

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

Contributors

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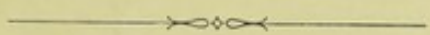
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M.O.H. Report,
1937—38.



City of Johannesburg.



REPORT of the MEDICAL OFFICER OF HEALTH on the PUBLIC HEALTH and SANITARY CIRCUMSTANCES of JOHANNESBURG during the Year 1st JULY, 1937—30th JUNE, 1938.

ARTHUR J. MILNE, M.B., Ch.B., D.P.H., D.T.M.


Medical Officer of Health; Hon. Cons. Medical Officer of the Rand Water Board; Lieut.-Colonel, Union Defence Force; Past President, South African Health Officials' Association; Chairman, Witwatersrand Epidemic Committee; President, Witwatersrand Mental Hygiene Society.



JOHANNESBURG,
MAY, 1939.



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City of Johannesburg.

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Report of the Medical Officer of Health, 1937—1938.

Public Health Department,
Escom House,
Johannesburg.

May, 1939.

TO HIS WORSHIP THE MAYOR (Mr. Councillor J. J. PAGE) AND CITY COUNCILLORS
OF THE CITY OF JOHANNESBURG.

GENTLEMEN,

I have the honour to present herewith my report of the health conditions of Johannesburg for the year 1937-38.

It is a pleasure to be able to record that the work of all members, professional, clerical and technical, of your Public Health Department has maintained the high level befitting the largest city in the Union of South Africa. Personally and officially I desire to acknowledge their valued assistance, often in difficult situations, and their loyalty both to the Council which they serve and to myself.

A major event during the year was the formulation and compilation of a scheme now known as the "Western Areas Scheme," designed for the rehousing of both Europeans and non-Europeans resident in the Western Suburbs.

A detailed record for the year of inspections, etc., undertaken by the inspectorate staff is submitted on page 47.

I also desire to express my thanks in particular to the occupant of the Mayoral Chair during 1937-38 (Councillor J. S. Fotheringham), and to the Chairman and Members of the Public Health Committee who extended to me kindly assistance and courtesy, and to all other Heads and Sub-Heads of Departments for their willing co-operation and assistance.

I have the honour to be, Gentlemen,

Your obedient servant,

A. J. MILNE,

Medical Officer of Health.

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CITY OF JOHANNESBURG.

PUBLIC HEALTH COMMITTEE, 1937-1938.

Councillor F. T. Howarth, M.P. (Chairman).
 Councillor D. Penry Roberts (Vice-Chairman).
 Councillor C. F. Beckett, M.P.C.
 Councillor A. S. Holland.
 Councillor L. Leveson.
 Councillor Mrs. E. M. Pemberton.
 Councillor Mrs. S. E. Wordingham.
 His Worship the Mayor (ex officio).

PUBLIC HEALTH DEPARTMENT.

STAFF.

Administrative and Office—

- 1 Medical Officer of Health: Arthur J. Milne, M.B., B.Ch., D.P.H., D.T.M.
- 1 Deputy Medical Officer of Health: Gordon D. Laing, B.Sc., M.B., Ch.B. (St. And.), D.P.H.
- 1 Assistant Medical Officer of Health (Medical Division): J. W. Scott Millar, B.A., M.B., Ch.B., D.P.H.
- 1 Assistant Medical Officer of Health (Sanitation Division): M. Maister, M.B., Ch.B., D.P.H. (to January, 1938); B. S. Mundel, M.B., Ch.B., D.P.H. (from March, 1938).
- 1 Chief Clerk: E. M. Coetzee, Cert. R.S.I. (S.A.).
- 1 Accountant: F. G. Hyde.
- 1 Statistical Clerk: Miss E. Oliver.
- 1 Records Clerk: J. A. H. Boshoff.
- 1 Licensing Clerk and Typist: Miss O. V. Joel.
- 2 Assistant Licensing Clerks and Typists: Miss S. Starfield, Miss A. Klein.
- 3 Typists: Miss M. S. Rae, Miss J. A. Grewer, Miss M. Powell.
- 1 Clerk-Typist: Miss M. K. Green.
- 2 Temporary Clerks (Plans Inspection Office): R. C. James, F. P. Brand.
- 2 Junior Clerks: H. M. Nieman, A. Snyman.
- 2 Messengers: L. L. W. Schwartz, A. C. Gittings.
- 1 Telephonist: Mrs. E. H. Coetzee.

Technical—

- 1 Bio-Chemist: Harold Wilson, B.Sc. (Lond.), A.M.C.I.
- 1 Chief Chemical Assistant: J. A. McLachlan, M.Sc., A.M.I.Chem.E.
- 3 Assistant Chemists: E. G. White, B.Sc.; J. R. Gaillard, B.Sc.; R. K. Williams, Miss E. M. Watson.
- 1 Microscopist and Photographer: Miss K. Rosenberg.
- 1 Clerk-Typist: Miss A. M. Stewart.

White Housing Staff—

- 1 Director of Housing: C. J. Crothall, M.I.A., A.M.I.S.E.
- 2 Housing Manageresses: Mrs. M. K. Robertson, Miss D. E. Miskin.
- 1 Handyman-Fumigator: B. G. van Pittius.

Inspectorate Staff—

- 1 Chief Health Inspector: G. Bidwell, Cert. R.S.I. (Eng.).
- 2 Plans Inspectors: J. S. Russell, Cert. R.S.I. (S.A.); J. E. Jarvis, Cert. R.S.I. (S.A.).
- 7 Divisional Health Inspectors:

H. Ballantyne.	A. H. Maxwell.	R. H. Pope.
J. A. Bell.	G. M. Parker.	A. H. Spargo.
V. P. Devitt.		

All Certificated Royal Sanitary Institute (S.A.).

20 District Health Inspectors:

- | | | |
|-----------------|------------------|------------------|
| R. C. Alderfon. | E. Kenward. | J. Smith. |
| J. Braden. | J. Ledgett. | E. F. Squires. |
| E. B. Floquet. | C. R. Morrison. | T. Patterson. |
| C. C. Fowles. | L. R. Niesewand. | K. G. Webster. |
| A. G. Grant. | J. S. Pitman. | A. J. Wilkinson. |
| C. M. Hagley. | C. P. Quin. | H. J. Wright. |
| H. Hunter. | A. Smith. | |

All Certificated Royal Sanitary Institute (S.A.).

- 2 Anti-Rodent Measures Inspectors:
 C. D. Adams, Cert. R.S.I. (S.A.).
 A. C. Ninow, Cert. R.S.I. (S.A.).
- 3 Housing Inspectors appointed to deal with Insanitary Properties under the Slums Act, 1934, and Local Government Ordinance:
 P. Squires, Cert. R.S.I. (S.A.).
 A. C. Wallace, Cert. R.S.I. (S.A.).
 H. Dunston, Cert. R.S.I. (S.A.).
- 2 Food and Drug Inspectors:
 I. J. Distiller, Cert. R.S.I. (S.A.).
 R. W. G. Grant, Cert. R.S.I. (S.A.).
- 8 Dairy Inspectors:
 W. C. Watson, Cert. R.S.I. (S.A.).
 H. H. Alexander, Cert. R.S.I. (S.A.).
 J. W. Forrett, Cert. R.S.I. (S.A.).
 W. G. Howarth, Cert. R.S.I. (S.A.).
 W. C. E. Lewis, Cert. R.S.I. (S.A.).
 F. Smith, Cert. R.S.I. (S.A.).
 D. Smith, Cert. R.S.I. (S.A.).
 J. Wilson, Cert. R.S.I. (S.A.).

Infectious Diseases and Disinfecting Station—

- 1 Infectious Diseases Inspector: A. C. Fraser, Cert. R.S.I. (S.A.).
 4 Disinfecting Inspectors: H. J. Hancock, J. A. M. Bain, J. H. Cutting,
 G. H. Gigg.
 1 Disinfecting Engineer: J. P. Jonas. Six native assistants.

Maternity and Child Welfare—

- 1 Pediatric Officer:
 B. G. von B. Melle, M.B., B.Ch. (Oxford), F.R.C.S.E.
- 1 Assistant Pediatric Officer:
 A. E. Strawbaun, M.R.C.S., L.R.C.P.
- 2 Obstetric and Ante-Natal Officers:
 W. H. Maxwell, M.A., M.B., L.R.C.P., F.R.C.S.
 F. K. Te Water, M.B., B.Ch., L.R.C.P., F.R.C.S.E.
- 1 Senior Health Visitor:
 C. Morisse.
- 1 Inspectress of Nursing Homes and Midwives:
 D. T. Fricker.
- 12 Health Visitors:
 (1) D. E. B. Bell.
 (2) M. Craig.
 (3) L. W. Godfrey.
 (4) E. Ide.
 (5) G. K. Jordan.
 (6) A. M. J. Lane.
 (7) A. Marshall.
 (8) E. E. Orn.
 (9) D. A. Smith.
 (10) R. E. Smith.
 (11) M. S. Wilson.
 (12) A. Siebert.
- All Trained General Nurses and Midwives and all certificated Health Visitors and School Nurses, Royal Sanitary Institute.
- Senior Health Visitor and (1) Cert. R.S.I. Sanitary (Health) Inspector.
- (4) Cert. R.S.I. (S.A.), Sanitary (Health) Inspector and Meat and other Foods Inspection.
- Trained General Nurse and Midwife.
- 1 Relieving Health Visitor and Ante-Natal Nurse:
 I. D. Kirkman, Trained General Nurse and Midwife, and Certificated Health Visitor and School Nurse, Royal Sanitary Institute.
- 4 Ante-Natal Nurses:
 D. Cameron. A. Pearson. } Certificated General
 M. E. Knox. A. F. M. Wright. } Nurses and Midwives.
- 1 Psychiatrist: F. F. du Toit, M.B., Ch.B.
- 1 Senior Supervisor, Nursery Health Classes: Miss E. Brosius.
- 6 Supervisors, Nursery Health Classes, and 6 Assistants.
- 1 Caretaker—Infant Welfare and Ante-Natal Clinic.

Fever Hospital—

1 Physician-in-charge: P. Bayer, M.D., Ch.B., M.R.C.P.
 1 Resident Medical Officer.

Nursing Staff:

Permanent: 1 Matron, 5 Sisters.

Temporary: 3 Staff Nurses, 17 Probationers.

Administrative: 1 Clerk.

1 Typist and Switchboard Attendant.

General: 1 Handyman, 1 Gardener, 1 Cook, 1 Kitchenmaid, 1 Sewingmaid,
 2 Housemaids, 3 Wardmaids, 23 Natives.

Venerical Diseases Clinic—

1 Director: H. Gluckman, M.R.C.S. (Eng.), L.R.C.P. (Lond.).

1 Clinic Orderly (Male).

2 Nursing Sisters.

Plague Rat-catching Staff—

1 Senior Rodent Inspector: R. J. Fox.

1 Junior Rodent Inspector: N. J. Smith.

16 Rat-catchers and 19 Rat-catching Youths.

Rest Rooms and Public Conveniences—

2 Supervisors and 30 Attendants.

SUMMARY OF STAFF EMPLOYED.

Europeans—

Permanent Salaried Staff	...	...	...	...	117
Temporary Salaried Staff	...	...	...	...	16
Daily-paid (Fixed Establishment)	...	...	...	...	65
Daily-paid (Temporary)	...	...	...	...	5
					<hr/>
					203
Fever Hospital	...	...	...	...	38
					<hr/>
Total	...	...	...	...	241
					<hr/>

Natives 49

Report, 1st July, 1937—30th June, 1938.

CLIMATE AND RATEABLE VALUE.

Latitude.—26 degrees 11 minutes 44 seconds South.

Longitude.—1 hour 52 minutes 10 seconds East.

Mean Altitude.—5,850 feet.

Climate.—The days are bright and warm, the nights cool, and in winter often very cold. The following averages of Johannesburg records for thirty-four years are kindly supplied by Dr. H. E. Wood, Union Astronomer: Temperature, average maximum 70·2 degrees F., average minimum 49·6 degrees F.; highest recorded 93·6 degrees F. on 21st December, 1926, lowest recorded 20·8 degrees F. on 23rd July, 1926. Annual rainfall, 29·57 inches on 95 days. Relative humidity, 59·5 per cent. (average of sixteen years). Bright sunshine, 8·9 hours daily.

Area.—The area of the City of Johannesburg is 53,478 acres, the extreme length $11\frac{1}{2}$ miles, extreme breadth $9\frac{1}{2}$ miles, extent of perimeter $41\frac{1}{2}$ miles.

Annual Rateable Value.—As assessed in accordance with Ordinance 20 of 1933, 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 at 30th June, 1938, £115,385,981.

The rate for 1937-38 was 4d. in the £1 on land. Rate produced £837,349. Special Road Rate, 1d. in the £1 on land, produced £192,142. Total, £1,029,491.

In 1936-37 the valuation was: Land, £28,547,804; Improvements, £58,951,930.

POPULATION.

	(Census May, 1936).	(Estimated 30th June, 1938).
Europeans	252,718	271,800
Natives	191,032	203,700
Eurafricans	21,366	22,700
Asiatics	9,918	10,600
	<u>475,034</u>	<u>508,800</u>

BIRTHS.

From 1st July, 1937, to 30th June, 1938, the number of White births registered was 6,595 (3,355 males, 3,240 females), as compared with 5,922 in 1935-36 and 6,653 in 1936-37.

The White Birth-rate was 24·26 per 1,000 for 1937-38, as compared with 23·63 in 1935-36 and 25·36 in 1936-37.

For England and Wales in 1937 the birth-rate was 14·9, in Pretoria 24·20, in Bloemfontein 19·43, in Capetown 18·71, in Pietermaritzburg 16·4, in East London 17·1, and in Durban 18·75 for 1937-38.

White Illegitimate Births.—These numbered 128, and constituted 1·94 per cent. of all births, as against 2·06 in Pretoria, 3·26 in Durban, 2·3 in Pietermaritzburg, 2·3 in East London, and 1·46 in Bloemfontein 1937-38.

The White birth-rate remains at a remarkably high level for a large industrial city, whilst the percentage of illegitimate births is also remarkably low for such a city.

The Native, Asiatic and Coloured Births registered during 1937-38 numbered 2,141 (800 Native, 705 Coloured, and 636 Asiatics), as compared with 2,171 in 1935-36, and 2,455 in 1936-37. This number represents a birth-rate of 9·03. It is not permissible, however, to draw a comparison between the birth-rate of Europeans and non-Europeans, because firstly the registration of births of non-Europeans is known to be very incomplete, and secondly the ratio of females to males in the non-European population is very much lower than in the European population. In the one case it is as 1 : 2·93 and in the other as 1 : 1·01 (1936 Census).

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, corrected for Inward and Outward Transfers:—

DEATHS.

Year	Whites	Natives	Eurafricans	Asiatics	All Persons
1928-29	1,989	2,795	304	143	5,231
1929-30	1,942	3,115	339	172	5,568
1930-31	2,038	3,349	357	181	5,925
1931-32	2,070	3,309	356	183	5,918
1932-33	2,181	3,178	354	210	5,923
1933-34	2,264	3,872	380	194	6,710
1934-35	2,345	3,478	401	187	6,411
1935-36	2,731	3,281	567	222	6,801
1936-37	2,686	3,181	513	207	6,587
1937-38	2,780	3,198	499	223	6,700

DEATH-RATES.

DEATH-RATES (excluding non-residents)	White		Natives	Eur- africans	Asiatics	All Persons
	Gross	*Corrected for Age and Sex distrib.				
1928-29	11.05	—	19.07	17.88	20.42	14.92
1929-30	10.67	—	21.62	18.83	22.93	15.72
1930-31	10.22	—	22.32	17.85	22.62	15.70
1931-32	10.01	—	21.84	17.45	22.60	15.35
1932-33	10.22	*10.83	20.55	25.28	21.00	15.11
1933-34	10.19	*10.80	23.32	26.48	18.74	16.25
1934-35	9.77	*10.35	19.03	27.27	17.64	14.31
1935-36	10.88	—	17.17	27.00	22.63	14.39
1936-37	10.24	—	16.11	23.24	20.15	13.38
1937-38	10.23	—	15.70	21.98	21.04	13.17

* Factor for correction 1.06.

DEATH-RATE IN BRITISH AND SOUTH AFRICAN CITIES.

Appended, for purposes of comparison, are particulars as to the "Death-rate per 1,000 from All Causes," in England and Wales, and in the large cities and towns of the Union:—

Greater London (i.e., Metro- politan and City Police Districts)	11.1 (1937)	JOHANNESBURG—			
		White	Natives	Eurafricans	Asiatics
England and Wales	12.4 "	10.23 (1937-38)	15.70 "	21.98 "	21.04 "
Durban	8.86 (1937-38)				13.17 "
Bloemfontein	6.88 "				
Capetown	10.33 "				
Pretoria	8.73 "				
Pietermaritzburg	9.44 "				
East London	10.05 "				

Except in regard to South African Towns, these figures are taken from the Statistical Review of the Registrar-General for England and Wales, 1937.

The European death rate is nearly 1 per thousand lower than that of Greater London, and more than 2 per thousand lower than that of England and Wales, and taking into account the continued industrial expansion of the City, together with the heavy influx of poor families into the City from the rural areas, can be regarded as satisfactory. The native death rate continues to decrease and has reached a new low level. It will be noted that this decrease has been progressive in the past few years, and whilst it might be overstepping the mark to ascribe in toto these very satisfactory decreases to the Council's very large schemes for the rehousing of natives at the various native townships, particularly Orlando, and the consequent clearance of natives from slum areas in the City, there cannot be a vestige of doubt that these progressive decreases can be in a great measure attributed to the wise Council policy of providing extensive and sanitary housing accommodation for town natives in its native townships and hostels.

The death rate for "all persons" too has decreased substantially and is the lowest recorded in the past 20 years.

CAUSES OF DEATH.

The causes of and ages at death and the local distribution are analysed in the usual Tables 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, 1935-36, 1936-37, 1937-38.

DISEASE	1935-36		1936-37		1937-38		DISEASE	1935-36		1936-37		1937-38			
	Deaths	Rates	Deaths	Rates	Deaths	Rates		Deaths	Rates	Deaths	Rates	Deaths	Rates		
Enteric Fever ...	W.	16	0'06	15	0'057	20	0'07	Diseases of the Heart ...	W.	411	1'63	528	2'01	586	2'16
	N.	67	0'35	40	0'21	43	0'21		N.	144	0'75	222	1'12	291	1'43
	E.	2	0'09	4	0'18	4	0'18		E.	39	1'85	69	3'13	64	2'82
	A.	1	0'10	3	0'29	1	0'09		A.	23	2'34	21	2'04	36	3'40
Measles ...	W.	5	0'02	1	0'004	21	0'08	Acute Bronchitis ...	W.	25	0'099	31	0'12	21	0'08
	N.	7	0'03	11	0'06	7	0'03		N.	125	0'65	100	0'50	64	0'31
	E.	3	0'14	—	—	4	0'18		E.	22	1'04	18	0'82	11	0'49
	A.	2	0'20	1	0'10	3	0'28		A.	15	1'53	11	1'07	9	0'84
Scarlet Fever ...	W.	7	0'027	2	0'008	—	—	Chronic Bronchitis ...	W.	48	0'19	27	0'10	49	0'18
	N.	—	—	—	—	—	—		N.	15	0'07	11	0'06	18	0'09
	E.	1	0'047	—	—	1	0'044		E.	4	0'19	8	0'36	4	0'18
	A.	—	—	—	—	—	—		A.	7	0'71	5	0'48	5	0'47
Whooping Cough ...	W.	11	0'04	26	0'10	7	0'03	Pneumonia ...	W.	395	1'65	350	1'33	317	1'17
	N.	7	0'037	20	0'10	7	0'03		N.	973	5'091	921	4'67	970	4'76
	E.	4	0'19	4	0'18	—	—		E.	156	7'42	124	5'62	128	5'64
	A.	—	—	3	0'29	—	—		A.	66	6'72	61	5'94	65	6'13
Diphtheria and Croup ...	W.	14	0'05	13	0'050	7	0'03	Silicosis ...	W.	41	0'16	30	0'11	55	0'20
	N.	1	0'005	2	0'01	3	0'015		N.	10	0'05	4	0'02	8	0'04
	E.	2	0'09	2	0'09	2	0'09		E.	5	0'24	2	0'09	2	0'09
	A.	—	—	—	—	—	—		A.	1	0'10	—	—	—	—
Influenza ...	W.	135	0'53	46	0'18	53	0'20	Other Respiratory Diseases ...	W.	74	0'29	32	0'12	62	0'23
	N.	37	0'19	36	0'18	52	0'255		N.	43	0'22	21	0'11	26	0'13
	E.	6	0'28	5	0'23	2	0'09		E.	15	0'71	8	0'36	6	0'26
	A.	6	0'61	1	0'10	4	0'38		A.	9	0'91	3	0'29	4	0'38
Tuberculosis of Lungs ...	W.	60	0'23	43	0'164	40	0'15	Diarrhoea and Enteritis ...	W.	130	0'51	114	0'43	138	0'51
	N.	220	1'15	209	1'06	193	0'95		N.	537	2'81	474	2'40	461	2'26
	E.	43	2'04	42	1'90	40	1'76		E.	76	3'61	68	3'08	67	2'95
	A.	10	1'02	12	1'17	8	0'76		A.	24	2'44	20	1'95	26	2'45
Other Forms of Tuberculosis ...	W.	7	0'027	14	0'053	13	0'05	Acute Nephritis and Bright's Disease ...	W.	110	0'43	95	0'36	131	0'48
	N.	45	0'23	43	0'21	88	0'43		N.	62	0'32	33	0'17	36	0'18
	E.	5	0'23	6	0'27	6	0'26		E.	9	0'43	11	0'49	10	0'44
	A.	2	0'20	3	0'29	2	0'09		A.	1	0'10	4	0'39	4	0'38
Cancer ...	W.	248	0'99	262	0'998	273	1'00	Congenital Malformation Premature & Early Infancy	W.	167	0'66	171	0'65	167	0'61
	N.	25	0'13	31	0'16	32	0'16		N.	172	0'90	138	0'69	208	1'02
	E.	12	0'37	13	0'58	17	0'75		E.	45	2'14	27	1'22	29	1'28
	A.	2	0'20	6	0'59	1	0'09		A.	8	0'81	15	1'46	20	1'89
Meningitis ...	W.	19	0'07	23	0'09	6	0'02	Violent Deaths	W.	146	0'58	181	0'69	198	0'73
	N.	31	0'16	32	0'16	36	0'18		N.	365	1'91	434	2'20	373	1'83
	E.	2	0'09	3	0'14	3	0'13		E.	12	0'37	25	1'13	32	1'41
	A.	3	0'30	—	—	—	—		A.	7	0'71	4	0'39	5	0'47
Cerebral Hemorrhage and Softening	W.	77	0'30	52	0'019	23	0'08								
	N.	14	0'07	12	0'06	7	0'34								
	E.	9	0'42	12	0'54	4	0'18								
	A.	1	0'10	4	0'39	2	0'19								

The following observations are suggested by an inspection of this table:—

(1) That during 1937-38 the chief factors of mortality were:—

(a) For Whites.—Heart diseases (586), pneumonia (317), cancer (273), violent deaths (198), premature birth and early infancy (167), diarrhoea

and enteritis (138), nephritis (131), other respiratory diseases (62), silicosis (55), influenza (53), chronic bronchitis (49), tuberculosis of lungs (40), cerebral haemorrhage (23), acute bronchitis (21), measles (21), enteric (20), other forms of tuberculosis (13), diphtheria (7), and whooping cough (7).

(b) *For Natives*.—Pneumonia (970), diarrhoea and enteritis (461), violent deaths (373), heart diseases (291), premature birth and early infancy (208), tuberculosis of lungs (193), other forms of tuberculosis (88), acute bronchitis (64), influenza (52), enteric (43), nephritis (36), meningitis (36), cancer (32), other respiratory diseases (26), chronic bronchitis (18), silicosis (8), whooping cough (7), cerebral haemorrhage (7), and measles (7).

(c) *For Eurafrians*.—Pneumonia (128), diarrhoea (67), heart diseases (64), tuberculosis of lungs (40), violent deaths (32), premature birth and early infancy (29), cancer (17), acute bronchitis (11), nephritis (10), other respiratory diseases (6), and other forms of tuberculosis (6).

(d) *For Asiatics*.—Pneumonia (65), heart diseases (36), diarrhoea (26), premature birth and early infancy (20), acute bronchitis (9), tuberculosis of lungs (8), chronic bronchitis (5), violent deaths (5).

(2) That the comparison with the two previous years is as follows:—

(a) *As regards Whites*, the principal *increases* are in respect of heart diseases, 586 as compared with 528 in 1936-37 and 411 in 1935-36; violent deaths, 198 as compared with 181 in 1936-37 and 146 in 1935-36; nephritis, 131 as compared with 95 in 1936-37 and 110 in 1935-36; cancer, 273 as compared with 262 in 1936-37 and 248 in 1935-36; other respiratory diseases, 62 as compared with 32 in 1936-37 and 74 in 1935-36; silicosis, 55 as compared with 30 in 1936-37 and 41 in 1935-36; diarrhoea and enteritis, 138 as compared with 114 in 1936-37 and 130 in 1935-36; chronic bronchitis, 49 as compared with 27 in 1936-37 and 48 in 1935-36; and measles, 21 as compared with 1 in 1936-37 and 5 in 1935-36. The principal *decreases* are in respect of pneumonia, 317 as compared with 350 in 1936-37 and 395 in 1935-36; cerebral haemorrhage, 23 as compared with 52 in 1936-37 and 77 in 1935-36; tuberculosis of lungs, 40 as compared with 43 in 1936-37 and 60 in 1935-36; acute bronchitis, 21 as compared with 31 in 1936-37 and 25 in 1935-36; and meningitis, 6 as compared with 23 in 1936-37 and 19 in 1935-36.

(b) *As regards Natives*, the principal *increases* are in respect of other forms of tuberculosis, 88 as compared with 43 in 1936-37 and 45 in 1935-36; influenza, 52 as compared with 36 in 1936-37 and 37 in 1935-36; heart diseases, 291 as compared with 222 in 1936-37 and 144 in 1935-36; premature birth and early infancy, 208 as compared with 138 in 1936-37 and 172 in 1935-36; and pneumonia, 970 as compared with 921 in 1936-37 and 972 in 1935-36. The principal *decreases* are in respect of whooping cough, 7 as compared with 20 in 1936-37 and 7 in 1935-36; acute bronchitis, 64 as compared with 100 in 1936-37 and 125 in 1935-36; violent deaths, 373 as compared with 434 in 1936-37 and 365 in 1935-36; tuberculosis of lungs, 193 as compared with 209 in 1936-37 and 220 in 1935-36; and diarrhoea and enteritis, 461 as compared with 474 in 1936-37 and 537 in 1935-36.

(c) *As regards Eurafrians and Asiatics* there is no important factor in comparison with the two previous years.

Though the deaths of all races from pneumonia are practically the same as in the previous year, there is a considerable diminution in the rates for Europeans in the past three years, the figures being 1.65, 1.33 and 1.17. It is possible that the mortality may be diminishing on account of improved therapeutic measures, though the newer drugs now coming into vogue were not being used to any large extent in the year under review. The results of their employment, however, indicate that in the future the case mortality of pneumonia will be considerably diminished, which in a place like Johannesburg, with a high incidence rate of pneumonia, is a pleasing prospect, and one which will have a noticeable effect in the diminution of the general mortality rate.

That no European deaths were occasioned by scarlet fever, and only 7 deaths by diphtheria in a city of the size of Johannesburg, is most gratifying. The reverse, however, is true in regard to the number of violent deaths, which, in the past three years, number 1,782. In comparison only 922 deaths from cancer occurred in the same period. It may, however, be some consolation to sufferers from a cancer complex to know that they are doubly likely to meet a violent end than to die of cancer.

INFANTILE MORTALITY, MATERNAL MORTALITY AND MATERNITY
AND CHILD WELFARE MEASURES.

Infantile Mortality, i.e. deaths of infants under one year per each 1,000 births registered, was: Whites 57·47, Eurafrians 212·77 and Asiatics 133·65.

The following table shows the white infantile mortality rate in recent years:—

1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38
72·77	78·62	79·08	76·61	80·04	82·43	69·21	74·13	64·63	57·47

This table shows a decrease from the preceding year of seven deaths per thousand births, and in the quinquennial period 1933-34 to 1937-38 a decrease of 25 deaths per thousand births. At 57·47 per thousand births it is much the lowest figure in the history of the City, a matter for congratulation, especially when the large influx from the platteland of girls and young women seeking employment and with but little knowledge of mothercraft and its proper application is taken into account. It also reflects great credit on the activities of the Council's Child Welfare Staff and the Council itself for the extensive provision of Staff and Clinics. Its further substantial decrease in future years can be anticipated with confidence.

MATERNAL MORTALITY.

	Puerperal Sepsis per 1,000 Births		Other Causes per 1,000 Births		All Causes per 1,000 Births	
	Joh'burg	E. & W.	Joh'burg	E. & W.	Joh'burg	E. & W.
1928-29	1·49	1·79 (1928)	2·35	2·63	3·85	4·42
1929-30	1·07	1·80 (1929)	2·77	2·53	3·85	4·33
1930-31	1·42	1·92 (1930)	1·01	2·48	2·44	4·40
1931-32	1·05	1·66 (1931)	1·89	2·45	2·94	4·11
1932-33	1·55	1·61 (1932)	0·22	2·60	1·77	4·21
1933-34	3·65	1·82 (1933)	4·33	2·68	7·99	4·51
1934-35	2·15	1·95 (1934)	1·96	2·47	4·11	4·41
1935-36	2·70	1·61 (1935)	3·55	2·32	6·25	3·94
1936-37	1·05	1·34 (1936)	3·00	2·31	4·05	3·65
1937-38	1·06	0·94 (1937)	1·36	1·77	2·43	3·13

The Maternal Mortality rate on account of puerperal sepsis remains at a low figure and is only fractionally higher than the same rate in "England and Wales." In regard to "Other Causes," Johannesburg compares favourably with "England and Wales" and at 1·36 per thousand births is a very satisfactory one and indicates clearly that ante-natal care and care at confinement is being well exercised in the City.

MATERNAL AND CHILD WELFARE MEASURES.

1.—GENERAL SUMMARY—EUROPEANS.

Year	Number of		Mothers referred to		Infants sent to Children's Hospital and O.P.D.	Infants Reported to Children's Aid Society	Mothers Attendances at		Cases Referred to Pediatric Officer	Attendances at Ante-Natal Clinic.	Assisted at Clinics
	First Visits	Re-visits	Maternity Hospital	Ante-Natal Nurse			Welfare Clinics	Health Visitors' Office			
1936-37 ...	5,557	13,876	246	365	262	48	49,117	123	1,480	3,015	12,179
1937-38 ...	5,989	14,701	466	383	308	71	56,173	75	1,126	3,339	11,842

2.—BIRTHS INVESTIGATED.

Year	Legitimate	Illegitimate	Full Time	Premature	Stillborn
1936-37 ...	5,567	60	5,380	178	92
1937-38 ...	5,879	34	5,757	156	131

Year	Attended by						Condition of Infant						Condition of Home					
	Doctor	Midwife		Friends	Condition of Mother			Good	Fair	Poor	Sick	Dead	Good	Fair	Bad	Clean	Dirty	
		Trained	Untrained		Good	Fair	Poor											
1936-37 ...	2,289	4,434	1,047	33	5,314	191	39	34	5,319	93	18	13	185	4,951	570	55	3,807	74
1937-38 ...	2,586	4,713	963	28	5,458	267	93	23	5,666	77	13	16	165	5,082	690	201	4,047	41

3.—METHODS OF FEEDING.

Year	Breast Milk	Cow's Milk	Tinned Milk	Breast and Complementary	Other Foods	Feeding Bottles				Comforter Used
						Pattern		Condition		
						Good	Bad	Good	Bad	
1936-37 ...	4,605	218	74	414	141	500	—	497	3	504
1937-38 ...	4,803	251	139	414	133	245	5	499	10	587

MATERNAL AND CHILD WELFARE MEASURES.

4.—NATIVE TOWNSHIPS.

First Visits	Re-visits	Welfare Clinics and Office Attendances	Feeding		Comforter Used
			Breast	Other	
Health Visitors 1,626	Health Visitors 1,122	6,010	1,288	158	231
Native Nurses 1,655	Native Nurses 18,156				

5.—EURAFRICANS.

First Visits	Re-visits	Legitimate	Illegitimate	Full Time	Premature.	Attended by			
						Trained Midwife	Untrained Midwife	Friends	No One
849	2,313	691	169	839	21	179	610	43	14

6.—ASIATICS.

First Visits	Re-visits	Legitimate	Illegitimate	Full Time	Premature	Attended by			
						Trained Midwife	Untrained Midwife	Friends	No One
644	2,796	643	4	645	22	265	375	2	1

Breast Feeding.—Whilst the percentage of breast-fed infants has fallen slightly, viz., from 81·8 per cent. in 1936-37 to 81·2 per cent. in the year under review, the percentage is still high. The decrease, if it can be attributed to any particular factor, might readily be ascribed to the importunities of artificial food merchants, the passivity of many medical men, who ought to know better, and possibly to the necessities of poor mothers who are increasingly becoming wage earners. It is most certainly not due to the teachings of the Welfare Staff of the Department, who consistently not only advocate but do their utmost to ensure breast feeding.

STAFF AND CLINICS.

The Council now employs one Senior Health Visitor, nine Health Visitors for European post-natal clinics, one Health Visitor for native clinics (with ten native qualified midwives), one Health Visitor for coloured clinics, and one Health Visitor for an Asiatic clinic, plus one Relieving Health Visitor. Expenditure on pasteurised milk, acidophilus milk and accessory foods for infants and mothers keeps on increasing and now amounts to the formidable total of approximately £4,000 per annum.

So far as the Ante-Natal Clinics held twice weekly at the New Market Clinic Building are concerned, it is interesting to note that the attendances continue to increase, viz., 3,339 in 1937-38 as against 3,015 in 1936-37. In this connection your M.O.H. desires to record his appreciation of the services of the Council's Specialist Obstetric Officers, Dr. W. H. Maxwell and Dr. F. K. te Water, and also of the services of your Pediatric Officers, Dr. B. G. v. B. Melle and Dr. A. E. Strawbaun at your Post-Natal Clinics.

The nett position to-day is that the Council provides weekly:—

1. Eight Post-Natal Clinics for Europeans.
2. Four Post-Natal Clinics for Natives.
3. Two Post-Natal Clinics for Coloured Persons.
4. One Post-Natal Clinic for Asiatics.
5. Two Ante-Natal Clinics for Europeans.

Finally, your M.O.H. desires to record his appreciation of the loyal services of all members of this branch of his Department, who, in spite of the prolonged absence on account of illness of the Senior Health Visitor, have pulled their weight admirably.

Pre-school Children.—Six Nursery Health classes were conducted by Miss Brosius, the Senior Supervisor, and her assistants in Vrededorp, Jeppes, Ophirton, Newlands, Fordsburg and Turffontein. These classes were well attended and an interesting development is the holding of instructional classes for the mothers of the pre-school children attending the nursery classes. The mothers receive valuable advice from the Supervisor in the up-bringing of their pre-school children and it is gratifying to note that the mothers are extraordinarily keen to learn and put in practice the advice given. All the children are regularly examined by the Pediatric Officer and their mental condition and development is attended to by the Council's Psychiatrist (Dr. F. F. du Toit). The Psychiatrist also gives a course of instruction in Psychology and Psychiatry to the Supervisors and Assistant Supervisors of these classes. The children attending these classes, all of whom are the children of indigent parents and between two and six years of age, are given simple health exercises and are instructed in such simple hygienic measures as head and body cleanliness, teeth cleaning, etc., etc., interspersed with occupational instruction, games, physical exercises and general kindergarten. They receive a daily ration of one-third of a pint of pasteurised milk and are weighed and have their body measurements taken at regular and frequent intervals.

Dental care of pre-school children is a particular object. All pre-school children attending the Nursery Health Classes are taken by the Supervisor to the Dental Section of the School Clinic. The sight of these toddlers going gaily in our motor-van with the Supervisor to the School Clinic, and at the Clinic opening their small mouths to the sympathetic dental officers without the smallest qualm is a spectacle which requires to be seen to be realised and is a tribute to their faith in their Supervisors and the kindness of the dental officers.

Since 1st July, 1936, the Provincial Education Department has subsidised the Council's Nursery Health Classes to the extent of £3 per pupil per annum with a limit of subsidy of 50 per cent. of the wages of the teaching (supervising) staff. It is only proper that the Provincial Education Department should so subsidise, especially as Principals of schools whereat new scholars are received at school age are fairly unanimous in their opinion that it is quite easy amongst entrants to recognise the Nursery Health Classes entrants from their physical conditions and mental outlook. The subsidy amounts approximately to £700 per annum.

Ante-Natal Nurses.—The Council employs four Ante-Natal Nurses, stationed at two Centres—Western and Central. These Ante-Natal Nurses are qualified general nurses and midwives. They extend ante-natal care to expectant mothers in the homes, shepherd these mothers to the Ante-Natal Clinics, arrange for their confinement in the Queen Victoria Maternity Hospital when desired, or themselves conduct the confinements in the homes. This branch of the work is extending rapidly, and has become a great boon to poor expectant mothers, who in the past have had to submit in their confinements to the tender mercies of the crude and unqualified midwife.

Ante-Natal Clinics.—Two Ante-Natal Clinics are conducted on Tuesday and Friday afternoons at the New Market Buildings. The attendance, shown in the General Summary above, continues to increase. During the year the Ante-Natal Nurses attended 408 confinements, paid 4,382 post-confinement visits, and made 2,213 visits to expectant mothers in their homes prior to their confinements. Students of the Witwatersrand University attend both the Ante-Natal Clinics and the confinements conducted in the homes by the Ante-Natal Nurses. Such attendance is an integral part of the medical curriculum, and affords facilities to medical students, which they are increasingly taking advantage of. These facilities are also extended to pupil midwives receiving their training at the Queen Victoria Hospital. Pupil midwives are availing themselves of the facilities afforded with enthusiasm.

SUPERVISION OF PRACTISING MIDWIVES AND NURSING HOMES.

A full-time Inspectress of Midwives and Nursing Homes is employed.

(a) Administration of Regulations regarding Persons Practising Midwifery:

The number of midwives listed in accordance with the above-quoted regulations is as follows:—

	1st July, 1937.	Removed from list during year.	Listed during year.	30th June, 1938.
European, certificated ...	252	58	75	269
European, uncertificated ...	60	11	3	52
Non-European, certificated ...	19	6	9	22
Non-European, uncertificated ...	40	6	—	34
	371	81	87	377

The registers of all listed midwives and the midwifery bags of all uncertificated midwives were examined each quarter, and the midwifery bags of certificated listed midwives were examined in October, 1937, and April, 1938. At the time of these inspections every effort was made to ensure that practising midwives knew and understood the regulations regarding persons practising midwifery.

In July, 1937, all listed midwives were circularised, drawing their attention to the amendment by Government Notice, No. 1104 of 1937, to Clause 23 of the Rules Regarding Midwives, and in June, 1938, all listed midwives were circularised regarding the newly promulgated Regulations Regarding Persons Practising Midwifery.

All notified cases of Puerperal Sepsis (105) were investigated and disinfection of midwives and their appliances was carried out in all such cases. Throat swabs were taken of all nurses, etc., in contact with Puerperal Sepsis cases, and where the result of such swabs indicated the presence of Haemolytic Streptococci, the necessary action was taken to prevent any spread of infection until negative swabs had been obtained.

During the year fifteen successful prosecutions were instituted against midwives for contravention of the Regulations Regarding Persons Practising Midwifery, the Local Government Ordinance (Transvaal), No. 11 of 1926, and the Public Health Act, No. 36 of 1919, as amended.

(b) *Nursing Homes.*

At the commencement of the period under review there were thirty-seven private hospitals and nursing homes, and at the 30th June, 1938, there were thirty-two, eight having closed down and three new institutions having opened up.

All plans submitted for alterations and additions to nursing homes were carefully examined, and frequent consultations took place with owners, architects and builders, with satisfactory results. During the year under review there has been a decided general improvement in the management of nursing homes in the City and it is pleasing to record that in the majority of the institutions better facilities for sterilisation of infected articles have been provided.

HEALTH PROPAGANDA.

The Department's activities on propaganda lines were continued during the year. The principal propaganda measures were:—

- (a) Distribution of leaflets on health subjects.
- (b) Preparation of new original posters illustrating various health subjects.
- (c) Distribution of booklets on health matters. These publications include " Facts about Ourselves," " Care of Mother and Child," " Your Health, Look into it " (a booklet dealing with every aspect of public health), " Prevention and Destruction of Rats and Mice," " The House or Typhoid Fly." It may be mentioned that by arrangement with the Registrar of Births and Deaths, a copy of the booklet " Care of Mother and Child " is handed to every person registering a birth.
- (d) Advertisements in the local papers and periodicals at some cost, illustrating various public health matters. More especially was public attention called to clean milk production by means of illustrations, and the Press were good enough to elaborate by appropriate articles. Indeed, the Press have assisted greatly in this connection.
- (e) In February, 1938, a National Health Congress, sponsored by the South African Health Officials' Association, the Royal Sanitary Institute and the Medical Officers of Health Group of the British Medical Association (South Africa), took place in Johannesburg. This Health Congress was largely attended by health officials from all parts of the Union of South Africa, and many interesting and instructive papers on various health subjects were read and discussed thereat. Much good publicity on health matters was thereby obtained through the courtesy and assistance of the Press, who were most indulgent in press space, and to whom much thanks are due. The staff of the Department contributed in considerable measure to the Congress programme. In connection with this Congress a very comprehensive Public Health Exhibition was staged in the City and Selborne Halls in collaboration with the " Rand Daily Mail " and " Sunday Times," and was very largely attended, not only by Johannesburg residents, but by residents of all the towns of the Witwatersrand. Each Reef Town furnished its own exhibit covering most branches of Public Health work, and each exhibit was well staffed by demonstrators from the various Reef Town Health Departments. Altogether the exhibition was a decided success and resulted in very valuable health propaganda. The Department played its share in the staging of this Exhibition.

PNEUMONIA.

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

	Whites	Natives	Eurafricans	Asiatics	England and Wales
1928-29	1.50	5.48	3.29	7.00	0.78 (1928)
1929-30	1.74	7.03	4.77	7.66	1.10 (1929)
1930-31	1.39	7.03	4.55	5.75	0.69 (1930)
1931-32	1.55	7.16	4.60	6.17	0.80 (1931)
1932-33	1.42	6.26	5.92	6.20	0.73 (1932)
1933-34	1.65	6.81	6.20	3.86	0.74 (1933)
1934-35	1.48	5.90	4.28	4.81	0.71 (1934)
1935-36	1.65	5.09	7.42	6.72	0.66 (1935)
1936-37	1.33	4.67	5.62	5.94	0.69 (1936)
1937-38	1.17	4.76	5.64	6.13	0.72 (1937)

MINERS' PHTHISIS, ROCK DRILL PNEUMONIA OR SILICOSIS.

Sixty-five deaths (55 Whites, 8 Natives and 2 Eurafricans) were registered during 1937-38, as compared with 36 (30 Whites, 4 Natives and 2 Eurafricans), and 57 (41 Whites, 10 Natives, 5 Eurafricans and 1 Asiatic) in 1936-37 and 1935-36 respectively.

ORGANIC DISEASES OF THE HEART.

These heart affections include pericarditis, endocarditis, angina pectoris, valvular disease and other diseases of the circulatory system. The deaths recorded during the year 1st July, 1937, to 30th June, 1938, were 586 for Whites, as compared with 528 and 384 for the two previous years. This figure represents a rate of 2.16 per 1,000 as against 3.832 for England and Wales in 1937. For Natives the rate was 1.43; for Eurafricans, 2.82; and for Asiatics, 3.40.

DIARRHOEAL DISEASES.

The following are the mortality rates per 1,000 of population for the period under notice:—

	Whites	Natives	Eurafricans	Asiatics	England and Wales
1928-29	0.63	2.52	3.00	1.42	0.16 (1928)
1929-30	0.65	3.33	2.72	2.53	0.18 (1929)
1930-31	0.78	4.10	3.10	3.87	0.14 (1930)
1931-32	0.49	3.22	2.59	3.20	0.13 (1931)
1932-33	0.68	3.39	4.07	3.10	0.14 (1932)
1933-34	0.56	4.65	4.25	3.67	0.14 (1933)
1934-35	0.42	2.95	4.08	2.73	0.12 (1934)
1935-36	0.51	2.81	3.61	2.44	0.12 (1935)
1936-37	0.43	2.40	3.08	1.94	0.12 (1936)
1937-38	0.51	2.26	2.95	2.45	0.12 (1937)

MALIGNANT DISEASE OR CANCER.

During 1937-38, the deaths from cancer numbered 320 Whites (including 47 non-residents), 49 Natives (including 17 non-residents), 19 Eurafrians (including 2 non-residents), and 1 Asiatic, as compared with 296 Whites (including 34 non-residents), 52 Natives (including 21 non-residents) 13 Eurafrians and 6 Asiatics in 1936-37 and 285 Whites (including 37 non-residents), 37 Natives (including 12 non-residents), 14 Eurafrians and 2 Asiatics in 1935-36.

Of the 320 Whites, 176 were males and 144 females, and 305 were over the age of 35 years. The rate was 1.00 for 1937-38 and 0.99 for the two previous years as compared with 1.633 per 1,000 for England and Wales in 1937.

In the following table is set forth the part of the body affected:—

	Whites			Natives			Eurafrians			Asiatics		
	1935-36	1936-37	1937-38	1935-36	1936-37	1937-38	1935-36	1936-37	1937-38	1935-36	1936-37	1937-38
Stomach	59	85	94	1	6	5	1	3	8	1	1	1
Womb and Ovaries	34	34	41	1	8	9	5	4	4	1	—	—
Breast	26	24	23	—	2	—	1	1	2	—	1	—
Liver	20	19	21	17	19	20	4	1	3	—	1	—
Neck and Throat	19	11	8	1	2	1	1	—	—	—	1	—
Mouth and Jaw	7	3	5	1	1	2	—	—	—	—	—	—
Tongue	5	4	4	1	1	1	—	1	—	—	—	—
Lungs	9	16	20	2	3	2	1	—	1	—	—	—
Rectum	5	10	16	1	—	—	—	—	—	—	—	—
Prostate	11	11	17	—	3	2	—	1	1	—	—	—
Head and Face	6	11	3	—	—	2	—	1	—	—	—	—
Bladder	6	7	10	1	2	2	—	—	—	—	—	—
Bones	4	3	—	3	—	—	—	—	—	—	—	—
Abdomen	1	2	2	—	1	—	—	—	—	—	—	—
Colon	21	21	19	2	—	2	1	—	—	—	2	—
Peritoneum	2	—	—	1	—	—	—	—	—	—	—	—
Spleen	1	—	—	—	—	—	—	—	—	—	—	—
Legs and Feet	1	4	2	—	—	—	—	—	—	—	—	—
Hand and Arm	2	1	—	—	—	—	—	—	—	—	—	—
Penis	1	—	1	—	—	—	—	—	—	—	—	—
Testes	—	—	2	2	—	—	—	—	—	—	—	—
Chest	6	—	4	—	—	1	—	—	—	—	—	—
Heart	—	1	1	—	—	—	—	—	—	—	—	—
Kidneys	4	3	3	1	1	—	—	—	—	—	—	—
Glands	6	8	14	—	1	—	—	—	—	—	—	—
Brain	10	2	2	—	—	—	—	—	—	—	—	—
Spine	3	3	1	—	—	—	—	—	—	—	—	—
Unspecified	16	13	7	2	2	—	—	1	—	—	—	—
Total	285	296	320	37	52	49	14	13	19	2	6	1

Whilst the incidence of Malignant Disease shows a slight increase, it is still more than desirable that persons of 35 years or over should on the least suspicion seek skilled medical advice as consistently advocated by the National Cancer Association of South Africa.

MEASLES.

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

	1933-34.	1934-35.	1935-36.	1936-37.	1937-38
Whites	0.009	0.05	0.02	0.003	0.08
Natives	0.03	0.02	0.03	0.05	0.03
Eurafrians	0.06	0.06	0.14	—	0.18
Asiatics	—	0.09	0.20	0.09	0.28

VENEREAL DISEASE.

171 White and 2,548 Coloured cases of Syphilis and other venereal diseases from Johannesburg were treated at Rietfontein Hospital during the year 1937-38.

STATISTICAL REPORT OF DIRECTOR OF "SPECIAL TREATMENT CENTRES" FOR PERIOD 1st JULY, 1937, TO 30th JUNE, 1938.

Venereal Clinic (European).

1.—SUMMARY.

Out Patients		Specimens		Salvarsan	
No. of New Patients	Total Attendances	No. sent to Institute	No. Examined at Clinic	No. of Patients treated with 606 or Substitutes	No. of Doses Administered
1,359	14,976	774	631	1,500	6,487

2.—ATTENDANCES AND DISEASES.

Attendances of New Patients								Attendances of Old Patients							
Gonorrhœa		Syphilis		Soft Chancre		Not V.D.		Gonorrhœa		Syphilis		Soft Chancre		Not V.D.	
M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
673	126	367	179	8	—	6	—	4,307	1,234	5,209	2,847	21	—	—	—

3.—LABORATORY. NUMBER OF SPECIMENS EXAMINED AND RESULTS OF EXAMINATION.

Clinic						Institute										Total Number of Specimens Examined
Gonococci		Spirochaetes		Others		Gonococci		Spirochaetes		Wasserman Test						
+	-	+	-	+	-	+	-	+	-	+++	++	+	-	?		
265	301	—	—	29	36	45	76	—	—	291	30	17	315	—	1,405	

Venereal Clinic (Non-European: Females and Children Only).

1.—SUMMARY.

Out Patients		Specimens		Salvarsan	
No. of New Patients	Total Attendances	No. sent to Institute	No. Examined at Clinic	No. of Patients treated with 606 or Substitutes	No. of Doses Administered
248	2,390	120	—	439	1,907

2.—ATTENDANCES AND DISEASES.

Attendances of New Patients								Attendances of Old Patients							
Gonorrhœa		Syphilis		Soft Chancre		Not V.D.		Gonorrhœa		Syphilis		Soft Chancre		Not V.D.	
M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
—	6	—	243	—	—	—	—	—	—	—	2,141	—	—	—	—

3.—LABORATORY. NUMBER OF SPECIMENS EXAMINED AND RESULTS OF EXAMINATION.

Clinic.				Institute										Total Number of Specimens Examined.	
Gonococci		Others		Gonococci		Spirochaetes		Wasserman Test					Others		
+	-	+	-	+	-	+	-	+++	++	+	-	?	+		-
—	—	—	—	—	—	—	—	42	24	20	18	—	—	—	104

REMARKS.

1. ATTENDANCES OF PATIENTS.

The attendances of new patients and the average attendance per patient both in the case of the European and non-European Centres approximates so closely to the figures for the year ended June, 1937, that no special comments are called for in this connection.

2. GENERAL.

As in the past, courses of instruction have been given at your European Centre to the following groups:—

- (a) Fifth and Sixth year medical and dental students of the University of the Witwatersrand.
- (b) Members attending the Department of Public Health Course of the University.
- (c) The ladies who are taking the Health Visitors' and School Nurses' Course under the auspices of the Witwatersrand Technical College.

HENRY GLUCKMAN, M.R.C.S., L.R.C.P.,
 Director, Johannesburg City Council's
 " Special Treatment Centres."

OPHTHALMIA NEONATORUM AND GONORRHOEAL OPHTHALMIA.

CASES NOTIFIED.

	1935-36.	1936-37.	1937-38.
Ophthalmia Neonatorum—			
Whites	36	93	86
Natives	4	40	22
Eurafricans	1	10	40
Asiatics	6	2	6
	47	145	154
Gonorrhœal Ophthalmia—			
Whites	2	4	1
Natives	2	1	3
Eurafricans	3	1	—
Asiatics	—	—	—
	7	6	4
All Cases—			
Whites	38	97	87
Natives	6	41	25
Eurafricans	4	11	40
Asiatics	6	2	6
	54	151	158

The number of notifications of these diseases received during the past two years is about treble the numbers notified in previous years. It is not, however, thought that there has been any material increase in the actual number of cases, because it was well known that in previous years notification of these diseases was notoriously incomplete, largely on account of the failure of midwives, especially uncertificated midwives, to notify cases of discharging eyes. Their previous neglect in this respect has been corrected largely through the supervision which is now exercised by the newly-appointed Inspectress of Midwives and Nursing Homes.

NOTIFIABLE INFECTIOUS DISEASES.

During the year under notice, 2,304 cases were notified, viz., 1,132 amongst Whites, 1,018 amongst Natives, 118 amongst Eurafricans, and 36 amongst Asiatics. Of these cases 490 were imported (30 White, 453 Native, 5 Eurafrican and 2 Asiatic).

These occurrences are discussed elsewhere in this Report.

The procedure adopted in regard to notified infectious diseases, disinfection, etc., has been the same as recorded in previous years.

2,108 houses and 31,176 articles of clothing, bedding, etc., were disinfected.

SMALLPOX.

Two Native cases of Smallpox—both imported—were reported during the year.

(a) *Vaccination Campaign as Result of Smallpox Cases in Alexandra Township.*

As the result of the occurrence of cases of Smallpox in Alexandra Township during December, 1937, it was considered necessary and desirable—owing to the fact that a large proportion of the male natives in that township work, and even live, in Johannesburg during the week, and that a large number of the female residents are washerwomen to Johannesburg residents, also that some of the cases of Smallpox had remained undiscovered for several weeks—to supplement the mass vaccination being carried out in Alexandra Township by mass vaccination in Johannesburg, with vaccination of the native population as the main objective.

Native vaccination stations were established at all four of the Council's Native Townships (Orlando, Pimville, Eastern and Western), at the Council's Hostels for male natives (Wemmer Barracks, Wolhuter Hostel, and Jubilee and Salisbury Compound) and also at Newlands and Ophirton. Mass vaccination was undertaken at all eleven of the Council's compounds, at which are housed practically all native municipal employees.

Vaccination facilities were also provided for Europeans at the Drill Hall and at the Newlands and Ophirton vaccination stations.

The total number of persons vaccinated during this campaign from 17th December, 1937, to 31st December, 1937, was 40,938 (40,530 Natives and 408 Europeans).

(b) *Smallpox Cases Notified during March, 1938.*

On 6th March, 1938, a native case of smallpox was notified to the Medical Officer of Health. Subsequent investigations revealed that the patient had arrived in Johannesburg from Pietersburg some 10 to 12 days earlier, having in all probability been infected outside Johannesburg. As it was impossible to trace completely this native's movements during the 10 days prior to discovery of the case, a vaccination campaign was commenced immediately for Europeans and non-Europeans.

On 16th March, 1938, advice was received of another native suspect smallpox case, the diagnosis of smallpox being confirmed by the Rietfontein Authorities on 18th March, 1938.

This native had left Louis Trichardt on 11th March, 1938, had spent a night at Pietersburg, arrived in Johannesburg on the evening of the 12th and obtained work at a horticultural establishment at Kensington, Johannesburg, on the 15th. He became sick on the 16th and was immediately taken to the non-European Hospital by his employer and transferred therefrom on the same day to the Rietfontein Hospital.

These two cases and the direct contacts were removed to Rietfontein Hospital for treatment and quarantine.

In view of the occurrence of the second case, the vaccination campaign was prolonged and further stations were opened.

In addition to the establishment of 21 public vaccination stations at fixed premises, two mobile squads carried out vaccinations at various industrial and business premises. The total number of persons vaccinated during the period 8th March, 1938, to 26th March, 1938, when the campaign was concluded, was 159,293 (66,505 Europeans and 92,788 non-Europeans).

(c) *Vaccination Campaign at Orlando and Pimville Native Townships—April 1938.*

Owing to the continued prevalence of Smallpox in Alexandra Township, it was deemed advisable, for the protection of the public health, to extend the vaccination campaign to the Council's Native Townships at Orlando and Pimville in order that as large a number as possible of the native population should be vaccinated. As a result of this campaign, from the 8th to the 24th April, 1938, 20,671 Natives were vaccinated at these two townships.

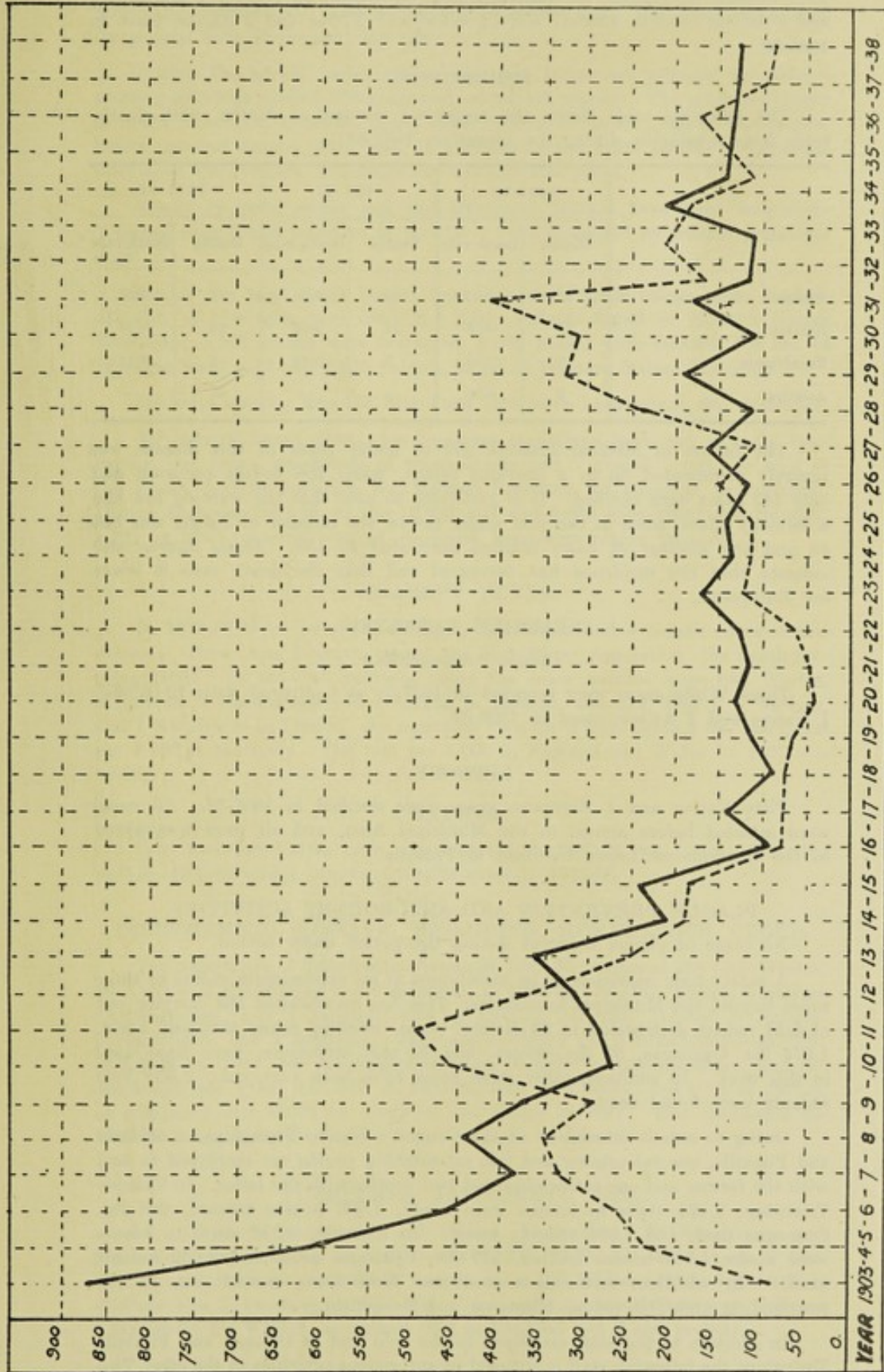
The total number of persons vaccinated during the aforementioned vaccination campaigns was 220,902 (66,913 Europeans and 153,989 non-Europeans) at a cost of £2,416 13s. 4d.

ENTERICA.

In the following is set forth the number of cases, and deaths, together with the case-rate per cent. and the death-rate per 1,000, and the death-rate for England and Wales.

	1935-36				1936-37				1937-38			
	Cases	Deaths	Case-rate %	Death-rate	Cases	Deaths	Case-rate %	Death-rate	Cases	Deaths	Case-rate %	Death-rate
Whites	137	16	11·68	0·06	128	15	11·72	0·057	124	20	16·13	0·07
Natives	166	67	40·36	0·35	98	40	40·82	0·20	91	43	47·25	0·21
Eurafricans ...	11	2	18·18	0·09	13	4	30·77	0·22	12	4	33·33	0·18
Asiatics	7	1	14·28	0·10	13	3	23·07	0·29	6	1	16·66	0·09
England and Wales ...				0·004 (1935)				0·006 (1936)				0·005 (1937)

YEARLY INCIDENCE OF ENTERIC FEVER IN THE 35 YEARS, 1903-4 TO 1937-38.



WHITES - CONTINUOUS LINE.

NATIVES - DOTTED LINE.

There is nothing in this incidence to comment on except its continued lowness.

ERYSIPELAS.

Eighty-five White, 25 Native, 5 Eurafrican and 1 Asiatic cases of Erysipelas were notified in 1937-38, as compared with 94 White, 33 Native, 4 Eurafrican and 1 Asiatic cases in 1936-37 and 74 White, 17 Native and 2 Asiatic cases in 1935-36.

MENINGITIS.

The following table shows the registered number of deaths, with death-rates from meningitis during the triennium 1935-38:—

	1935-36		1936-37		1937-38	
	Deaths	Death-rate	Deaths	Death-rate	Deaths	Death-rate
Whites	19	0.07	23	0.08	6	0.02
Natives	31	0.16	32	0.16	36	0.18
Eurafricans	2	0.09	3	0.13	3	0.13
Asiatics	3	0.30	—	—	—	—

The failure of Medical Practitioners to notify cases of this disease was severely commented on in a previous report, when 168 deaths occurred and only 145 cases were notified. It is gratifying to note that the warning has had a salutary effect, since in the year under review the number of deaths was but 45 and the number of cases notified amounted to 130. These figures also indicate that the incidence has decreased and that the death rate is lower for Europeans.

INFANTILE PARALYSIS.

(Acute Poliomyelitis.)

Three White cases were reported in 1937-38 as compared with 12 White, 1 Native and 1 Asiatic cases in 1936-37.

LEPROSY.

Fifty Native and 1 European cases were notified in 1937-38. All cases were infected before arrival in the Municipal Area, and all were transferred to the Government Leper Institute in Pretoria.

PLAGUE PREVENTION AND ANTI-RODENT ACTIVITIES.

No cases of plague occurred during the period under review.

A safety zone continues to be maintained at an approximate radius of three miles beyond the Municipal boundaries. This has necessitated the carrying out of field rodent destruction in 23 distinct areas, totalling many thousand acres. 1,074 lbs. Cyanogas, 32 lbs. wheat, and 10 ozs. strychnine have been used in this work. In addition, other large areas have been surveyed. 2,630 Veld rodents were found dead.

Owing to rodent infestation of the Council's Native Townships of Orlando and Pimville, one rat-catcher and two rat-catching youths are employed to deal with the former and one rat-catcher and two youths with the latter. In Orlando Township, 7,424 visits to houses were made, 2,993 houses treated, 258 lbs. Cyanogas used, and 1,585 rodents found. In Pimville, 3,283 visits to houses were made, 1,733 houses treated, 217 lbs. Cyanogas used, and 2,632 rodents found. In addition, anti-rodent measures have been carried out in the surrounding areas, including Kliptown and Nancefield.

In addition to the staff employed in the veld and at Orlando and Pimville Townships the following staff is engaged in anti-rodent activities in the city: Two Health Inspectors, who are suitably qualified for the work, are employed—mainly in the commercial and industrial areas of the city—in enforcing the provisions of

the Government Rodent-proofing Regulations; five ratcatchers work under the supervision of the five Divisional Health Inspectors working in the residential suburbs; two anti-rodent gangs operate in the Eastern and Western Native Townships respectively; and a mobile anti-rodent gang has been established for general duty throughout the city.

During the period under review the two Inspectors engaged on rodent-proofing activities made 1,966 visits and served 174 notices. The premises visited included bioscopes, theatres, grain stores, furniture stores, cafés, restaurants, hotels, general dealers, etc., and, in addition to the visits specified, numerous interviews with owners, architects and builders took place.

Stocks in grain stores and the Municipal Market have been frequently "turned over," and numbers of rats have been destroyed by trained municipal dogs.

During the year, 3,631 houses were inspected, 3,588 houses were treated, 445 lbs. of cyanogas were used and 3,340 rodents found in Eastern Native Township; 5,528 houses were inspected, 3,062 houses were treated, 184 lbs. of cyanogas were used and 2,675 rodents found in Western Native Township.

All hares coming into the Municipal area have been seized and destroyed.

All rodents found dead where gassing operations have not recently been carried out and a proportion of trapped rats and "gassed" rats are sent to the South African Institute for Medical Research for bacterial examination. During the year 1937-38, of the 18,997 rats and 6,666 mice killed and trapped, 3,222, or 12.55 per cent. were so examined; none were plague infected.

SCARLET FEVER.

In 1937-38 there were 487 White, 2 Eurafrican and 4 Asiatic cases of this disease. There was 1 death among the Eurafrican population, the death-rate being 0.044. In the two previous years the cases notified were 683 Whites, 3 Natives, 3 Eurafricans and 1 Asiatic in 1935-36, and 512 Whites, 2 Natives, and 1 Eurafrican in 1936-37, the mortality rate for Whites being 0.027 and 0.008 per 1,000 respectively. The rate per 1,000 in England and Wales for 1937 was 0.009.

TYPHUS.

One imported Native case was reported in 1937-38, as against 1 Native case in 1936-37 and 2 imported Native cases in 1935-36.

DIPHThERITIC DISEASE, INCLUDING MEMBRANOUS CROUP.

The occurrence of diphtheritic disease in 1937-38 numbered 218 (203 Whites, 10 Natives, 2 Eurafricans and 3 Asiatics), in 1935-36 170 (157 Whites, 6 Natives, 5 Eurafricans, and 2 Asiatics), and in 1936-37 221 (207 Whites, 6 Natives, 6 Eurafricans and 2 Asiatics). The case mortality for Whites being 3.45, 8.91 and 6.28 per cent. for the respective years in order mentioned above, and the death-rate per 1,000 was 0.05 in 1935-36, 0.05 in 1936-37, and 0.03 in 1937-8, as compared with 0.072 for England and Wales in 1937. This death-rate for 1937-38 is unusually low.

PUERPERAL SEPTICÆMIA, ETC.

In 1937-38 84 local cases (51 Whites, 15 Natives, 10 Eurafricans and 8 Asiatics) were reported, as compared with 103 (52 Whites, 41 Natives, 9 Eurafricans and 1 Asiatic) in 1936-37 and 56 cases (30 Whites, 17 Natives, 6 Eurafricans and 3 Asiatics) in 1935-36. The death-rate for 1936-37 was 1.06 per 1,000 births for Whites, as against 0.94 in England and Wales in 1937.

ANTHRAX.

No case of this disease was notified in 1937-38.

INFLUENZA.

The number of registered deaths from influenza during the year was 53 Whites, 52 Natives, 2 Eurafricans and 4 Asiatics.

ENCEPHALITIS LETHARGICA.

One White case and 1 imported Native case were notified in 1937-38, as against 2 White and 2 Native cases in 1936-37 and 1 Native case in 1935-36. 2 White and 1 Native deaths were registered.

TUBERCULOSIS.

Appended is a statistical summary of the mortality from tuberculosis in Johannesburg for the years 1935-36, 1936-37, and 1937-38:—

DEATH-RATE PER 1,000.

	Pulmonary Phthisis			Other Forms of Tuberculosis		
	1935-36	1936-37	1937-38	1935-36	1936-37	1937-38
Johannesburg—						
Whites	0.23	0.164	0.15	0.027	0.053	0.05
Natives	1.15	1.05	0.95	0.23	0.21	0.43
Eurafricans	2.04	2.40	1.76	0.23	0.36	0.26
Asiatics	1.02	1.26	0.76	0.20	0.19	0.19
England and Wales ...						
	1935	1936	1937	1935	1936	1937
	0.605	0.583	0.584	0.113	0.109	0.111

Notification of Tuberculosis.—639 notifications were received during 1937-38, namely, in regard to 22 Whites, 578 Natives, 36 Eurafricans and 3 Asiatics. Of these cases 3 Whites, 268 Natives and 2 Eurafricans were imported.

As happens in most communities, notification of tuberculosis is lamentably incomplete in the city, with the result that preventive measures for both patients and contacts are nullified in a large degree. An appeal is made to the medical profession to notify every case which individual members of the profession see in consultation, even though the impression may be conveyed that the case has already been notified. Duplication of notifications does no harm, whereas non-notification renders abortive the application of the vitally necessary preventive measures.

ISOLATION HOSPITALS.

Fever Hospital.—The number of White cases treated at the Fever Hospital in Johannesburg was 717 as compared with 697 in 1936-37, as follows: Scarlet fever 285, diphtheria 198, erysipelas 68, measles 85, meningitis 35, chicken-pox 4, mumps 11, German measles 16, other cases 15. The total number of patient days was 21,551.

The cost of the upkeep of the Fever Hospital for 1937-38 was £14,317 17s. 5d.

Springkell Sanatorium.—34 non-miners suffering from tuberculosis were being treated at Springkell Sanatorium on 1st July, 1937, and 39 fresh cases were sent there during 1937-38. 14 Patients died and 31 left. The cost of treatment of these cases was £5,087 6s.

Rietfontein Hospital.—The following non-European cases of infectious diseases were removed for treatment to Rietfontein Hospital, viz.:—

Ninety cases of chicken-pox, 40 cases of measles, 23 cases of diphtheria, 22 cases of mumps, 12 cases of whooping-cough, 2 cases of scarlet fever, 2 cases of meningitis, 32 cases of erysipelas, 4 cases of smallpox, and 38 smallpox contacts. The cost of these services was £475 10s.

AMBULANCE REMOVALS.

During the period under review, 29 White cases and 253 Coloured were removed to Rietfontein Hospital, 584 White cases to the Fever Hospital, and 77 White cases to the General Hospital. In addition, 31 White patients were removed to the Children's Hospital, 92 patients to the Non-European Hospital, 27 Whites to Springkell Sanatorium, 71 Whites to Private Hospitals, 4 to Municipal Compound Hospital, and 8 cases were transferred to private dwellings. Four cases were also removed from outside districts at the request of, and on payment by, the local authorities concerned.

LIVE STOCK MARKET AND PUBLIC ABATTOIR.

The following figures have been kindly supplied by the Director, Abattoir and Live Stock Market:—

During 1937-38 1,388,160 animals passed through the Live Stock and Quarantine Yards, and 143,918 cattle, 522,535 sheep, etc., 19,886 calves and 125,551 pigs, or a total of 811,890 animals, were slaughtered at the Abattoir; 2,048,104 lbs. imported meat was inspected, and 1,735,332 lbs. meat was condemned.

FOOD, DRUGS AND DISINFECTANTS INSPECTOR'S REPORT.

ANALYSIS OF FOODS, ETC.

Milk.

Appended is tabulated summary of milk samples taken from local milkshops, depots and in the course of delivery, and on behalf of the Union Government at railway stations within the municipal area of Johannesburg:—

	1935-36	1936-37	1937-38
Number of samples taken ...	686	892	961
Number deficient in solids-not-fat: 8% to 8.4% ...	73 = 11.3%	281 = 31.5%	296 = 30.8%
Number of Prosecutions ...	45	116	100
(a) Added water ...	—	92	69
(b) Deficient in milk-fat ...	—	24	31
Amount of Fines ...	£111 15 0	£661 12 6	£535 10 0

Food and Drugs.

The following is a summary of samples of foodstuffs taken by the Local Authority and on behalf of Union Government:—

Article.	Number of Samples.	Below Standard or Adulterated.	Fines.
Butter-milk ...	2	1	£3 0 0
Skim-milk ...	1	—	—
Minced Meat ...	117	23	103 0 0
Ice Cream ...	53	16	101 10 0
Boer-Wors ...	26	7	45 0 0
Sausages ...	12	2	13 0 0
Syrups ...	9	3	5 0 0
Aerated Waters (Soda Fountains) ...	8	2	4 10 0
Polony ...	4	—	—
Cream Cheese ...	3	—	—
Lard ...	3	—	—
Worcester Sauce ...	2	1	5 0 0
White Cheese ...	2	—	—
Baking Powder ...	1	—	—
Skim-milk-cheese ...	2	—	—
White Pepper ...	1	—	—
Virginian Cheese ...	1	—	—
Kaffir-corn Meal ...	1	—	—
Orange Juice ...	1	—	—
Coffee ...	4	1	Cautioned
Coffee and Chicory ...	1	—	—
Mixed Coffee ...	10	—	—
Salad Oils ...	9	1	5 0 0
Soap ...	9	1	3 0 0
Orange Squash ...	2	—	—
Aerated Waters ...	12	—	—
Lime Juice Cordial ...	2	—	—
Red Rose Self-raising Flour ...	1	1	3 0 0
Tincture of Strophanthus ...	3	—	—
Total ...	302	59	£291 0 0

There were an additional four prosecutions for contraventions of Act No. 13 of 1920.

(a) Skim-milk-cheese. Section 18 (Labelling) ...	£1 0 0
(b) Butter-milk. Section 18 (Labelling) ...	1 0 0
(c) False information. Section 32 (1) (a) ...	3 0 0
(d) Soap. Regulation 2 (1) (b) (Labelling) ...	0 10 0
	£5 10 0

The number of samples taken under the Food, Drugs and Disinfectants Act is equal to 4.64 per 1,000 of European population.

MILK SAMPLES—SOLIDS-NOT-FAT BELOW 8.5 PER CENT.

As reported for the year 1936-7, the unsatisfactory standard for milk-solids-not-fat remains practically unchanged. 30.80 per cent. of the total milk samples were below the standard of 8.5 per cent.

No prosecutions were instituted in these 296 samples, but as this matter is now being investigated by the Union Agricultural Department, it is to be hoped that in the near future there will be a considerable improvement in the quality of the milk.

The classification of these samples below standard are as follows:—

24 samples contained	8.0% solids-not-fat.
23	8.1% solids-not-fat.
45	8.2% solids-not-fat.
89	8.3% solids-not-fat.
115	8.4% solids-not-fat.

In the case of milk samples taken on behalf of this department, 191 warning letters were sent to the various dairymen whose milk was found to be deficient in milk-solids-not-fat.

Milk Adulterations.

1936-37 ... 13 per cent. 1937-38 ... 10.40 per cent.

Although there is an increase in the number of samples taken, there is a decrease in the adulterations as compared with the year 1936-7.

Minced Meat.

The position with regard to the adulteration of minced meat by the addition of preservatives has considerably improved, as is reflected in the following figures:

Adulterations: 1936-7 ... 37.0% 1937-8 ... 19.7%

It is expected that in the coming year the use of sodium sulphite crystals as a preservative will have been reduced to a minimum.

Condemned Foodstuffs.

The following foodstuffs were condemned by the Food and Drugs Inspectors:

Fish: 12,783 lbs.
 Snoek: 4 cases.
 Smoked Silver Fish: 2 cases.
 Smoked Herrings: 5 trays.
 Olives: 4 tins.
 Dates: 2 boxes weighing 110 lbs.
 Flour: 10 bags.
 Bananas: 10 crates weighing 2,750 lbs.
 Gaviota Plums: 35 cases.
 Monkey-nuts: 3 bags weighing 600 lbs.
 Kraft Cheese: 33 cases.
 Chocolates: 8 2lb. boxes.
 Sausages: 12 1lb. packets.

Foodstuffs Contained in Hermetically Sealed Tins, Jars and Barrels.

Tinned Meat: 28 cases and 351 tins.
 Tinned Fish: 9 cases, 48 jars and 1,278 tins.
 Tinned Poultry: 177 tins.
 Assorted Foodstuffs: 185 cases and 890 tins.
 Tinned Sauer Krout and Dill Pickles: 450 tins.
 Herrings: 65 barrels.

Morning Market.

Inspection of incoming foodstuffs exposed for sale by auction:—

Dressed Poultry: 31,551.
 Fish-in-Ice: 3,279 lbs.
 Buck: 1,577.
 Guinea Fowl: 1,329.
 Cream Cheese: 50 lbs.
 Skim-milk Cheese: 500 lbs.
 Cheese: 325 lbs.
 Cream (in cartons): 100.
 Smoked Fish: 950 lbs.
 Biltong: 1 tin.

Condemned.

Dressed Poultry: 1,917.
 Fish-in-Ice: 820 lbs.
 Buck: 3.
 Guinea Fowl: 24.
 Grape Fruit: 370 pockets.
 Naartjes: 46 cases.
 Oranges: 182 pockets.
 Turnips: 11 bags.
 Biltong: 1 tin.

Early morning inspections have been made throughout all sections, and all foodstuffs have been examined and unsound foodstuffs have been dealt with accordingly.

Six Market Agents were prosecuted for exposing for sale foodstuffs which were unfit for human consumption, and were fined £30 10s. in all.

A stallholder in the Market Buildings was prosecuted for having in his possession for the purpose of sale a quantity of unsound cheese, and was fined £5. The cheese was seized and destroyed.

During the period under review the following foodstuffs were passed at Kazerne:—

Cray Fish	...	...	...	...	8,054 lbs.
Fish-in-Ice	...	...	...	...	11,831,065 lbs.
Smoked Fish	...	...	...	...	1,132,724 lbs.
Meat	...	...	...	...	72,670 lbs.
Hams and Bacon	...	...	...	...	458,001 lbs.
Biltong	...	...	...	...	469 lbs.

Blown Tins of Hermetically Sealed Foodstuff.

Inspections have been carried out at wholesale and retail grocers and bazaars and tin foodstuffs have been carefully examined.

Three warnings were issued and one Kaffir Eating House Keeper was prosecuted for this offence, and was fined £7 10s.

Food Manufacturing Factories.

Regular inspections have been made at these premises during the year. Two large factories have been reconstructed and two factories propose to carry out extensive alterations shortly; modern equipment is now being used in these premises and suitable receptacles for the storage of foodstuffs.

Indian Fruit Market, President Street West.

It was necessary to warn several fruiterers in this vicinity, who were in the habit of exposing for sale extensively decayed fruit. Warnings were also issued for the depositing of bags of fruit on the pavement.

One fruiterer was prosecuted for exposing a quantity of unsound fruit for sale, and was fined £3.

Hotels and Boarding Houses.

During the year under review attention was drawn to the unhygienic handling and storage of foodstuffs in these premises. During the period when the price of meat was raised in the city, several boarding-house keepers resorted to the purchasing of meat from butcheries situated outside the municipal area. Special attention was paid to this and observation kept, resulting in three licensees being prosecuted for introducing unstamped meat into the municipal area and having diseased meat on their premises; the fines for these three prosecutions totalled £40.

Conveyance of Foodstuffs in the Streets.

Special attention continues to be paid to the methods of conveyance of foodstuffs. Several warnings were issued for failing to take adequate measures to protect foodstuffs from contamination during transit, and six bakers were prosecuted for exposing bread to contamination, and were fined £28 in all.

Frequent inspections of vehicles and observance at the time of delivery have resulted in necessary precautions being taken in most cases.

General.

The following licensees of premises were prosecuted for exposing for sale or having in their possession for the purpose of sale foodstuffs which were unfit for the food of man, namely: 4 Butchers, 3 Restaurant Keepers, 3 Kaffir Eating House Keepers, 1 Tea Room Proprietor, 1 General Dealer (Grocer).

The total amount of fines for the 12 prosecutions was £84.

The licensee of a Sweet Factory was prosecuted for failing to keep his premises and utensils in a clean and sanitary condition, and was fined £3.

Two butchers were prosecuted for conveying butcher's meat into the municipal area without having same examined, branded or stamped by the authorised officials of the Council. Total fines, £6.

Foods and Drugs Act.

Observations and inspections have been maintained throughout the year in connection with the above Act.

I. J. DISTILLER.

Senior Food and Drugs Inspector.

MILK SUPPLIES AND DAIRY INSPECTION.

(a) INSPECTION OF DAIRIES INSIDE THE MUNICIPAL AREA.

Local Milk Affairs.

Local milk requirements show an increase of 958 gallons daily when compared with the corresponding period of the previous year. Milk supplies conveyed to the city by road transport from controlled sources of production situated outside of the city area have increased in the aggregate by 2,432 gallons daily, whereas similarly controlled supplies brought in by rail record a decrease of 1,129 gallons over a like period. Local milk production has decreased to the extent of 345 gallons daily.

Sources of the City Milk Supply.

(a) Daily gallonage of milk arriving by road from outside sources	15,737
(b) Daily gallonage of milk arriving by rail from outside sources	12,000
(c) Daily gallonage of milk produced in local dairies	4,472
Total	32,209

Approximately one-fifth of the total milk supply is pasteurised or subjected to a form of heat treatment.

Local Producing Dairies.

The number of local producing dairies continues to diminish, and during the period under review 14 such places, mainly situated in what have become residential areas, have closed down. On the other hand, there is a marked growth in milk production at dairies operating on agricultural lots situated within the municipal area. At present there are approximately 2,082 cows kept in local dairies, being 142 less than last year.

Sale of Milk in Sealed Containers.

The Council's Dairy By-Laws, promulgated during 1937, provide under the cover of a Milk Purveyor Licence for the sale of milk for off consumption, from restaurants, tea rooms, etc., provided the milk so sold is held in an approved container filled and closed by means of an untamperable seal at a licensed dairy or milkshop. The milk so contained must be handed to the purchaser with the seal intact.

Considerable delay was experienced in the Council being able to put the By-laws affecting milk purveyors into active operation, by reason of the fact that a bottle capable of being effectively sealed was unobtainable in South Africa. A local firm established a factory for the manufacture of waxed parchment milk cartons of a well-known overseas type, but success in that direction was also delayed owing to circumstances which could not have been reasonably foreseen, and the difficulty of obtaining mechanics in South Africa conversant with the rather complicated machinery employed. Conditions at the factory are improving and an adequate supply of milk cartons is now available for local requirements. At present there are 676 licensed milk purveyors in Johannesburg and approximately 4,700 gallons of milk is sold daily in sealed cartons. This class of trade is greatly on the increase, as the carton affords a convenient means of supplies gaining access to factories, workshops, etc., and for distribution at sports and other public gatherings.

Score Card System of Dairy Inspection.

The above-mentioned system has been in operation in this city for many years, and there can be no doubt that much of the great advancement made in improving the methods of milk production, handling and distribution may be attributed to this form of dairy inspection, in conjunction with the publication quarterly in the Press of the points awarded in respect of each dairy. In order still further to advance standards of milk purity, each of the four sectional score cards have been re-drafted to conform to the most modern dairying practices. Several producing dairies and milk shops at present meet the new standards. Nevertheless, there are other such places which do not, and it is trusted that when scoring on the later system commences to operate, during July next, an effort will be made by all concerned to attain maximum awards.

National Mark Milk Supplies.

The Council collaborated with the Division of Markets and Economics relative to the placing on the local market retail milk supplies of a grade commensurate with National Mark standards. The Council has presented its proposals to the Department of Agriculture, and the matter is now under consideration.

Typhoid Carrier Tests.

The people of this city prefer raw milk delivered to their households irrespective of the fact that milk which has been pasteurised is much the safer for family use. The Council, in order to protect the health of raw milk consumers, has paid particular attention to the cleanliness of milk production and its subsequent handling. In addition, it has endeavoured to collect blood samples for examination from milkers and milk handlers where milk is produced for local use, but owing to the widely spread sources from which the local milk supply is now obtained and the fact that native dairy farm employees are continuously on the move from place to place, the collection of blood samples has been almost economically impossible. Greater reliance has always been placed on clean dairy methods than on the accuracy of the "Widal" blood test, and the Council's officials have stressed to milk producers and handlers the

great importance of enforcing personal cleanliness amongst their employees, and particularly so in regard to the danger of milk contamination by contact with dirty or infected hands. The latter precautionary measure is largely observed, and it may to a great degree contribute to the fact that the city has not experienced an outbreak of milk-borne diseases for very many years. In order to further the cause of personal cleanliness amongst persons engaged in the dairy trade, the Council has prepared a series of suitably worded illustrated posters. Such posters are printed in both official and also native languages, and it is intended that they shall be displayed in a manner prominent to dairy employees at each place where milk is prepared or produced for local consumption. It is believed that the message so conveyed will be appreciated by all concerned in the milk trade.

Milk Centralising Scheme.

During the period under review I submitted a lengthy report on the changing conditions now taking place regarding the milk requirements of this city, with particular reference to the likelihood that much of the local milk supply may in the near future have to be obtained from producing sources still further distant than those which at present exist. I expressed the opinion that in the interests of the public and the milk trade, the Council should give consideration to the question of a scheme dealing with milk centralisation, for not only do I consider that such a scheme would be economically sound and would provide scope for dealing with malnutrition existing amongst the poorer section of the community, but that it is necessary in the provision of a safe milk supply commensurate with the ever-increasing local demand.

Milk Supplies for the Council's Native Townships.

A report was furnished concerning a proposal to make available under a sub-economic scheme an adequate supply of full cream, skimmed and sour clotted milks for use by the residents of the above-mentioned native townships. The matter is now under consideration by the Council.

Milk Cleanliness.

The following results are of tests conducted within the city area for the presence of visible dirt contained in milk exposed for sale or during the ordinary course of delivery or distribution:—

Classification.

1. Good—where no dirt was visible on the test wads	1,081
2. Fair—where dirt was visible in a minor degree	61
3. Bad—where dirt was highly visible	35
	1,177

Warning notices were served on dairymen vending milk as described in Item No. 2, and Court proceedings were instigated against all firms responsible for milk conditions referred to in Item No. 3.

Departmental Plans and Specifications of Dairy Buildings.

Several hundred copies of dairy plans, etc., were supplied on request for educational purposes to the—

- (a) School of Agriculture, Potchefstroom.
- (b) Government Extension Officer, Natal.
- (c) Medical Conference, Bloemfontein.
- (d) Local Authorities and farmers in the Union.

Inspections, Special Reports, etc.

Local Dairies and Milk Shops.

Number of inspections	4,208
.. .. special reports furnished to M.O.H. or A.M.O.H. ...	146
.. .. milkshops, including 7 pasteurising depots ...	133
.. .. milkshop licence applications refused	6
.. .. producing dairies, including 5 stockyards	86
.. .. notices served	69
.. .. plans examined	40
.. .. attendances in Public Health Committee Courts ...	29

*Milk Purveyors (New Licence).**Sale of Milk in Sealed Containers from Restaurants, Tea Rooms, etc.*

Gallonage of milk sold daily in waxed parchment cartons ...	4,700
Number of inspections	4,086
.. .. applications for licences	686
.. .. applications for licences granted	676
.. .. notices served	477
.. .. refrigerating plants installed	232

Court Proceedings under the Council's Dairy By-laws.

Offence.	Convictions.	Discharges.	Fines Imposed.
1. Selling dirty milk	34	1	£140 0 0
2. Stacking or conveying milk in dirty baskets ...	27	—	33 12 6
3. Trading without a licence	18	—	50 0 0
4. Fly breeding	7	—	17 10 0
5. Transferring milk in unpermitted places ...	3	—	3 15 0
	89	1	£244 17 6

The co-operation extended to the Department by the Transvaal Milk Union and the Witwatersrand Dairymen's Association is gratefully acknowledged.

In conclusion, as this is the final yearly report I will submit in my capacity as the Council's Senior Dairy Inspector, I may be allowed to take this opportunity of expressing my thanks to all persons engaged in the fluid milk industry, both in the farming areas of the Union and this city, for the courtesy they have extended to me in my official capacity during the period of approximately twenty-three years that I have been directly associated with them.

Credit is due to milk producers and distributors for the great strides made by them in the advancement of the standards of milk purity, which has been possible only at a cost which, if presented in figures for general information, would be staggering, and when consideration is given to the fact that during 1915, the year that the Council obtained full control of the city milk supply, but very few of the outside farm milk producers had arrangements in compliance with the very moderate Dairy By-laws of that period, and comparison is made with present-day conditions where several hundred outside producers in the farming areas have premises and equipment where modern methods of milk production are conducted in conformity with the now rigid Council Dairy By-laws, it requires no words of mine to elaborate what producers have done for the benefit of local milk consumers. Locally, almost every milkshop has been re-equipped and modernised during the past ten years, and arrangements are in hand for large extensions at the leading large milk pasteurising depots, to commence during the current year.

W. C. WATSON,
Senior Dairy Inspector.

(b) INSPECTION OF DAIRIES OUTSIDE THE MUNICIPAL AREA.*Number and Situation of Dairy Farms.*

The total number of dairy farms from which milk was supplied during the year under review is 415, an increase of 19 over the preceding year. These farms are situated in the districts of Standerton, Ermelo, Bethal, Breyten, Waterval-Boven, Heidelberg, Pretoria, Witbank, Witwatersrand, Vereeniging, Krugersdorp, Rustenburg, Ventersdorp, Lichtenburg, Potchefstroom, Klerksdorp and Settlers in the Transvaal; and Coalbrook, Wolvehoek, Heilbron, Greenlands, Kopjes, Parys, Kroonstad, Bethlehem, Harrismith, Warrenton, C.P., Ladybrand in the Orange Free State, and Ingogo, Natal.

Milk Introduced into Johannesburg.

The quantity of milk introduced daily into Johannesburg from dairy farms outside the municipal area was approximately 27,737 gallons. Of this supply, some 12,000 gallons were consigned by rail to stations within the city, whilst about 15,737 were delivered by road transport.

Approximately 23,477 gallons of milk were supplied daily to owners of milk depots and milkshops, while about 4,260 gallons were delivered direct to the consumer by dairy farmers licensed to retail milk in Johannesburg.

The approximate amount of milk used daily in Johannesburg was 32,209 gallons, of which 86 per cent. was supplied from sources outside the city. These figures show an increase of 959 gallons per day over the corresponding period of last year.

Farmer-owned Milk Distributing Depots.

Twenty dairy farmers have established their own milk distributing depots within the city, through which 4,925 gallons of milk were retailed daily to the public.

Applications by Dairy Farmers for Permits to Introduce Milk into Johannesburg.

Applications received	...	...	...	...	415
Applications granted	...	...	...	...	316
Applications refused	...	...	...	...	11
Applications abandoned and held over	...	...	...	...	88

A permit to introduce within the municipality milk or fresh cream produced on any premises outside the municipal area may be granted for any period not exceeding one year, and all permits expire on the 31st December of the year for which they are granted. No permit is issued until the requirements of the Council's By-laws are complied with.

Applications by Dairy Farmers for Licences to Retail Milk in Johannesburg.

Applications received	...	...	...	...	40
Applications issued	...	...	...	...	39
Applications held over	...	...	...	...	1

Licences to retail milk within the city are taken out by dairy farmers who find it more profitable to sell direct to the consumer than to deliver in wholesale quantities to milk depot owners.

Inspection of Farm Dairies.

Regular and systematic inspections were carried out on all dairies in which milk was produced and supplied to Johannesburg.

The results of these inspections were carefully recorded, and any infringement of the Dairy By-laws dealt with.

The number of inspections made was 1,609.

Plans drawn in accordance with the requirements of the Council's Dairy By-laws were supplied gratuitously to dairy farmers contemplating the construction of buildings for dairying purposes.

Control of Milk Supplies.

Periodical inspections were made at all railway stations inside Johannesburg and on the main roads leading to the city of all supplies of milk consigned to Johannesburg. Three supplies from unpermitted sources were discovered; further supplies from these sources were immediately prohibited.

Tests for Visible Dirt in Milk.

This test, which is applied by passing a pint of milk through a cotton wool pad of small area, thereby arresting and rendering visible all solid impurities, was applied to 550 consignments of milk arriving at railway stations within the city or at the source of production. The results were:—

Clean ... 478. Fair ... 62. Dirty ... 10.

Ten farmers were warned by letter that proceedings for cancellation of their permits would be instituted without further notice should they in future introduce into Johannesburg milk containing visible dirt.

Refrigeration of Farm Milk Supplies.

Owing to the shortage of milk in the early part of 1938, dairy farmers as far afield as Warrenton, Bethlehem, Ingogo, Tuinplaats and Waterval-Boven found a market for their milk in Johannesburg. In order to ensure a regular all-the-year round supply, they have resorted to refrigeration. To date the milk

supplied from these sources has been satisfactory. The number of dairy farms from which milk is supplied to Johannesburg from refrigerated sources is 47, and the tendency is to draw the city's milk supply from sources situated at greater distances from Johannesburg than was formerly the case.

We wish to express our appreciation of the co-operation and efficient manner in which the majority of dairy farmers endeavour to produce pure, wholesome milk of good quality for the Johannesburg market.

We also desire to thank the railway officials at the various railway stations for their willing assistance and co-operation in connection with the testing and inspection of milk on railway property.

JAS. W. FORRETT,
D. SMITH,
Farm Dairy Inspectors.

WATER SUPPLY.

Water is supplied in bulk by the Rand Water Board to the City Council. The Council controls the distribution of water throughout the city and owns the reticulation. The following table shows the quantity and percentage of water pumped from various sources by the Rand Water Board and is taken from the Thirty-third Annual Report of the Chief Engineer, Rand Water Board:—

Source	Total Quantity Pumped during Year ending 31st March, 1938	Percentages
	Gallons	
From Zwartkopjes	4,300,000	0-03
From Zuurbekom	1,561,575,000	10-92
From Vaal River	12,729,436,000	89-05
Grand Total	14,295,311,000	100-00

The length of the mains within the Municipal Area is now 718-08 miles; 51-83 miles have been added during 1937-38, while during the same period 4,979,526,000, or 13,652,000 gallons of water per day, were supplied to consumers connected to same.

CHEMICAL AND BACTERIOLOGICAL EXAMINATIONS.

One hundred and seventy-five chemical and 623 bacteriological samples of water were taken for examination during the year 1937-38, also 66 chemical and 64 bacteriological samples from private boreholes and wells, also 29 bacteriological and 29 chemical samples from boreholes and wells on dairying premises in the Klipspruit area.

One new borehole water supply was condemned, as also five well-water supplies in the Sophiatown-Martindale area, as being unfit for human consumption on account of pollution indicated on analysis.

It is desired to acknowledge the obligation of the city to the officials of the Rand Water Board, who have at all times been assiduous in securing an adequate and pure supply of water to the city and in the area of their reticulation.

The Medical Officer of Health is also Honorary Medical Officer of Health of the Rand Water Board.

SEWERAGE.

The City Engineer has kindly supplied the following information:—

On 30th June, 1938, there were 558 miles of sewers and 98 miles of 4in. house connections completed.

On the same date 49,705 premises had been connected.

The Council's Sewerage System now includes outfalls to the Council's Sewage Farm at Klipspruit, and to the new Sewage Disposal Works at Antea (Langlaagte) for the Western Basin, Cydna (Melrose) for the North-eastern Basin, Bruma (South Kensington) for the Eastern Basin, and Delta for the North-western Basin.

REPORT OF BIO-CHEMIST.

SEWAGE DISPOSAL.

The flow of sewage to the five sewage disposal works has increased by nearly 1,000,000 gallons per day for the year under review, as compared with that of the preceding year. Extensions are being, or have been, carried out at all the disposal works to meet this constantly increasing flow.

Contributing population to the sewage disposal works (estimated):—

European	...	...	...	...	235,000
Non-European	...	...	...	...	105,000

Works.						Daily Average Flow. (Gallons).
Klipspruit	...	...	...	...	...	6,552,697
Antea	...	...	...	...	...	255,318
Bruma	...	...	...	...	...	1,600,000
Cydna	...	...	...	...	...	802,901
Delta	...	...	...	...	...	1,000,000

The average analyses for the year are given on page 39.

Klipspruit Works.

Another large area of land, 4,249 acres in extent, known as Olifantsvlei, lying at a lower level than the existing farm, has been purchased by the Council as the flow of sewage in this drainage basin will be increasing for some years to come. This year the flow to these works has increased by 424,064 gallons per day.

Klipspruit Sewage Works Reconstruction.

The original Klipspruit Sewage Works was constructed in 1910, and consisted of screens, detritus pits, and sedimentation tanks prior to the treatment of sewage on land. The sedimentation tanks consisted of four units, one of which was completed as a Travis hydrolytic tank, the other three being horizontal flow tanks capable of conversion at a later date to Travis tanks. The performance of the Travis tank, however, never warranted the conversion of the remaining units. Later, night storage tanks were constructed to conserve the flow during hours of darkness for distribution during the day. Increase in the flow to the works led to the construction of two additional units to the sedimentation tanks and the modification of the original units to improve their efficiency. The night storage tanks were converted to secondary sedimentation tanks, and the night flow was conserved on specially prepared areas of land.

The recent development in the central area of the city has again led to increased flows at Klipspruit, and the existing plant was severely overloaded. This, combined with the necessity of controlling the aerial nuisance caused by the strong sewage on the land, and the provision of a purified stable effluent for use as cooling water at the new Orlando Power Station, necessitated the consideration of extending and remodelling the existing plant or constructing new treatment works. It was eventually decided that it would be more economical and satisfactory to construct an entirely new works than to attempt to modernise and improve the efficiency of the existing works, while dealing at the same time with the existing flow.

Towards the end of September work was commenced on the construction of the new screens, grit channels, sedimentation tanks, and dividing chamber, while the main sewer was extended to the new works. A stormwater overflow was provided in this extension, and the excess stormwater can be diverted for treatment in the old works.

Antea Works.

The yeast waste, which proved so severe a load on these works last year, is now being discharged into a special trade waste sewer and pumped into the outfall sewer to Klipspruit where, due to the greater dilution, the effect of this waste is not so noticeable. For this reason the standard of effluent produced at Antea has been considerably bettered.

Three rectangular digestion tanks with floating steel gas collectors have been completed and are in operation, and in the near future the heating system will also be in operation. This extra digestion capacity has considerably improved the supernatant liquor and given a more completely digested sludge.

Operation of the bacteria beds is referred to later.

Bruma Works.

The three new hopper bottom upward flow sedimentation tanks and two new circular digestion tanks with floating steel gas collectors, to cope with the increasing flow to these works, are nearing completion. When data has been obtained from the operation of this extra plant the other units are to be extended.

The covering of the circular sedimentation tanks presented many interesting problems, and several alternative methods were considered before the adopted design was decided upon. This provided for the erection of a low parapet wall surrounding each tank, on which was a conical roof constructed in timber.

The ventilation of these separate buildings over the sedimentation tanks is effected through the existing sedimentation house, via the effluent channels.

The operation of the activated sludge plant has been much the same as last year. New diffuser tiles have been placed in some sections where choking in the original diffuser tiles has occurred. Most of the digested sludge is now pumped on to land, the remainder being run on to drying beds.

Cydna Works.

Two open rectangular secondary sludge digestion tanks have been completed, and the supernatant liquor and digested sludge drawn from these are in a better condition than that which was drawn from the existing Pruss digestion tank, which was reaching the limit of its capacity. A small gas engine driven pump to deliver effluent, humus, sludge, or supernatant liquor on to croppable land has also been installed.

During the latter half of the year only half the number of bacteria beds has been in operation, giving a dosage of between 130 and 140 gallons per cubic yard of medium per day. This is referred to later.

Delta Works.

At the end of the year the Assistant Manager, Mr. J. J. Pollock, B.Sc., A.M.I.Mech.E., relinquished his post as he had received an appointment as Assistant at the Mechanical Branch.

About the middle of the year an extension of 50 per cent. to the existing aeration tanks and sludge separating tanks was put into commission, and these units are to be further increased during the coming year so that this plant may be capable of dealing with an increased flow caused by the sewerage of another large area in this drainage basin. With spoil from these extensions (now completed) a dam holding four million gallons has been constructed, so that observations may be taken as to the behaviour of the effluent from storage. The gas engine alternator set has produced 569,302 kilowatt hour units, this being more than 80 per cent. of the power requirements at this plant.

RESEARCH ON SEWAGE PURIFICATION.

Research activity on sewage disposal problems has been directed to the study of the percolating filter bed. The study has been approached on a very broad basis, and involves laboratory, small scale, and works scale investigations. Laboratory investigations cover determinations of carbon and nitrogen balances in laboratory filters, and the composition of the atmosphere at various points in filter beds.

A series of eight water-jacketed filters 12in. diameter has been erected, which can be operated at various controlled temperatures in an effort to distinguish between the effects of temperature and of ventilation on the operation of a filter bed. Detailed temperatures and analyses of the atmosphere in the beds are being recorded, and an extensive biological study commenced.

A study of the effect of carbon dioxide on the operation of bacteria beds is also being conducted at Cydna Works on two 6in. diameter filters, as a corollary to the major study of the necessity for ventilation.

A 3ft. diameter concrete pipe filter is being used to study the results of continuous high-rate dosing.

At the Antea and Cydna Works the flow at each works has been dosed throughout the winter months at approximately double the previous rates by passing the total flow through half the number of beds. The quality of effluent has been maintained, and even improved; this is reflected in the averaged analyses for the year in which the B.O.D. and the per cent. purification are, in general, somewhat better than in the previous year.

In addition, at the Antea Works, one of the filters was divided in half and ventilating pipes laid in the horizontal layer at a depth half-way down the bed in one half. Air was blown into this half of the bed, while the other half operated with natural ventilation. A close record of the effluents delivered by the two sections was kept over several months.

The study of the settlement and biological treatment of Klipspruit in a pilot scale plant has been continued, the results being reported in a joint paper by the Biochemist (Mr. H. Wilson) and the City Engineer (Dr. E. J. Hamlin).

and delivered by the Biochemist to the Summer Conference of the Institute of Sewage Purification at Glasgow, July, 1938. This paper is contained in an annexure to this report.

ALGAL GROWTH IN YEOVILLE RESERVOIR.

The blue-green alga *Phormidium* was present in the old open reservoir throughout the year. Continuous dosage of approximately 0.2 part copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) per million was necessary to keep it in check, while vigorous growth in the summer months was only inhibited by occasional increases to 0.5 part per million for about 24 hours.

As in previous years, the growth of algae in the new reservoir, fed from the old reservoir, was considerably less, and was readily kept in check by a continuous dose of 0.1 part copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) per million.

Owing to heavy demands during a period of drought, levels fell rapidly, and it was possible to observe that algal growths persist to a depth only a few feet from the bottom of the reservoir.

A simple device for dosing the copper sulphate has been installed and has proved very satisfactory in operation, obviating the necessity for attendance every half-hour for the weighing and addition of small charges.

SWIMMING BATH WATERS.

Complete chemical analyses were made monthly.

The complaints of smarting eyes reported from several baths towards the end of the season are certainly related to the drop in alkalinity, as shown in the table of chemical analyses. A very slight amount of aluminium sulphate added to water of low alkalinity has, in many baths elsewhere, been the cause of smarting eyes. Heavier application of soda from the beginning of the season will be made in the future.

At Mayfair, Milner Park, Pioneer Park and Turffontein baths difficulty was encountered in keeping the water clean during the dusty months of October and November, 1937.

Bacteriological Results.

Weekly samples at varied times and days were taken and examined in accordance with the Ministry of Health (Great Britain) technique for drinking waters.

Except in one or two cases during the dusty months at the beginning of the season, the waters were free from *B. Coli* in 10 ces., when there was an appreciable amount of free chlorine in the water.

Ellis Park had a decidedly bad record up to the middle of the season.

If the British Ministry of Health's recommendation to maintain not less than 0.2 part per million of free chlorine everywhere in the bath is faithfully observed there will be few finds of *B. Coli*, except occasionally during the dusty season at the baths in the southern suburbs and Milner Park.

The Public Health Department has requested the Parks and Estates Department to keep to the standard of 0.2 part per million of free chlorine as a minimum at all times.

CHEMICAL ANALYSIS OF KAFFIR BEER.

At the request of the Non-European and Native Affairs Department, daily routine tests for determination of alcohol content of the Kaffir beer brewed in the Municipal Brewery have been made, in order to ensure that the alcohol content shall not exceed the permitted 3 per cent. On the few occasions when the alcohol content did exceed this 3 per cent, the dilution required to comply with the regulation has been telephoned to the brewer before 8 a.m. each day, before the batch of beer was placed for sale.

Considerable research on the chemical and biological problems relating to the production of Kaffir beer is necessary, and arrangements are being made to carry this out.

During the year the provision of chemical services to other departments has been under consideration, and it has now been established in principle that the Laboratory Division of the Public Health Department will undertake to provide chemical and biological service when and where required by other departments. The financing of this more comprehensive service is to be worked out in the ensuing year.

H. WILSON,
Bio-Chemist.

SEWAGE DISPOSAL.

TABLE OF CHEMICAL ANALYSES FOR YEAR 1st JULY, 1937, TO 30th JUNE, 1938.

Average of Weekly Analyses: Parts per 100,000.

	Oxygen absorbed in 3 mins.	Oxygen absorbed in 4 hrs.	Chlorine in Chlorides.	Settleable Solids, cc./litre. (1 hour) Imhoff Cone.	Nitrous		Nitric		Ammon.		Albd.		Bio-Chemical Oxygen Demand 5 days test.	% Purification: Screened Sewage to Final Effluent
					N.	N.	N.	N.	N.	N.	On Oxygen Abs. in 4 hours.	On Albd. N.		
Antea Works:														
Screened Sewage	4.00	13.31	11.8	13.0	—	—	—	—	7.12	—	1.43	—	—	—
Tank Effluent	3.21	8.42	12.1	1.4	—	—	—	—	6.92	—	0.93	—	—	—
Primary Effluent	1.34	3.75	12.7	6.3 H.	0.40	—	2.7	—	2.79	—	0.56	—	—	—
Secondary Effluent	0.64	1.86	12.3	—	0.29	—	2.4	—	2.32	—	0.19	—	2.44	86.7
Brama Works:														
Screened Sewage	3.79	11.26	15.0	33.0	—	—	—	—	6.32	—	1.50	—	—	—
Tank Effluent	2.62	7.22	14.7	2.7	—	—	—	—	5.92	—	0.69	—	—	—
Primary Influent	1.49	3.91	15.4	11.0	—	—	—	—	4.07	—	0.56	—	—	—
Primary Effluent	0.95	2.62	15.4	1.3 H.	0.17	—	1.8	—	1.14	—	0.45	—	—	—
Secondary Effluent	0.36	1.04	15.4	Trace	0.05	—	1.9	—	0.84	—	0.11	—	0.94	90.9
Cydna Works:														
Screened Sewage	2.56	9.23	8.6	12.0	—	—	—	—	5.30	—	1.09	—	—	—
Tank Effluent	2.07	6.66	8.6	3.2	—	—	—	—	5.01	—	0.83	—	—	—
Primary Effluent	0.96	2.81	9.0	3.7	0.26	—	2.8	—	1.48	—	0.43	—	—	—
Secondary Effluent	0.32	0.92	9.0	—	0.10	—	2.5	—	1.05	—	0.12	—	0.96	90.0
Delta Works:														
Screened Sewage	3.37	9.97	9.9	24.0	—	—	—	—	4.82	—	1.30	—	—	—
Tank Effluent	2.28	5.53	9.7	3.1	—	—	—	—	4.26	—	0.58	—	—	—
Primary Effluent	1.04	2.28	9.2	2.0 A.S.	0.93	—	1.3	—	2.86	—	0.31	—	—	—
Secondary Effluent	0.71	1.65	9.2	Trace	0.73	—	2.2	—	2.32	—	0.22	—	3.06	83.5
Klipspruit Farm:														
Screened Sewage	10.92	31.09	21.6	21.0	—	—	—	—	8.09	—	2.54	—	—	—
Primary Tank Effluent	7.82	20.82	19.1	9.0	—	—	—	—	7.76	—	1.52	—	—	**
Secondary Tank Effluent	7.75	18.95	19.0	7.0	—	—	—	—	7.82	—	1.38	—	—	—
Effluent to Homestead Farm	1.62	4.37	32.7	—	0.11	—	1.3	—	2.98	—	0.36	—	5.76	—
Effluent from Harrington Spruit Filter	1.01	2.88	37.7	—	0.04	—	0.9	—	2.19	—	0.27	—	2.94	90.8

H. = Humus.

A.S. = Activated Sludge.

** Half-yearly averages only.

CHEMICAL EXAMINATION OF THE WATER FROM THE MUNICIPAL SWIMMING BATHS, JOHANNESBURG, SEASON 1937-38.
Examined at the Municipal Bio-Chemical Laboratory, Cydna.

Free Chlorine expressed as parts per million.

B = Samples taken at beginning of season.

"Alkalinity" expressed as $\frac{N}{10}$ HCL per 100 ccs. sample, to methyl orange indicator.

E = Samples taken at end of season.

Remarks refer to the behaviour of total solids on ignition.

Other results expressed as parts per 100,000.

Bath.	Time Taken.	Free Chlorine.	Total Chlorine.	pH.	Alkalinity.	Solids.		Oxygen Absorbed in 4 Hours.	Nitrite Nitrogen.	Nitrate Nitrogen.	Ammoniacal Nitrogen.	Albuminoid Nitrogen.	B.O.D.	SO ₂ .	Fe ₂ O ₃ + Al ₂ O ₃ .	CaO.	MgO.	Remarks.
						Total Soluble.	Loss on Ignition.											
Zoo Lake ...	B 8.15 a.m. E 10.50 a.m.	trace 0.2	2.1 6.4	7.4 6.8	3.0 0.6	26.19 30.70	8.82 9.10	18.5 10.0	nil nil	0.01 0.32	0.004 0.004	0.009 0.009	0.07 0.08	5.6 9.6	0.24 0.56	4.98 4.94	1.14 0.86	Slight charring and smell Charring and urinous odour
Ellis Park ...	B 11.0 a.m. E 2.15 p.m.	nil 0.1	1.9 9.6	7.3 6.9	3.0 0.3	28.17 32.86	8.51 8.05	18.0 11.1	nil nil	0.01 0.14	0.008 0.019	0.010 0.006	0.05 0.05	6.4 8.0	0.41 0.25	5.51 4.72	1.49 0.94	Slight charring and smell
Paterson Park	B 12.10 p.m. E 8.15 a.m.	nil 1.8	2.0 13.0	7.3 6.8	2.9 0.5	22.50 44.95	7.32 16.21	17.5 17.0	nil nil	0.01 0.17	0.004 0.003	0.009 0.007	0.05 0.06	6.0 10.8	0.49 0.54	4.23 10.69	1.28 0.83	Charring and some smell
Pioneer Park	B 10.20 a.m. E 9.55 a.m.	0.25 nil	2.5 15.6	7.3 6.8	3.0 0.3	25.57 47.80	8.31 13.96	18.5 15.0	nil nil	0.01 0.18	0.005 0.006	0.010 0.007	0.05 0.02	6.8 6.8	0.36 1.00	3.75 8.23	1.88 0.95	Considerable charring and slight smell
Milner Park ...	B 8.45 a.m. E 10.40 a.m.	nil trace	2.6 13.8	7.4 6.8	3.0 0.3	25.71 47.87	8.50 20.96	19.0 17.5	nil nil	0.02 0.15	0.003 0.021	0.011 0.009	0.09 0.02	5.6 11.2	0.43 0.63	5.41 8.15	1.40 0.86	Charring and urinous smell
Mayfair Bath	B 9.5 a.m. E 10.25 a.m.	0.1 0.1	2.3 7.0	7.4 6.8	3.0 0.3	25.53 29.57	8.45 9.10	18.5 10.0	nil nil	0.02 0.10	0.005 0.017	0.010 0.017	0.06 0.05	6.4 8.4	0.16 0.43	5.94 6.41	1.44 0.83	Considerable charring and urinous smell
Rhodes Park ...	B 11.15 a.m. E 1.50 p.m.	0.15 0.2	2.1 9.5	7.3 7.1	2.7 0.4	23.88 37.70	7.81 7.19	19.0 11.9	nil nil	0.01 0.07	0.003 0.018	0.010 0.014	0.08 0.10	6.0 12.0	0.31 0.24	4.34 3.68	1.36 1.69	Some charring and smell
Yeoville Bath	B Noon E 11.0 a.m.	0.1 nil	1.8 8.2	7.3 5.1	2.8 0.1	23.26 32.22	8.03 6.91	18.0 10.7	nil nil	0.01 0.06	0.003 0.026	0.009 0.011	0.05 0.02	6.0 12.8	0.27 1.99	4.31 3.86	1.34 0.96	Slight charring and smell
Turffontein Bath	B 11.10 a.m. E 10.5 a.m.	0.2 0.3	2.2 7.8	7.4 6.8	3.0 0.3	27.56 31.92	9.12 8.13	19.0 10.0	nil nil	0.02 0.11	0.003 0.002	0.011 0.009	0.03 0.10	5.6 10.0	0.28 0.22	5.13 5.82	1.54 1.0	Charring and smell
Malvern Bath	B 11.35 a.m. E 1.35 p.m.	nil 0.2	2.4 11.4	7.4 7.1	3.0 0.6	25.43 43.74	8.14 10.52	18.5 16.0	nil nil	0.01 0.06	0.002 0.036	0.010 0.026	0.06 0.08	6.0 12.0	0.21 0.18	5.18 5.75	1.41 1.75	Considerable charring and smell

**BACTERIOLOGICAL EXAMINATION OF SWIMMING BATH WATERS, SEASON 1937-1938.
AT BEGINNING AND END OF SEASON.**

Bath.	Date Sampled.	Time Sampled.	Position Sampled.	Free Chlorine.	B. Coli at 37°C. present in 10 ccs. In 5 tubes.		Organisms per c.c. growing at 37°C.	Spreading Colonies.
					Acid.	Gas.		
Zoo Lake	31/8/37	8.15 a.m.	Outlet	trace	0/5	0/5	Innumerable	13
	29/3/38	10.50 a.m.	Outlet	0.2	0/5	0/5	8	1
Ellis Park	31/8/37	11.0 a.m.	Outlet	nil	3/5	2/5	800	4
	29/3/38	2.15 p.m.	Outlet	0.1	3/5	1/5	61	3
Paterson Park	31/8/37	12.10 p.m.	Outlet	nil	1/5	0/5	12	2
	29/3/38	8.15 a.m.	Outlet	1.8	0/5	0/5	1	0
Pioneer Park	31/8/37	10.20 a.m.	Outlet	0.25	0/5	0/5	1	0
	29/3/38	9.55 a.m.	Outlet	nil	5/5	3/5	63	2
Milner Park	31/8/37	8.45 a.m.	Outlet	nil	2/5	1/5	17	3
	29/3/38	10.40 a.m.	Outlet	trace	4/5	3/5	6	3
Mayfair	31/8/37	9.5 a.m.	Outlet	0.1	0/5	0/5	Innumerable	1
	29/3/38	10.25 a.m.	Outlet	0.1	3/5	1/5	43	3
Rhodes Park	31/8/37	11.15 a.m.	Outlet	0.15	0/5	0/5	3	3
	29/3/38	1.50 p.m.	Outlet	0.2	2/5	1/5	58	4
Yeoville	31/8/37	12 noon	Outlet	0.1	5/5	3/5	Innumerable	Innumerable
	29/3/38	11.0 a.m.	Outlet	nil	5/5	5/5	563	5
Turfontein	1/9/37	11.10 a.m.	Outlet	0.2	0/5	0/5	3	1
	29/3/38	10.05 a.m.	Outlet	0.3	0/5	0/5	3	1
Malvern	31/8/37	11.35 p.m.	Outlet	nil	0/5	0/5	3	1
	29/3/38	1.35 p.m.	Outlet	0.2	4/5	1/5	42	2

MINES SANITATION.

The usual procedure has been carried out in regard to systematic inspections of the mining properties in the Johannesburg area.

This work has included inspections of Native compounds, hospitals and locations, married and single White quarters, contractors' compounds, brickfields, dairies and cowsheds, Native eating houses, stone crushing works, mine boarding houses, railway stations and quarters, pumping and power stations, disposal of refuse, the sanitary arrangements at the various works and the supervision of the daily cleaning up and scavenging at all places and premises on the surface.

All plans submitted in regard to new, or additions and alterations to existing housing accommodation, drainage or other sanitary requirements have been examined by the Medical Officer of Health and amended when necessary.

All cases of infectious disease among White, Native and Coloured persons have been visited, inquired into and reported on in the usual way.

SLUMS AND INSANITARY PROPERTIES.

1. SLUMS ACT.

At the commencement of the period under review, the Department was dealing with 167 properties under the Slums Act, and during the year action was instituted in terms of the said Act in respect of 158 properties situated in the following townships:—Albertsville, 68; Doornfontein, 15; Fordsburg, 15; Jeppes, 13; Denver, 10; Johannesburg, 8; La Rochelle, 4; Rosettenville, 4; Turffontein, 4; North Doornfontein, 3; City and Suburban, 3; Bellevue East, 1; Fairview, 1; Farm Cyferfontein, 1; Forest Hill, 1; Ferreira's, 1; Kenilworth, 1; Norwood, 1; Newtown, 1; Parkhurst, 1; Turffontein West, 1; and Wolhuter, 1.

On the 30th June, 1938, the position with regard to the 325 properties concerned was as follows:—

- (a) Properties declared slums and such declaration rescinded after the premises had been demolished or reconstructed, 22 (Jeppes, 8; Doornfontein, 4; La Rochelle, 3; Ophirton, 1; New Doornfontein, 1; Fordsburg, 1; Judith's Paarl, 1; Regents Park, 1; Ferreira's, 1; Lorentzville, 1).
- (b) Properties declared slums, further action to be taken to be decided, 134 (Albertsville, 68; Vrededorp, 66).
- (c) Properties declared slums, reconstruction or demolition in progress, or notices to be served under Section 5 (1) (a) and (b), 109 (Springfield, 36; Fordsburg, 16; Denver, 10; Doornfontein, 6; Lorentzville, 6; Johannesburg, 6; Ferreira's, 5; Jeppes, 5; Turffontein, 3; La Rochelle, 3; North Doornfontein, 2; Booyens Reserve, 1; Marshalls, 1; Farm Cyferfontein, 1; Newtown, 1; Norwood, 1; Turffontein West, 1; Wolhuter, 1; City and Suburban, 1; Forest Hill, 1; Rosettenville, 1; and Kenilworth, 1).
- (d) Properties demolished or reconstructed as the result of undertakings given by owners, 11 (Doornfontein, 2; Rosettenville, 2; Klipriviersberg, 1; Jeppes, 1; Troyeville, 1; Johannesburg, 1; Fairview, 1; La Rochelle, 1; Parkhurst, 1).
- (e) Properties where work of demolition or reconstruction is in progress as the result of undertakings given by owners, 11 (Doornfontein, 4; City and Suburban, 2; Johannesburg, 2; Jeppes, 1; Rosettenville, 1; Turffontein, 1).
- (f) Number of properties in respect of which evidence has been heard by the Public Health Committee, and its decision reserved, 21 (Vrededorp).
- (g) Properties to be acquired by the Council by agreement or expropriation, 14 (Bertrams, 10; North Doornfontein, 2; Lorentzville, 2).

It will be seen from the foregoing that the number of properties being dealt with in terms of the Slums Act at the close of the year under review is 292.

2. CLOSING AND DEMOLITION ORDERS.

In addition to its activities under the Slums Act, the Department dealt with 62 insanitary properties in terms of Section 74 of the Local Government Ordinance, No. 11 of 1926. At the close of the year under review the position with regard to these properties was as follows:—

- (a) Closing orders in operation, 10 (Bezuidenhout Valley, 4; Vrededorp, 2; Booyens, 1; Berea, 1; New Doornfontein, 1; Johannesburg, 1).

- (b) Properties demolished after closing order obtained, 18 (Bezuidenhout Valley, 9; Berea, 2; Doornfontein, 2; Jeppes, 2; New Doornfontein, 1; City and Suburban, 1; Fordsburg, 1).
- (c) Properties reconstructed after closing order obtained, 7 (Bezuidenhout Valley, 3; Berea, 1; Jeppes, 1; Ferreiras, 1; Troyeville, 1).
- (d) Demolition orders granted, properties subsequently put in order, 23 (Bezuidenhout Valley, 11; New Doornfontein, 2; Doornfontein, 3; Lorentzville, 2; Berea, 1; Jeppes, 1; Ferreiras, 1; Norwood, 1; North Doornfontein, 1).
- (e) Demolition orders granted, not yet complied with, 4 (Bezuidenhout Valley).

3. MINOR SLUMS.

In addition to action taken in terms of the Slums Act and the Local Government Ordinance No. 11 of 1926, the practice has been instituted in the case of properties which may be termed "Minor Slums" of notifying the owners that it is competent for the Council to deal with the said premises as slums, and intimating the advisability of effecting alterations and repairs required. Sixty-two properties were dealt with in this manner during the year under review.

4. PLANS.

Two hundred and one plans were checked on the site in regard to properties listed as "Slums" in the housing survey lists, and in all cases the M.O.H.'s requirements to render the premises fit for human habitation were endorsed on the plans.

HOUSING.

1. EUROPEAN HOUSING SCHEMES.

(a) *Jan Hofmeyr Township.*

This white housing scheme is the first one inaugurated by the Council, and as occupation was completed during February, 1937, it follows that a full year's experience has been gained within the period under review.

This township consists of 194 houses, 47 per cent. of which are of two bedroom and 53 per cent. of three bedroom capacity. In addition to the sleeping apartments each house has a living room, of varying sizes, kitchen, ventilated food cupboard, bathroom and water closet, with a brick storage shed in the yard. Each dwelling stands on its own plot of ground, approximately 75 feet by 50 feet. Cooking and heating is provided for by means of gas. No hot water supply is provided.

Communal Hall.

The sum of £6,000 has been provided for a Communal Hall, which has been specially designed for community purposes and will include separate accommodation for a Nursery Health Class and an Infant Welfare Clinic, as well as Estate Offices and repair workshop, etc.

Recreation Ground, Parks and Gardens.

A further sum of £4,750 has been provided for recreation grounds, parks and gardens. The work is now well in hand and tree planting has been carried out in all streets. Work on the recreation ground is expected to start shortly.

The work of forming footpaths, kerbing, channelling, and stormwater drainage is also well in hand, and when the works enumerated herein are completed and the existing tarred roads are made good after the stormwater drainage work has been completed, the township may justly lay claim to be a model one in all respects.

There is great demand for these houses at 10s. and 12s. 6d. per week and a long waiting list of would-be tenants.

The Council gives prizes for the best gardens and, in season, the flowers and miniature lawns make up a pretty picture which would provide a great contrast to the yards from which many of the tenants came. To encourage gardening the Council supplies 3,750 gallons of free water to each house.

The experiment in rehabilitation has proved an unqualified success. The mothers are house proud and the children are growing up in an atmosphere of comfort and cleanliness which must have a far-reaching effect on these future fathers, mothers and citizens.

This happy state of affairs is only brought about by constant contact and a lively interest in the domestic life of the tenants. Great credit is due to the trained and bilingual manageress (Mrs. M. K. Robertson), whose work has been of great value.

The capital outlay to 31st May, 1938, was £114,707, which includes buildings, fencing, electric, gas and water supply, drainage and establishment charges.

(b) *New Schemes in Hand.*

Two new sub-economic housing schemes are well in hand, and it is expected that the first groups of dwellings will be ready for occupation by August, 1938. One scheme is situated at Bertrams Township and has been named after Councillor Maurice Freeman, a past Mayor of the City and also ex-Chairman of the Public Health Committee.

The site of this township was once a particularly foul slum area. All these insanitary dwellings have been demolished and new and attractive dwellings have taken the place of the hovels.

Adjacent slum areas are now being dealt with under the Slums Act with a view to further clearance of buildings and an extension of the new township. This scheme includes 48 maisonettes in eight groups of two-storey buildings and 70 detached houses, thus providing accommodation for 118 families.

£4,000 has been provided for a communal hall and administration offices and £4,750 for parks and gardens.

The ratio of two-bedroomed houses and flats is 64 per cent and three-bedroomed is 36 per cent. of the whole. The average size of the plots for each house is 40 by 75 Cape feet.

The capital outlay to the 31st May, 1938, was £157,250.

The second scheme is situated in the Southern Suburbs, adjacent to the southern boundary of Springfield Township, the site being part of the original Township of Glenesk, the vacant ground having been purchased for the express purpose of establishing the scheme. The name chosen is Pioneer Township as it adjoins Pioneer Park on its northern boundary.

This second scheme comprises 96 detached houses and 24 maisonettes, the latter in three groups of eight two-storeyed buildings, thus providing for 120 families.

The ratio of two-bedroomed maisonettes and houses is 51 per cent., three-bedroomed maisonettes and houses 42 per cent. and 7 per cent. of four-bedroomed detached houses, the latter for the special benefit of very large families. The average size of plots for the detached houses is 45 by 75 Cape feet. £3,000 has been provided for a communal hall and administration offices, and £2,500 for tree planting, gardens for maisonettes and children's playground, etc.

The capital outlay to the 31st May, 1938, for the main scheme was £120,500.

Rents.

The rents charged at Jan Hofmeyr Township are 10s. per week for a two-bedroomed house and 12s. 6d. per week for a three-bedroomed house. At the two newer townships now in course of construction the rents to be charged will be as follows:—

For a two-bedroomed detached house	...	12s. 6d. per week.
For a three-bedroomed detached house	...	15s. 0d. per week.
For a four-bedroomed detached house	...	17s. 6d. per week.
For a two-bedroomed maisonette	... ..	15s. 0d. per week.
For a three-bedroomed maisonette	... ..	17s. 6d. per week.

In all townships gas will be supplied at a specially reduced rate of 3s. 4d. per 1,000 cubic feet as against the usual charge of 4s. 6d. per 1,000 cubic feet. Payment is by slot meter.

Electric lighting is provided for and payment is also made by slot meter at ordinary tariff rates. 3,750 gallons of water will be supplied free monthly to each house tenant.

In addition to the sleeping rooms, each house is provided with a large living room, kitchen, ventilated food cupboard, bathroom, W.C., storeroom, and a built-in clothes cupboard in one room, and in the maisonettes specially fitted washing and rinsing tubs have been provided, but separate storage sheds are not provided. Advantage has been taken of experiences gained in the first scheme at Jan Hofmeyr Township, and the new houses are bigger and better in several

respects, such as larger living rooms and bedrooms; the provision of slow combustion stoves and hot water service throughout houses and maisonettes; bug-proof metal picture rails, bugproof cement skirtings, the elimination of wood from sinks, provision of a clothes cupboard and ample hat and coat hooks, clothes drying posts and lines, improved cross ventilation, etc. These improvements and the enhanced cost of building are responsible for the increased rentals.

Girls' Residential Club.

Tenders are about to be called for the erection of a residential club for 50 working girls unable to pay economic rentals. The cost is estimated to be about £12,500 and although the scheme is comparatively small, it is intended as an experiment which, if successful, will undoubtedly lead to extensions in other suburbs where the need is greatest.

Klipriviersberg Estate Housing Scheme.

About 270 acres of land forming portion of the Klipriviersberg Estate Small Holdings, situate to the south-east of the City, have been purchased at a cost of approximately £76,000 with the object of establishing a sub-economic housing scheme of approximately 2,000 houses for Europeans. Preliminary work on this scheme is in hand.

2. COLOURED HOUSING.

Coronation Township for Coloured Persons.

During the year the Council purchased approximately 200 acres of ground adjacent to the southern boundary of the Western Native Township for the purpose of establishing a housing scheme for Eurafrians at a cost of about £41,000 for the land. The full scheme approved by the Central Housing Board makes provision for the erection of 900 houses of varying capacity and design, together with communal centre, parks, schools, church and hospital sites. The total estimated cost approved by the Administrator, is £680,000.

The first section of development decided upon by the Council makes provision for the immediate erection of 250 houses of different design and capacity and it will depend on the success of this experiment in housing for Eurafrians whether future expansion will be on similar lines.

Personnel.

The personnel required for the efficient administration of the Council's Housing Schemes, either completed or in course of erection, consists of:—

- (a) A Director of Housing.
- (b) Two Manageresses.
- (c) One full-time handyman with two native assistants.

An interesting feature in connection with the work of the specially trained Manageresses is the inauguration of a scheme by the Government, acting in co-operation with certain of the larger local authorities. This scheme provides for the employment of a woman manager, who holds the Certificate of the Society of Women Housing Estate Managers, London, and who is trained under the well known Octavia Hill System.

A three years' agreement has been entered into with one of these trained Manageresses (Miss D. E. Miskin), whose principal duty it will be to train students in Johannesburg for social welfare and estate work in connection with the Council's Housing Schemes. These trainees, who are paid by the Government at approximately £10 per month, will be interchangeable over a period of two years, between large towns or cities where a certificated and Octavia Hill trained Manageress is employed, as at Cape Town, etc. The ultimate aim is to produce in South Africa from these highly qualified trainees a supply of efficient women managers capable of administering to the best advantage housing schemes of local authorities duly approved by the Central Housing Board and the Administrator of the Province.

3. NATIVE HOUSING.

The Council has under its control in its native locations 8,830 houses, and in its hostels for single native men and women has 6,766 beds for males and 130 beds for females.

At the end of June, 1938, the Council housed approximately 75,000 natives in its various locations and hostels; in pursuing a policy of providing such extensive housing accommodation for natives, the City Council is showing itself to be most long-sighted in slum elimination in Johannesburg, as a very considerable proportion of the slums of the City exist primarily on account of

native occupation in the poorer areas. It is also encouraging to note that natives and their families respond in a marked degree to the efforts made in providing proper housing conditions in the Council's native townships, and particularly in the rapidly-growing Orlando Township, which is a model of its kind.

The Manager of the Council's Non-European Housing and Native Administration Department, reports that "at one time not more than 12 per cent. of natives evacuated from slum areas actually took up residence in locations and hostels. This figure is now 100 per cent., and in the present abnormal conditions obtaining, the demand is so keen that many subterfuges are employed by them to secure municipal accommodation."

4. ASIATIC HOUSING.

In addition to the activities detailed in the foregoing paragraphs the Council has now under consideration the provision of housing accommodation for Asiatics.

INSPECTION OF PLANS.

During the year under review 9,175 plans were approved, as against 11,522 the previous year; the estimated value of the work for the year ending 30th June, 1938, was £8,392,688 as against £11,420,353 for 1937, a decrease of £3,027,665.

All plans submitted to the Council through the City Engineer are passed on to your Medical Officer of Health for examination *re* all matters relating to drainage, lighting, ventilation, open space, licensing, etc. The provisions of the Factory Act, Native Labour Regulations (1911), Natives (Urban Areas) Act, Slums Act, Town Planning Ordinance, all receive necessary consideration before plans can be finally approved.

The majority of the drawings are returned for amendments and are, therefore, handled twice or three times.

As extensive slum clearance work is now proceeding under the Slums Act, the system is particularly valuable, especially in cases of partial demolition and rebuilding, as the closest co-operation exists between the officials concerned, enabling great improvements to be effected.

The co-ordination and organisation of work and the cordial relations existing between the City Engineer's staff, the Inspector of Factories, the Municipal Native Affairs Department, and the Plans Inspection staff is gratifying and is acknowledged.

Many architects and their assistants, builders, plumbers and owners avail themselves of the opportunities given to discuss improvements and amendments, and the qualified and valuable advice given is much appreciated.

The difficult problem of preventing some considerable amount of skilful circumvention of the By-laws has engaged the attention of your Medical Officer of Health and plans staff, and the measures adopted have had a marked effect in planning of certain types of domestic buildings in specified areas.

In addition to the ground covered by the Special Inspectors, the District Inspectorate Staff have accomplished 201 inspections in connection with repairs to buildings, and 473 inspections in connection with unauthorised buildings.

ANNUAL RECORD OF DUTIES PERFORMED BY DISTRICT
INSPECTORS ONLY.

From 1st July, 1937, to 30th June, 1938.

This page, indicating as it does the mass activities of the Inspectorate Staff of the Department, is generally passed by—as being an incongruous mass of figures—by the public, the Press and those in authority. But in a way it is highly illuminating to those who wish to know the extent of the activities of the Staff of the Health Department of a large city. Including Licensing Inspections enumerated in the following table on "Licensed Places," it means that the Inspectorate Staff of the Department made 77,762 visits to various premises in the course of the year. That figure substantiates a claim to meticulous and comprehensive inspection of premises by the Inspectorate Staff of the Department, and, it is thought, leaves little leaven to the bread of those who exclaim that they haven't seen a Health Inspector or Sanitary Inspector for years.

INSPECTIONS.

BUILDINGS—		INFECTIOUS DISEASES—	
Repairs to	201	Contacts	327
Unauthorised	473	Vaccination	83
CLOSETS AND URINALS—		LICENSED PREMISES—	
Inspected	6,819	Aerated Water and Ice Factories	111
Additional Provided	219	Asiatic Eating Houses ...	31
French Drains	353	Bakeries	1,212
Dwellings—Routine Visits ..	9,244	Hairdressers	846
Dwellings—Survey	5,231	Bioscopes	103
Factories	1,215	Boarding Houses	685
Business Buildings	1,544	Butcheries	3,598
Native Housing	1,410	Cowsheds	8
Interviews—Owners, Agents etc.	3,167	Dairies	36
Reports	1,321	Garages	508
NUISANCES—		General Dealers	11,714
Animals	231	Hawkers and Pedlars ...	1,069
Drainage	1,213	Hotel Dining Rooms	237
Fly	428	Ice Creameries	106
Manure	793	Kaffir Eating Houses ...	2,487
Mosquito	133	Laundries	469
Poultry	515	Lodging Houses	12
Rats	720	Milk Shops	47
Refuse	5,528	Noxious Trades	2,981
Slopwater	809	Nursing Homes	66
Smoke	201	Private Cows	15
Stables	1,200	Restaurants	1,650
Stormwater	147	Tea Rooms	2,762
Unspecified	1,632	NOTICES SERVED—	
Service Complaints	303	Statutory	3,450
Wells	2,200	Others	3,498
CYANIDE FUMIGATIONS—		Prosecutions	102
Supervised	2,359	Attendance at Court (Hours)	138
INFECTIOUS DISEASES—		Licensing Court (Hours) ...	529
Cases Investigated	1,152	Special Duty	336

LICENSED PLACES.

From 1st July, 1937, to 30th June, 1938, 6,420 applications for licences of various kinds have been dealt with, the premises in question being in all cases carefully examined as to sanitary requirements.

	Granted	Refused or not taken out	Total
1. Tea Rooms, Hotel Dining Rooms, Boarding Houses, Restaurants, etc.	1,231	181	1,412
2. Dairies and Cowsheds	142	17	159
3. Milk Shops	831	117	948
4. Butcheries	610	104	714
5. Bakers and Confectioners	158	63	221
6. Permits to introduce Milk	498	150	648
7. Kaffir and Asiatic Eating Houses	171	59	230
8. Nursing Homes	33	26	59
9. Laundries	73	19	92
10. Ice Cream Vendors and Manufacturers	613	36	649
11. Noxious or Offensive Trades	385	86	471
12. Aerated Water and Ice Factories	30	2	32
13. Hairdressers and Barbers	416	47	463
14. Lodging Houses	2	—	2
15. Hawkers and Pedlars of Foodstuffs	119	191	310
16. Private Cowkeepers	3	7	10
	5,315	1,105	6,420

PROSECUTIONS.

Three hundred and twenty-seven persons were prosecuted involving 354 charges for various breaches of the Public Health Act, Local Government Ordinance, Food and Drugs Act, Slums Act, and Public Health By-laws.

Of the 354 charges, 347 convictions resulted, and fines aggregating £1,521 2s. 6d. were imposed. Particulars are appended:—

Offence	Race			Total
	Whites	Natives and Coloured	Asiaties	
Dirty and Verminous Premises	5	—	—	5
Fumigation By-laws	1	—	—	1
Fly Breeding	11	—	1	12
Insufficient Sanitary Accommodation	6	—	—	6
Nuisances (Dirty Yards, etc.)	31	3	6	40
Dirty and Adulterated Milk	101	11	1	113
Food and Drugs Act	70	—	15	85
Unsound and Adulterated Foodstuffs	34	—	2	36
Food Exposed to Contamination	17	—	2	19
Unsound and Unstamped Meat	12	—	1	13
Rodent Proofing Regulations	1	1	—	2
Obstruction	1	1	—	2
Unlicensed Premises	6	—	2	8
Midwifery Regulations	9	3	—	12
	305	19	30	354
RESULTS —				
Convicted and Fined	291	17	29	337
Convicted and Cautioned	8	1	1	10
Dismissed	3	1	—	4
Withdrawn	3	—	—	3
	305	19	30	354
AMOUNT OF FINES	£ 1,371 12 6	35 10 0	114 0 0	1,521 2 6

This work is supervised by the Medical Officer of Health, his Deputy, the Assistant Health Officers, and the Chief Health Inspector, under whose directions proofs of evidence, summonses, subpoenas and charge-sheets are prepared and handed to the Council's Solicitors.

SOME NOTES ON THE VENTILATION OF PERCOLATION FILTERS

BY

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AND

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Introduction.

The authors, who have the honour to be in the employ of the City Council of Johannesburg, are endeavouring to establish Sewage Disposal technique specially suitable to meet South African conditions. They have been supported very liberally by the City Council.

The authors have received a great amount of assistance from investigations all over the world, and feel that they would like to repay that kindness by giving results of some of their work. One of their colleagues, Mr. J. A. McLachlan, M.Sc., read a paper at Exeter on certain investigations made in Johannesburg on Activated Sludge Treatment.

They have felt for some considerable time that there is need for intensive research on the Percolating Filter, and this contribution deals with some preliminary work.

Historical Investigations.

Sir Edward Frankland, in his "Experimental Researches on Applied Chemistry" (work done for the Rivers Pollution Commission of 1868), pages 766 and 767, dated 16th February, 1870, wrote:—

"A filter, as has already been shown, is not a mere mechanical contrivance. It is a machine for oxidising and thus altogether transforming, as well as for merely separating the filth of dirty water.

"Sewage traversing the soil undergoes a process to some extent analogous to that experienced by blood passing through the lungs in the act of breathing.

"A field of porous soil irrigated intermittently virtually performs an act of respiration, copying on an enormous scale the lung action of a breathing animal; for it is alternately receiving and expiring air, and thus dealing as an oxidising agent with the filthy fluid trickling through it."

Even in these original experiments of Frankland, which led to the development of biological oxidation methods of sewage purification, it was very clearly recognised that renewal of air or ventilation was a necessity.

In the Twenty-third Report of the Massachusetts State Board of Health, 1891, page 428, is written:—

"The purification of sewage by filters depends on oxygen and time; all other considerations are secondary. Temperature has only a minor influence, the organisms necessary for purification are sure to establish themselves in a filter before it has been long in use. Imperfect purification for any considerable period can invariably be traced either to lack of oxygen in the gases of the filter, or to the sewage passing so quickly through that there is not sufficient time for the oxidation process to take place. Any treatment which keeps all particles of sewage distributed on the surface of sand particles in contact with excess of air for a sufficient time is sure to give a well oxidised effluent and power of any material to purify sewage depends almost entirely upon its ability to hold the sewage in contact with air. It must hold both sewage and air in sufficient amounts."

These statements were made 69 years and 46 years ago respectively, yet even now, after years of research and large-scale operation of biological filters, we are not able to add very much to these statements as summaries of the action in the percolating filters.

Air supply, ventilation or respiration is clearly the outstanding idea contained in those statements, and from time to time the necessity for ventilation has been recognised and attempts made to improve on the natural ventilation of the filter.

In 1890 Ducat induced ventilation under the false floors, and through the sides of percolating beds by means of ventilator cowls in the roof of the buildings enclosing the filters.

In 1891 Waring patented a filter in which air was blown in under the false floor.

In 1892 and 1895 the Lawrence Experimental Station constructed gravel beds with forced downward ventilation.

In 1892 Lowcock blew air through a perforated pipe embedded in the middle of the filter medium.

Hering, in 1909, and others have employed wind ventilation ducts leading into the filter.

Coming to more recent times, Stroganoff 1925 and Reddie 1926, ventilated by compressed air under the false floor of the bed, and Blunk 1933 ventilated by vacuum extraction from the building enclosing the filter, and later, forced air in above the medium, and thus ventilated downwards.

All later ventilation trials differed from the early ones in that they were applied to deep and coarse grained filters, the earlier work being done on shallow and fine grained medium.

These quotations and references are sufficient to show that throughout the history and development of the percolating filter, ventilation has been long regarded as an important factor in the design, and a variety of ways of enhancing the natural ventilation have been devised.

That our present knowledge concerning the theory of the action and concerning even features in design of percolating beds is far from satisfactory is well shown in the following statements chiefly taken from recent American publications:—

1. "Downward ventilation is secured by the natural flow of sewage through the bed."—Metcalf and Eddy, 1930, Sewerage and Sewage Disposal.
"The natural downward current of air has always been found sufficient except that some times slight troubles have been experienced with fine filter materials."—Fuller and McClintock, Solving Sewage Problems, 1926.

2. "Diffusion alone is sufficient to supply the necessary oxygen concentration."—A. M. Buswell, Chemistry of Water and Sewage Treatment, 1928.

3. "The enclosed (sealed from air at the top) filter gives slightly better oxidation, is more efficient in removal of bacteria, and does not breed as many psychoda flies."

A comparison of the efficiency of open and enclosed trickling filters.—E. D. Walker, Pennsylvania State College, Bulletin No. 15, 1930.

4. "Filters at Decatur, have operated with one and two feet of stone submerged for periods of two to three weeks without any deterioration of effluent."—W. D. Hatfield, Sewage Works Journal, 3-175-78, 1931.

5. "Elimination of bottom ventilation resulted in a rapid decrease in the purifying efficiency of the filter."

6. "Elimination of bottom ventilation was quickly followed by severe clogging of the filter."

Effect of bottom ventilation on purification by an experimental trickling filter.—Levine and Goresline, Bulletin 116, Iowa Engineering Experimental Station, 1934.

7. "The only factors causing air to flow through a filter of this type (model filter 3ft. diameter 6ft. deep, gravel 1½ in.), are the difference in the temperature of the air and the liquid, and the difference in humidity of the air in the filter and the air outside."

Aero-filtration of Sewage and Industrial Wastes.—H. O. Halvorson, Water Works and Sewerage, Volume 83, September, 1936.

8. Forced Aeration.

(a) Upwards. Stroganoff, Treatment of Moscow Sewage, 1931. Bach, Gesundheits Ingenieur, 1933.

(b) Downwards. Massachusetts State Board of Health Report, 1893. Blunk and others, 1935.

(c) Vacuum. Blunk, 1933.

(d) Pressure. Massachusetts State Board of Health Report, 1892.
Lowcock, Proc. Inst. C.E., 1893. Blunk, 1935.

Each is stated or claimed to increase markedly the capacity of trickling filters.

9. "The results obtained (in an aerofilter) despite the fact that excessive air supply was employed, were not sufficiently better than those obtained from the percolating filter to suggest any economic advantage."—Arden, Manchester Rivers Department Annual Report, 1928.
10. "Sand, gravel, coal, coke, granite, polarite, clinker, limestone and various other artificial or natural media are each claimed as superior." Scores of references since 1892.
11. "(a) Shallow; (b) deep; (c) intermediate depths, say 6ft. claimed as most efficient or economical." Scores of references since 1892.
12. "Intermittent dosing has been considered essential or of great importance since Frankland's original work in 1870."
13. "Rest periods are not essential for the operation of properly designed trickling filters, short rest periods will probably do no harm, but long rests are definitely injurious to the performance of the bed."

Aero-filtration of Sewage and Industrial Wastes.—H. O. Halvorson, Water Works and Sewerage, September, 1936.

In quoting these sometimes contradictory or incompatible statements the present authors wish it to be understood that they do so in no spirit of sarcasm.

That there are incompatibilities in these statements suggest that:—

- (a) The specific observations or statements apply only to special local circumstances; or
- (b) The points observed are not really concerning vitally important factors, wide variations may, therefore, occur, and efficiency is not really dependent on the factors concerned in the statements.

Whilst recognising that local circumstances, strength and character of sewage do sometimes have great influence they prefer to take the view that there is deeper significance in the discrepancies.

A factor even of vital importance may sometimes vary within very wide limits without affecting the efficiency of a process.

A careful review of past work with some further experimental research on the question of ventilation of the percolating filter should not only result in increased efficiency and greater output, but also give us such increased knowledge as may lead to developments of importance.

Research Plant.

KLIPSPRUIT SEWAGE FARM.

The Klipspruit Sewage Farm, Johannesburg's first sewage treatment plant, constructed in 1905, is to be reconstructed in accordance with modern practice.

When contemplating design of a partial treatment process preliminary to irrigation on land, the claims for the Prüss enclosed ventilated filter were brought to the notice of the authors as a possible competitor with the ordinary percolating bed or the activated sludge process.

The information received concerning the Prüss enclosed filter was that a very greatly increased amount of sewage per cubic yard of medium could be treated when compared with the ordinary open percolating filter, and that the enclosed filter could be operated without smell nuisance.

Freedom from smell with greatly increased output per cubic yard offered such attraction to Johannesburg that it was considered desirable to instal an experimental Prüss filter.

To enable first-hand knowledge and design data to be obtained for use in the projected works the City Engineer and Medical Officer of Health jointly recommended to the Public Health Committee in 1936 that the offer of the Sewerage Engineering Co. (per Mr. J. D. Griffin, Chairman and Managing Director) to instal a 40ft. diameter enclosed filter at the Klipspruit farm be accepted, and that a pilot plant be constructed with the following objects:—

1. To determine the efficiency of the vertical flow type sedimentation tank, successfully operating at the Delta Sewage Disposal Works, when used to settle the sewage received at the Klipspruit Outfall. The sewage at these works is probably one of the worst in the world and very septic.
2. To yield information regarding the quantity of tank effluent a filter bed of given dimensions could efficiently purify having regard to the nature and strength of sewage reaching the outfall.
3. To form a standard of comparison for the efficiency of an enclosed type of biological filter, having the same radius as the open type of filter bed, and working under identical conditions.

The pilot plant installed consists of the following units:—

1. Screening chamber fitted with a bar screen for removal of coarse solids.
2. Sedimentation Tanks.

The sedimentation tank, constructed in concrete, is circular in plan, its diameter being 20ft. 9in., and depth 24ft. A cylindrical upper portion 6ft. 6in. in depth is super-imposed on a conical section 17ft. 6in. deep, with sides sloping to 60 degrees to the horizontal. A 9in. inlet pipe discharges in an upward direction into a stilling box inlet 4ft. diameter, 8ft. deep below water surface, supported from two R.S.J.'s, which also form the means of support of the pipe.

The settled effluent discharges radially over a weir surrounding the tank into a circumferential channel.

A 6in. cast-iron sludge pipe reaching to within 12in. of the bottom of the tank is attached to the sloping sides thereof, and passes through the vertical wall into a valve chamber.

A scum-baffle plate 2ft. deep, made of $\frac{1}{2}$ in. steel plate, submerged 1ft. 3in. is fixed circumferentially, 1ft. 3in. from the tank wall.

3. Dosing Tank, fitted with automatic dosing syphon.
4. Open Percolating Filter (bacteria bed).

The filter, circular in plan, 40ft. internal diameter, has a concrete floor and brick walls. The floor is sloped outward from the centre at a grade of 1:60. Stoneware aerating tiles, finishing flush with the outside wall, are butted, one against the other, on the outer circumference of the filter bed and built into the wall. The tiles are continued radially towards the central circular chamber, 5ft. 6in. external diameter, built in brick.

The walls of the filter are 6ft. 1 $\frac{1}{2}$ in. measured from the top of the aerating tile level, and filter bed effluent is received in a collecting channel on the entire circumference of the filter graded to the outlet channel.

The depth of filter material is 5ft. 6in. at the centre and 5ft. 9in. at the outside. The media used is crushed minestone (quartzite). At the centre of the bed a depth of approximately 12in. of stone, reputedly varying in size between 3in. and 6in., is placed over the aeration tiles, whilst at the outside the depth is 16in. approximately. From this level 2 $\frac{1}{2}$ in. stone is used for a depth of 4ft. approximately.

A concrete column placed within the central chamber supports a 40ft. diameter "Simplex" Patent mercury seal type four-arm revolving sprinkler. The sprinkler is operated under a head of water of about 2ft.

5. Flow Recorders.

An accurate means of measuring the flow treated in the tank and filters is very necessary, three "V" notches, with automatic flow recorders, have been installed to measure and record the following:—

- (1) The flow of sedimentation tank effluent to the open percolating filter.
- (2) The balance of the tank effluent, which is discharged into a pump sump, whence portion is pumped to the enclosed filter.
- (3) The overflow from the pump sump.

The difference in the readings between (2) and (3) above represents the volume of tank effluent pumped into the enclosed filter.

Prüss Enclosed Filter.

The Sewerage Engineering Co. (Prop., The Griffin Engineering Co., Ltd.) has erected an enclosed filter contiguous to the pilot plant in order to operate this, and the open percolating type under similar conditions.

The following description of the enclosed filter is supplied by the Company:—

“ The enclosed filter has an internal diameter of 40ft., and is constructed of reinforced concrete.

“ The floor with a grade of 1 in 40 slopes to the centre of the filter, whence a channel leads the effluent away. The roof of the filter has a slope of 1 in 4. The vertical walls are 20 feet high.

“ Hume concrete semi-cylindrical aerating tiles are spaced evenly on the circumference of the floor and protrude through the footing of the wall.

“ Space is left between each aerating tile for the vertical reinforcement rods. The tiles extend radially to the centre of the filter. On top of the tiles a layer of 18in. of stone 3in. to 6in. is placed to afford efficient drainage. A layer of 12ft. of 1½in. media follows, and finally a layer of 18in. of 2in. to 3in. media. The coarse layer is placed on top of the fine to prevent ponding.

“ Three windows are placed in the vertical walls at such a height, and spaced such that sufficient light is introduced to give visibility. One window affords entrance for the necessary attention to the sprinkler.

“ The sprinkler is the Ames Crosta ‘ Simplex ’ variety with four arms and Mercury Seal.

“ The effluent from the sedimentation tank flows through a ‘ V ’ notch with recording apparatus to a pump sump with overflow. The latter flows over a ‘ V ’ notch with recording apparatus. The difference in the readings represents what is going through the enclosed filter.

“ A 3 h.p. paraffin engine running continuously pumps the effluent to the sprinkler. The capacity of the pump is 180 gallons per minute.

“ The same engine drives the fan supplying air to the filter, the air being delivered at the top of the filter. The air is forced evenly through the media and comes out at the base of the filter uniformly through the tiles at the base of the filter wall.”

The filter medium, aeration tile floor and distributors are, as far as could be arranged, identical in the open and enclosed filter.

It should be noted that the sewage received at Klipspruit contains the city's abattoir waste and gas liquor, brewery and yeast factory wastes, and a very varied assortment of other trades waste as well as the nightsoil from large unsewered areas still on the pail system. The main outfall sewer is nine miles long and is at its deepest point no less than three hundred feet below the surface passing through mined ground.

Although bleaching powder is used, it is not economically feasible to keep the contents of the sewer fresh; thus on arrival at the outfall the sewage is a very highly objectionable one in every way, its chemical characteristics being shown in Table I. The results obtained during operation from 15th September, 1936, to 31st August, 1937, of the pilot plant are given in Tables I., II. and III.

For the first two weeks the filters were dosed at high rates for a few daylight hours only, with the object of removing rock dust.

The rate of application was thereafter reduced and spread over the twenty-four hours.

The dosing chamber for the open filter was made smaller in order that there might be four doses and four rests of almost equal duration per hour.

The flow to the open filter was kept between 30 and 40 gallons per cubic yard of medium from 11th October to 8th November, during which period the filter rapidly matured as evidenced by the decrease in Nitrous Nitrogen and increase in Nitric Nitrogen.

The flow to the open filter was increased by small amounts as shown in the tables attached.

It must be emphasised that these figures are presented at this early stage in order to comply with very widespread request for information especially in regard to the performance of the Prüss enclosed filter.

Klipspruit Pilot Plant.

Tables I, II, and III, attached give the results of the operation of this plant. Extensive comments on the figures in these Tables are not considered necessary.

The enclosed filter was found to be much less sensitive to the effects of cold winds, so that through the coldest winter months (May, June and July) the enclosed filter gave three to four times the output per cubic yard of medium that was given by the open filter. High-class effluents of 100 per cent. stability, when settled, were aimed at in the case of both filters.

In order to establish beyond doubt the effects of, or necessity for, artificial ventilation of the enclosed filter, the fan was stopped on Friday, 20th August, and the filter dosed at the same rate as before. However, these results must form the subject of a later contribution.

Economical Aspect.

The following brief statement of comparative capital costs of the open filter and Prüss enclosed filter are given as a matter of interest, and it must not be inferred from these figures that the difference would be proportionate for larger installations.

The price paid to the Contractors for the Prüss plant was £3,170, whilst the cost to construct the 40ft. diameter open filter was £400. Both prices are for the complete filter unit, and in the case of the open filter included dosing syphon and sprinkler, whilst the price paid for the Prüss filter included the cost of a petrol engine for operating pump and fan.

The cubic yardage of filter media in the Prüss filter was 705 cubic yards, and in the open filter 267 cubic yards.

From the above figures it will be seen that the initial cost of the enclosed filter was approximately eight times that of the open filter, and the cost per cubic yard of available filter media was approximately 30s. for the open filter and 90s. for the closed filter.

At this stage it is not thought either fair or desirable to discuss the cost of treatment per million gallons, more especially as the authors think the Prüss filter should be improved upon at an early date.

Research on Percolating Beds.

The authors have realised, for many years, that there is a great need for systematic research into the question of Percolating Filters. A certain amount of work was being done at the time the Prüss filter was introduced on the South African market, and the authors asked the City Council of Johannesburg to instal the experimental plant described in this paper.

The authors are definitely of the opinion that much more work is necessary before any definite conclusions can be stated. For instance, the daily maximum flow at the Sewage Disposal Works under our control is approximately three times the average daily flow. The authors realise that an ordinary open Percolating bed will deal with these variations, but they cannot state with certainty that the Prüss filter will or will not do the same.

From small scale work done up to date the authors believe that the efficiency of the ordinary open type Percolating bed can be greatly improved and its sphere of application widened from the economic point of view. Judging from our South African experience it may be possible to effect great economies by the improvement in the open type, more especially when the heavy royalties at present charged on the Prüss Filter are taken into account.

The authors, realising the necessity of large scale operations, have been voted £9,000 by the City Council of Johannesburg to construct two 100ft. experimental filters, one being 6ft. deep and the other 12ft. deep. Each filter will be divided into twelve sections. The filters will be equipped with the apparatus to collect the necessary information to prove or disprove the small scale experimental work done to date. The authors hope to be allowed to present the results of their work at a later date.

Gases in Percolating Filters.

Analyses of gases from different depths in contact and percolating beds have been made at various times and places.

Table 4: Dunbar and Calvert—shows not only the extent to which carbon dioxide may accumulate on a contact bed, but also that the whole of the oxygen of the atmosphere within the bed may be used up.

Table 5: Royal Commission on Sewage Disposal—gives analyses of gases from different depths of percolating beds.

Table 6: Johannesburg—gives analyses of the atmospheres beneath the false floor of the 40ft. diameter open and enclosed (Prüss) filters.

Table 7: Johannesburg—gives analyses of air samples taken at various depths in a 100ft. diameter percolating bed.

Table 8—gives for comparison analyses of the exhaust air from an activated sludge floor, Johannesburg.

It will be seen that in a percolating bed the concentration of carbon dioxide does not exceed 0.5 per cent. and seldom exceeds 0.25 per cent.

Must we take it that the object of ventilation is to remove this slight concentration of carbon dioxide?

The authors think that careful study of the effect of removing this by ventilation should reveal whether this low concentration can be detrimental to the action of the filter.

Conclusion.

These notes, incomplete as they must be, are presented in the belief that organised study of the percolating filter is an urgent matter. The experimental work should be done, if possible, under the usual operating conditions found on Sewage Disposal Works.

It is necessary for every one concerned to pool information as early as it is available. We must all realise our debt of gratitude to those pioneers who unstintingly gave of their best for our sakes. They had no thought of personal gain through royalties, etc., for they must have realised, as many of us realise, that patents as applied to Sewage Disposal are more often a hindrance than a help to the cause of what has been termed "preventive medicine." May we all do our best to repay their unselfish work.

The authors hope that their paper will, at least, stimulate a desire in many to help in the solution of this great problem.

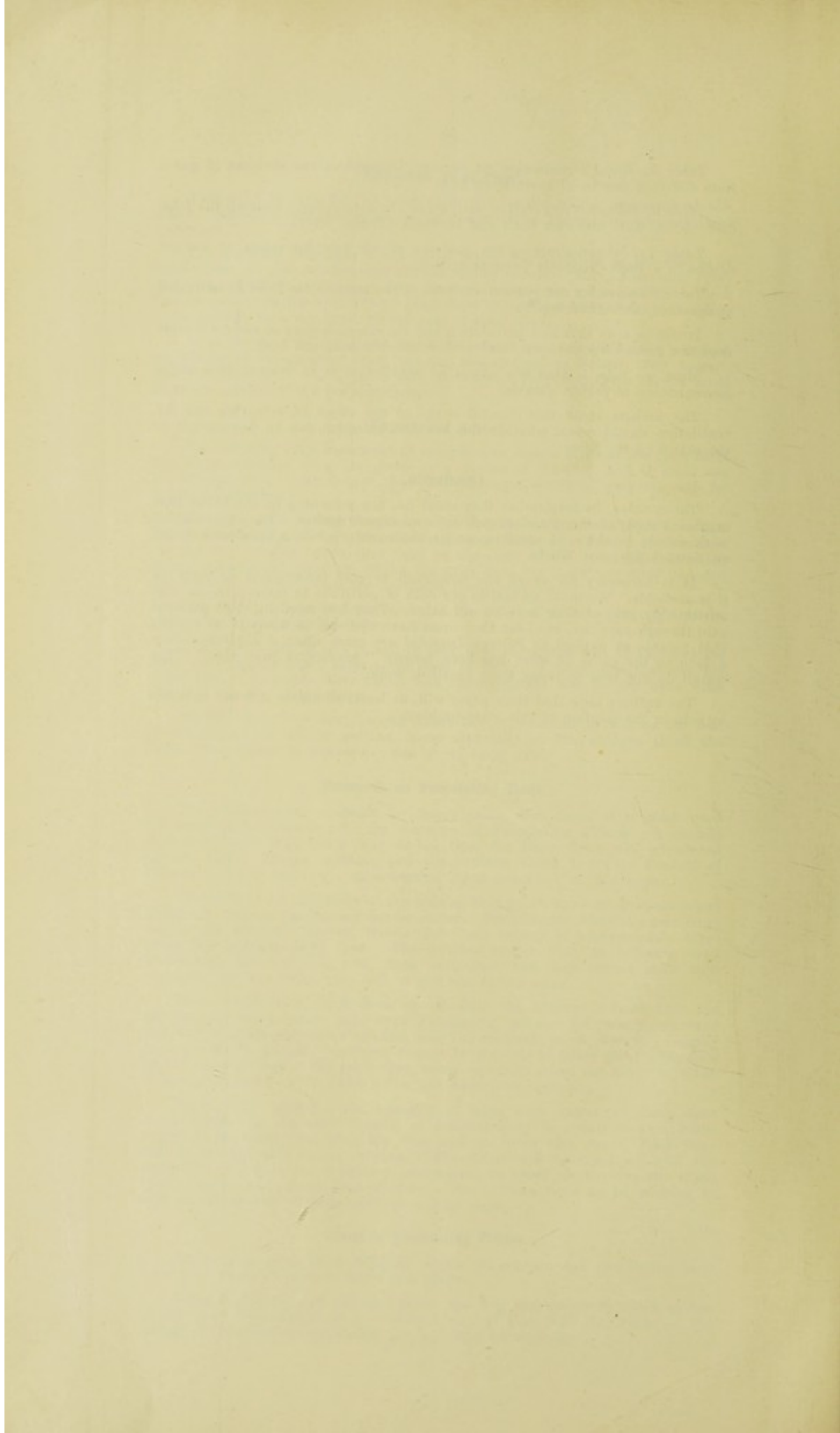


TABLE I.

THE SETTLEMENT AND BIOLOGICAL FILTRATION OF KLIPSPRUIT SEWAGE.

1ST TRIAL RUN. Summary of Weekly Averages for period ending 19th August, 1937. Samples=Mixtures of 24 hourly samples. Parts per 100,000.

WEEK ENDING.	Screened Sewage.							Tank Effluent (Settled Sewage).						Per cent. Purification on Settled Solids.	Per cent. Purification on 4 hours.
	Daily Average Flow for week in gallons.	Oxygen absorbed in 3 minutes.	Chlorine in Chlorides	Oxygen absorbed in 4 hours.	Settle-able Solids. cc/Litre (1 hour) Imhoff Conc.	Ammon. N.	Albd. N.	Oxygen absorbed in 3 minutes.	Chlorine in Chlorides	Oxygen absorbed in 4 hours.	Settle-able Solids cc/Litre (1 hour) Imhoff Conc.	Ammon. N.	Albd. N.		
Sunday, Sept. 27th	94,200	—	—	—	—	—	—	—	—	—	—	—	—	—	
Sunday, Oct. 11th	76,300	10.08	21.9	30.00	40.1	14.40	3.08	6.60	23.8	16.48	1.7	15.20	1.84	95.6	45.1
Sunday, Oct. 18th	55,600	8.35	21.8	24.64	17.0	—	—	7.01	24.1	16.69	1.0	—	—	94.1	32.2
Sunday, Oct. 25th	49,900	7.64	23.6	23.56	24.0	10.40	1.88	6.52	21.6	16.20	1.1	12.00	0.98	95.6	31.3
Sunday, Nov. 1st	68,300	8.96	24.7	27.38	23.3	—	—	8.96	25.1	21.65	0.5	—	—	97.9	21.0
Sunday, Nov. 8th	124,200	8.93	31.5	23.87	22.5	9.00	1.90	6.80	21.7	16.53	0.4	8.80	1.22	98.3	30.7
Sunday, Nov. 15th	244,000	7.23	17.8	27.47	17.3	9.80	2.80	5.33	18.3	18.19	0.6	8.00	1.44	96.5	33.8
Sunday, Nov. 22nd	246,800	7.31	17.2	26.05	15.5	7.60	2.13	5.52	17.2	17.76	0.6	7.20	1.81	96.1	31.8
Sunday, Nov. 29th	243,400	8.08	20.1	25.28	21.2	10.80	3.70	5.89	19.7	18.00	0.8	10.80	2.60	96.2	28.8
Sunday, Dec. 6th	242,800	8.84	19.2	27.12	19.8	12.20	4.08	6.72	19.0	19.06	1.0	11.60	2.08	95.0	29.8
Sunday, Dec. 13th	251,400	8.60	19.4	23.32	21.9	10.00	2.82	5.88	21.3	18.24	1.0	9.00	1.70	95.4	21.8
Sunday, Dec. 20th	249,200	8.98	19.4	24.78	23.7	9.22	3.07	6.44	19.3	16.38	1.4	9.63	1.63	94.1	34.0
Sunday, Dec. 27th	244,000	8.98	20.2	26.13	24.7	11.04	2.86	6.92	19.8	18.09	1.1	9.84	1.90	95.4	30.6
Sunday, Jan. 3rd	247,700	7.55	18.5	22.32	21.0	9.70	2.74	5.68	17.6	14.48	1.0	9.80	1.22	95.2	35.2
Sunday, Jan. 10th	241,900	5.68	19.5	20.05	18.3	—	—	4.53	18.3	13.41	0.8	—	—	95.6	32.2
Sunday, Jan. 17th	245,000	6.56	19.9	20.58	21.4	8.58	3.32	5.16	19.4	13.68	0.6	7.38	1.40	97.3	33.6
Sunday, Jan. 24th	252,300	8.06	21.1	23.93	21.7	8.00	1.66	5.75	21.4	12.85	0.8	8.00	1.26	96.3	46.3
Sunday, Jan. 31st	256,900	6.82	19.8	21.24	18.7	6.62	1.73	5.35	18.5	13.92	0.8	6.62	1.17	95.8	34.4
Sunday, Feb. 7th	248,100	7.12	15.1	19.04	20.7	—	—	4.08	15.1	10.48	0.8	—	—	96.2	47.0
Sunday, Feb. 14th	256,600	6.12	17.8	18.64	16.1	6.28	2.14	4.91	18.0	11.48	0.8	7.88	1.50	95.0	38.4
Sunday, Feb. 21st	241,800	5.72	16.8	19.80	20.3	8.60	1.58	4.60	16.4	12.94	0.7	7.20	1.38	96.5	34.7
Sunday, Feb. 28th	250,000	7.60	17.7	19.55	24.0	8.00	2.40	5.44	18.9	12.68	1.0	7.80	1.60	96.0	35.2
Sunday, Mar. 7th	245,600	7.41	17.6	23.25	20.4	7.82	2.24	5.95	16.6	14.80	1.0	7.62	1.36	95.0	36.4
Sunday, Mar. 14th	246,600	6.84	18.1	21.70	21.6	7.60	2.08	5.70	18.3	15.49	0.6	8.80	1.52	97.2	28.6
Sunday, Mar. 21st	244,900	8.00	19.5	22.64	21.1	7.60	1.92	6.16	19.8	17.36	0.6	6.80	1.84	97.1	23.3
Sunday, Mar. 28th	247,600	7.20	19.4	22.60	24.9	6.00	1.20	6.13	18.2	15.32	0.9	6.00	1.28	96.4	32.2
Sunday, Apr. 4th	239,300	7.61	16.3	22.56	20.4	7.20	2.02	5.65	16.7	14.21	0.9	6.00	1.62	95.6	37.1
Sunday, Apr. 11th	240,100	8.72	19.1	23.81	20.1	9.64	1.86	5.60	18.8	15.25	1.2	9.04	1.18	93.9	36.0
Sunday, Apr. 18th	245,200	7.96	18.4	23.14	21.0	8.64	2.10	5.92	18.0	12.52	1.1	9.64	1.38	94.8	45.9
Sunday, Apr. 25th	237,600	8.04	22.9	25.72	21.7	10.88	1.92	5.20	17.7	12.24	0.7	9.08	1.16	96.8	52.4
Sunday, May 2nd	249,100	8.51	18.3	28.64	21.7	10.40	4.18	6.29	18.8	17.55	0.6	9.20	2.26	97.3	38.7
Sunday, May 9th	245,300	10.56	20.5	27.97	22.7	7.40	2.05	7.13	20.6	19.39	0.8	7.80	0.85	96.5	30.7
Sunday, May 16th	234,500	7.40	16.9	20.20	23.4	—	—	5.60	16.8	16.80	0.5	—	—	97.8	16.8
Sunday, May 23rd	236,500	10.04	18.6	26.56	22.6	9.40	2.90	7.00	19.9	19.16	0.9	9.00	3.02	96.1	27.9
Sunday, May 30th	224,000	9.04	20.1	28.19	23.7	7.60	2.90	6.08	19.1	18.51	0.8	8.80	2.34	96.7	34.4
Sunday, June 6th	233,200	7.82	16.0	24.77	20.9	6.00	2.84	5.52	17.1	16.38	0.8	5.20	2.20	96.2	33.9
Sunday, June 13th	226,500	9.76	19.8	26.48	21.3	—	—	7.28	20.5	20.08	0.8	—	—	96.2	24.2
Sunday, June 20th	236,600	9.65	17.6	26.21	21.3	9.40	2.56	7.07	19.9	17.73	0.6	7.60	1.84	97.3	32.4
Sunday, June 27th	228,400	8.67	17.1	24.96	20.4	8.08	2.20	7.04	17.8	20.32	0.6	7.68	1.76	97.1	18.6
Sunday, July 4th	223,400	8.59	21.7	24.21	19.4	8.32	2.90	6.16	19.1	17.79	0.7	7.12	1.86	96.4	26.6
Sunday, July 11th	225,800	9.92	20.3	31.84	19.7	8.20	2.95	6.96	19.5	20.19	0.7	7.80	1.39	96.5	36.6
Sunday, July 18th	230,000	10.56	19.9	30.27	21.0	8.80	2.96	7.60	18.4	20.99	0.8	6.60	2.24	96.2	30.6
Sunday, July 25th	234,500	10.99	20.1	37.90	24.4	10.80	2.88	8.00	20.8	26.04	0.9	7.80	2.56	96.3	31.3
Sunday, Aug. 1st	204,200	10.60	21.2	38.28	22.1	8.08	2.20	7.56	21.3	26.40	0.9	7.68	1.76	95.9	31.0
Sunday, Aug. 8th	230,000	10.06	19.5	31.14	26.9	6.60	2.59	6.64	18.2	19.08	0.7	8.00	1.91	97.4	38.8
Sunday, Aug. 15th	225,800	9.87	22.9	30.11	28.1	11.78	3.91	6.43	20.1	17.12	0.6	9.38	2.15	97.8	43.2
Thursday, Aug. 19th Average 16-19th only	218,400	10.92	23.0	37.72	26.0	9.81	2.31	7.44	23.0	23.32	0.7	9.21	1.91	97.4	38.2

First trial run ended.

The following table shows the results of the experiments conducted on the 15th of June 1900.

Experiment No.	Time	Temperature	Pressure	Volume	Weight	Remarks
1	10.00	20.0	760	100	1.000	Initial state
2	10.15	20.5	760	100	1.000	After 15 min
3	10.30	21.0	760	100	1.000	After 30 min
4	10.45	21.5	760	100	1.000	After 45 min
5	11.00	22.0	760	100	1.000	After 1 hour
6	11.15	22.5	760	100	1.000	After 1.15 hours
7	11.30	23.0	760	100	1.000	After 1.30 hours
8	11.45	23.5	760	100	1.000	After 1.45 hours
9	12.00	24.0	760	100	1.000	After 2 hours
10	12.15	24.5	760	100	1.000	After 2.15 hours
11	12.30	25.0	760	100	1.000	After 2.30 hours
12	12.45	25.5	760	100	1.000	After 2.45 hours
13	13.00	26.0	760	100	1.000	After 3 hours
14	13.15	26.5	760	100	1.000	After 3.15 hours
15	13.30	27.0	760	100	1.000	After 3.30 hours
16	13.45	27.5	760	100	1.000	After 3.45 hours
17	14.00	28.0	760	100	1.000	After 4 hours
18	14.15	28.5	760	100	1.000	After 4.15 hours
19	14.30	29.0	760	100	1.000	After 4.30 hours
20	14.45	29.5	760	100	1.000	After 4.45 hours
21	15.00	30.0	760	100	1.000	After 5 hours
22	15.15	30.5	760	100	1.000	After 5.15 hours
23	15.30	31.0	760	100	1.000	After 5.30 hours
24	15.45	31.5	760	100	1.000	After 5.45 hours
25	16.00	32.0	760	100	1.000	After 6 hours
26	16.15	32.5	760	100	1.000	After 6.15 hours
27	16.30	33.0	760	100	1.000	After 6.30 hours
28	16.45	33.5	760	100	1.000	After 6.45 hours
29	17.00	34.0	760	100	1.000	After 7 hours
30	17.15	34.5	760	100	1.000	After 7.15 hours
31	17.30	35.0	760	100	1.000	After 7.30 hours
32	17.45	35.5	760	100	1.000	After 7.45 hours
33	18.00	36.0	760	100	1.000	After 8 hours
34	18.15	36.5	760	100	1.000	After 8.15 hours
35	18.30	37.0	760	100	1.000	After 8.30 hours
36	18.45	37.5	760	100	1.000	After 8.45 hours
37	19.00	38.0	760	100	1.000	After 9 hours
38	19.15	38.5	760	100	1.000	After 9.15 hours
39	19.30	39.0	760	100	1.000	After 9.30 hours
40	19.45	39.5	760	100	1.000	After 9.45 hours
41	20.00	40.0	760	100	1.000	After 10 hours
42	20.15	40.5	760	100	1.000	After 10.15 hours
43	20.30	41.0	760	100	1.000	After 10.30 hours
44	20.45	41.5	760	100	1.000	After 10.45 hours
45	21.00	42.0	760	100	1.000	After 11 hours
46	21.15	42.5	760	100	1.000	After 11.15 hours
47	21.30	43.0	760	100	1.000	After 11.30 hours
48	21.45	43.5	760	100	1.000	After 11.45 hours
49	22.00	44.0	760	100	1.000	After 12 hours
50	22.15	44.5	760	100	1.000	After 12.15 hours
51	22.30	45.0	760	100	1.000	After 12.30 hours
52	22.45	45.5	760	100	1.000	After 12.45 hours
53	23.00	46.0	760	100	1.000	After 13 hours
54	23.15	46.5	760	100	1.000	After 13.15 hours
55	23.30	47.0	760	100	1.000	After 13.30 hours
56	23.45	47.5	760	100	1.000	After 13.45 hours
57	24.00	48.0	760	100	1.000	After 14 hours
58	24.15	48.5	760	100	1.000	After 14.15 hours
59	24.30	49.0	760	100	1.000	After 14.30 hours
60	24.45	49.5	760	100	1.000	After 14.45 hours
61	25.00	50.0	760	100	1.000	After 15 hours
62	25.15	50.5	760	100	1.000	After 15.15 hours
63	25.30	51.0	760	100	1.000	After 15.30 hours
64	25.45	51.5	760	100	1.000	After 15.45 hours
65	26.00	52.0	760	100	1.000	After 16 hours
66	26.15	52.5	760	100	1.000	After 16.15 hours
67	26.30	53.0	760	100	1.000	After 16.30 hours
68	26.45	53.5	760	100	1.000	After 16.45 hours
69	27.00	54.0	760	100	1.000	After 17 hours
70	27.15	54.5	760	100	1.000	After 17.15 hours
71	27.30	55.0	760	100	1.000	After 17.30 hours
72	27.45	55.5	760	100	1.000	After 17.45 hours
73	28.00	56.0	760	100	1.000	After 18 hours
74	28.15	56.5	760	100	1.000	After 18.15 hours
75	28.30	57.0	760	100	1.000	After 18.30 hours
76	28.45	57.5	760	100	1.000	After 18.45 hours
77	29.00	58.0	760	100	1.000	After 19 hours
78	29.15	58.5	760	100	1.000	After 19.15 hours
79	29.30	59.0	760	100	1.000	After 19.30 hours
80	29.45	59.5	760	100	1.000	After 19.45 hours
81	30.00	60.0	760	100	1.000	After 20 hours
82	30.15	60.5	760	100	1.000	After 20.15 hours
83	30.30	61.0	760	100	1.000	After 20.30 hours
84	30.45	61.5	760	100	1.000	After 20.45 hours
85	31.00	62.0	760	100	1.000	After 21 hours
86	31.15	62.5	760	100	1.000	After 21.15 hours
87	31.30	63.0	760	100	1.000	After 21.30 hours
88	31.45	63.5	760	100	1.000	After 21.45 hours
89	32.00	64.0	760	100	1.000	After 22 hours
90	32.15	64.5	760	100	1.000	After 22.15 hours
91	32.30	65.0	760	100	1.000	After 22.30 hours
92	32.45	65.5	760	100	1.000	After 22.45 hours
93	33.00	66.0	760	100	1.000	After 23 hours
94	33.15	66.5	760	100	1.000	After 23.15 hours
95	33.30	67.0	760	100	1.000	After 23.30 hours
96	33.45	67.5	760	100	1.000	After 23.45 hours
97	34.00	68.0	760	100	1.000	After 24 hours
98	34.15	68.5	760	100	1.000	After 24.15 hours
99	34.30	69.0	760	100	1.000	After 24.30 hours
100	34.45	69.5	760	100	1.000	After 24.45 hours

TABLE II.

1ST TRIAL RUN.

THE SETTLEMENT AND BIOLOGICAL FILTRATION OF KLIPSPRUIT SEWAGE.

Summary of Weekly Averages for period ending 19th August, 1937. Samples=Mixtures of 24 hourly samples. Parts per 100,000.

OPEN FILTER.

WEEK ENDING	Flow Treated Galls.		Settle-able Solids cc/Litre (1 hour) Imhoff Cone.	Analysis on Humus Free Effluent (Settled 1 hour).								Relative Stability per cent.	Per cent. Purification over Settled Sewage 4 hours.
	Daily Average Flow for week.	Per Cubic Yard.		Oxygen absorbed in 3 Minutes.	Chlorine in Chlorides	Oxygen absorbed in 4 hours.	Ammon. N.	Albd. N.	Nitrite N.	Nitrate N.	B.O.D.		
Sunday, Sept. 27th	36,900	138.2	—	2.68	—	7.36	—	—	Nil	Nil	—	—	—
Sunday, Oct. 11th	11,400	42.7	0.8	2.46	20.9	5.60	4.70	0.70	0.62	0.03	6.22	100	66.1
Sunday, Oct. 18th	8,600	32.2	22.5	5.12	23.2	12.85	—	—	0.27	Nil	—	30.0	23.0
Sunday, Oct. 25th	8,000	30.0	8.5	3.08	19.4	9.28	4.80	0.98	1.20	0.04	4.61	19.0	42.7
Sunday, Nov. 1st	8,200	30.7	8.3	5.63	22.4	10.16	—	—	2.69	0.45	—	90.8	53.1
Sunday, Nov. 8th	9,800	36.8	2.1	4.43	21.9	8.35	2.20	0.45	2.49	0.85	—	52.0	49.4
Sunday, Nov. 15th	11,200	42.0	5.0	2.15	18.0	6.19	3.50	0.48	0.93	0.69	2.92	82.0	66.0
Sunday, Nov. 22nd	11,700	43.8	0.8	1.76	16.0	4.80	1.80	0.26	0.61	1.37	2.85	99.7	72.9
Sunday, Nov. 29th	12,100	45.3	1.8	1.59	19.1	4.20	3.00	0.43	0.39	1.48	1.16	100	76.6
Sunday, Dec. 6th	11,800	44.3	2.1	1.55	18.5	4.42	2.60	0.24	0.13	1.16	1.84	99.0	77.0
Sunday, Dec. 13th	12,300	46.2	1.9	1.43	21.2	3.78	1.60	0.39	0.20	1.25	4.24	100	79.2
Sunday, Dec. 20th	12,400	46.5	2.1	1.54	18.0	3.58	1.06	0.33	0.25	1.39	5.23	99.7	78.1
Sunday, Dec. 27th	12,300	46.2	1.8	1.59	18.3	3.45	0.40	0.31	0.28	2.09	1.66	100	81.0
Sunday, Jan. 3rd	13,400	50.2	1.6	1.25	16.1	3.08	2.15	0.34	0.32	1.80	3.02	100	78.8
Sunday, Jan. 10th	13,000	48.7	0.9	0.99	16.7	2.48	—	—	0.39	1.58	—	100	81.6
Sunday, Jan. 17th	14,700	55.1	0.4	1.45	18.7	4.04	1.69	0.34	0.50	1.56	2.43	100	70.5
Sunday, Jan. 24th	15,700	58.8	0.4	1.64	20.4	3.32	1.36	0.37	0.47	0.93	5.85	100	74.2
Sunday, Jan. 31st	16,700	62.6	0.3	1.25	17.8	3.08	2.66	0.30	0.34	0.93	6.59	100	77.9
Sunday, Feb. 7th	16,100	60.3	0.5	1.12	15.7	2.90	—	—	0.23	1.33	—	100	72.7
Sunday, Feb. 14th	16,600	62.2	0.4	1.05	16.4	2.60	2.34	0.33	0.28	1.55	2.20	100	77.3
Sunday, Feb. 21st	16,400	61.4	0.3	1.18	16.5	3.13	2.40	0.39	0.26	1.85	2.61	100	75.8
Sunday, Feb. 28th	16,600	62.2	0.6	1.33	17.1	2.92	2.60	0.38	0.17	1.07	6.22	100	77.1
Sunday, Mar. 7th	15,700	58.8	0.5	1.52	16.5	3.73	3.31	0.52	0.11	0.67	4.62	86.0	74.8
Sunday, Mar. 14th	16,400	61.5	1.2	1.54	17.6	3.98	4.00	0.40	0.10	0.37	3.25	54.0	74.4
Sunday, Mar. 21st	16,000	60.0	0.7	1.63	18.3	6.14	3.00	0.46	0.09	0.20	4.83	45.0	64.6
Sunday, Mar. 28th	15,600	58.4	0.8	2.03	18.5	5.38	3.40	0.52	0.10	0.11	5.80	27.0	64.8
Sunday, Apr. 4th	15,500	58.2	0.5	1.44	16.1	3.44	3.20	0.37	0.15	0.47	3.63	91.3	75.7
Sunday, Apr. 11th	15,700	58.8	0.7	1.64	17.8	3.68	4.02	0.39	0.22	0.53	1.05	66.0	75.6
Sunday, Apr. 18th	14,100	52.8	0.6	1.82	17.8	4.64	3.72	0.21	0.16	0.72	2.43	60.5	63.0
Sunday, Apr. 25th	12,600	47.2	0.5	1.52	18.1	2.42	5.74	0.36	0.15	0.70	4.02	88.0	80.2
Sunday, May 2nd	12,000	45.0	0.2	1.77	18.1	4.43	4.70	0.63	0.10	0.43	—	69.0	74.8
Sunday, May 9th	11,800	44.2	0.6	1.92	18.6	4.65	4.20	0.48	0.19	0.53	—	62.0	76.0
Sunday, May 16th	10,800	40.5	0.3	1.74	17.6	4.04	—	—	0.54	0.42	2.46	84.0	75.8
Sunday, May 23rd	9,500	35.6	1.6	1.64	17.2	3.82	4.10	0.63	0.18	1.87	—	75.0	80.1
Sunday, May 30th	8,900	33.4	1.4	1.64	17.6	4.75	4.00	0.71	0.20	1.42	—	89.0	74.3
Sunday, June 6th	10,600	39.7	2.6	1.95	18.0	5.10	2.90	0.86	0.12	0.64	—	65.0	68.8
Sunday, June 13th	10,200	38.2	1.1	2.26	19.8	4.98	—	—	0.15	0.95	—	100	75.2
Sunday, June 20th	9,000	33.8	2.0	1.94	18.6	4.29	4.00	0.44	0.21	1.70	5.73	100	75.8
Sunday, June 27th	10,500	39.4	1.2	1.89	17.4	4.52	4.24	0.56	0.15	2.10	2.61	100	77.8
Sunday, July 4th	11,700	43.8	2.8	1.68	18.3	3.81	3.36	0.43	0.23	2.55	1.26	100	78.6
Sunday, July 11th	12,200	45.8	3.0	1.71	18.8	3.96	3.70	0.45	0.19	2.73	6.23	100	80.5
Sunday, July 18th	12,900	48.2	1.2	2.24	18.1	5.20	4.00	0.68	0.16	3.03	8.04	96.0	75.3
Sunday, July 25th	12,800	48.2	0.4	2.53	19.7	6.32	3.60	1.00	0.29	1.77	7.18	—	75.8
Sunday, Aug. 1st	12,150	45.5	0.5	2.14	19.2	5.30	4.24	0.56	0.18	2.33	8.21	98.3	79.8
Sunday, Aug. 8th	13,300	49.8	1.1	1.55	17.4	4.21	4.20	0.37	0.31	2.91	9.00	100	77.9
Sunday, Aug. 15th	13,400	50.2	0.7	1.57	19.5	4.04	3.49	0.49	0.44	3.15	7.84	—	76.4
Thursday, Aug. 19th	13,700	51.4	1.5	1.64	21.7	4.28	2.60	0.45	0.43	3.50	4.40	—	80.3
Average 16-19th only													

First trial run ended.

Table II

The following table shows the results of the analysis of the samples of the various types of wood, and the results of the analysis of the various types of wood, and the results of the analysis of the various types of wood.

No.	Name of wood	Analysis of wood			Analysis of wood		
		Moisture	Carbon	Hydrogen	Moisture	Carbon	Hydrogen
1
2
3
4
5
6
7
8
9
10
11
12
13
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15
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TABLE III.

THE SETTLEMENT AND BIOLOGICAL FILTRATION OF KLIPSPRUIT SEWAGE.

1ST TRIAL RUN

Summary of Weekly Averages for period ending 19th August, 1937.

Samples=Mixtures of 24 hourly samples. Parts per 100,000.

ENCLOSED FILTER.

WEEK ENDING.	Flow Treated Galls.		Settle-able Solids cc/Litre (1 hour) Imhoff Cone.	Analysis on Humus Free Effluent (Settled 1 hour).							Relative Stability per cent.	Per cent. Purification over Settled Sewage 4 hours.	
	Daily Average Flow for week.	Per Cubic Yard.		Oxygen absorbed in 3 Minutes.	Chlorine in Chlorides	Oxygen absorbed in 4 hours.	Ammon. N.	Albd. N.	Nitrite N.	Nitrate N.			B.O.D.
Sunday, Sept. 27th	19,900	28.2	—	2.80	—	7.92	—	—	Nil	Nil	—	—	—
Sunday, Oct. 11th	17,300	24.6	1.7	2.46	22.6	6.94	7.50	0.92	0.12	0.01	—	100	57.8
Sunday, Oct. 18th	17,700	25.1	8.3	3.61	23.4	9.71	—	—	0.55	0.06	—	68.0	41.8
Sunday, Oct. 25th	18,300	26.0	26.5	3.92	20.5	11.08	6.80	1.28	1.76	0.12	4.61	45.0	31.6
Sunday, Nov. 1st	31,900	45.2	5.2	5.56	23.9	11.07	—	—	2.63	0.26	—	86.0	48.8
Sunday, Nov. 8th	71,400	101.2	2.5	4.01	21.5	8.80	4.30	0.49	2.57	0.83	—	69.2	46.8
Sunday, Nov. 15th	89,800	127.5	10.5	2.11	18.1	5.39	3.70	0.42	1.01	0.79	2.22	93.0	70.4
Sunday, Nov. 22nd	110,500	157.0	6.0	1.91	16.2	6.05	1.75	0.30	0.55	0.28	3.05	98.0	66.0
Sunday, Nov. 29th	114,400	162.5	7.7	1.85	18.8	4.74	8.80	0.57	0.49	0.27	2.07	90.0	73.6
Sunday, Dec. 6th	117,300	166.8	6.2	2.27	18.5	5.61	13.80	0.56	0.15	0.24	8.04	88.5	70.6
Sunday, Dec. 13th	119,400	169.5	3.0	1.80	20.6	5.92	6.20	0.57	0.14	0.31	5.44	92.0	67.6
Sunday, Dec. 20th	96,200	136.8	3.8	1.77	18.5	5.02	6.41	0.43	0.05	0.02	8.03	33.0	69.1
Sunday, Dec. 27th	86,000	122.0	3.5	2.08	18.1	4.86	7.92	0.55	0.02	0.08	6.94	23.2	73.2
Sunday, Jan. 3rd	69,400	98.5	2.8	1.30	16.9	3.43	5.90	0.43	0.23	0.49	5.55	87.0	76.4
Sunday, Jan. 10th	47,700	67.7	0.7	1.15	16.5	2.85	—	—	0.49	0.95	—	100	78.7
Sunday, Jan. 17th	63,800	90.6	0.4	1.46	18.5	3.59	3.49	0.34	0.53	0.93	2.03	100	73.6
Sunday, Jan. 24th	72,800	103.2	0.7	1.60	20.2	3.51	3.20	0.31	0.47	0.55	5.85	100	72.5
Sunday, Jan. 31st	82,200	116.3	1.1	1.45	17.3	3.45	3.26	0.32	0.14	0.15	7.36	35.8	75.2
Sunday, Feb. 7th	85,100	121.0	1.0	1.38	15.3	3.58	—	—	trace	trace	—	—	65.8
Sunday, Feb. 14th	70,600	100.1	1.7	1.47	17.1	3.52	4.34	0.49	0.02	nil	5.60	6.0	69.5
Sunday, Feb. 21st	38,400	54.5	5.0	1.39	16.0	3.70	4.20	0.51	0.06	0.06	2.71	11.0	71.4
Sunday, Feb. 28th	36,500	51.8	9.0	1.26	17.2	2.92	2.10	0.40	0.16	0.23	6.02	76.0	77.1
Sunday, Mar. 7th	33,700	47.8	15.6	1.58	16.7	3.92	2.11	0.30	0.25	0.95	3.62	89.0	73.4
Sunday, Mar. 14th	43,000	61.0	28.3	1.77	17.1	4.88	3.40	0.42	0.35	1.99	2.56	100	68.6
Sunday, Mar. 21st	49,400	70.2	18.7	2.04	18.4	8.28	2.10	0.62	0.34	2.13	2.23	100	52.4
Sunday, Mar. 28th	52,700	74.1	16.9	2.74	18.8	6.12	2.70	0.56	0.33	1.80	5.98	100	60.0
Sunday, Apr. 4th	65,100	92.3	14.9	2.11	16.2	5.01	2.90	0.59	0.40	2.28	4.63	100	64.7
Sunday, Apr. 11th	71,400	101.0	7.9	1.93	18.6	4.64	4.42	0.51	0.72	2.05	1.71	100	69.6
Sunday, Apr. 18th	80,400	114.1	5.4	2.26	18.4	5.60	5.02	0.51	0.59	2.15	2.43	100	55.3
Sunday, Apr. 25th	87,500	122.2	4.0	2.00	17.6	3.08	5.04	0.38	0.54	2.25	2.62	100	74.8
Sunday, May 2nd	97,700	139.0	4.0	2.07	17.8	4.98	5.90	0.69	0.57	1.85	4.62	100	71.4
Sunday, May 9th	115,600	164.0	4.4	2.20	18.6	5.69	5.50	0.54	0.61	2.07	—	100	70.6
Sunday, May 16th	96,900	137.5	3.4	2.10	17.2	4.84	—	—	0.92	0.70	4.06	100	71.2
Sunday, May 23rd	104,200	148.1	3.9	2.23	19.7	5.20	6.00	0.75	0.50	1.58	—	99.3	72.8
Sunday, May 30th	75,000	106.6	4.6	2.13	19.1	6.80	7.00	0.69	0.55	1.13	—	99.7	63.3
Sunday, June 6th	101,200	143.4	4.9	2.02	17.5	5.07	4.00	0.65	0.38	0.82	—	86.0	69.1
Sunday, June 13th	99,500	141.0	5.1	2.52	18.6	5.32	—	—	0.41	0.95	—	100	73.4
Sunday, June 20th	98,600	140.0	4.7	1.98	17.6	4.25	5.60	0.40	0.48	1.10	5.53	100	75.9
Sunday, June 27th	102,200	145.0	5.6	2.29	16.8	5.27	6.04	0.60	0.27	0.90	1.61	79.0	74.1
Sunday, July 4th	106,300	151.0	6.4	1.85	18.3	4.43	5.16	0.59	0.46	1.05	1.46	100	75.2
Sunday, July 11th	101,000	143.3	4.6	2.01	18.5	4.57	6.20	0.43	0.29	0.62	4.23	100	77.6
Sunday, July 18th	97,600	138.6	4.2	1.96	17.7	4.96	5.80	0.72	0.28	0.98	2.04	100	76.5
Sunday, July 25th	94,200	134.0	4.9	2.61	19.8	6.43	6.10	1.08	0.19	0.34	4.13	60.3	75.4
Sunday, Aug. 1st	102,800	145.8	5.6	2.21	19.7	5.40	6.04	0.60	0.24	0.40	1.11	91.7	79.5
Sunday, Aug. 8th	100,800	143.0	5.1	1.61	16.7	4.28	7.00	0.39	0.27	0.76	4.82	99.5	77.6
Sunday, Aug. 15th	91,300	129.5	5.1	1.76	18.9	4.55	7.89	0.59	0.48	0.62	6.64	96.0	73.4
Thursday, Aug. 19th	91,300	129.5	4.0	2.16	21.6	5.22	6.90	0.57	0.31	0.25	5.68	71.0	77.8
Average Aug. 16-19th													

First trial run ended.

Table III

The following table shows the results of the analysis of the samples of the various types of wood, and the results of the analysis of the various types of wood, and the results of the analysis of the various types of wood.

Sample No.	Species	Moisture	Cellulose	Hemicellulose	Lignin	Extractives	Residual
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TABLE IV.

Principles of Sewage Treatment—Dunbar and Calvert, p. 166.

Production of Carbon Dioxide in a Mature Contact Bed Charged with Sewage Daily.

Time Sewage in Contact (hours).	Time bed standing empty before analysis (hours).	Oxygen remaining per cent. of total Gases.	Oxygen consumed (per cent. of oxygen added).	Carbon Dioxide produced per cent. of total Gases.
2	3.5	8.2	60.4	4.1
2	4.0	8.2	60.4	6.3
2	6.0	Trace	Circa 100	9.7
2	9.0	0	100	8.6
2	14.5	0	100	8.9
4	15.5	0	100	8.0
4	20.0	0	100	7.4
2	40.5	0	100	8.9

TABLE V.

Royal Commission on Sewage Disposal—Appendix IV. (1910) 5th Report, page 231.

Report on Experiments carried out at Ilford.

Analyses of samples of gas from interior of percolating filters.

Depth at which sample was drawn	...	...	From Deep Filter six feet deep.		From Shallow Filter two feet deep.		
			No. 1.	No. 2.	No. 3.	No. 4.	
	4 feet	3 feet	...	2 feet	1.5 feet
Per cent. found by volume.							
Carbon Dioxide	0.36	0.36	...	0.44	Not
Oxygen	20.67	20.27	...	20.85	analysed
Nitrogen	78.97	79.37	...	78.71	

Remarks.

These samples all represent practically pure air, and they are sufficient to show that at this time the filters were fully aerated throughout. The poor quality of the effluent was therefore not due to any lack of oxygen in the interior of the filters.

TABLE VI.

Analyses of Gases Sampled by a Pipe Thrust 15 feet under the False Floor of the Open and Enclosed (Prüss) Filters at Klipspruit Farm, Johannesburg.

	Open Filter.		...	Prüss Filter.		...	Outside Air.		
	CO ₂ %	O ₂ %		CO ₂ %	O ₂ %		CO ₂ %	O ₂ %	
March 19	...	0.30	20.58	...	0.46	20.39	...	0.15	20.87
April 4	...	0.22	20.63	...	0.86	20.40	...	—	—
April 17	...	0.20	20.63	...	0.91	19.84	...	0.05	20.87
April 22	...	0.20	20.85	...	0.76	20.35	...	0.15	21.14

TABLE VII.

Analyses of Gases from 100 feet diameter Percolating Bed at Antea Works, Johannesburg.

Samples taken from Vertical Pipes in the Medium half-way between Outside and Middle of Bed.

(Media, Top 2ft. 1in.—1½in. Lower, 4ft. 1½in.—2½in.).

Date 1937.	Gases.	Depth of sample below surface.				Floor 20ft. into bed 6ft. depth of medium.	Air above surface of bed
		1ft.	2ft.	3ft.	4ft.		
July 12 ...	CO ₂	0.30	0.05	0.25	0.05	—	—
	O ₂	20.50	20.50	20.70	19.80	—	—
July 13 ...	CO ₂	0.20	0.15	0.20	0.20	0.35	0.15
	O ₂	20.14	20.82	20.61	20.72	20.62	20.82

TABLE VIII.

Air escaping from the Surface of the Sewage Aeration Channels, Bruma Activated Sludge Plant, Johannesburg.

Date	CO ₂	O ₂	Nitrogen by Difference.
9/8/35 ...	1.82	14.80	83.38
9/8/35 ...	1.53	16.69	81.78





