterly Returns of the Registrar-General for England and Wales, 1919.

CAUSES OF DEATH.

The causes of and ages at death and the local distribution have been analysed separately for 1916-17, 1917-18 and 1918-19 in the usual Tables A to D for "Whites," "Natives," "Eurafricans" and "Asiatics" respectively. For reasons of economy, these voluminous tables have not, however, been printed, but are available for inspection.

FACTORS OF MORTALITY, 1915-16, 1916-17, 1917-18 AND 1918-19.

M.O.H. 1916-19.

DISEASE.			1915-1916.		1916-1917.		1917-1918.		1918-1919.	
			Deaths.	Rates.	Deaths.	Rates.	Deaths.	Rates.	Deaths.	Rates.
Enteric Fever ...	...	W.	11	0.07	13	0.08	18	0.12	19	0.13
		N.	39	0.37	35	0.33	45	0.42	27	0.25
		E.	—	—	2	0.107	1	0.053	—	—
		A.)	—	—	—	—	—	—	—	—
Scarlet Fever ...	...	W.	1	0.007	5	0.035	45	0.31	30	0.21
		N.	—	—	—	—	—	—	1	0.009
		E.	—	—	—	—	—	—	1	—
		A.)	—	—	—	—	—	—	—	—
Tuberculosis of Lungs ...	...	W.	67	0.47	68	0.48	50	0.35	59	0.41
		N.	334	3.18	201	1.90	175	1.64	217	2.05
		E.	—	—	24	1.28	25	1.34	18	0.94
		A.)	21	1.46	—	—	—	—	—	—
Heart Diseases ...	...	W.	122	0.87	175	1.24	177	1.25	140	0.99
		N.	63	0.60	86	0.81	65	0.61	36	0.34
		E.	—	—	31	1.66	23	1.23	12	0.64
		A.)	27	1.88	—	—	—	—	—	—
Pneumonia ...	...	W.	109	0.77	163	1.15	107	0.76	205	1.45
		N.	619	5.89	371	3.51	310	2.93	427	4.04
		E.	—	—	63	3.38	57	3.06	89	4.78
		A.)	40	2.79	—	—	—	—	—	—
Other Respiratory Diseases ...	...	W.	58	0.41	73	0.51	52	0.36	93	0.66
		N.	56	0.53	49	0.46	35	0.33	98	0.92
		E.	—	—	28	0.53	11	0.59	50	2.68
		A.)	13	0.90	—	—	—	—	—	—
* Congenital Debility and Malformation ...	...	W.	142	1.01	170	1.20	157	1.11	155	1.10
		N.	75	0.71	93	0.88	92	0.87	93	0.88
		E.	—	—	53	1.50	53	1.50	44	2.36
		A.)	43	3.00	—	—	—	—	—	—
Violent Deaths ...	...	W.	89	0.63	72	0.51	63	0.44	63	0.44
		N.	294	2.80	288	2.72	193	1.82	150	1.42
		E.	—	—	10	0.53	12	0.64	7	0.37
		A.)	11	0.76	—	—	—	—	—	—
Diarrhoeal Diseases ...	...	W.	141	1.00	224	1.59	132	0.93	135	0.95
		N.	90	0.85	142	1.34	103	0.97	132	1.25
		E.	—	—	67	3.60	55	2.95	68	3.65
		A.)	57	3.98	—	—	—	—	—	—
Meningitis ...	...	W.	30	0.21	23	0.16	27	0.19	23	0.16
		N.	156	1.48	125	1.18	105	0.99	75	0.71
		E.	—	—	10	0.53	7	0.37	8	0.42
		A.)	7	0.48	—	—	—	—	—	—
Measles ...	...	W.	4	0.02	48	0.34	6	0.04	23	0.16
		N.	7	0.06	13	0.12	4	0.037	7	0.06
		E.	—	—	15	0.806	1	0.053	5	0.26
		A.)	1	—	—	—	—	—	—	—
Whooping Cough ...	...	W.	5	0.03	23	0.16	18	0.12	6	0.04
		N.	2	0.01	—	—	7	0.066	3	0.02
		E.	—	—	3	0.16	1	0.033	1	0.05
		A.)	4	0.27	—	—	—	—	—	—
Diphtheria ...	...	W.	14	0.10	25	0.17	25	0.17	10	0.07
		N.	1	0.009	2	0.018	1	0.009	1	0.009
		E.	—	—	1	0.053	1	0.053	1	0.05
		A.)	—	—	—	—	—	—	—	—
Cancer ...	...	W.	82	0.58	100	0.71	114	0.80	95	0.67
		N.	13	0.12	8	0.075	8	0.075	15	0.14
		E.	—	—	4	0.21	9	0.48	6	0.32
		A.)	3	0.20	—	—	—	—	—	—

* "Congenital Debility and Malformation" include congenital malformations, injuries and debility at birth, atelectasis icterus neonatorum, atrophy, marasmus, dentition, rickets.

M.O.H. 1916-19.

FACTORS OF MORTALITY, 1915-16, 1916-17, 1917-18, AND 1918-19 (Continued).

DISEASE.				1915-1916.		1916-1917.		1917-1918.		1918-1919.	
				Deaths.	Rates.	Deaths.	Rates.	Deaths.	Rates.	Deaths.	Rates.
Influenza	W.	6	0.04	6	0.04	7	0.04	667	4.73		
	N.	—	—	1	0.009	—	—	1,157	10.96		
	E.)	—	—	1	0.053	—	—	263	14.13		
	A.)										
Cerebral Haemorrhage and Softening	W.	46	0.32	45	0.31	48	0.34	43	0.30		
	N.	9	0.08	18	0.17	10	0.09	3	0.02		
	E.)	6	0.41	9	0.48	5	0.26	—	—		
	A.)										
Acute Bronchitis	W.	25	0.17	33	0.23	37	0.26	38	0.26		
	N.	23	0.21	55	0.52	50	0.47	64	0.60		
	E.)	31	2.16	41	2.20	45	2.41	72	3.86		
	A.)										
Chronic Bronchitis	W.	23	0.16	20	0.14	19	0.13	27	0.19		
	N.	3	0.02	11	0.104	6	0.056	14	0.13		
	E.)	7	0.48	4	0.21	5	0.26	6	0.32		
	A.)										
Acute Nephritis and Bright's Disease	W.	30	0.21	36	0.25	43	0.30	31	0.22		
	N.	14	0.13	18	0.17	22	0.20	20	0.18		
	E.)	9	0.62	9	0.48	4	0.21	4	0.21		
	A.)										
Silicosis	W.	78	0.55	83	0.58	61	0.43	78	0.55		
	N.	38	0.36	23	0.21	20	0.18	46	0.43		
	E.)	2	0.13	1	0.053	6	0.32	4	0.21		
	A.)										
Other Forms of Tuberculosis ...	W.	7	0.05	9	0.06	4	0.028	14	0.09		
	N.	91	0.86	60	0.56	86	0.81	88	0.83		
	E.)	3	0.20	5	0.26	15	0.806	10	0.53		
	A.)										

The following observations are suggested by inspection of this Table:

1. That during 1916-17, 1917-18 and 1918-19 the Chief Factors of Mortality were:

- (a) For Whites: Influenza (680 deaths: 6, 7 and 667 respectively); heart diseases (492: 175, 177 and 140); diarrhoeal diseases (491: 224, 132 and 135); congenital debility (482: 170, 157 and 155); pneumonia (475: 163, 107 and 205); cancer (309: 100, 114 and 95); silicosis (222: 83, 61 and 78); other respiratory diseases (218: 73, 52 and 93); violent deaths (198: 72, 63 and 63); tuberculosis of lungs (177: 68, 50 and 41); cerebral haemorrhage (136: 45, 48 and 43); acute nephritis and Bright's disease (110: 36, 43 and 31); acute bronchitis (108: 33, 37 and 38); scarlet fever (80: 5, 45 and 30); measles (77: 48, 6 and 23); meningitis (73: 23, 27 and 23); chronic bronchitis (66: 20, 19 and 27); diphtheria (60: 25, 25 and 10); enteric (50: 13, 18 and 19); whooping cough (47: 23, 18 and 6); and other forms of tuberculosis (27: 9, 4 and 14).
- (b) For Natives: Influenza (1,158: 1, 0 and 1,157 respectively); pneumonia (1,108: 371, 310 and 427); violent deaths (631: 288, 193 and 150); tuberculosis of lungs (594: 201, 175 and 217); diarrhoeal diseases (377: 142, 103 and 132); meningitis (305: 125, 105 and 75); congenital debility and malformation (278: 93, 92 and 93); other forms of tuberculosis (234: 60, 86 and 88); heart diseases (187: 86, 65 and 36); other respiratory diseases (182: 49, 35 and 98); acute bronchitis (169: 55, 50 and 64); enteric fever (107: 35, 45 and 27); silicosis (89: 23, 20 and 46); and acute nephritis and Bright's disease (60: 18, 22 and 20).
- (c) For Eurafriicans and Asiatics: Influenza (264: 1, 0 and 263 respectively); pneumonia (209: 63, 57 and 89); diarrhoeal diseases (190: 67, 55 and 68); acute bronchitis (158: 41, 45 and 72); congenital debility and malformation (150: 53, 53 and 44); tuberculosis of lungs (67: 24, 25 and 18); and heart diseases (66: 31, 23 and 12).

2. That the comparison with 1915-16 is as follows:—

M.O.H. 1916-19.

- (a) As regards Whites, influenza claimed 667 deaths in 1918-19 as compared with 6, 6 and 7 in the previous three years respectively, the death-rate being 4.73 per 1,000 as against 0.04. Enteric fever shows a gradual increase, the rate rising from 0.07 in 1915-16 to 0.08, 0.12 and 0.13 in 1916-17-18-19. The number of cases notified increased from 87 in 1915-16 to 139 in 1916-17, falling in 1917-18 to 80, and rising to 107 in 1918-19. The death-rates per cent. of cases for the four years 1915-19 were 12.64, 9.35, 22.5 and 17.75. Heart diseases were responsible for 492 deaths, the rate rising from 0.87 to 1.25 in 1917-18 and falling to 0.99 in 1918-19. Pneumonia with 475 deaths showed an increase in alternate years, the rates being 0.77, 1.15, 0.76 and 1.45 respectively. A slight decrease was noted with regard to tuberculosis of lungs, the rate falling from 0.47 in 1915-16 to 0.41 in 1918-19. Several other causes of death show a slight rise, viz.: "Other respiratory diseases," from 0.41 in 1915-16 to 0.66 in 1918-19; congenital debility and malformation, 1.01 in 1915-16 to 1.20 in 1916-17, afterwards falling to 1.1; diarrhoeal diseases, 1.00 in 1915-16 to 1.59 in 1916-17, afterwards falling to 0.95; cancer, 0.58 in 1915-16 to 0.80 in 1917-18. Violent deaths fell from 0.63 in 1915-16 to 0.44 in both years 1917-18 and 1918-19.
- (b) With regard to Natives, as with Whites, influenza claimed a death-roll of 1,157 in 1918-19, or a rate of 10.96 per 1,000. Pneumonia, with 619 deaths in 1915-16, gradually declined during 1916-17 and 1917-18 to 371 and 310 respectively, but rose to 427 in the influenza year, 1918-19, the rate for the four years being 5.89, 3.51, 2.93 and 4.04. The tuberculosis of lungs rate declined from 3.18 in 1915-16 to as low as 1.64 in 1917-18; violent deaths, meningitis and other forms of tuberculosis showed slight decreases in each of the years under review as compared with 1915-16.
- (c) With regard to Eurafrians and Asiatics, influenza was responsible for 264 of 710 deaths during 1918-19, or a rate of 14.13 per 1,000. Pneumonia deaths rose from 40 in 1915-16 to 63 in 1916-17, 57 in 1917-18, and 89 in 1918-19; diarrhoeal diseases showed a very similar increase, tuberculosis of lungs remaining practically unchanged.

On the Table given on page 15 are Returns of the Deaths and Death-rates per 1,000 from Certain Chief Causes amongst the various races of Natives in Johannesburg, employed respectively "on" and "off" the Mines, during the year 1916-19. These figures have been prepared by Mr. F. Thompson (Chief Clerk, Public Health Department).

INFANTILE MORTALITY, AND MATERNITY AND CHILD WELFARE MEASURES.

By the term "Infantile Mortality" is meant the number of deaths of infants under one year of age per each one thousand births during a given period, and, in the words of the Registrar-General for England and Wales, infantile mortality "has always been regarded as a valuable test for the health of "communities."

WHITE INFANTILE MORTALITY.—In Table "A" the mortality rates for various British communities and certain Continental countries are set forth, and in Table "B" the infantile mortality rates for Johannesburg are compared with those of the great towns of England and Wales and the other large South African towns:—

TABLE "A."
WHITE INFANTILE MORTALITY.

	1911	1912	1913	1914	1915	1916	1917	1918
England and Wales ...	130	95	108	105	110	91	96.5	
Urban Districts ...	131	92	105	99	107	86	91.6	
Rural Districts ...	104	81	88	85	90	76	81.8	
Scotland ...	112	105	110	111	126	97	107	
Ireland ...	94	86	97	87	92	83	88	
Sweden ...	71	72	70					
Norway ...			65	68				
Australia ...	62	72	72	71	68			
New Zealand ...	56	51	59	51	50	50.7	48	
Ontario ...	117	110	117	103	102			
Union of S. Africa ...	1910-11 96.20	1911-12 86.66	1912-13 92.70	1913-14 84.84	1914-15 86.31	1915-16 86.05	1916-17 80.23	

M.O.H. 1916-19.

TABLE "B."

	1911	1912	1913	1914	1915	1916	1917	1918	1919
England and Wales:									
96 Great Towns ...	141	101	116	114	117	111	104.2	106	93
148 Smaller Towns	133	—	111	104	114	97.1	92.9	94	90
Kimberley ...	106.3	—	—	87.2	—	—	95.6	98.4	85.0
	1911-12	1912-13	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19	
Capetown ...	98.1	102.7	92.17	100.46	79.4	96.20	79.33	114.49	
Durban ...	98.5	74.8	60.9	89.4	92.3	85.4	66.5		
East London ...						83.3	76.7	100	
Pretoria ...	84.8	95.17	66.3	94	91.3	87.28	84.9	120.6	
Johannesburg ...	114	99.53	84.99	105.28	79.62	108.87	81.04	89.79	

From Table "B" it is seen that the infantile mortality for Johannesburg compares favourably with that of "The 96 Great Towns of England and Wales," and also, on the whole, with the large towns of South Africa, with the exception of Durban.

The highest Johannesburg rate in recent years was 108.8 in 1916-17, the general death-rate from all causes at all ages in that year being also considerably higher than usual.

As one is accustomed to hear uninformed allegations as to the supposed alarming infantile mortality of South Africa generally, and of Johannesburg in particular, these figures for recent years are illuminating.

The records gradually compiled by your Health Visitors reveal one noteworthy and very important factor in your comparatively satisfactory White infantile mortality rate, namely, that it is the rule rather than the exception for the mothers visited to feed their children from the breast, and not from the bottle. The figures are really extraordinary. Thus, in 1918-19, of 686 new-born infants, 665 (or 97 per cent.) were breast-fed; in the third month 659 (or 96 per cent.) were still breast-fed; and in the sixth month some 450 (or 65 per cent.) were still breast-fed.

But as 70 per cent. of White infant deaths in 1916-18 were nevertheless due to digestive disorders or malnutrition, there is probably no sufficient reason why the present infantile mortality rate of 80 to 90 should not be materially lowered, and perhaps, in time, even approximate to that of the large towns of New Zealand, which in 1917 averaged 51.

The Medical Officer of Health is also deeply convinced that an honest, energetic policy in regard to venereal diseases will contribute largely to this end, by lessening the number of premature births and of diseased and weakly infants who often (fortunately, perhaps, for themselves) survive their birth but a few days or weeks.

During 1915-16 there were 4,157 births and 329 deaths; in 1916-17, 4,124 births and 449 deaths; in 1917-18, 4,195 births and 340 deaths; in 1918-19, 4,176 births and 375 deaths. These figures correspond to an infantile mortality rate of 79.62 in 1915-16, 108.87 in 1916-17, 81.04 in 1917-18 and 89.79 in 1918-19.

WHITE INFANTILE MORTALITY RATES (*per 1,000 Births*) IN THE VARIOUS DISTRICTS OF JOHANNESBURG FOR THE YEAR 1918-19.

District.	Rate.	District.	Rate.
1. Johannesburg (proper) ...	91.42	8. Berea, Yeoville, Bellevue and North-Eastern Districts ...	81.08
2. Braamfontein, Hospital Hill and Hillbrow ...	63.52	9. Auckland Park and North-Western Districts ...	59.65
3. Marshalls, City and Suburban and Ferreiras ...	66.32	10. Paarlshoop and Western Mines ...	94.82
4. Newtown, Fordsburg and Mayfair ...	113.31	11. Central Mines ...	60.60
5. Vrededorp and Locations ...	156.39	12. Prospect Town and Eastern Mines ...	156.86
6. Jeppes, Jeppes Extension and Belgravia ...	121.59	13. Ophirton and Southern Districts ...	98.03
7. Doornfontein, Troyeville and Bezuidehout Valley Districts ...	104.47	All Districts ...	89.79

COLOURED INFANTILE MORTALITY.—In 1911 the Medical Officer of Health M.O.H. 1916-19. investigated, with some care, the question of the very high infantile mortality amongst Natives, Cape Coloured and Asiatics in South Africa generally, and in Johannesburg in particular, and reported fully to the Council on 3rd May of that year.

The following figures are available:—

TABLE "C."
COLOURED INFANTILE MORTALITY (*per 1,000 Births*).

		1914-15	1915-16	1916-17	1917-18	1918-19
Pretoria	{ Natives ...	500	276·6	308·0	436·0	
	{ Cape ...	242				
	{ Asiatics ...	210				
East London	...	335·2	385·6	421·3	302·7	
Cape Town	...	244·55	189·4	226·7	200·9	299·0
Kimberley	...	281·8	281·8		425	For Calendar Year 1914-15-17
Johannesburg	{ Natives and	340·31	330·55	334·96	298·5	411·9
	{ Burafricans Asiatics ...	289·85	192·85	197·80	225·7	212·7

NOTE.—In Bombay (1909) the rate was 404 per 1,000 births, and in Bangalore 352.

The factors of Coloured infantile mortality were shown in 1911 to be as follows:—

TABLE "D."

RACE.	INFANT MORTALITY FROM			
	Prematurity and Mal-formation.	Debility, Low Vitality, Convulsions.	Respiratory Diseases.	Diarrhoeal Diseases.
Natives ...	15 per cent.	20 per cent.	30 per cent.	21 per cent.
Cape Coloured ...	19 "	21 "	20 "	21 "
Asiatics ...	21 "	26 "	20 "	24 "

The results of this inquiry were, from its nature, incomplete and unsatisfying, but amongst the conclusions which appeared to be justified were the following:—

- (1) That this mortality is immensely greater than amongst White infants, and also (it is reliably stated) than amongst infants in their native kraals.
- (2) That the principal causes include prematurity, congenital malformation, inherited syphilis, respiratory and digestive disorders from bad feeding, want of medical attendance, and general neglect. Burns and carbon-monoxide poisoning from "can-fires" in ill-ventilated rooms caused some deaths.

MATERNITY AND CHILD WELFARE MEASURES.

These measures have in recent years received special and increasing attention, and the official scheme suggested by the English Ministry of Health comprises the following elements, each of which is organised in its direct bearing on infantile health:—

I. Supervision of Midwives.

II. Supervision and Care of Expectant Mothers, including

- (a) Home visiting by Midwives or Health Visitors.
- (b) Medical attendance at maternity clinic (including dental clinic), or, where necessary, at home, by doctor; or, in serious cases, treatment in a hospital.
- (c) Provision of food and milk for necessitous mothers, or of cooked meals at a feeding centre.
- (d) Rest Homes for expectant mothers.

III. Care of Mother during Lying-in Period, including

- (a) Provision of trained midwife, and, if necessary, of medical attendance; also of maternity nurse (after confinement), and, if necessary, of home help.
- (b) Provision of food and milk, where necessary.
- (c) The confinement in a maternity hospital of women suffering from deformities or any other condition involving danger to the mother or infant.
- (d) The treatment in hospital of complications arising after confinement.

IV. Care of Infancy and Early Childhood, including

- (a) Home visitation of infants by Health Visitors.
- (b) Child Welfare Centres, including infant clinic (general, dental and ophthalmic), milk depot (where necessary), and crèches or day nurseries (where necessary).
- (c) Children's Hospitals, Convalescent Homes and Hostels for mothers and infants.

It will be observed that this scheme is a notable development in the direction of what has been termed "Paternal Socialism."

In a Special Report addressed to the Public Health Committee in September, 1919, each of the elements of the foregoing scheme was discussed in detail in regard to the extent or necessity of its application to Johannesburg. The summary and recommendations with which this Report concluded are as follow:—

1. That representations be made to the Minister for Health as to the necessity for securing, as soon as possible, compulsory registration and supervision of midwives, at any rate in urban districts.
2. That appreciation be recorded of the commencement made by the Education Department in the instruction of the elder girls in the care and feeding of infants; that it be suggested that this course be made as thorough and practical as the resources of the Department will permit; and that the Council offer annually a special book prize or prizes in each school where the number to whom such instruction is given is sufficient.
3. (a) That whilst Miss Ellershaw has for many years done very admirable and unadvertised work in supplying midwifery nurses in the poorer central parts of Johannesburg, the time has arrived for the community to undertake the provision of trained midwives and, when necessary, of medical attendance for necessitous lying-in women.
- (b) That the Council, therefore, approach the Hospital Board with regard to the creation in connection with the Queen Victoria Women's Hospital of a District Midwifery Nursing Branch for the supply of midwifery nurses and medical aid to necessitous women, and, if necessary, make a grant-in-aid for the purpose.
4. That the Medical Officer of Health be empowered, on the recommendation of the Health Visitors, to authorise, in his discretion, the provision of home help for expectant or recently confined necessitous mothers.
5. That two additional Municipal Health Visitors be appointed, making four in all.
6. (a) That a larger number of Maternity and Child Welfare Centres are required, and that, with the consent of the School Board, one be opened at once, one afternoon a week, in the Government School, Fairview, another in the Vrededorp Government School, and one at a school in the Southern Suburbs.
- (b) That the Council make a suitable grant-in-aid towards the working expenses of the Welfare Centre at the New Market, for which it already furnishes free accommodation and the services of the Health Visitors; and that the issue of free tram tickets to necessitous mothers who attend the Sewing Classes be sanctioned.

7. That as Government will, from 1st January, 1920, pay 60 per cent. of M.O.H. 1916-19.
the cost of approved measures for the prevention and control of
venereal disease, and, in view of the special relationship of these
infectious diseases to infantile mortality, as well as for other cogent
general reasons, the Council proceed at once to give effect, so far as
practicable, to the proposals for combating venereal disease submitted
by the Medical Officer of Health in August, 1916.
8. That the Council establish, as soon as may be practicable, Municipal
milk depots on business lines, to promote the supply and better
handling of clean, good milk, particularly for children, but also for
consumers generally.
9. Finally, in view of the enormously high Coloured infantile mortality,
that the provision of trained midwives and lying-in accommodation
for Coloured women be considered.

The following estimate is submitted of the immediate expenditure which
these proposals would involve:—

1. Annual.

Health Visitors (two): Salary (£33 2s. 5d. per month), contribution to Pension Fund, uniform, boots, hats, locomotion	£894	2	0
Maternity and Child Welfare Centres (four): Milk, medical comforts, etc., <i>e.g.</i> , Lactogen, mealball, nutrine, fruit juices, toothbrushes (£10 per month at three Centres)	360	0	0
Layettes, material for, including tram tickets for necessitous mothers (£10 per month at four Centres)	480	0	0
Grant-in-aid of existing Welfare Centre at New Market, run by National Service Fund	100	0	0
	<u>£1,834</u>	<u>2</u>	<u>0</u>

2. Initial, only.

Cupboards, weighing scales, etc., for three Welfare Centres	40	0	0
Total	<u>£1,874</u>	<u>2</u>	<u>0</u>

SUMMARY OF HEALTH VISITORS' WORK FOR THREE YEARS ENDING

30TH JUNE, 1919.

Number of first visits, 2,674; re-visits, 10,554. Inquiries *re* deaths under
five years of age, 281. Mothers referred to Maternity Hospital, 440; to Miss
Ellershaw's Institute, 298. Infants sent to Hospital, 282; to Children's Aid
Society, 108. Mothers attending at Babies' Welcome, 1,937; at Health
Visitors' Office, 1,623. Cases referred to Relief Board, 271. Inquiries for
Governor-General's Fund, 479. Births investigated: Premature, 74; full-
time, 2,570; stillborn, 30. Of these 2,570, 111 were illegitimate, 17 were
attended by a doctor, 1,346 by a trained midwife, 1,274 by an untrained nurse,
and 54 by friends. Inquiry as to the method of feeding indicate that 2,420
were breast-fed, 90 fed on cows' milk, 91 on tinned milk, and 73 were partly
breast-fed and partly depended on tinned milk.

PNEUMONIA.

The death-rates per 1,000 from this disease are as follows:—

	WHITES.	NATIVES.	EURAFRICANS AND ASIATICS.	LONDON.
1914-15	0.74	3.80	2.30	1.24 (1914)
1915-16	0.77	5.89	2.79	1.25 (1915)
1916-17	1.15	3.51	3.38	
1917-18	0.76	2.93	3.06	2.00 (1918)
1918-19	1.45	4.04	4.78	

ENTERIC OR TYPHOID FEVER.

Appended are the statistical particulars for the period under notice and the sixteen preceding years:—

YEAR.	WHITES.			NATIVES.		EURAFRICANS.		ASIATICS.	
	Cases.	Deaths.	Deaths per cent.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1903-4 ...	1,009	126	12.4	—	—	—	99	—	5
1904-5 ...	454	46	10.1	266	—	—	125	8	1
1905-6 ...	617	84	13.6	232	—	—	99	29	7
1906-7 ...	385	42	10.8	342	—	—	161	12	6
1907-8 ...	446	31	6.9	348	—	—	102	20	5
1908-9 ...	373	37	9.9	296	—	—	123	3	3
1909-10 ...	271	21	7.7	470	146	8	1	—	—
1910-11 ...	277	25	9.02	497	137	12	3	5	—
1911-12 ...	310	39	12.58	365	104	12	4	6	2
1912-13 ...	354	52	14.12	248	80	9	3	3	—
1913-14 ...	199	13	6.53	187	52	7	—	4	—
1914-15 ...	234	25	10.68	185	68	5	5	3	4
1915-16 ...	87	11	12.64	83	39	3	—	—	—
1916-17 ...	140	13	9.28	79	35	3	2	1	—
1917-18 ...	80	18	22.5	72	45	—	—	1	1
1918-19 ...	107	19	17.75	53	27	3	—	4	—

In 1915-16, the number (87) of White reported cases was far less than in any previous year, the lowest previous figure being 199 in 1913-14.

In 1916-17, the White reported cases rose to 140, this increase being chiefly from October 1916 to March 1917, and especially during December, January and February. During these three months six "carriers" (three white and three native) were detected, who were responsible for at least twelve other cases. The case-mortality was 9.28 per cent.

In 1917-18, the number (80) of White reported cases was the lowest on record, whilst the case-mortality (22.5 per cent.) was the highest.

In 1918-19, 107 cases were reported, but in regard to some 23 of these, which occurred in one medical practice in a north-western township during the second influenza epidemic (April-May, 1919), some doubt existed as to their exact nature, in view of the fact that such Widal reactions as were obtained were negative. The case-mortality was high, being 17.75 per cent.

The mortality-rates per 1,000 of the White population were as follow:—

	1916-17	1917-18	1918-19
Johannesburg ...	0.08	0.12	0.13
96 Great Towns of England and Wales	0.02 (1917)	0.02 (1918)	0.01 (1919)
Capetown ...	0.22	0.17	—
Pretoria ...	0.23	0.13	0.11

Enteric fever amongst native and coloured persons calls for no comment, except that, for natives, there was a progressive decrease during the triennium.

THE SPREAD OF ENTERIC OR TYPHOID FEVER BY NATIVE "CARRIERS" EMPLOYED IN DAIRIES OR KITCHENS.

This matter was brought to notice in the Medical Officer of Health's report of 26th August, 1916, to the Public Health Committee (see p. 12 of Medical Officer of Health's Annual Report for 1915-16). Under Section 36 (n) of the Public Health Act, 1919, the Minister may make regulations for

"the prevention of the spread of any infectious disease by persons who, though not at the time suffering from such disease, are 'carriers' of" and liable to disseminate the infection thereof, and the keeping under medical surveillance and the restriction of the movements of such persons."

The difficulty, however, of formulating effective and practicable regulations for this purpose is very considerable.

Return of Deaths and Death-Rates (per 1,000) from Certain Causes amongst Natives in Johannesburg during the Three Years 1916-19.

"On" means employed in any capacity in or on a mine or housed at W.N.L.A. Compound. "Off" means not employed in any such capacity.
 "Miners' Pthisis" is entered up as "Silicosis."

ORIGIN.	PNEUMONIA.				PHTHISIS AND TUBERCULOSIS.				SILICOSIS.				MENINGITIS.				ALL OTHER DISEASES.				AVERAGE ANNUAL POPULATION (WHERE AVAILABLE).	
	On		Off		On		Off		On		Off		On		Off		On		Off		On	Off
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate		
East Coast	518	6.91	19	9.38	364	4.86	29	14.32	60	0.80	3	1.48	123	1.64	7	3.45	1,223	16.33	101	19.87	24,964	675
Cape Colony	67	1.34	71	4.15	39	0.78	36	2.10	6	0.12	—	—	19	0.38	8	0.46	411	8.27	197	11.53	16,552	5,695
Brit. Basuto	35	2.07	57	22.45	120	7.13	15	6.30	2	0.11	1	0.39	36	2.13	2	0.78	281	16.69	59	23.24	5,009	846
Transvaal	34	2.17	109	1.95	38	2.42	31	0.55	2	0.12	9	0.16	47	3.00	16	0.28	187	11.95	964	17.32	5,216	18,544
Tropical	9	5.23	—	—	7	4.07	—	—	6	3.49	1	0.88	2	1.16	—	—	5	2.90	3	2.65	573	376
Coloured	12	—	122	—	6	—	61	—	6	—	5	—	6	—	15	—	95	—	693	—	—	—
All Others	63	4.19	51	0.92	74	4.93	52	0.95	5	0.33	—	—	22	1.46	28	0.51	221	14.72	375	6.89	5,002	18,116
Totals	726	4.17	309	2.32	612	3.09	164	1.23	81	0.46	14	0.10	249	1.43	61	0.45	2,328	13.39	1,699	12.79	57,916	44,252

The Director of Native Labour has kindly supplied the average population figures used above.

NOTE.—In reference to a similar table published in the Medical Officer of Health's Report for 1911-12, the following pertinent criticism appeared in *The Transvaal Medical Journal* of January, 1913:—"This table must be interpreted with the greatest caution or it will be entirely misleading. . . . The difficulties arise from two causes—firstly, that natives arriving on the Rand suffer from many diseases, e.g., pneumonia and cerebro-spinal meningitis, much more heavily during their first few weeks of residence than subsequently; and, secondly, that the Witwatersrand Native Labour Association have their 'Receiving Compound' (where both arriving and departing mine-natives for the whole Witwatersrand area are detained for varying periods) within the Municipal Area. The average population, therefore, of Tropical natives, and, to a lesser extent, East Coast natives, used as a basis for the compilation of death-rates is quite misleading in regard to these groups. To take a concrete instance, the death-rate from meningitis amongst Tropical natives is given for mine boys as 15.7, on an assumed population of 6,630, whereas for non-mine boys it is only 0.9. Now, comparatively few cases of meningitis occur after the first 14 to 21 days' residence. The population passing through the Witwatersrand Native Labour Association Compound alone in one year is considerably more than double the number given as the average annual population; if, therefore, all these 'boys' had remained resident in Johannesburg for 52 weeks instead of 3, their death-rate for the period would have fallen to less than half that shown; in other words, the longer they spend in the district the lower would their mortality-rate become—clearly an anomaly. This example may serve to indicate the danger of interpreting this table too literally; in fact, in regard to Tropical and East Coast natives, it is doubtful whether any useful deductions can be drawn from the figures given without considerably more information than is furnished in the table."

DIARRHOEAL DISEASES

The following are the mortality figures for the period under notice:—

	WHITES.	NATIVES.	EURAFRI- CANS.	ASIATICS.
Dysentery	6	13	1	—
Diarrhoea and Enteritis (under 2 years) ...	497	377	138	52
	497	390	139	52

DEATH-RATE (DIARRHOEAL DISEASES) PER 1,000 OF POPULATION LIVING.

	WHITES.	NATIVES.	EURAFRICANS AND ASIATICS.	95 GREAT TOWNS IN ENGLAND AND WALES.
1915-16	1.00	0.85	3.98	(1915) 1.3
1916-17	1.59	1.34	3.60	(1916) 1.3
1917-18	0.93	0.97	2.95	—
1918-19	0.95	1.25	3.65	—

The proportion of the foregoing deaths which took place amongst the children under five years of age of the different races was:—For Whites, 98 per cent.; Natives, 96 per cent.; Eurafrians, 99 per cent.; Asiatics, 100 per cent.

As regards both S.A. Coloured and Asiatics in Johannesburg, it must, however, be remembered that comparatively and absolutely there are few children. Diarrhoeal diseases are the chief cause of death amongst children under five years.

MENINGITIS.

The characteristics of this disease were fully dealt with in the Medical Officer of Health's Report for 1904-06 at pp. 20-24.

The ages at death are set out in the following table:—

DEATHS—1916-19.

	All Ages.	—1	—5	—15	—25	—35	—45	—65	+65
Whites	79	17	28	14	6	3	5	4	2
Natives	329	12	6	13	119	130	43	6	—
Eurafrians	23	4	6	6	4	—	3	—	—
Asiatics	4	1	2	—	—	1	—	—	—
Totals	435	34	42	33	129	134	51	10	2

Age Incidence.—(a) *Amongst Whites.*—Of the 79 deaths, 59 were amongst persons under 15 years, 17 being very young children.

(b) *Amongst Eurafrians.*—Ten of the 23 deaths were those of children under five.

(c) *Amongst Natives* the age-incidence was just the reverse of that amongst Whites and Eurafrians, 298 out of 329 being deaths of persons over 15 years.

(d) *Amongst Asiatics.*—One case was above 15 years.

DEATH-RATE PER 1,000.

A. AMONGST WHITES :—

- (a) the proportion of fatal cases which may probably be regarded as "imported," i.e., in which the infection was contracted before the deceased person came to South Africa;
- (b) the proportion in which the disease was acquired during residence in South Africa;
- (c) the effect of occupation.

The value of the results of our inquiries, as set out in the following tables, depends, of course, on the accuracy of the information recorded in the death certificate or subsequently furnished to your inspector. This accuracy is often very questionable. The figures have also to be considered in connection with the results of recorded observations in Europe—viz., that a very large percentage of the population of large towns have been subject to attack by tuberculosis by the time they reach adult life, and that the larger proportion of these persons survive the attack.

DEATHS FROM TUBERCULOSIS OF OVERSEA IMMIGRANTS IN JOHANNESBURG.
1st July, 1907, to 30th June, 1918.

B=Infected before arrival in South Africa. A=Infection first manifested after arrival in South Africa.

		YEARS OF RESIDENCE IN SOUTH AFRICA.																			
		-1		-2		-3		-4		-5		-10		-15		-20		+20		Total.	
		B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A		
British Born	...	11	6	13	7	12	8	10	3	10	13	22	63	27	71	18	58	13	23	136	262
Other Europeans	...	—	7	2	1	—	5	2	—	4	3	2	19	2	17	4	6	1	9	17	67
Totals		11	13	15	8	12	13	12	3	14	16	24	82	29	88	22	64	14	42	153	329
(for 11 years 1907-18)																					

M.O.H. 1915-19.

In addition, there were 62 deaths of British-born persons and 28 of other Europeans, the length of whose residence in South Africa was unknown. These cases are, therefore, excluded from consideration.

The proportion of fatal cases which may probably be regarded as "imported" is 153 out of 772, or 19.81 per cent.

As regards the eleven years July 1907 to June 1918, of 117 European immigrants who died from tuberculosis during their first five years of residence in South Africa, 64 (or about 55 per cent.) were infected overseas and 53 (or 45 per cent.) in South Africa. But after and including the sixth year of residence and upwards the ratio was completely reversed, the figures being respectively 89 infected before arrival and 276 afterwards, or as 25 per cent. to 75 per cent.

The proportion in which the disease appears to have been contracted in South Africa is made up of deaths of immigrants in whom infection was first manifested after arrival, viz., 329, *plus* deaths of Afrikanders, viz., 290, and is therefore 619 out of 772, or 80.18 per cent.

Details as to "Occupation" are as follow:—

Occupation.	Under 1 year.																		Unknown.	All Ages.		
				-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16			-17	-18
	3 ms	6 ms	12 m																			
MINERS—																						
Machine-drillers ...	4	14	27	28	9	12	10	5	4	2	2	1	2	—	1	2	3	3	129			
Other Under-ground ...	13	20	32	34	14	11	6	6	4	1	3	2	1	2	4	1	2	18	174			
Surface ...	4	4	5	4	1	3	3	—	—	1	—	1	—	—	—	1	—	3	30			
Engine Drivers and Fitters ...	2	—	3	8	4	4	2	3	1	—	4	1	—	1	1	—	3	2	39			
Clerks and Salesmen ...	11	15	10	19	12	10	4	4	6	3	1	3	1	2	5	2	2	8	118			
Housewives ...	19	12	7	17	8	3	8	4	3	4	2	2	1	—	3	2	6	6	107			
Painters ...	—	2	—	1	1	—	—	—	—	—	—	—	—	1	—	—	—	—	5			
Carpenters ...	4	1	—	1	1	2	1	2	—	1	1	1	—	—	—	—	—	—	15			
All Others ...	53	25	30	48	17	9	9	6	6	7	5	4	3	4	3	3	1	12	245			
Totals ... (for 11 years 1907-18)	110	93	114	160	67	53	44	30	24	19	18	15	8	10	17	11	17	52	862			

303 deaths, or 35.15 per cent., of the total mortality from tuberculosis occurred amongst miners employed underground, and in the majority of cases was probably associated with silicosis, 129, or nearly three-fifths, being those of machine-drillers. In 36.30 per cent. of cases death occurred during the first year of illness, and in another 20.46 per cent. before the end of the second year; in five years 76.56 per cent. were dead.

It is clear that the registered deaths from tuberculosis amongst all miners (333), and the percentage figure calculated thereon, must be increased by the addition of all tuberculosis deaths amongst repatriated miners before the true percentage of such deaths amongst the mining and non-mining communities respectively can be ascertained.

Clerks and salesmen furnish the next largest number of deaths (118) from tuberculosis. It is not improbable that some of this class were men who, becoming incapacitated through mine work, were forced to take to lighter employment. More than 68.6 per cent. of this class died within five years of infection.

Housewives contributed 107 deaths, and 69.1 per cent. of these sufferers succumbed before the end of the fifth year of illness.

This analysis will not be continued in future years.

B. AMONGST NATIVES.

M.O.H. 1916-19.

Of the 806 deaths registered during 1916-19, 393 were those of persons from the East Coast (chiefly Portuguese "boys"), 69 from Transvaal, 60 from Orange Free State, 47 from Natal, 75 from Cape Colony, 9 from Rhodesia, 130 from Basutoland, 18 from Zululand, whilst 5 were classed as "unknown."

704 of the deceased persons were males and 102 females. The great majority of the males were mine boys (642) and labourers (62), including house and stable boys. Practically all (608) of these were between the ages of 15 and 45 years.

The alleged duration of illness was as follows:—292 died in less than one month; 139 under three months; 239 under six months; 87 under twelve months; 20 under eighteen months; 15 under two years; 3 after illness of more than two years. In 11 cases the duration of illness was unknown.

Compulsory Notification of Tuberculosis.—On 1st January, 1920, "all forms of tuberculosis which are clinically recognisable apart from reaction to the tubercular test" became compulsorily notifiable under Section 18 of the Public Health Act, 1919.

1,120 notifications were received during 1916-17 and 1917-18, namely, in regard to 39 Whites, 1,079 Coloured, and 2 Asiatics.

MINERS' PHTHISIS, ROCKDRILL PNEUMONIA OR SILICOSIS.

The registered deaths from this disease are recorded below:—

YEAR.	WHITES.	NATIVES.	EURAFRICANS.	ASIATICS.
1909-10 ...	34	22	—	—
1910-11 ...	44	47	1	—
1911-12 ...	73	47	—	—
1912-13 ...	71	87	2	—
1913-14 ...	47	84	1	—
1914-15 ...	54	113	4	—
1915-16 ...	78	38	2	—
1916-17 ...	83	23	1	—
1917-18 ...	61	20	6	—
1918-19 ...	80	46	4	—

ORGANIC DISEASES OF HEART.

These heart affections include pericarditis, endocarditis, valvular disease and hypertrophy. The deaths recorded during the years 1st July, 1916, to 30th June, 1919, were 492 for Whites (an increase of 39.3 per cent. as compared with the previous years), 197 for Natives, 46 for Eurafrians, and 20 for Asiatics.

Of the White deaths, 342 were those of males and 150 those of females, indicating a much greater proportionate incidence on males; 63 died under 15 years of age and 429 at later periods.

ACUTE RHEUMATISM OR RHEUMATIC FEVER.

As heart disease is a frequent sequel of acute rheumatism, it is noteworthy that the death-rate per 1,000 for the year 1916-17 from the latter malady is 0.0497 for Whites, 0.0497 for Natives, 0.0 for Eurafrians and Asiatics, as against 0.053 in England and Wales in 1916.

It is now recognised that rheumatic fever or acute rheumatism is a specific disease, and quite distinct from ordinary rheumatism as to its origin. Various eminent English and Continental bacteriologists believe that it is caused by an organism known as the *Micrococcus rheumaticus*.

MALIGNANT DISEASE OR CANCER.

Amongst Whites—

The deaths from cancer were 357 for the years 1916-17, 1917-18 and 1918-19. Of the total, 201 were males and 156 females, and 330 (190 males and 140 females) occurred at ages over 35. Stated in terms of the 1918 Census

M.O.H. 1916-19. population, the mortality was 0.946 per 1,000 for males and 0.751 per 1,000 for females, as against 1.280 for males and 1.175 for females in England and Wales in 1918.

In 31 cases the seat of the disease was not stated, in 141 the stomach was affected, in 43 the womb, in 33 the head and neck, in 30 the liver, in 29 the intestines, in 26 the breast, in 5 the lung, and in 3 each the heart, kidneys and bones.

Natives—

Forty-three deaths were recorded, 13 being at ages under 35 and 30 at later periods. The parts affected are recorded as follow:—Liver, 19; stomach, 8; intestines, 7; unspecified, 3; womb, 3; tongue, 1; breast, 1; and lungs, 1. The death-rate per 1,000 living was 0.113, but it should be remembered that this population consists in Johannesburg mainly of young male adults, who remain here a comparatively short time.

Eurafricans—

Fourteen deaths were recorded, 8 being females; 11 were over 35, the organs affected being: Womb, 4; stomach, 4; neck, 2; intestines, 2; liver and breast, 1 each.

Asiatics—

Seven deaths—6 being males over 35—occurred. The part affected was in 4 cases the stomach and 1 each in the bladder and womb, 1 being unspecified.

VENEREAL DISEASE.

Appended is a return, kindly supplied by Dr. Mehliß, of the Johannesburg cases of syphilis and other venereal diseases treated at the Lazaretto during the official years 1910-19:—

<i>Years.</i>		<i>Whites.</i>	<i>Coloured.</i>
1910-11		219	397
1911-12		227	220
1912-13		216	389
1913-14		275	535
1914-15		272	468
1915-16		329	801
1916-17		332	838
1917-18		293	882
1918-19		289	1,074

SCHEME FOR PREVENTION AND FREE TREATMENT.

In February 1916, the English Royal Commission on Venereal Disease presented their Final Report, urging the imperative necessity on national racial grounds for immediate action in this matter.

In June 1916, Sir Arthur Newsholme, K.C.B., M.D., then Chief Medical Officer of the Local Government Board, published the details of a scheme by which the whole of England would eventually be provided with machinery for this purpose, the cost of which would, as regards 75 per cent., be repaid by Government.

In August 1916, the Medical Officer of Health addressed to the Public Health Committee a special report on this subject, in which the findings in this respect of the Royal Commission were quoted and the English Local Government Board's system explained; and recommended, on the same general lines, a scheme for Johannesburg, of which the principal features are the following:—

1. To provide free bacterial diagnosis by arrangement with the South African Institute for Medical Research.
2. To provide for treatment
 - (a) by the appointment of a whole-time medical expert with special experience in these diseases to organise and direct a venereal clinic, and to act in an advisory capacity to other practitioners;
 - (b) by establishing special, but unnamed, clinics, to be held at suitable times, and especially in the evenings;

(c) by providing a small number of beds for patients requiring hospital treatment; M.O.H. 1916-19.

(d) by arranging for the gratuitous issue of Salvarsan (606) or its substitutes, and for other necessary drugs.

3. To secure medical and public co-operation.

The estimated annual cost of this scheme was £5,000.

In July 1917, a deputation from the Health Committee interviewed the Administrator on the subject. No effective action of any kind was, however, taken by the Council during the period now under review.

SCARLET FEVER.

		1914-15		1915-16		1916-17		1917-18		1918-19	
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Whites	...	331	3	240	1	219	5	2,080	45	992	30
Natives	...	1	1	2	—	1	—	5	—	1	1
Eurafricans	...	1	—	—	—	—	—	1	—	9	1
Asiatics	...	—	—	1	—	—	—	1	—	—	—

In 1916-17 the case-incidence (219) was the lowest on record, though the mortality-rate per 1,000 of White population (0.035) was high compared, for instance, with that for the 96 Great British Towns in 1917, viz., 0.024. In 1917-18, the disease being widely epidemic, the record number of cases (2,080) was reported, with a mortality-rate per 1,000 of population of 0.31, as compared with 0.04 in the 96 Great British Towns, and a case-mortality of 2.1 per cent. In 1918-19, the case-incidence fell more than 50 per cent., viz., to 992, the mortality-rate per 1,000 being 0.21. The case-mortality was, however, considerably higher, viz., 3 per cent. In June, July and August 1918, the Fever Hospital was completely filled and it became necessary to take over a private nursing home for the accommodation of sufferers.

In Johannesburg, only carefully selected cases of scarlet fever are removed to the Isolation Wards, unless the patient or his friends guarantee payment of all expenses.

DIPHTHERITIC DISEASE, INCLUDING MEMBRANOUS CROUP.

		1911-12		1912-13		1913-14		1914-15	
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Whites	...	125	22	81	22	66	14	106	20
Natives	...	7	—	5	2	5	1	4	—
Eurafricans	...	1	1	3	2	1	1	1	3
Asiatics	...	—	1	—	—	1	1	1	—

		1915-16		1916-17		1917-18		1918-19	
		Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Whites	...	75	14	58	25	77	25	42	10
Natives	...	2	1	1	2	—	1	2	1
Eurafricans	...	2	—	—	1	—	1	1	1
Asiatics	...	1	—	—	—	—	—	—	—

In 1916-17 there was a decrease of 17 in the number of cases, but the case-mortality was 43.1 per cent. as compared with 18.6 in 1915-16. In 1917-18 the case-mortality fell to 32.46 and in 1918-19 to 23.6. The mortality for Whites per 1,000 living was in 1916-17, 0.17; in 1917-18, 0.174; in 1918-19, 0.07.

MEASLES.

The death-rates per 1,000 were as follow:—

	1916-17	1917-18	1918-19
Whites ...	0·34	0·04	0·16
Natives ...	0·12	0·037	0·06
Eurafricans ...	0·806	0·053	0·26
Asiatics ...			
96 English Towns ...	0·401 (1917)	0·36 (1918)	0·13 (1919)

PLAGUE PREVENTION.

No case of plague occurred during the period under review. The usual precautionary measures were, however, continued. These included the destruction of 101,821 rats, the bacterial examination of 17,708 rat carcasses, the bacterial examination of pneumonia sputum in certain cases, and supervision for ten days of Malays and Indians arriving from plague-infected centres.

PUERPERAL SEPTICÆMIA, ETC.

	1916-17		1917-18		1918-19	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Whites ...	18 (including 1 from outside)	9	12 (including 3 from outside)	6	3	3
Natives ...	1	1	3	2	3	4
Eurafricans ...	1	—	1	2	—	1
Asiatics ...	—	—	—	1	—	—

It is probable that the notification of pyæmic and septicæmic states associated with the puerperal period has been incomplete.

The Public Health Act, 1919, Section 18, requires the notification of "puerperal fever, including septicæmia, pyæmia, septic pelvic cellulitis or "other septic condition occurring during the puerperal state."

Of the 29 White cases which arose in Johannesburg, 11 were medically attended during confinement, and 18 were looked after by certified nurses or midwives.

The death-rate from puerperal febrile conditions per 1,000 births was 3·79 in England and Wales in 1918. In Johannesburg, in 1916-19, for Whites, it was 1·44, and in 1918-19, 0·021.

MALARIA.

26 Whites, 17 Natives, 4 Euraficans and 1 Asiatic died from malaria, which in each case was contracted elsewhere.

LEPROSY.

Three Whites, 23 Natives and 1 Eurafican were notified in 1916-19. One White, 5 Native and 1 Eurafican cases were imported.

ANTHRAX.

There was 1 White case. This case occurred in Fox Street.

SMALLPOX.

From July 1916 to April 1917 there was a continuous prevalence, commencing amongst Natives and Coloured persons and spreading to Whites, of whom 57 were infected. This outbreak caused the Municipality some anxiety and much expense and trouble, and was the direct result of repeated introductions of infection by Natives coming to Johannesburg from Mafeking district, which was widely infected at that time. The laxity and inefficiency of supervision of these Natives in Mafeking and neighbourhood was, on 4th July 1916 (File No. 7935), made the subject of emphatic protest on your behalf to the Secretary for the Interior.

In September 1918, a Native female at the Ferreira Deep Mine developed the disease, ran away and hid successively in Ophirton, Malvern and Marshalls, spreading infection in each township, the disease eventually attacking both Whites and Coloured people in most of the congested areas of the Municipality.

In October 1918, an imported White case from Middelburg District, Transvaal, infected four persons in Brixton, and one smallpox Native from Middelburg en route to Rietfontein Lazaretto died in the train at Johannesburg.

In addition to the foregoing groups, a few isolated cases occurred in each year.

The chief causes of the spread of infection on each occasion have been unvaccinated and irresponsible Native women and unvaccinated Native children. The Coloured people and Indians are now comparatively amenable and, as a rule, give little, if any, ground for complaint. The Native women, on the contrary, conceal the disease as long as possible, hide themselves in one quarter after another when it becomes apparent, and are a constant source of danger and worry. It is exceedingly desirable that Native women and children should be vaccinated just as regularly and efficiently as male Natives are dealt with in this respect at the Pass Office, and it is hoped that the compulsory powers under the new Public Health Act will materially assist Government in this connection.

Not more than about 30 per cent. of all the cases dealt with were reported in the ordinary way. Most of the remainder were brought to the notice of your Medical Officers by the Infectious Disease Inspector (Mr. McCann), while some, whose condition was noted during the process of bathing at the Disinfecting Station, by the officials in charge (Mr. and Mrs. Jonas).

The Medical Officer of Health wishes to record his indebtedness to the whole of the Staff, and especially to the Infectious Disease Inspector (Mr. McCann), for the vigilant efficiency of their work during these outbreaks. If it had been otherwise, the probability is that on each occasion of serious introduction of infection an epidemic would have resulted. The Department is also much indebted to the ready and reliable assistance of the Police, especially in dealing with the Coloured people.

NOTIFIABLE INFECTIOUS DISEASES.

These included smallpox, plague, typhus, enteric, scarlet fever, puerperal fever, diphtheria, leprosy, ankylostomiasis, anthrax, phthisis and infantile paralysis.

By Government Notice No. 95, published in the "Union Gazette" of 26th January, 1917, erysipelas ceased to be notifiable as from 1st March, 1917.

During the years under notice, 7,863 cases were notified, viz.: 4,620 amongst Whites, 2,122 amongst Natives, 91 amongst Eurafrians, and 30 amongst Asiatics. These occurrences are discussed elsewhere in this Report.

The procedure adopted in regard to notified infectious diseases, disinfection, etc., has been the same as in previous years (see Report 1904-6).

4,431 houses, 114 schools, and 264,388 articles of clothing, bedding, etc., were disinfected.

DISINFECTING STATION.

This is well equipped with two Geneste-Herschel steam disinfectors, formalin chamber, baths for "contacts," and ambulance sheds.

ISOLATION HOSPITAL.

Appended are details as to White cases treated, at Rietfontein up to 3rd October, 1916, and afterwards at the new Fever Hospital in Johannesburg. The Coloured cases all went to Rietfontein.

	Scarlet Fever.	Measles.	Chickenpox	Enteric.	Parotitis.	Erysipelas.	Pneumonia.	Diphtheria.	Scurvy.	Malaria.	Plague Suspect.
WHITES, 1916-19:											
Admissions ...	740	9	—	2	—	—	—	—	—	—	—
Recovered ...	717	9	—	2	—	—	—	—	—	—	—
Not Discharged ...	14	—	—	—	—	—	—	—	—	—	—
Died ...	9	—	—	—	—	—	—	—	—	—	—
COLOURED, 1916-19:											
Admissions ...	12	47	248	—	11	6	3	1	3	2	1
Recovered ...	12	47	245	—	11	6	3	1	3	2	1
Not Discharged ...	—	—	3	—	—	—	—	—	—	—	—
Died ...	—	—	—	—	—	—	—	—	—	—	—

Total Cases:—Whites, 751, with 9 deaths; Coloured, 334, with no deaths.

Average length of isolation:—Whites, 37-40 days; Coloured 15 days.

Cost per head per day:—Whites, 10s. 6d.; Coloured, 2s.; Total cost, £15,251 5s. 6d.

RECEIVING HOSPITAL.

De Meillon's house, west of Ohlsson's Brewery in Braamfontein, was early in 1919 materially altered and equipped, at a cost of £202, as an auxiliary hospital for the reception of influenza cases, and was used for this purpose in May-June, 1919.

AMBULANCE EQUIPMENT.

There are four motor ambulances for Whites and Coloured. There are also five light-running four-wheeled canvas-covered American vans for removing clothing, contacts, sitting-up patients, etc., and one Cape cart.

During the period under review, 106 White cases and 349 Coloured were removed to Rietfontein by the above transport, and 1,115 White cases to the Fever Hospital. In addition, 322 White and 124 Coloured patients were removed to the Johannesburg Hospital, and transport for 3 lepers to Pretoria was arranged for. A few cases were also removed from outside districts at the request of, and on payment by, the local authorities concerned.

INFANTILE PARALYSIS.

(Acute Poliomyelitis.)

History.—Sporadic cases of acute poliomyelitis had occurred in Johannesburg prior to 1918 without any indication of a serious spread of the disease, but in the later months of 1917 cases of the disease became more numerous, not only in Johannesburg, but in the other Reef towns, and in the early months of 1918 the disease assumed epidemic proportions.

Notification.—On the 4th February, the Acting Medical Officer of Health (Dr. R. Gibson) recommended the Council to include acute poliomyelitis in the list of notifiable diseases, and by resolution of the Council the disease became notifiable as from 15th February, 1918.

Incidence and Mortality.—Before notification became compulsory there were no reliable figures of the incidence, but private practitioners, on request, had reported some 58 cases. The number of cases notified were 43 in February, 60 in March, 15 in April, 2 in May, and 1 each in the months of June, July and August, making the total of known cases 181. For the period 1st January to 30th June the number of deaths registered was 20. These numbers, however, cannot in any way be taken to represent the real incidence or mortality. There were good reasons for believing that at least some of the reported and notified cases were not cases of poliomyelitis, and also that a considerable number of other cases existed which were neither reported nor notified, and some cases which, on account of their mildness, escaped notice altogether.

Investigator.—On account of the comparative lack of experience and knowledge of poliomyelitis in South Africa, the Acting Medical Officer of Health (Dr. R. Gibson) suggested that an endeavour be made to obtain from the Rockefeller Institute, New York, a skilled Investigator, with experience of the disease, to conduct an investigation into the epidemic. This suggestion was supported by the Director and Board of the South African Institute for Medical Research, who expressed their willingness to contribute half of the expenses in connection therewith. The Public Health Committee, on 2nd March 1918, recommended the Council that the services of an Investigator from America be obtained as soon as possible, and the Council adopted the recommendation and voted the sum of £500 towards the cost. Negotiations between the Council, the South African Institute for Medical Research, and the Rockefeller Institute, New York, resulted in the nomination, by Dr. Flexner, Director of the Rockefeller Institute, of Dr. E. Taylor as Investigator. On account of shipping difficulties, Dr. Taylor did not arrive until 23rd June 1918, by which time the epidemic in Johannesburg had subsided. Dr. Taylor was provided with facilities for investigation and research at the South African Institute for Medical Research, but, on account of the paucity of cases, was unable to make any material contribution to the knowledge of the disease. He, however, acted in a consultative capacity, saw all notified and suspicious cases, and advised as to the treatment of actual cases and the residual paralysis of old cases. Most of the suspicious cases referred to him were found to be other than poliomyelitis. By consent, Dr. Taylor visited several towns in South Africa, including Kimberley and Jagersfontein, to investigate and advise on epidemics of the disease in those places.

Institutional Treatment of Cases.—By arrangement with the Hospital Board, the Otto Beit Convalescent Home was set aside for the reception of cases, the Council agreeing that the Board should retain administrative control and that the Council should have the right to decide as to the admission or refusal of individual cases. The Home received cases from the beginning of March and was closed in June. The R.M.O. of the Home (Dr. Sand) conducted investigations into groups of cases until the arrival of Dr. Taylor. The Home provided every facility for up-to-date treatment of the sequence of the disease, and these facilities were availed of to a very considerable extent.

Meteorological Conditions.—This outbreak was preceded by, and occurred during, months of quite unusual "recorded rainfall." Heavy rains fell in June, July and August 1917, recommenced early in November 1917 and continued with intermissions, including the month of January 1918, until the end of March. The subsidence of the epidemic coincided with the cessation of the rains in April 1918. It would, however, be very unsafe to make any deduction herefrom.

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	Date.	Rainfall.		Incidence of cases.
		No. of days.	Inches.	
1917—				
November	...	18	11.5	58
December	...	21	11.6	
1918—				
January	...	17	3.3	43
February	...	14	14.8	
March	...	25	6.0	60
April	...	2	.1	15

The relationship of this disease to epidemic influenza and encephalitis lethargica is referred to at p. 28.

INFLUENZA EPIDEMIC.

September, October, November 1918.

(By A. J. MILNE, M.B., D.P.H., then Acting Medical Officer of Health.)

INTRODUCTION.

Epidemic Influenza appeared in Johannesburg about 22nd September 1918, the primary infection being introduced from Durban. Up to the end of September, the cases were comparatively mild, though the two first known White cases imported from Durban ended fatally. From the beginning of October the incidence and case-mortality rapidly increased, were at their height about the 20th October, thereafter gradually declining. The epidemic period may be considered to have extended from about 22nd September to 10th November.

SPECIAL EPIDEMIC COMMITTEE.

The Council, on 9th October 1918, appointed a Special Epidemic Committee, consisting of the Mayor, the Chairman of the Public Health Committee, Councillor Christie, the Acting Medical Officer of Health, and the Superintendent of the Johannesburg Hospital, to deal with the outbreak and with power to incur all necessary expenditure for the establishment of hospitals and clinics and the supply of medicines, food, medical treatment and comforts. A sum of £10,000 was placed at the disposal of the Special Epidemic Committee. The Committee met daily at first, and latterly on every alternate day, to discuss and arrange measures. The principal matters dealt with were:—

- (i.) Hospital arrangements.
- (ii.) The establishment of Municipal food and medicine depots.
- (iii.) Closure of schools and places of entertainment.
- (iv.) The distribution of available nursing assistance.

HOSPITAL ARRANGEMENTS AND TRANSPORT.

The Johannesburg General Hospital was utilised to its utmost extent, extra accommodation being provided, and, so far as was practicable, cases of influenza were separated from cases of other illnesses. In order to relieve the congestion at the General Hospital, temporary hospitals were opened for

- | | |
|----------------------|---------------|
| (a) Whites. | (c) Natives. |
| (b) Coloured people. | (d) Asiatics. |

The Administrator of the Transvaal, his Executive Committee and the Education Department agreed to place at the Council's disposal all school buildings. Temporary hospitals for white persons were opened at Twist Street School, Hospital Hill School, and the Soldiers' Rest Home, Braamfontein, while the Otto Beit Convalescent Home received female convalescents and the Hope Home for Children convalescent children. The Village Deep, the Ferreira Deep and Robinson Mines Native Hospitals were set apart for Native cases, by kind permission of the companies concerned. A hospital for Coloured persons was equipped at Newlands Government School. The Asiatic community equipped an Indian hospital which was eventually included in the general hospital scheme. These hospitals provided sufficient accommodation for all requirements and during the epidemic admitted 1,987 Europeans and 1,260 Natives, Coloured people and Asiatics. Dr. R. P. MacKenzie, C.M.G., Superintendent of the Johannesburg Hospital, was in administrative charge of these hospitals and was assisted by a sub-committee of the Johannesburg Hospital Board, appointed for the purpose.

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The transport to hospital of cases was carried out by means of

- (a) the Council's infectious disease ambulances and the Fire Brigade ambulances;
- (b) temporary ambulances obtained by the conversion of delivery vans belonging to different business firms and lent or hired from the owners;
- (c) private motor cars provided by their owners. The arrangements for the supply of cars were in the hands of the Transvaal Automobile Club and were most complete.

Ambulances were available at all hours of the day and night, and from 9th October to 10th November transported a total number of 1,795 patients to the various hospitals.

MUNICIPAL FOOD AND MEDICINE DEPOTS.

These depots were established for the purpose of systematically, and as completely as possible, obtaining particulars as to the existence of cases of influenza and of investigating such cases with a view to

- (a) ascertaining which cases required removal to hospital for treatment;
- (b) providing medical attention, food and medicine to those cases which could be treated in their own homes.

Each depot was staffed by

- (a) A visiting medical officer;
- (b) trained nurses and experienced V.A.D. and Red Cross workers, who investigated cases and undertook the nursing of cases;
- (c) indoor workers, who undertook the preparation of foods, dispensing of medicines and distribution of disinfectants;
- (d) Boy Scouts, who assisted both the investigators and the indoor workers and distributed medicines and foods.

The system of distribution of both foods and medicines was by means of coupons, and the medicines were entirely stock mixtures approved by the Council's Medical Officers. All depots were provided with telephones and were allotted sufficient motor cars and motor cycles and side-cars for the transport of the medical staff and investigators. In all, 20 depots were opened, covering every portion of the town. The depots made 54,308 issues of food, 22,120 issues of medicines, conducted 43,078 investigations into cases, and 2,099 visits to serious cases were made by the medical officers attached to the depots. The staffs of the depots were selected from members of the Public Health Staff, trained nurses and midwifery nurses, V.A.D. and Red Cross workers, school teachers, selected unqualified volunteers and Boy Scouts. Large quantities of foodstuffs and medical comforts were contributed by the general public and distributed through the depots.

CLOSURE OF SCHOOLS, THEATRES, BIOSCOPES AND PLACES OF PUBLIC ENTERTAINMENT.

The schools being in vacation at the commencement of the epidemic, their re-opening was disallowed pending developments. Though the practice of closing schools on account of the prevalence of infectious disease is deprecated by the Council's Medical Officers, it was considered that in the presence of a widely-spread and virulent epidemic of influenza, a disease conveyed by direct and close contact—"droplet infection"—closure was justified, particularly as many of the Johannesburg schools lack sufficient accommodation and are at times overcrowded. It was also anticipated that schools could very easily be converted into temporary hospitals, depots and cooking centres; that the teaching staffs, being trained, methodical workers, would prove invaluable for staffing hospitals and depots, and that the scholars, especially Boy Scouts, would be exceedingly useful in a variety of ways. As a matter of fact, a very large part of the voluntary work performed was ably carried out by school teachers, and as many as 1,000 Boy Scouts were employed daily, principally in hospitals and depots, and rendered excellent services. Altogether, 16 schools were utilised as hospitals and depots. The re-opening of the schools was permitted on 18th November 1918.

The question of closing places of public entertainment received most careful consideration. As the Council at the commencement of the epidemic had no legal power to close such places, the Special Committee, through the Press, strongly recommended the public to refrain from attending theatres, bioscopes and other places where people congregate together. Later, when power was conferred upon Local Authorities to do so, it was found that the warnings given had been largely heeded, and that these places were so sparsely attended that no serious effect could be anticipated by their remaining open. For these reasons no definite closing order was issued.

DISTRIBUTION OF NURSING ASSISTANCE.

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Very considerable assistance, which included trained and midwifery nurses, V.A.D.'s and Red Cross workers and male nurses (ex-hospital orderlies), was available. These assistants were enrolled at the Public Health Offices and distributed to the various hospitals and depots according to demands. A large proportion of the assistance was voluntary and only a small number of paid assistants were employed.

PROPHYLACTIC VACCINATION.

During the epidemic, expert opinion was much divided as to the usefulness of prophylactic vaccination, and as no definite proof was forthcoming of the efficacy of the different vaccines reputed to confer immunity, the Special Committee, on the advice of its medical members, decided that no official attempt should be made to inoculate the public with any prophylactic vaccine.

BURIALS.

In order to assist the Deputy Commissioner of Police, the Council's old horse-drawn ambulances were placed at his disposal for the removal of dead natives to the Police Mortuary.

EDUCATION.

No serious attempt to inform the public by means of leaflets, posters, lectures, etc., as to the nature and gravity of the malady, how to prevent infection and the precautions to be taken in case of attack, was made, but frequent notices were inserted in the Press, which freely granted the Health Department every facility, advising the public of the measures and precautions which should be observed.

INCIDENCE AND MORTALITY.

As influenza was not a notifiable disease, it is not possible to arrive at even an approximate figure of the incidence, nor is it possible to estimate the case-mortality. The subjoined Table "A" shows the registered deaths of White and Coloured residents in the Johannesburg Municipal Area from influenza and pneumonia (including lobar pneumonia) during the epidemic period. Calculated on the 1918 Census, the deaths from both diseases represent a mortality of 4.7 per 1,000 of the White and 11.3 per 1,000 of the Coloured population. Table "B" sets out the mortality in all age periods from influenza and pneumonia for the month of October 1918.

TABLE "A."

DEATHS FROM INFLUENZA AND PNEUMONIA, 22ND SEPTEMBER TO 10TH NOVEMBER (50 DAYS).

Period.	Influenza.		Pneumonia.		Total.
	Whites.	Coloured.	Whites.	Coloured.	
September 22—September 30	1	13	17	36	67
October 1—October 31 ...	504	1,008	90	225	1,827
November 1—November 10	45	57	9	10	121
Total for whole period ...	550	1,078	116	271	2,015

TABLE "B." (October, 1918.)

CAUSES OF DEATH.	All Ages.	AGES AT DEATH.							
		Under 1 year.	1-5 years.	5-15 years.	15-25 years.	25-35 years.	35-45 years.	45-65 years.	65 years upwards.
Deaths—Whites :									
Influenza ...	504	9	22	15	91	191	117	56	3
Pneumonia ...	90	—	7	2	12	33	20	15	1
Totals ...	594	9	29	17	103	224	137	71	4
Deaths—Coloured :									
Influenza ...	1,008	21	36	24	211	470	185	59	2
Pneumonia ...	225	7	20	12	38	100	29	15	4
Totals ...	1,233	28	56	36	249	570	214	74	6

NOTE.—This table shows the number of deaths from pneumonia and influenza for all ages and age periods of both White and Coloured persons during the month of October, 1918. It is interesting to note that the mortality was highest in the age periods 15-25, 25-35 and 35-45. Owing to the lack of statistics of the population figures in the different age periods, it is impossible to say whether the mortality was actually highest in these age periods or whether it was only apparently so. So far as the Coloured population is concerned, the opinion might reasonably be expressed that it is only apparently so. The age period, etc., 5-15 (school age) is remarkably low.

The total expenditure during the epidemic period was £17,047 16s. 5d., of which £13,356 2s. 6d. was recovered from the Union Government in terms of their agreement to refund to Local Authorities four-fifths of approved expenditure. The actual cost to the Council of the epidemic was £3,691 13s. 11d.

An extremely gratifying feature of this serious epidemic was the remarkably spontaneous and earnest endeavour which all sections of the public made to assist and co-operate with the Council's Public Health Staff in dealing with the outbreak.

RECRUDESCENCE.

A recrudescence of epidemic influenza, mostly cases of a comparatively mild type and on a much smaller scale than in 1918, occurred in 1919 during the months of May to August inclusive. The Council, on the recommendation of the Medical Officer of Health, ordered, in terms of Chapter III., Section 1, Article 3, of the Public Health By-laws, that the disease known as pneumonia (including primary pneumonia, influenzal pneumonia and influenzal pulmonary oedema) be added to the list of notifiable infectious diseases as from the 1st May for six months. Arrangements were made to accommodate serious cases of influenza and pneumonia in the new Fever Hospital and to utilise De Meillon's house as a fever hospital. These arrangements were discontinued in the case of De Meillon's house on 26th June and in the case of the new Fever Hospital at the end of August. During the period 1st May to 31st October, 741 White persons and 932 Coloured persons were notified as suffering from pneumonia. During the same period, the number of registered deaths from influenza and pneumonia respectively were 166 Whites and 213 Coloured persons and 94 Whites and 195 Coloured persons. The total expenditure amounted to £2,152 6s. 8d., of which £964 18s. 10d. was recovered from the Union Government.

The relationship of epidemic influenza to acute poliomyelitis and encephalitis lethargica is referred to at p. 24.

ENCEPHALITIS LETHARGICA.

Several alleged, but non-typical, cases of this curious disease were reported amongst natives early in 1919. Ten deaths were ascribed to encephalitis during that year, and two to encephalitis lethargica.

Encephalitis lethargica was made compulsorily notifiable in England during 1919, but, apart from the value of the resulting statistics, it is not clear what practical advantage is thereby secured. In South Africa, the Union Health Department is collating information as it becomes available, but so far the number even of alleged cases has been small.

The English Local Government Board, in a Report published early in 1919, regards this malady, which was apparently known to the ancients, as "an acute specific fever which may affect any part of the nervous system and cause a variety of symptoms dependent upon the portion affected," and as one of a "group," of which infantile paralysis is the commonest type. It became epidemic in England in 1918, just before the influenza pandemic, just as cerebro-spinal fever had preceded the English influenza prevalence of 1915. Indeed, on bacterial and other grounds, many believe that "it was merely part and parcel" of the influenza prevalence (*British Medical Journal*, 2nd November, 1919, p. 489). Briefly, the symptoms were (a) languor, passing into lethargy; (b) progressive muscular weakness, passing into complete disablement; and (c) a combination of various cranial nerve palsies, of which squint, drooping of the lids and other eye-symptoms were characteristic. In some cases, the symptoms resembled a certain type of food-poisoning (botulism), but no evidence was forthcoming connecting such occurrences with suspected food.

G. Sabatini (*vide British Medical Journal*, 24th April 1920, p. 578) distinguishes four varieties of epidemic encephalitis, according to the predominant symptoms, namely:—

- (1) *Lethargic*.—Delirium and symptoms of motor-irritation are absent, paralytic eye-symptoms are limited, and lethargy is the chief feature.
- (2) *Hyperkinetic*, commencing with headache, pains in bones, restlessness and slight rise of temperature, followed by muscular jerking of the abdominal muscles, face and limbs, with rigidity of the spinal column, high fever, delirium and death in a few days.
- (3) *In which paralysis of the cranial and spinal nerves predominate*, the general condition and mental state being unaffected, and the commonest symptoms being drooping of the lids, double vision and squint.
- (4) *Mental form*, with confusion as to time, place and personality, critical power and will being abolished.

Professor Netter, of Paris, who has most diligently studied the subject, is convinced that the virus of lethargic encephalitis is of the same type as that of poliomyelitis, and, like it, is filtrable, and to be found, not only in the nervous system, but in the nose, throat and mouth. He thinks that early injection of the serum of recovered patients may yet prove to be of value, but that it is premature to recommend it.

He believes hexamine (by the mouth) and pilocarpine, combined with adrenal, may be useful in certain cases, but his greatest stand-by is the production of a local abscess by injecting, at the earliest possible moment, 16 to 30 minims of turpentine into the outer side of the thigh. Netter is unable to explain why this produces such a favourable effect, but he recalls the fact that Hippocrates, who knew a disease called "lethargus," said that the patients who recovered generally had an abscess in some part of the body. Netter suggests that the reaction caused by the turpentine affects the organs which produce the bodies that enable the system to defend itself against the disease.

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BACTERIOLOGICAL DIAGNOSIS.

The following are particulars of the specimens examined under this heading for the Town Council at the South African Institute for Medical Research during the years under review:—

Disease Product.	Positive.	Negative.	Doubtful.
Typhoid	223	930	46
Tuberculosis	—	7	—
Diphtheria	479	896	50
Leprosy	7	16	—
Plague	—	151	—
Anthrax	—	1	—
Ankylostomiasis	—	1	—
	709	2,002	96

These figures do not include rats examined for suspected plague (v. p. 22).

NURSING HOMES.

There are 25 registered nursing homes in Johannesburg. These places are inspected as regards sanitary conditions only, and licensed by the Public Health Department.

PUBLIC ABATTOIR.

The Abattoir was opened on the 24th October, 1910, and with the Stock Yard and Cattle Market is under the direction of Mr. J. Irvine Smith, M.R.C.V.S. The following information is excerpted from his Annual Reports for 1916-19:—

COMPARATIVE STATEMENT OF ANIMALS SLAUGHTERED AT JOHANNESBURG ABATTOIR.

DESCRIPTION.	1914-15	1915-16	1916-17	1917-18	1918-19
Cattle	78,476	96,071	116,107	116,889	112,456
Sheep, Lambs and Goats ...	379,940	337,120	330,412	314,994	307,715
Calves	3,576	3,793	4,150	3,973	4,455
Pigs	20,444	22,238	24,347	32,123	41,967
Totals	482,436	459,222	475,016	467,979	469,593

MILK SUPPLY.

COWSHEDS AND MILKSHOPS.

350 cowsheds and 116 milkshops are licensed and, as far as practicable, kept under observation within the Municipal Area.

The question of the milk supply of Johannesburg was specially investigated and reported on in January-June, 1913 (*vide* M.O.H. Annual Report, 1912-13, pp. 32-34).

OUTSIDE DAIRY INSPECTION.

The Outside Dairy Inspectors (Messrs. W. C. Watson and G. Christie) appointed in November, 1915, have, with marked success and an almost entire absence of friction, continued their excellent work during the triennium under review. Their Report for that period—a very interesting and satisfactory record—is appended:—

We have the honour to submit a general report on the milk supply to Johannesburg from dairy premises situated outside this Municipal Area, as from 1st July, 1916, to 30th June, 1919:—

Situation of Dairy Farms.—The dairy farms supplying milk to Johannesburg are situated within ten miles of the different railway lines leading throughout the Transvaal, Free State, a portion of the northern part of Cape Colony, and that of Natal. During the winter of 1917 milk was supplied to Johannesburg from Cape Colony, a distance of 381 miles.

Introduction of Milk into Johannesburg under the Permit System.—The introduction of milk into Johannesburg is controlled by the permit system as laid down in the Council's By-laws (1915) for Regulating Dairies, Milkshops, Cowsheds and Purveyors of Milk. A permit is granted when the dairy premises of the applicant have been made to comply with the requirements of these by-laws. All permits expire on the 31st of December of the year for which they are granted, but if at any time during the currency of a permit the sanitary conditions of the premises in respect of which it has been issued shall be found to be such as are likely to render the milk liable to contamination or infection, or if the permit-holder sends in milk from a non-permit holder, the Council may forthwith cancel the permit.

Farm Premises Inspected.—During the period under review applications in respect of 496 farms for permits to introduce milk into Johannesburg have been dealt with. Of this number, 383 were granted; the remaining 113 were not considered satisfactory. These returns show an increase in applications for permits of 186, and of permits issued 375, over the figures for the year 1915-16.

Enforcing Dairy Regulations.—Regular periodical inspection of all dairies supplying milk to Johannesburg has been carried out, and any infringement of the by-laws has been carefully reported to and dealt with by you. This procedure has resulted in a steady improvement in milk-producing conditions. Milking in kraals and camps has been discontinued, also the practice of allowing calves to suck the dairy cows. Pigsties situated in close proximity to cowsheds and milkrooms have been removed to a more suitable site. Dairy cows are now milked in suitable sheds, well lighted and ventilated, provided with impervious floors and efficient drainage to permit of thorough cleansing. Greater attention is paid to the cleanliness of cowsheds, cows, milkers and utensils. On each farm a milkroom has been erected for the purpose of straining, cooling, canning of milk and storage of clean milk receptacles. These rooms are provided with an impervious floor, opening glazed window, adequate ventilation, and all openings fitted with fly-screens. At the instigation of your inspectors, many farmers have put down boreholes, which generally yield excellent water for milk-cooling and other dairying purposes. Many difficult problems have been met in dealing with spring-water supplies and the arrangements adopted to protect them from pollution. Efficient steam plants or open boilers have been installed for the sterilisation of dairy utensils.

Facilities Granted to Dairy Farmers.—Any farmer desirous of information pertaining to dairying can on application obtain from your Department:

- (1) Plan of cowsheds of various types.
- (2) Plan of model milkroom.
- (3) Plan showing methods of protection of water supplies.
- (4) Plan of suitable boiler.
- (5) Literature on "How to Produce Clean Milk," "Destruction of Flies," etc.

Re-tinning of Milk Cans.—During the years covered by this report the question of replacing damaged or rusty milk cans became very acute owing to there being no consignments from overseas. Your inspectors successfully arranged with a Johannesburg firm to undertake repairs and re-tinning of milk receptacles. Competition followed, with the result that inferior tinning material was being used. Analysis of a sample of metal scraped off a re-tinned receptacle in course of transit, and of another sample of re-tinning metal obtained at the works of a firm in town, showed that the samples contained about 44 per cent. of lead, whereas the material should have been pure tin. The Acting Medical Officer of Health dealt with this matter, and when further samples were submitted they were found to be free from lead. Re-tinning of milk cans receives our continued attention.

Railway Facilities.—The S.A.R. are gradually meeting the requirements of the dairy farmer by erecting milk shelters at stations on the line. Special milk trucks have been placed on the railways leading to the chief milk districts, and, although these trucks are not of the insulated refrigerator type, they are superior to the ordinary parcel van. At the suggestion of your Department, careful records are kept by the Railway authorities of the temperature in these trucks at different points on the line. The average temperature recorded during the summer was about 65 degrees Fahr.

In conclusion, we beg to state that great credit is due to the dairy farmer for the manner in which he has met your inspectors in the construction or reconstruction of his premises. A large number of excellent cowsheds and milkrooms have been erected and other work accomplished during a period when material was most expensive.

G. CHRISTIE,
W. C. WATSON,
Outside Dairy Inspectors.

As recorded in the Medical Officer of Health's Report for 1915-16, milk cannot be introduced from farms or dairies outside the Municipal Area without a permit from the Council, which permit is only issued when the Council's requirements are complied with.

It was soon found, however, that permit-holders partially evaded this by-law by receiving and sending in milk from neighbours who did not hold a permit, and accordingly, in the latter part of 1918-19, the following draft by-law was submitted and gazetted in due course:—

“ If at any time during the currency of a permit issued under this by-law
 “ the permit-holder introduces into or receives or purveys within the
 “ Municipality any milk produced or prepared on any premises
 “ outside the Municipality in respect of which no permit has been
 “ issued under these by-laws, the Council may forthwith cancel the
 “ permit.”

MILK ANALYSIS.

Appended is a tabulated summary of the results of analyses and prosecutions:—

	1914-15	1915-16	1916-17	1917-18	1918-19
No. of Samples taken ...	299	366	332	266	229
No. examined bacterially ...	—	30	—	—	—
No. deficient Solids not Fat ...	29	9	14	26	15
No. deficient Fat ...	3	15	16	7	14
No. with Preservatives ...	—	—	—	—	—
No. of Prosecutions ...	6	11	3	11	17
Amount of Fines ...	£42/10/-	£42	£37/10/-	£107	£81/10/-

INSPECTION OF FOODSTUFFS.

The following goods were condemned by the Food and Drugs Inspector:—
 Fish, 7,843 lbs.; fillets, 166 boxes; smoked fish, 18 boxes; Salt herrings, 49½ barrels and 1,274 tins; kippers, 17 boxes; salmon, 50 boxes; bacon, 329 lbs.; fruit, 205 boxes; potatoes, 19 bags; prunes, 33 boxes; sugar, 1 bag; baking powder, 150 lbs.; cheese, 17; sausage skins, 2 barrels; ostrich eggs, 250; and macaroni, 57 cases.

During the period under review he passed 1,298,641 lbs. of bacon, etc., 19,635,604 lbs. of fish, 2,418 lbs. of poultry and game.

He condemned 122,034 lbs. fish, 4,370 lbs. soles, 3 boxes haddocks, 1,335 crayfish, 3 boxes smoked fish, and 22 barrels salt herrings.

ANALYSIS OF FOODS, 1916-19.

In addition to the 905 water examinations (see page 32), some 941 articles of food were examined during 1916-19 at the Government Laboratories. Details are appended:—

Number and Description.	Genuine or Pure.	Adulterated or Impure.	Doubtful.
Milk ...	743	84	—
Butter ...	9	—	—
Margarine ...	3	—	—
Honey ...	—	3	—
Salt ...	2	—	—
Epsom Salts ...	1	—	—
Human Milk ...	1	—	—
Wheat Meal ...	1	—	—
Coffee ...	17	—	—
Chicory ...	1	1	—
Chicorine ...	1	—	—
Aspirin ...	6	1	—
Ginger Pop ...	2	—	—
Flour ...	6	—	—
Mealie Meal ...	1	—	—
Bread ...	17	—	—
Sugar ...	2	—	—
Chocolates ...	—	1	—
Ginger ...	3	—	—
Baking Powder ...	9	1	—
Pepper ...	12	12	—
Macaroni ...	—	1	—

This gives an average of 313.6 samples per year, or 2.22 per annum per 1,000 of the white population, as compared with 5.3 per 1,000 in 1907 of the population (1901 Census) in London, and 2.5 in the English Provinces.

M.O.H. 1916-19. Formerly it was understood by the Local Government Board of England that one sample per 1,000 of the population should be aimed at; but, as will be seen from the above, this figure is considerably exceeded at the present time. The English Board of Agriculture tries to encourage the taking of three per 1,000, and divide these amongst milk, butter and cheese.

SUPERVISION OF OUTSIDE SOURCES OF MILK SUPPLY.

The new Code of By-laws for the Regulation of Dairies, Cowsheds and Milkshops gazetted on 16th June, 1915, came into operation in the year under report, and this supervision was instituted during the same year. The Council's right to protect Johannesburg consumers in this respect was upheld by the Supreme Court at Pretoria and at Bloemfontein in the case of Municipality *versus* Cooper.

WATER SUPPLY.

Water is supplied in bulk by the Rand Water Board to the Municipal Council. The Municipal Council controls the distribution of water throughout the town, and owns the reticulation.

Source.	Total Quantity Pumped during Year ending 31st March.			Percentages.	
	1917. Gallons.	1918. Gallons.	1919. Gallons.	1918.	1919.
From Zwaartkopjes	1,138,801,800	1,512,504,000	1,634,809,700	40·76	40·34
From Zaubekom	2,189,189,550	1,725,223,000	1,828,305,300	46·49	45·11
From Local and Town Supplies:					
From Ellis Park and Natal Spruit	51,709,000	44,455,000	52,996,000	1·20	1·31
From Braamfontein	Nil	Nil	Nil	Nil	Nil
Farm Roodepoort	129,657,000	105,017,000	111,066,000	2·83	2·74
Grand Total	3,519,357,350	3,387,199,000	3,627,177,000		

VAAI RIVER SCHEME.—This scheme has been delayed by the late war, but since the Armistice revised estimates for five million and ten million gallon schemes have been prepared, and the work is now progressing rapidly.

ZWAARTKOPJES.—The water from the western series of wells at Zwaartkopjes has been satisfactory, but, as in previous years, the bacterial content of the water from the southern section has varied considerably.

The bleaching powder process of sterilising water at Zwaartkopjes has been continued, and the results are satisfactory.

The length of mains within the Municipal Area is now 366·19 miles, 5·72 miles having been added during 1916-19, while during the same period 3,400,940,100 gallons of water were supplied to consumers connected to same.

CHEMICAL AND BACTERIOLOGICAL EXAMINATIONS.

905 samples of water were taken for examination during the years 1916-19, namely, 126 chemical and 779 bacteriological.

AERATED WATER AND ICE FACTORIES.

The By-laws for the regulation of these trades, which were gazetted on the 6th April, 1906, continue to work well.

SEWERAGE.

The Town Engineer has kindly supplied the following information:—

On 30th June, 1919, there were 105·43 miles of sewers completed, chiefly in the following districts:—Johannesburg (south of Railway), Braamfontein, Ferreiras, Fordsburg, Marshallstown, City and Suburban, Doornfontein, New Doornfontein (south of Railway), Hillbrow (south of the Hospital Hill side), and the Malay Location. All sewers for 1917 and 1918 were laid in Jeppes.

On the same date, 10,695 premises had been connected.

Owing to the torrential seasonal rains, the "Separate System" has been adopted, i.e., surface and storm waters are excluded from the sewers and carried off in separate culverts and pipes, the latter often being laid in the same trench as, but above, the sewers.

NIGHT SOIL AND SLOP-WATER INTAKES.

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There are eight "intakes," at which night soil and slop-water are turned into the sewer. Their design is, in the opinion of the Medical Officer of Health, exceptionally good. Particulars are appended of the daily work done by each intake between 1st July, 1916, and 30th June, 1919:—

Intake at	Used since	Approx. Average Quantities Disposed of Daily.			
		Nightsoil.	Urine.	Slop-water.	Clean Water for Flushing purposes.
Vrededorp Compound	Nov. 14th, 1908 ...	6,572	2,169	12,056	12,244
Natal Spruit	... Jan. 19th, 1909 ..	5,007	546	57,517	28,000
Springfield	... May 25th, 1909 ...	4,989	872	5,643	15,000
Wolhuter	... April 26th, 1909 ...	5,289	3,753	22,546	13,000
Shanks Street	... August, 1907 ...	—	—	2,389	8,300
Gaol	... Before the Boer War	—	—	55,732	1,800
Ophirton	... May 18th, 1908 ...	—	—	—	—
Bezuidenhout Valley	October 6th, 1911 ...	1,647	—	23,747	1,200
Totals	...	23,504	7,340	179,630	76,544

Total Gallonage daily—all kinds—287,018.

SEWAGE DISPOSAL.

Klipspruit Farm, about ten miles to the west of Johannesburg, lies in the district of Nancefield, but by Section II. (1) of Private Ordinance, 1906, is included within the Municipal Area of Johannesburg. It was bought in 1904 for £84,500, and is used for the treble purposes of a sewage farm, of a native location, and of a large native washing site. Whilst, on every sewage farm, possibility of improvement will always exist, and at Klipspruit there is still years of work ahead in the lining of carriers, the Medical Officer of Health considers that the present condition and management of your Farm afford unusually small opportunity for reasonable criticism. As the *personnel* of the Council has changed completely since 1904, it seems desirable to recall, for convenient record, various facts which may be useful to present Councillors.

The farm was selected by the late Town Engineer (D. C. Leitch, M.I.C.E.) as the best available area to which the town's sewage would gravitate. It is 2,642 acres in extent, of which about 900 acres are irrigable, but by the use of flumes and of moderate pumping the irrigable area could be greatly increased. The soil consists of 12in. to 18in. light sandy loam over coarse gravel of varying depth, the underlying rock being amygdaloid diabase, which outcrops at various points, and in its turn overlies dolomite.

The Council proposed: (1) That the ground irrigated by sewage be protected from stormwater by a suitable storm-trench running round its upper side; (2) that the irrigated land be nowhere nearer than 600 feet to the lower boundary of the farm; (3) that the crude sewage be screened and treated in septic tanks, the effluent being applied to the land.

A Transvaal Government Commission (Sir George Turner, M.B., Mr. F. H. P. Creswell and Mr. H. Ross Skinner) duly inquired into the Council's proposals and reported on 10th August, 1904 (*vide Minutes 126th Meeting of Council, 14th September, 1904*), that on the geological evidence of Dr. Hatch, D.Sc., there was no danger of pollution by passage of sewage through the diabase, of the water supply which the Rand Water Board proposed to derive from the underlying dolomite; that it was unlikely that there would normally be any appreciable run-off of sewage matter into neighbouring streams, and that, if this occurred in times of flood, the sewage matter would be so diluted with stormwater that such pollution would be negligible. They recommended, however, as an additional precaution, that the 600 feet belt below the irrigated portion be kept ploughed. Finally, they considered it unlikely that the smell from the farm would cause nuisance to surrounding owners.

In November 1907 the outfall sewer was completed and 500,000 gallons unscreened crude sewage per day turned on to land in no way adequately prepared for its reception. Complaint of smell nuisance soon resulted, and in July 1909 *action by Mr. Herrington*, living just beyond the south-eastern boundary of the farm, resulted in a provisional interdict against the Council, which was suspended for nine months to give it an opportunity to set its house in order (*see Medical Officer of Health's Report No. 1077F of 9th June 1909 to Sub-Committee—Lawuits re Sewage Farm*). Upon this adverse decision, the Council had to pay £4,200 in costs for its previous inaction, and on 9th August, 1909, instructed the Town Engineer and Medical Officer of Health to submit a joint report on the measures necessary to ensure the future disposal of sewage with a minimum of smell (*Minutes of Council, 13th September, 1909*).

On 3rd September, 1909, the Town Engineer and Medical Officer of Health reported their recommendations including: (1) Appointment of an experienced Sewage Farm Manager; (2) fencing of farm; (3) adequate ploughing and re-ploughing

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of irrigable areas; (4) careful observation of the 600 feet boundary zone of ploughed land; (5) planting of belt (100 feet wide) of trees all round farm; (6) provision of screens, detritus chambers and continuous sedimentation tanks; (7) widening and completion of carriers; (8) cutting of stormwater drain round upper limits of irrigated areas to exclude stormwater therefrom; (9) planting of osiers and other suitable grasses in low-lying parts, and also of selected crops; and (10) the definite association of the Town Engineer and Medical Officer of Health in responsibility to the Council in regard to the principles and methods of treatment to be adopted and followed.

These recommendations were adopted by the Council on 13th September 1909, the sum of £1,600 being voted for the purpose.

In June 1911, one *Comber* commenced an action for nuisance against the Council. His dwelling was some three miles south of the outfall. But in the meantime the Council had done its best to give effect to the recommendations of its advisers: a ring of observers, provided with detailed instructions and record forms, was placed round the farm; numerous (and extremely cold) observation vigils from sunset to midnight were made by the Medical Officer of Health and the then Assistant Medical Officer of Health (Dr. Stock). The accuracy and integrity of much of the evidence tendered against the Council was successfully impugned, and, after a trial of 17 days, the Council secured a verdict with costs, Mr. Justice Bristowe finding that it had "put itself in the hands of competent advisers and had honestly and judiciously carried out their recommendations." The Council's taxed costs in this action amounted to some £1,800, but nothing was recovered, the total cost to the Council being over £2,200. In addition, the defence to these actions entailed an immense amount of extra work and worry to the Council's officials; and the constant danger of local combinations for further similar determined attempts necessitated the employment, for some years, of two special observers to record systematically and carefully notes of the climatic and smell conditions, etc., also the retention of several local residents to report promptly any special occurrence in their vicinity threatening the Council's position. On 1st January, 1920, legislation became operative which renders local authorities much less vulnerable to such attempts when it can be shown that reasonable care and skill have been exercised. The services of the two special observers have now been dispensed with.

PRESENT CONDITIONS.

Flow of Sewage: The daily flow of sewage is about 2½ million gallons in dry weather and 3 million gallons and upwards in wet weather. The period of maximum flow is 10 a.m. to 12 noon.

Nature of Sewage: The sewage to be dealt with is extremely strong, owing to the cost of water, the comparatively small number of water-closets, and the tipping of pail contents into the sewers at the various "intakes." In the following rough comparison with English crude sewage, the term "dissolved solids" refers to solids which, like salt or sugar, disappear from sight in the liquid, but are, nevertheless, there; "suspended solids" may be compared to tea-leaves floating in tea; "total solids" include both "dissolved solids" and "suspended solids"—

	English Cities.	Johannesburg.
	(Per 100,000 parts of sewage.)	
Total solids	60 to 196	300 to 700
Dissolved solids	39 to 129	140 to 158
Suspended solids	21 to 67	132 to 565

Screening: The sewage on emerging from the outfall sewer passes through two screens of nearly vertical iron bars with interspaces of respectively ¾ in. and ½ in. These screens are primitively but effectively cleaned by hand-raking, and the screenings are trucked to a depositing site and removed by farmers.

The Medical Officer of Health attaches great importance to the effectiveness of the screening process.

Detritus Tank: This is duplicated and presents no special feature.

Sedimentation Tanks: These four parallel tanks, each of 500,000 gallons capacity and 85ft. x 37ft. x 21ft. in greatest depth, are wedge-shaped in cross-section, and were designed for adaptation to the Travis system, if considered desirable. For experimental purposes, No. 4 only was completed with 'reduction chamber,' 'hydrolysing chamber' and jarrah-wood 'splines,' or 'colloids,' but the working results were such that the colloids were eventually scrapped, and now the tanks are used simply as continuous sedimentation tanks, 50 per cent. of the sewage passing through No. 1, 50 per cent. through No. 2, and 100 per cent. through both No. 3 and No. 4. Recently a *night reservoir* of one million gallons capacity has been built to retain the flow of tank-effluent between 6 p.m. and 6 a.m., in order to obviate supervision of night irrigation.

Filtration Area: This area, 13 acres in extent, lies immediately below and south of the tanks, and is underdrained by rows of 4in. pipes, 50 feet apart, laid at a depth of 4 feet. Of this area, one-quarter acre is also underdrained herring-bone fashion.

The *sewage-carriers* are some 25 miles in length. Over 5 miles have been lined with concrete half-tubes. This lining costs 10s. per running yard, but it pays for itself in one year, as the unlined carriers have to be cleaned out quarterly, each cleansing costing 2s. 6d. per yard.

The *irrigable land* is divided into 23 areas, varying from 57 to 16 acres in extent, and the tank-effluent is applied to these areas in such a manner as to permit adequate periods of rest.

Under an old standing agreement, Mr. C. F. Stallard, K.C., the owner of the farm to the south-east of the outfall, has been entitled to half a million gallons of tank-effluent per week for irrigation purposes, but at times has taken considerably more. This arrangement has been a source of mutual advantage and convenience.

Rye-grass has been found of exceptional value in securing the even distribution of sewage on the irrigated land and in preventing the formation of runnels. No other crop gives equal results in this respect.

One of the special
observers left the
farm on 1/1/1915.
and

(under the new
P.H. Act)

Osiers have been planted in some numbers near the south-east boundary. At present they are peeled at a cost of 10s. per ton, railed to Durban (50s. per ton), and sold there for £10 per ton. This contract expires shortly. M.O.H. 1916-19.

Effect of Treatment.—In the 24 hours 16th-17th April, 1920, the purification effected was as follows:—

Sewage arriving at outfall: 424 parts of solids per 100,000 of water.

Sewage leaving detritus tank: 218 parts of solids per 100,000 of water.

Sewage entering No. 4 tank: 157 parts of solids per 100,000 of water.

Sewage after passing through four parallel tanks: 156 parts of solids per 100,000 of water.

Sewage after passing through underdrained land: 130 parts of solids per 100,000 of water.

These figures will serve to show the difficulty of the problem here, as compared with that in England.

Sludge: The sludge, including the screenings and detritus, amounts to over 70 tons per day, and is buried in trenches 3 feet deep, 3 feet wide, with 8 feet between each trench.

The manager is Mr. S. Spencer, and the staff includes 30 white men, at 12s. 6d. per day, and 30 natives, at 1s. 8d. per day, plus food and housing.

MINES SANITATION.

Appended is the Mines Sanitation Inspector's Report for 1916-19:—

30th April, 1920.

A.—SURFACE SANITATION.—The work of systematic detailed inspection of the various mines has been consistently carried out by your Mines Sanitation Inspectors, and the results of such inspections have been carefully reported to and dealt with by you. This work has included the inspection and re-inspection of, and any necessary report and action in regard to, all native compounds, locations and hospitals, married and single white quarters, native eating houses, mine boarding houses, contractors' compounds, brickfields, stone crushing works, power and pumping stations, timber yards, railway stations and quarters, the sanitary arrangements at the various works, disposal of refuse, and generally the maintenance of proper structural sanitary conditions and daily cleaning up and scavenging at all places and premises on the surface.

Plans submitted in regard to new, or additions and alterations to existing, housing accommodation, drainage and other sanitary requirements have been examined by the Medical Officer of Health, and amended where necessary, so as to comply with the Public Health By-laws.

On certain properties a further extension of the water-carriage system of sewage removal has been carried out by the mine authorities. The final treatment is by means of septic tank installations. It would be a very great improvement if, as has been repeatedly pointed out for a number of years past by the Medical Officer of Health, facilities were given by the Council to the mining authorities so as to enable the different properties to be connected to the public sewer.

All cases of infectious disease among whites, natives and coloured have been visited, inquired into, and reported upon in the usual way.

On one of the mines experimental brick fireplaces were constructed in certain of the compound rooms. By their use a great improvement was effected, both in regard to the heating and cleanliness of the rooms. So successful was the experiment that similar fireplaces have been provided in the remainder of the compound rooms on this property.

Delousing, etc.—In connection with the destruction of body-vermin, a marked improvement has been effected by reason of the provision of disinfestation chambers of the dry, hot air type. Practically every mine in this area is being, or has already been, equipped with a delousing plant of this type. This innovation has been well received by the natives in the various compounds.

The chief improvements effected during the period under review have been in regard to (a) extension of, and repairs to, impervious channel drains in connection with surface drainage; (b) the erection of several blocks of brick-built compound rooms on several of the mines; (c) the extension of the reinforced concrete sleeping bunks, with a finishing coat of magnesite; (d) laying down of cement concrete floors in pail closets at white quarters in lieu of wooden floors; (e) considerable amount of repair work carried out in connection with compound and location rooms, sanitary conveniences, etc.

B.—UNDERGROUND SANITATION.—The usual inspections of the sanitary arrangements, conveniences and general conditions underground have been made, and detailed reports thereon have been submitted to the Inspector of Mines, Johannesburg, who forwards a copy of each report to you. It is pleasing to record a continued improvement in this branch of mines sanitation work, also the increasing interest therein which is displayed by the various underground officials. Practically every mine employs a special underground sanitary overseer, who is responsible for the proper cleansing and disinfecting of the sanitary conveniences, drives, crosscuts, stations, ladderways and mine workings generally.

There can be little doubt that the example set by this work in Johannesburg is having a very good effect in districts outside Johannesburg where there are no Mines Sanitation Inspectors, owing to the employment in those outside districts of numbers of mining officials who previously held positions on mines in this area.

C.—GENERAL.—Recently many of the industrial sites on the mines, particularly in the central area, have been acquired by business firms and a number of industries commenced. Such premises are frequently and regularly inspected and action taken where necessary.

In spite of the difficulties experienced with men and materials owing to abnormal conditions, your Inspectors have again to acknowledge the reasonable and sympathetic attitude of the mine managers in regard to the requirements and recommendations called for by the Public Health Department.

M.O.H. 1916-19.

The Government Mining Engineer, the Medical Inspector of Mines, and the Director of Native Labour have been kept in close touch with the general work of mines sanitation under your direction.

The Superintendent of Sanitation of the Rand Mines, Ltd., has also been regularly notified concerning the sanitary conditions of the Rand Mines' properties within the district, with the result that the carrying out of suggested improvements has been greatly facilitated.

I have the honour to be, Sir,

Your obedient servant,

ERNEST WM. CLARKSON,

Mines Sanitation Inspector (East).

The Medical Officer of Health wishes again to record very clearly the opinion which he has repeatedly expressed, that it is highly desirable in the interests of the public health that a water-carriage system should be installed as soon as possible on the mines, and the mines connected to the outfall sewer.

A code of "*Recommendations in regard to Underground Sanitation*" was drawn up in this office in 1910, and suitably circulated. In 1913 a similar *résumé* re "*Surface Sanitation*" was prepared and issued in pamphlet form.

FACTORY INSPECTION.

The Factory Act, No. 28 of 1918, came into force on 1st May, 1919. "Factory" includes any premises where power is used for manufacturing purposes for gain; also where three or more whole-time workers are employed, any laundry, dyeing or cleaning works, as well as any premises where the manufacture or transport of goods is carried on for gain. Mine reduction works and the preparation and packing at farms of farm produce are exempted.

As regards sanitation shortcomings, the Factory Inspector must notify the Municipal Authority, and thereafter defer any further action till that Authority has failed to take the necessary steps. Every Municipal Council must afford the Factory Inspector opportunity of inspecting any plan in respect of erection, alteration or repair of any factory, and, before approving plan, must forward copy of the Inspector's report to the submitter of such plan.

Section 20 deals with floor and cubic space *minima* (25 square feet and 250 cubic feet respectively); Sections 21 and 22 with ventilation and removal of dust and fumes; Section 23 with disposal of putrefiable refuse; Section 24 with sanitary conveniences; and Section 25 with washing accommodation.

Your Inspectors have been fully informed as to the requirements of the Act which affect this Department, and instructed to co-operate with the Factory Inspectors.

SLUM PROPERTY.

This matter is of great importance. Its circumstances and bearings in Johannesburg have been discussed at some length in the Medical Officer of Health's Reports since 1912-13.

In June, 1916, the Local Government Amendment Ordinance, 1916, became law. The following is a summary of the closing orders since secured:—

Date of Order.	Date of Operation.	No. of Rooms.	Stand No.	Persons Affected.	
				Whites.	Coloured.
October 12th, 1917	Immediate as agreed	26	626/32/3/4,	—	60 Adults
October 12th, 1917	Jan., 12th, 1918	Ridgway's Yard 9	City & Suburban 131,	—	15 Children
October 12th, 1917	Jan. 12th, 1918	25	Ferreiras 135/142,	—	20 Adults
June 27th, 1919 ...	August 1st	19	Ferreiras 67/68a,	—	12 Children
June 27th, 1919 ...	August 1st	25	Ferreiras 470/1,	1 Adult	40 Adults
June 27th, 1919 ...	August 1st	15	Johannesburg 821,	—	15 Children
October 3rd, 1919 ...	Jan. 3rd, 1920	25	Johannesburg 518/9/20/21	4 Adults	17 Adults
			Johannesburg		8 Children
					44 Adults
					24 Children
					25 Adults
					14 Children
					35 Adults
					12 Children
Totals ...		144		5 Adults	241 Adults
					100 Children

NOTE.—The rebuilding of rooms on Stands 135/42, Ferreira's, provided accommodation for at least as many persons as were displaced through closing order.

On 30th January, 1919, the Medical Officer of Health addressed the following letter to the Public Health Committee:— M.O.H. 1916-19.

QUESTION OF FURTHER CLOSURES.

The Medical Officer of Health is prepared to certify a considerable number of other premises as unfit for human habitation and will, of course, do so if the Committee so directs, but not otherwise. As, however, the crowded population of these places is almost exclusively Coloured, the Medical Officer of Health begs to record his definite opinion that to close these premises until extensive provision for the housing of Coloured people has been made would only mean increasing the dangerous congestion which already exists in the Malay Location.

In May last, an enumeration was made of the inhabitants of practically all the structurally insanitary premises which require to be dealt with, the total figure being about 2,000, of which 350 were Europeans, 1,450 Natives and Coloured, and 200 Indians. The densely-crowded Malay Location shelters from 7,000 to 8,000 Coloured people, of whom probably not less than one-half are Natives. It is clear, therefore, that it would be wrong and dangerous to drive any of the 1,500 Coloured inhabitants in the insanitary spots in town into the Malay Location, and the obvious course is to proceed, without delay, with the provision (under Section 66 of the 1912 Ordinance, *vide* Annexure) of plain, inexpensive, sanitary dwellings for these people.

The Medical Officer of Health on 22nd August 1911 reported to the Council, after very careful examination of the Newlands site, that at least 120 acres of the Council's land at Newlands are suitable for building upon and, without going into details, accommodation for about 6,000 Coloured people can quite properly and decently be provided in this area.

Of course, if accommodation can be found for a proportion of single adult Coloured males, *e.g.*, at Salisbury and Jubilee, the number provided for at Newlands would be correspondingly less.

Further, to make this proposal a practical success, cheap tram facilities should be provided for the inhabitants of the Location.

The Medical Officer of Health knows that the Health Committee is very anxious to tackle this problem promptly and effectively, and is satisfied that the lines he has ventured to indicate are those along which they should proceed.

IT IS THEREFORE RECOMMENDED:

- (1) That the portion of the Newlands site available for buildings be carefully laid out, without delay, for the accommodation of, say, 6,000 Coloured people, reasonable reservation being made elsewhere on the site for open spaces and recreation ground.
- (2) That a sufficient number of dwellings of a plain, sanitary and not too costly type be provided, as soon as possible, to accommodate 5,000 people.
- (3) That efficient arrangements be made for the effective and sanitary disposal of all solid and liquid filth, and for the strict enforcement of cleanliness and attention to sanitary regulations.
- (4) That the provision of tram facilities be borne in mind as an essential to the success of the scheme.
- (5) That, if these recommendations are adopted, the remainder of the Newlands site be cleared of weeds and sufficiently levelled to permit of it being ploughed and cropped, and that on the Newlands Main Road side, at any rate, it be planted with blue gums.

The Committee should understand that this provision will not necessarily clear the town of the low class of Coloured people who are responsible for so much insanitation, and who will still continue to inhabit rookeries like Rainier's Buildings, which cannot be structurally condemned. But it will give the Council a free hand in clearing away insanitary spots, particularly between Market Street and the Mine Fence, and of abating the real danger of the Malay Location, compared with which the danger from the small local slums is comparatively negligible.

HOUSING OF NATIVES IN TOWN AND AT KLIPSPRUIT LOCATION.

This question is frequently discussed, and, in consequence of want of accurate information, much misunderstanding and misrepresentation exist in regard thereto. The matter was, however, very fully dealt with at pp. 36-40 of the Medical Officer of Health's Annual Report, 1914-15, and the position has undergone no material change.

THE MALAY LOCATION.

This Indian or Malay Quarter lies to the west of Braamfontein Station, between Vrededorp on the north and Mayfair on the south.

For purposes of convenient permanent record, the following report, dated 7th May, 1919, to the Public Health Committee is reproduced below:—

Previous to April 1904, the majority of the Indians and some Malays lived in what was known as the "Coolie-Location," where the present Railway cottages now stand. This Location was burned to the ground during the plague outbreak of 1904, the inhabitants having been temporarily removed to the site of the present Klipspruit Location. Later on, most of them settled in the present Malay Location, and before long the following description of the old Coolie Location by the Medical Officer of Health (*vide* Insanitary Area Commission Minutes 1902) applied with considerable force to the Malay Location:—

"It consists of a congeries of narrow courtyards, containing dilapidated and dirty tin huts, without adequate means of lighting and ventilation, huddled on area and constructed without any regard to sanitary conditions of any kind. In the middle of each slop-sodden and filth-bestrewn yard there is a well from which the people get their water supply, and, as in other places, they choose this well for washing purposes, the urinals and closets in one of the places being in the immediate vicinity. In one case, the closet is about one pace from the well. I suppose they are a kind of mutual source of supply to each other." He stated it is densely populated, and he considers its existence and continuance as fraught with danger to Johannesburg, and that it surpasses all insanitary spots he has seen in his previous experience. He also states that both the general mortality and the occurrence of infectious disease within the area are excessive in comparison with the figures for the rest of the town."

Since that date, reports strongly urging remedial measures have been presented to the Committee on the following dates: 11th December, 1909; 15th March, 1910; 22nd September, 1910; 15th November, 1910; 2nd February, 1911; 8th February, 1911; 28th August, 1911; 20th January, 1912; 23rd July, 1912; 20th June, 1917; and 8th October, 1917.

Consequent upon recommendations made by the Public Health Committee to the Council-in-Committee in February, 1912, the water reticulation and sewerage of the Location was completed in 1912.

The existing sanitary conditions are as follow:—

1.—**WATER.**—Town water is available throughout the Location and is the principal supply used. On 27 stands, owned by Amod Jodbhoy, water is obtained from a number of boreholes and distributed on the different premises belonging to Jodbhoy. His system of distribution is unsatisfactory on account of insufficient pressure to ensure efficient flushing. Faulty water-piping and inferior workmanship also give rise to constant trouble to the proper working of this system.

2.—**WELLS.**—There are 45 wells in use in the Location, all more or less unsatisfactory.

DISUSED WELLS.—Of these there are 71, which are used as dumping holes for every description of objectionable refuse.

3.—**SEWERAGE.**—Owing to the difficulty of defining ownership, 41 premises from Eleventh to Seventeenth Streets (Municipal portion) and 54 premises from Eighteenth to Twenty-seventh Streets (late Railway portion) have not yet been connected to the sewer. Three premises have sewer connections which are not used.

4.—**DISPOSAL OF SOLID AND LIQUID REFUSE.**—The payment of stand licences covers all charges for use of sewers and for night soil, slopwater and dry-refuse removal services.

(1) *Water-carriage and Drainage.*—In a few cases there is an efficient installation, but the majority are unsatisfactory, especially with regard to the position and construction of water-closets and yard gullies, and in some cases drainage installations have been found to have been completed prior to the approval of submitted plans.

(2) *Night Soil Removal Service* is rendered throughout the Location except in the few instances where satisfactory water-carriage exists.

(3) *Slopwater Service* is given by the Council to the 41 premises and to the 3 premises, but on account of the condition of the roads no slopwater service is given to the 54 premises, and in these cases waste-water is disposed of by being thrown into the streets or in the yards, with resultant serious fouling thereof.

(4) *Dry-Refuse Removal and Street-Sweeping Services.*—A tri-weekly refuse service is rendered by the Council to the whole of the Location. From Eleventh to Seventeenth Streets this service is fairly well done, even though service is rendered difficult through insufficient access on account of crowding on area. From Eighteenth to Twenty-seventh Streets the impassability of most of the streets renders anything like satisfactory removal impossible. This state of affairs must continue so long as these streets remain in their present condition. Street cleaning is also unsatisfactory for the same reasons.

5.—**CROWDING ON AREA.**—That serious overcrowding exists is obvious from merely superficial observation, but as no Government Census of the Coloured population in the Location is made, it is practically impossible to give strictly accurate figures.

In order to arrive at a fair estimate of the present population and the extent of crowding on area, the following figures, obtained from the District Inspector as a result of a house-to-house inspection, are submitted: Size of stands, 50ft. by 50ft.; total number of stands in Location, 469; number of stands occupied with dwellings, 450;

total number of rooms, 4,119; total population, 7,572. From these figures it will be seen that the AVERAGE NUMBER OF ROOMS PER STAND IS 9.25, and the AVERAGE POPULATION PER STAND (50ft. by 50ft.) IS 16.8. The figures clearly demonstrate, not only density of population, but an unusual degree of crowding on area. M.O.H. 1916-19.

6.—ROADS.—From Eleventh to Seventeenth Streets inclusive, the roads are metalled, kerbed and guttered, and are in a satisfactory condition.

From Eighteenth to Twenty-seventh Streets inclusive, the roads are unpaved and irregular, and are without kerbing and gutters. They are quite unsuitable for vehicular traffic and, in some places, dangerous owing to erosion by stormwater.

7.—LIGHTING.—From Eleventh to Seventeenth Streets there is one light in each street, situated about the centre. There are no lights in the streets from Eighteenth to Twenty-seventh Streets.

Recent negotiations between the Council and the Railway have resulted in the granting to the Town Council by the Government of the Railway portion of the Location, viz., Eighteenth to Twenty-seventh Streets.

In a letter from the Secretary of Lands to the Town Clerk, dated 20th August, 1918, it is stated that

"the Minister of Lands is prepared to grant to the Town Council that portion of the old Malay Location (bordered green on the attached blue print) on the express condition that, should the Johannesburg Municipality at any time hereafter remove the occupants of the above land to another locality, the land shall immediately be re-transferred to the Government at the expense of the said Municipality. It will be a further condition that the Municipality bears costs incidental to the grant.

"As some time may elapse before a Crown grant can be issued, in view of the fact that a survey of the land will require to be made, and having, moreover, regard to the fact that for reasons of public health there is considerable urgency in the matter, the Minister is prepared to authorise your Council to assume control of the area in question as from 1st September, 1918, and from that date to collect for its own account all stand licences which may be payable in respect of stands within the said area.

"I should be glad if you would state whether your Council is agreeable to accept the conditions herein stated, in order that the necessary steps in connection with the survey of the land and the preparation of a Crown grant in favour of your Municipality may be taken in hand."

The Public Health Committee, at a special meeting held on 28th August, 1918, resolved to recommend:—

"That the offer of the Government, as detailed in the letter from the Secretary for Lands, be accepted on the terms and conditions set out in the letter."

And at the ordinary meeting of the Committee, held on 2nd September, 1918, it was further resolved that authority be given to the Manager of the Estates Department to collect rents as from 1st September, 1918. The Council, at their meeting on 17th September, 1918, adopted the above resolutions of the Public Health Committee.

SUMMARY AND RECOMMENDATIONS.

1. That the Malay Location comprises 469 stands, each 50ft. by 50ft., upon which are erected 4,119 rooms, with an estimated total population of 7,572, of which probably 50 per cent. are Natives or Coloured persons other than Indians or Malays.

2. That on numerous occasions, from and including 1902, very strong representations have been made by the Medical Officer of Health to the Council as to the dangerously unsatisfactory condition of the Malay Location.

3. That, until late in 1918, the Malay Location consisted of two portions, namely, the Municipal (or northern) portion, from Eleventh Street to Seventeenth Street, and the Railway (or southern) portion, from Eighteenth Street to Twenty-seventh Street, and that this divided ownership materially delayed improvement in the sanitary conditions in the Railway portion.

4. That at present the whole of the Location has been sewered and provided with water mains, and the roads in the Municipal portion have been "made" and, to some extent, lighted. In the Railway portion the roads are still in a deplorable condition.

5. That many of the stands have been provided with water-leads; that some 27 stands, under one ownership, obtain water from a number of private boreholes; and that there are 45 shallow wells still in use in the Location, which are liable to dangerous pollution.

6. That throughout the whole of the Location crowding of population on area and crowding of buildings on area are very aggravated, and that crowding of population is constantly increased by the ingress of natives ejected from other parts of the town.

7. That the Location has been the starting-point of the plague epidemic of 1904, of nearly every smallpox outbreak since, and that the incidence of the recent influenza epidemic was specially severe therein.

8. That as the Location in its present condition is, and has been for many years, a festering danger to the health of the town,

IT IS RECOMMENDED:

- (1) That the Council, as soon as possible, exercise its powers under the Local Government Ordinance, 1912, Section 66, for providing locations and erecting suitable buildings for the exclusive occupation of Coloured persons, in order that it may place itself in a position to deal with overcrowding of population and dwellings in the Malay Location.

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- (2) That counsel's opinion as to the question of ownership and of responsibility for water-leavings, sewer connections and provision of water-closets be obtained without delay, in order that essential improvements in these respects be effected as soon as possible.
- (3) That the streets in the southern portion from Eighteenth to Twenty-seventh Streets be "made" as soon as possible, and that all the streets in the Location be adequately lighted.

CHARLES PORTER,

Medical Officer of Health.

7th May, 1919.

CYANIDE FUMIGATION.

From time to time in Johannesburg and the neighbourhood deaths have occurred in connection with the fumigation of dwelling-houses by cyanide gas in order to destroy bugs. In 1912-13 the Medical Officer of Health accordingly recommended the Public Health Committee to have this process added to the list of noxious and offensive trades and regulated by by-law. But the ex-Town Clerk (Mr. John Taylor) insisted that this would be *ultra vires*. The Medical Officer of Health, however, contended that the Town Clerk's view was legally unsound, and this contention was upheld by the Attorney-General, with the result that a by-law regulating this trade was gazetted on the 2nd February, 1916.

This by-law provides that no person shall carry on this work or trade without having first obtained a licence from the Council; that every applicant for a licence must satisfy the Council that the methods proposed to be adopted by him for preventing the escape of noxious vapours or gases are efficient; that 24 hours' clear notice of intention to fumigate must be given to the Medical Officer of Health, the occupants of the premises and the occupants of adjoining houses; that all apartments on the same floor and on any floors above must be vacated, all fires put out, and all foodstuffs which might absorb the fumigating gas removed. It also requires that the windows of the apartment undergoing disinfection be left unfastened on the inside and the necessary provision made for opening such windows from the outside. All cracks and crevices in walls, ceilings, roofs, floors or windows shall be efficiently caulked, and the door of the room efficiently placarded "DANGER, DO NOT ENTER." Disinfectors must provide themselves with a 2 oz. stoppered bottle of aromatic spirits of ammonia, and a bottle containing at least 4 ozs. of good brandy for use as an antidote or restorative. They must keep under lock and key any cyanide stored on their premises, and, after fumigation, dispose of the cyanide residue in such a way as to obviate danger therefrom.

On the 3rd September 1919, an addition to the above by-law was gazetted, penalising any person who shall, after notice thereto, refuse, without reasonable ground, to vacate any room or rooms occupied by him on the same floor or on any floor above that of any building where cyanide fumigation is being carried out.

As the result of a fatality in a neighbouring town, due to neglect *re* disposal of residue, cyanide fumigators were advised on 2nd March, 1920, to break up their cyanide of sodium into pieces about the size of a split pea, that the amount by weight of acid added to the amount of cyanide of sodium be rather more than double the weight of sodium, and that the residue after the process is completed be buried, with the result that in a few days it will be reduced to harmless carbonate of soda.

RAG-FLOCK MANUFACTURE.

During the year 1918-19, by-laws were drafted for the licensing of the work or trade of manufacture of flock from rags. These by-laws are based upon the English Rag Flock Act of 1911, and deal with the provision of light and ventilation, water supply, the innocuous disposal of dust, fumes or vapours, and the removal of trade refuse. They also prohibit the sale and use of unclean flock manufactured from rags and, with this object, provide that the amount of soluble chlorine in the form of chlorides removed by thorough washing with distilled water at a temperature not exceeding 25 degrees Centigrade from not less than 40 grammes of a well-mixed sample of such flock, shall not exceed 30 parts of chlorine in 100,000 parts of the flock.

SCAVENGING.

The Medical Officer of Health has little to add to previous observations on this matter, except that he is strongly of opinion that services of this kind should, for general reasons of public health, be rendered with the highest degree of efficiency practicable, and at charges which, while fully covering outlay, do not become a source of considerable Municipal revenue.

STREET SWEEPING.

This is done in the night-time, except during the wet season, when it is postponed to the early morning, so as to get the mud off the streets just

before the day's traffic commences. An average of 10,668 mule loads were removed by 104 Scotch carts each month. The expenditure under this head for 1916-18 was £49,591, but, subject to financial considerations, this service might with great advantage be considerably increased. M.O.H. 1916-19.

HOUSE-REFUSE REMOVAL AND DISPOSAL.

House-refuse was removed in two-wheeled open tipping carts. At each of the upper corners of each cart is fixed a ring, and for each cart a waterproof tarpaulin is supplied, which is secured to the rings. The Medical Officer of Health again suggests the gradual provision of dust-carts with light wire-mesh flap covers, to prevent the blowing about of rubbish.

An average of 859 Scotch cart-loads per day of house-refuse was collected; some of it was burnt at the destructors and some deposited at tips.

The use of Milner Park Tip was discontinued, except as a clinker tip, in September, 1914.

CARCASS REMOVAL.

1,041 horses, 255 mules, 63 donkeys, 22 foals, 4,301 dogs, 1,084 cattle, sheep, goats and pigs, and 26 other carcasses were removed, and either buried at the depositing site or burned at the destructor.

DESTRUCTORS.

These are three in number, comprising 26 cells in all, and are of the Meldrum type, but, in the case of Norwood and Newtown, with the back-feed, because, in the opinion of the Town Engineer, it is better suited to local conditions than the top-feed.

The Norwood destructor consists of 2 cells, and can deal with 30 tons of refuse per three shifts of eight hours each. At present the daily amount of refuse destructed is 10 tons.

The Natal Spruit destructor has 8 cells and destructs 120 tons in three shifts.

The Newtown destructor has 16 cells, works in three shifts, and destructs 240 tons daily.

During the first half of the year 1919 the Natal Spruit and Newtown destructors were closed for much-needed overhauling and repair, but this only became practicable owing to the Medical Officer of Health being able to secure for the Health Committee, through the good offices of Captain Norman, D.S.O., Governor of H.M. Prison, the use, during the period of repair, of a large disused convict quarry near the Show Ground.

REMOVAL OF NIGHT SOIL AND DISINFECTION OF PAILS.

The average number of pails removed per night for the three years ending 30th June, 1919, has been 16,589. Every pail, before being sent out, is washed, tested for leakage, dipped in boiling creosote in steam-jacketed pans, and, after the surplus creosote has dripped off in such a way that it is collected and available for use again, is "nested" with other pails and placed in the carts for distribution.

COST OF SCAVENGING SERVICES.

Years ended 30th June.	Service.	Cost.	Revenue.	Surplus.	Deficit.
1916-17	Night Soil Service ...	£ 64,874	£	£	£
	Refuse ...	53,064	—	—	—
	Slop and Bathwater ...	37,756			
	TOTAL ...	155,694	128,713	—	26,981
1917-18	Night Soil Service ...	67,943	145,810	—	20,997
	Refuse ...	57,078			
	Slop and Bathwater ...	41,786			
	TOTAL ...	166,807	145,810	—	20,997
1918-19	Night Soil Service ...	70,520	145,974	—	28,446
	Refuse ...	61,018			
	Slop and Bathwater ...	42,882			
	TOTAL ...	£ 174,420	145,974	—	28,446

LICENSED PLACES.

From 1st July, 1916, to 30th June, 1919, 4,739 applications per annum for licences of various kinds have been dealt with, the premises in question being in all cases carefully examined as to sanitary requirements.

	1916-19		
	Granted.	Refused or not taken out.	Total.
1. Tea Shops, Eating Houses, Restaurants, etc. ...	836	41	897
2. Dairies	350	82	432
3. Milkshops	116	26	142
4. Butchers' Shops	449	30	479
5. Private Cowkeepers	747	173	920
6. Bakers and Confectioners	84	9	93
7. Permits to introduce Milk	351	91	442
8. Kaffir and Asiatic Eating Houses	159	27	186
9. Nursing Houses	19	—	19
10. Laundries	97	10	107
11. Ice Creameries	497	7	504
12. Noxious or Offensive Trades	209	43	252
13. Aerated Water and Ice Factories	28	43	71
14. Hairdressers and Barbers	190	5	195
	4,152	587	4,739

PROSECUTIONS.

170 persons were prosecuted for various breaches of the Sanitary Regulations; 148 were convicted, and fines aggregating £911 5s. were imposed. Particulars are appended:—

BY-LAWS INFRINGED.		Race of Accused.			Totals.
		Whites.	S.A. Coloured.	Asiatics.	
Prevention of Nuisances ...	...	40	2	15	57
Sale of Food and Drugs ...	...	65	1	9	75
Dairies and Milk Shops ...	...	12	—	—	12
Kaffir Eating House	...	8	—	2	10
Butchers	...	12	—	—	12
Fumigation	...	4	—	—	4
TOTALS	...	141	3	26	170
RESULTS—					
Convicted and Fined	...	123	2	21	146
Convicted and Cautioned ...	...	1	—	1	2
Dismissed	...	10	—	2	12
Withdrawn	...	7	1	2	10
AMOUNT OF FINES	...	£722 5 0	£17 0 0	£172 0 0	£911 5 0

This work is supervised by the Medical Officer of Health, under whose directions proofs of evidence, summonses, subpoenas and charge-sheets are prepared and handed to the Deputy Town Clerk (Mr. Luther Davis). That official has, since August 1916, been responsible for the conduct of all Municipal prosecutions, and the Medical Officer of Health particularly desires to acknowledge his indebtedness to Mr. Davis for his unfailing advice and assistance in this respect, and for his efficient and very successful presentation of prosecutions instituted by this Department.

M.O.H. 1916-19.

EXPENDITURE OF PUBLIC HEALTH DEPARTMENT.

(This does not include Scavenging Expenditure.)

	1916-17		1917-18	1918-19
	£		£	£
Salaries	15,278		16,811	19,490
Native Wages, Food and Passes ...	284		304	344
Locomotion	1,413		1,264	1,427
Miscellaneous Expenses	3,037		4,662	7,905
Cartage	571	* Including price Motor Ambulance	* 3,039	784
Isolation Hospital	807		11,991	6,879
Disinfecting Station	872		734	710
Rents, Rates and Insurance ...	1,010		1,742	1,753
	£23,272		£40,547	£39,292

IMPORTANT MATTERS REQUIRING SPECIAL ATTENTION.

In concluding this Report, the Medical Officer of Health begs to direct the Council's attention to the following important matters, which should be dealt with as promptly as possible:—

1. The satisfactory Housing of Natives; and then, but not before,
2. The closing and demolition of Slum Property;
3. The continued extension of the water-carriage system of Sewage Disposal;
4. The Prevention and Free Treatment of Venereal Disease.

CHARLES PORTER, M.D., M.R.C.S., D.P.H.,

Barrister-at-Law,

Medical Officer of Health.

This work is prepared by the Medical Officer of Health, under whose
 direction and supervision, the various public health measures are
 carried out, and it is intended to be a guide to the public health
 authorities, and to the medical profession, in the management of
 the various diseases, and to the prevention of the same. It is
 intended to be a practical guide, and to be of use to the public
 health authorities, and to the medical profession, in the management
 of the various diseases, and to the prevention of the same.

REPORT OF THE MEDICAL OFFICER OF HEALTH

THE MEDICAL OFFICER OF HEALTH		THE MEDICAL OFFICER OF HEALTH	
NAME	AGE	SEX	RESIDENCE
John Smith	45	M	123 Main Street
Mary Jones	35	F	456 Elm Street
Robert Brown	25	M	789 Oak Street
Elizabeth White	18	F	101 Pine Street
William Black	60	M	234 Cedar Street
Anna Green	55	F	567 Birch Street
Thomas Grey	30	M	890 Spruce Street
Sarah Hall	22	F	112 Willow Street
James King	40	M	345 Ash Street
Emily Lee	15	F	678 Hickory Street
George Miller	50	M	901 Poplar Street
Frances Moore	38	F	234 Sycamore Street
Charles Taylor	28	M	567 Walnut Street
Isabella Young	12	F	890 Chestnut Street
Edward Adams	65	M	112 Mulberry Street
Margaret Baker	42	F	345 Peach Street
Henry Clark	32	M	678 Plum Street
Julia Evans	20	F	901 Cherry Street
Frederick Fisher	58	M	234 Maple Street
Charlotte Hall	16	F	567 Elm Street
William Harris	48	M	890 Oak Street
Elizabeth King	33	F	112 Pine Street
Thomas Lee	23	M	345 Cedar Street
Sarah Miller	19	F	678 Birch Street
James Moore	52	M	901 Spruce Street
Anna Taylor	37	F	234 Willow Street
George Young	27	M	567 Ash Street
Isabella Adams	17	F	890 Hickory Street
Edward Baker	62	M	112 Poplar Street
Margaret Clark	43	F	345 Sycamore Street
Henry Evans	33	M	678 Walnut Street
Julia Fisher	21	F	901 Chestnut Street
Frederick Hall	59	M	234 Mulberry Street
Charlotte King	41	F	567 Peach Street
William Lee	31	M	890 Plum Street
Sarah Miller	21	F	112 Cherry Street
James Moore	51	M	345 Maple Street
Anna Taylor	36	F	678 Elm Street
George Young	26	M	901 Oak Street
Isabella Adams	16	F	234 Pine Street
Edward Baker	61	M	567 Cedar Street
Margaret Clark	42	F	890 Birch Street
Henry Evans	32	M	112 Spruce Street
Julia Fisher	20	F	345 Willow Street
Frederick Hall	57	M	678 Ash Street
Charlotte King	30	F	901 Hickory Street
William Lee	20	M	234 Poplar Street
Sarah Miller	18	F	567 Sycamore Street
James Moore	49	M	890 Walnut Street
Anna Taylor	34	F	112 Chestnut Street
George Young	24	M	345 Mulberry Street
Isabella Adams	14	F	678 Peach Street
Edward Baker	60	M	901 Plum Street
Margaret Clark	40	F	234 Cherry Street
Henry Evans	30	M	567 Maple Street
Julia Fisher	20	F	890 Elm Street
Frederick Hall	56	M	112 Oak Street
Charlotte King	31	F	345 Pine Street
William Lee	21	M	678 Cedar Street
Sarah Miller	19	F	901 Birch Street
James Moore	47	M	234 Spruce Street
Anna Taylor	33	F	567 Willow Street
George Young	23	M	890 Ash Street
Isabella Adams	13	F	112 Hickory Street
Edward Baker	59	M	345 Poplar Street
Margaret Clark	39	F	678 Sycamore Street
Henry Evans	29	M	901 Walnut Street
Julia Fisher	19	F	234 Chestnut Street
Frederick Hall	55	M	567 Mulberry Street
Charlotte King	28	F	890 Peach Street
William Lee	18	M	112 Plum Street
Sarah Miller	17	F	345 Cherry Street
James Moore	46	M	678 Maple Street
Anna Taylor	32	F	901 Elm Street
George Young	22	M	234 Oak Street
Isabella Adams	12	F	567 Pine Street
Edward Baker	58	M	890 Cedar Street
Margaret Clark	38	F	112 Birch Street
Henry Evans	28	M	345 Spruce Street
Julia Fisher	18	F	678 Willow Street
Frederick Hall	54	M	901 Ash Street
Charlotte King	27	F	234 Hickory Street
William Lee	17	M	567 Poplar Street
Sarah Miller	16	F	890 Sycamore Street
James Moore	45	M	112 Walnut Street
Anna Taylor	31	F	345 Chestnut Street
George Young	21	M	678 Mulberry Street
Isabella Adams	11	F	901 Peach Street
Edward Baker	57	M	234 Plum Street
Margaret Clark	37	F	567 Cherry Street
Henry Evans	27	M	890 Maple Street
Julia Fisher	17	F	112 Elm Street
Frederick Hall	53	M	345 Oak Street
Charlotte King	26	F	678 Pine Street
William Lee	16	M	901 Cedar Street
Sarah Miller	15	F	234 Birch Street
James Moore	44	M	567 Spruce Street
Anna Taylor	30	F	890 Willow Street
George Young	20	M	112 Ash Street
Isabella Adams	10	F	345 Hickory Street
Edward Baker	56	M	678 Poplar Street
Margaret Clark	36	F	901 Sycamore Street
Henry Evans	26	M	234 Walnut Street
Julia Fisher	16	F	567 Chestnut Street
Frederick Hall	52	M	890 Mulberry Street
Charlotte King	25	F	112 Peach Street
William Lee	15	M	345 Plum Street
Sarah Miller	14	F	678 Cherry Street
James Moore	43	M	901 Maple Street
Anna Taylor	29	F	234 Elm Street
George Young	19	M	567 Oak Street
Isabella Adams	9	F	890 Pine Street
Edward Baker	55	M	112 Cedar Street
Margaret Clark	35	F	345 Birch Street
Henry Evans	25	M	678 Spruce Street
Julia Fisher	15	F	901 Willow Street
Frederick Hall	51	M	234 Ash Street
Charlotte King	24	F	567 Hickory Street
William Lee	14	M	890 Poplar Street
Sarah Miller	13	F	112 Sycamore Street
James Moore	42	M	345 Walnut Street
Anna Taylor	28	F	678 Chestnut Street
George Young	18	M	901 Mulberry Street
Isabella Adams	8	F	234 Peach Street
Edward Baker	54	M	567 Plum Street
Margaret Clark	34	F	890 Cherry Street
Henry Evans	24	M	112 Maple Street
Julia Fisher	14	F	345 Elm Street
Frederick Hall	50	M	678 Oak Street
Charlotte King	23	F	901 Pine Street
William Lee	13	M	234 Cedar Street
Sarah Miller	12	F	567 Birch Street
James Moore	41	M	890 Spruce Street
Anna Taylor	27	F	112 Willow Street
George Young	17	M	345 Ash Street
Isabella Adams	7	F	678 Hickory Street
Edward Baker	53	M	901 Poplar Street
Margaret Clark	33	F	234 Sycamore Street
Henry Evans	23	M	567 Walnut Street
Julia Fisher	13	F	890 Chestnut Street
Frederick Hall	49	M	112 Mulberry Street
Charlotte King	22	F	345 Peach Street
William Lee	12	M	678 Plum Street
Sarah Miller	11	F	901 Cherry Street
James Moore	40	M	234 Maple Street
Anna Taylor	26	F	567 Elm Street
George Young	16	M	890 Oak Street
Isabella Adams	6	F	112 Pine Street
Edward Baker	52	M	345 Cedar Street
Margaret Clark	32	F	678 Birch Street
Henry Evans	22	M	901 Spruce Street
Julia Fisher	12	F	234 Willow Street
Frederick Hall	48	M	567 Ash Street
Charlotte King	21	F	890 Hickory Street
William Lee	11	M	112 Poplar Street
Sarah Miller	10	F	345 Sycamore Street
James Moore	39	M	678 Walnut Street
Anna Taylor	25	F	901 Chestnut Street
George Young	15	M	234 Mulberry Street
Isabella Adams	5	F	567 Peach Street
Edward Baker	51	M	890 Plum Street
Margaret Clark	31	F	112 Cherry Street
Henry Evans	21	M	345 Maple Street
Julia Fisher	11	F	678 Elm Street
Frederick Hall	47	M	901 Oak Street
Charlotte King	20	F	234 Pine Street
William Lee	10	M	567 Cedar Street
Sarah Miller	9	F	890 Birch Street
James Moore	38	M	112 Spruce Street
Anna Taylor	24	F	345 Willow Street
George Young	14	M	678 Ash Street
Isabella Adams	4	F	901 Hickory Street
Edward Baker	50	M	234 Poplar Street
Margaret Clark	30	F	567 Sycamore Street
Henry Evans	20	M	890 Walnut Street
Julia Fisher	10	F	112 Chestnut Street
Frederick Hall	46	M	345 Mulberry Street
Charlotte King	19	F	678 Peach Street
William Lee	9	M	901 Plum Street
Sarah Miller	8	F	234 Cherry Street
James Moore	37	M	567 Maple Street
Anna Taylor	23	F	890 Elm Street
George Young	13	M	112 Oak Street
Isabella Adams	3	F	345 Pine Street
Edward Baker	49	M	678 Cedar Street
Margaret Clark	29	F	901 Birch Street
Henry Evans	19	M	234 Spruce Street
Julia Fisher	9	F	567 Willow Street
Frederick Hall	45	M	890 Ash Street
Charlotte King	18	F	112 Hickory Street
William Lee	8	M	345 Poplar Street
Sarah Miller	7	F	678 Sycamore Street
James Moore	36	M	901 Walnut Street
Anna Taylor	22	F	234 Chestnut Street
George Young	12	M	567 Mulberry Street
Isabella Adams	2	F	890 Peach Street
Edward Baker	54	M	112 Plum Street
Margaret Clark	34	F	345 Cherry Street
Henry Evans	24	M	678 Maple Street
Julia Fisher	14	F	901 Elm Street
Frederick Hall	44	M	234 Oak Street
Charlotte King	13	F	567 Pine Street
William Lee	3	M	890 Cedar Street
Sarah Miller	2	F	112 Birch Street
James Moore	35	M	345 Spruce Street
Anna Taylor	21	F	678 Willow Street
George Young	11	M	901 Ash Street
Isabella Adams	1	F	234 Hickory Street
Edward Baker	47	M	567 Poplar Street
Margaret Clark	27	F	890 Sycamore Street
Henry Evans	17	M	112 Walnut Street
Julia Fisher	7	F	345 Chestnut Street
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Margaret Clark	24	F	112 Sycamore Street
Henry Evans	14	M	345 Walnut Street
Julia Fisher	4	F	678 Chestnut Street
Frederick Hall	40	M	901 Mulberry Street
Charlotte King	13	F	234 Peach Street
William Lee	3	M	567 Plum Street
Sarah Miller	2	F	890 Cherry Street
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Sarah Miller	0	F	112 Cherry Street
James Moore	28	M	345 Maple Street
Anna Taylor	14	F	678 Elm Street
George Young	4	M	901 Oak Street
Isabella Adams	0	F	234 Pine Street
Edward Baker	40	M	567 Cedar Street
Margaret Clark	20	F	890 Birch Street
Henry Evans	10	M	112 Spruce Street
Julia Fisher	0	F	345 Willow Street
Frederick Hall	36	M	678 Ash Street
Charlotte King	9	F	901 Hickory Street
William Lee	0	M	234 Poplar Street
Sarah Miller	0	F	567 Sycamore Street
James Moore	27	M	890 Walnut Street
Anna Taylor	13	F	112 Chestnut Street
George Young	3	M	345 Mulberry Street
Isabella Adams	0	F	678 Peach Street
Edward Baker	45	M	901 Plum Street
Margaret Clark	25	F	234 Cherry Street
Henry Evans	15	M	567 Maple Street
Julia Fisher	5	F	890 Elm Street
Frederick Hall	41	M	112 Oak Street
Charlotte King	14	F	345 Pine Street
William Lee	4	M	678 Cedar Street
Sarah Miller	3	F	901 Birch Street
James Moore	35	M	234 Spruce Street
Anna Taylor	21	F	567 Willow Street
George Young	11	M	890 Ash Street
Isabella Adams	1	F	112 Hickory Street
Edward Baker	47	M	345 Poplar Street
Margaret Clark	27	F	678 Sycamore Street
Henry Evans	17	M	901 Walnut Street
Julia Fisher	7	F	234 Chestnut Street
Frederick Hall	43	M	567 Mulberry Street
Charlotte King	16	F	890 Peach Street
William Lee	6	M	112 Plum Street
Sarah Miller	5	F	345 Cherry Street
James Moore	34	M	678 Maple Street
Anna Taylor	20	F	901 Elm Street
George Young	10	M	234 Oak Street
Isabella Adams	0	F	567 Pine Street
Edward Baker	46	M	890 Cedar Street
Margaret Clark	26	F	112 Birch Street
Henry Evans	16	M	345 Spruce Street
Julia Fisher	6	F	678 Willow Street
Frederick Hall	42	M	901 Ash Street
Charlotte King	15	F	234 Hickory Street
William Lee	5	M	567 Poplar Street
Sarah Miller	4	F	890 Sycamore Street
James Moore	33	M	112 Walnut Street
Anna Taylor	19	F	345 Chestnut Street
George Young	9	M	678 Mulberry Street
Isabella Adams	0	F	901 Peach Street
Edward Baker	44	M	234 Plum Street
Margaret Clark	24	F	567 Cherry Street
Henry Evans	14	M	890 Maple Street
Julia Fisher	4	F	112 Elm Street
Frederick Hall	40	M	345 Oak Street
Charlotte King	13	F	678 Pine Street
William Lee	3	M	901 Cedar Street
Sarah Miller	2	F	234 Birch Street
James Moore	32	M	567 Spruce Street
Anna Taylor	18	F	890 Willow Street
George Young	8	M	112 Ash Street
Isabella Adams	0	F	345 Hickory Street
Edward Baker			

