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CEYLON.



PART IV.—EDUCATION, SCIENCE, AND ART (C).

Administration Report of the Director of Medical and Sanitary Services for 1938.

(Dr. S. T. GUNASEKARA.)

AUGUST, 1939.

Printed on the Orders of Government.

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CEYLON
SHEWING
HEALTH DISTRICTS
BY
CHIEF HEADMEN'S BOUNDARIES

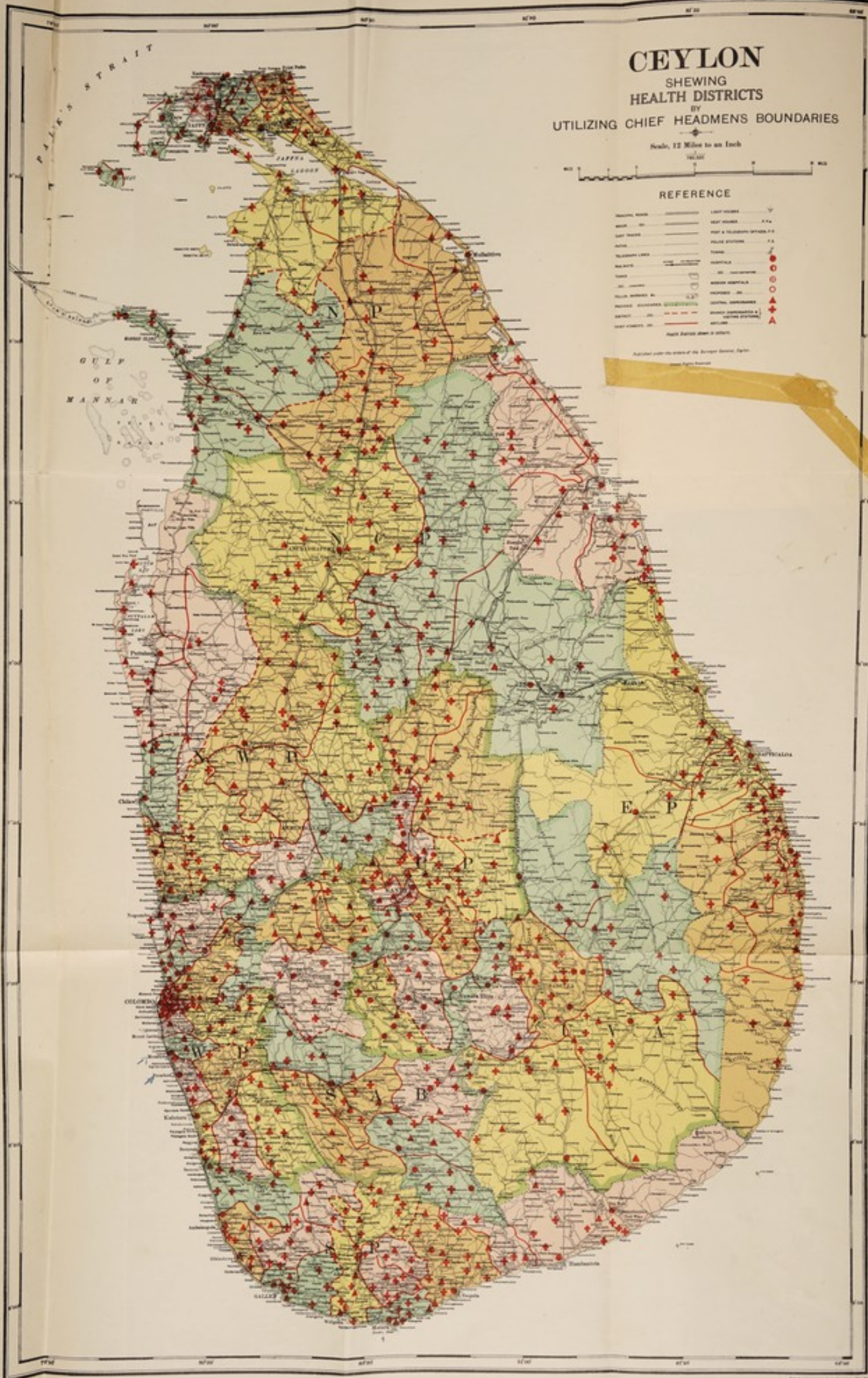


Scale, 12 Miles to an Inch

REFERENCE

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MAP

Map of Ceylon showing Medical Institutions.

Inserted facing page 3

I.—ADMINISTRATION.

(a) (1) **Establishments (including vacancies) on December 31, 1938.**

Directorate.

- 1 Director of Medical and Sanitary Services.
- 1 Assistant Director of Medical Services.
- 1 Assistant Director of Sanitary Services.
- 1 Administrative Secretary.
- 2 Senior Medical Officers, Headquarters.
- 1 Senior Medical Officer of Health.
- 1 Medical Officer of Health, Headquarters.
- 1 Accountant and 1 Assistant.

Medical Service.

- 5 Medical Superintendents, General Hospital, Colombo ; Lunatic Asylum, Angoda ; Leper Asylum, Hendala ; Civil Hospital, Kandy ; and Civil Hospital, Galle.
- 9 Provincial Surgeons.
- 2 Medical Officers-in-Charge, Anti-Tuberculosis Institute ; and Dental Institute.
- 1 Radiologist, General Hospital, Colombo.
- 248 Medical Officers—Grades I. and II., and Women Medical Officers (12 vacancies).

Health Service.

- 3 Inspecting Medical Officers of Estates and 2 Assistants.
- 27 Medical Officers of Health.
- 2 Itinerating Medical Officers, Parangi Campaign.
- 1 Superintendent, Anti-Malaria Campaigns and 1 Assistant.
- 2 Medical Officers, Leprosy Survey.
- 8 School Medical Officers.
- 5 Women Medical Officers, Maternity and Child-welfare.
- 4 Sanitary Engineers (including 3 Assistant Sanitary Engineers).
- 9 Inspectors and 139 Vaccinators.

Laboratory Service.

- 1 Director of Bacteriological and Pasteur Institutes and Vaccine Establishments.
- 1 Bacteriologist and 1 Assistant.
- 1 Medical Officer, Nutrition Department.
- 1 Medical Entomologist, and 1 Assistant.
- 1 Research Assistant in Entomology.

Nursing Staff.

Recruited through the Overseas Nursing Association :—

- 8 Matrons, 23 Sisters, and 1 Sister Tutor.

Recruited from Religious Orders :—

- 8 Mothers and 131 Sisters.

Recruited in Ceylon :—

- 13 Sisters, 50 Public Health Nurses, 83 Matrons and 338 Nurses.

Clerical Staff.

- 1 Chief Clerk and 174 Clerks.

Apothecaries.

448 Apothecaries.

Civil Medical Stores.

1 Superintendent and Chief Medical Storekeeper.

1 Assistant Superintendent.

Malaria Control Scheme.

61 Field Medical Officers. (12 vacancies).

Ankylostomiasis Campaign.

1 Superintendent, Ankylostomiasis Campaign (Medical Officer Grade I.).

Opium Branch.

1 Opium Storekeeper.

Miscellaneous.

97 Employees and about 3,500 Minor Employees.

(2) Changes in Personnel.

Dr. S. T. Gunasekera, Director of Medical and Sanitary Services went on furlough on April 13, 1938, and returned on October 3, 1938. Dr. W. E. de Silva, Assistant Director of Medical Services acted as Director of Medical and Sanitary Services. During this period Dr. Paul H. Perera acted as Assistant Director of Medical Services.

Mr. A. M. A. Azeez, C.C.S., was appointed Secretary to the Hon. the Minister for Health with effect from October 1, 1938, *vice* Mr. M. Rajendra, C.C.S. Mr. V. E. H. de Mel, C.C.S., was appointed Assistant Secretary to the Hon. the Minister for Health and attached to the office of the Director of Medical and Sanitary Services with effect from October 1, 1938.

(3) Officers on Leave.

Twenty-three officers of the department, exclusive of the Nursing Staff, proceeded to Europe on long leave during the course of the year.

(4) Special Qualifications, &c.

The following officers obtained special qualifications during the year :—

Dr. P. C. Wickremasinghe obtained the degree of M.D. (Lond.) Branch I. Medicine

Dr. J. H. Gunawardena obtained the degree of M.B., B.S. (Lond.).

Dr. C. Ponnambalam obtained the D.P.M. (Lond.).

Dr. V. D. Seevaratnam, Dr. S. Amerasinghe, Dr. C. S. P. Peries, Dr. S. N. Chelliah, and Dr. C. Ponnambalam obtained the D.T.M. & H. (Lond.).

Dr. O. E. R. Abeyaratne obtained the M.P.H. (Harward).

Dr. A. W. Rasiah, Dr. S. Amerasinghe, and Dr. S. N. Chelliah obtained the D.P.H. (Lond.).

Dr. P. K. Chanmugam obtained the degree of M.Sc. (Anatomy) (Lond.).

Dr. Sam. Gunawardena obtained the L.D.S. (Manchester).

Dr. C. S. P. Peries obtained the Diploma of L.R.C.P. & S. (Edin.), and L.R.F.P. & S. (Glas.).

(b) Legislation affecting Public Health enacted during the Year.

The draft of an Ordinance to amend the Lunacy Ordinance, 1873, to remedy certain defects now existing is before the State Council. The question of drafting another Ordinance in accordance with the English Lunacy Act, to repeal the existing Lunacy Ordinance is under consideration.

A draft of an ordinance to provide for the destruction and the prevention of the propagation of mosquitoes has been prepared and is under consideration of the Departmental Committee on Malaria.

An Ordinance, No. 27 of 1938, to prevent the treatment of venereal disease otherwise than by registered medical practitioners or specially authorized practitioners of indigenous medicine and to control the supply of remedies therefor, and for other matters connected therewith, was passed on July 21, 1938.

An Ordinance, No. 35 of 1938, to enable the Medical College Council to issue the diploma as a Licentiate in Dental Surgery and to provide for the registration as dentists of persons who hold such diplomas was passed on August 27, 1938.

An Ordinance, No. 55 of 1938, to restrict the admission of aliens as medical practitioners, dentists, &c., was passed on December 3, 1938.

A draft Ordinance amending the Poisons, Opium and Dangerous Drugs Ordinance, 1929, to make certain amendments which were found to be necessary in the actual working of the said Ordinance was under consideration.

The following regulations were passed during 1938 :—

(a) Under the Quarantine and Prevention of Diseases Ordinance, 1897 :—

Relating to—

- (1) Grain Store Regulations—*Gazettes* of June 10, July 15, and September 30, 1938.
- (2) Appointment of Quarantine Committee—*Gazette* of April 22, 1938.
- (3) Fumigation of Vessels—*Gazette* of December 9, 1938.
- (4) Pratique—*Gazette* of June 3, 1938.
- (5) Health Certificates—*Gazettes* of February 4 and September 30, 1938.

(b) Under the Medical Ordinance, 1927, relating to the control of the practice of Midwifery within the area of—

- (1) Wattegama S. B.—February 25, 1938.
- (2) Hikkaduwa S. B.—*Gazette* of March 25, 1938.
- (3) Dodanduwa S. B.—*Gazette* of March 25, 1938.
- (4) Batticaloa U. D. C.—*Gazette* of June 3, 1938.
- (5) Matale U. D. C.—*Gazette* of July 19, 1938.
- (6) Kaduwela V. C.—*Gazette* of July 7, 1938.
- (7) Point Pedro S. B.—*Gazette* of July 7, 1938.
- (8) Valvettiturai S. B.—*Gazette* of July 7, 1938.

(c) Under the Medical Wants Ordinance, 1912, relating to new rebate form—*Gazette* of November 25, 1938.

(c) **Financial.**

The revenue of this department for the financial year ending September 30, 1938, was Rs. 2,072,786, and the expenditure was Rs. 12,079,166 (the Budget Estimate being Rs. 12,144,592). These figures do not include the cost of new buildings and improvements to, and maintenance of, existing ones.

The revenue of the Island during the financial year ending September 30, 1938, was Rs. 113,347,591.

II.—PUBLIC HEALTH AND GENERAL EPIDEMIOLOGY.

A.—GENERAL REMARKS.

PREVALENCE OF SICKNESS IN DIFFERENT PROVINCES.

Western Province.—Malaria incidence has been, on the whole, lower than in previous years, although hospital admissions for the disease show a slight increase. Typhoid fever was slightly more prevalent than in previous years. There was an increase in the incidence of the bacillary type of dysentery. No cases of cholera or small-pox occurred during the year.

Central Province.—The malaria situation this year has been very satisfactory. The incidence of the disease was only slightly above the normal. There was no epidemic rise in any part of the province. There has been an appreciable reduction in the number of cases treated in hospitals and dispensaries. This improvement must be ascribed to the good work of the officers of the Malaria Control and Health Scheme. Enteric fever shows no abatement and parangi is gradually dying out but exists in relatively mild form, in the more remote and inaccessible villages in Matale North and East and Uda Dumbura divisions. Action to deal with this situation is being taken.

Southern Province.—Typhoid fever was the most important communicable disease prevalent during the year. Towards the latter part of the year an outbreak of malaria occurred in the villages of Madampe and Urawatte in Wellaboda pattu of the Galle District due to local breeding in quarry pits; with this exception the district remained healthy. In Matara District, as in previous years, malaria in a more or less severe form prevailed from January to July; thereafter the incidence was low till the end of the year. In Hambantota District the malaria fever season continued from January to July; there was a lull from August to November followed by another rise in December.

Northern Province.—Malaria situation has been satisfactory. The figures have gone down steadily from the beginning of the year. Owing to the late onset of the rains and deficient rainfall, the usual rise in the last quarter of the year was not marked. The control work done by Medical Officers of Health and Field Medical Officers, treatment made available at temporary fever dispensaries and the availability of quinine at distribution centres have all been instrumental in keeping down the incidence. Outbreaks of dysentery occurred at Pungudutivu, Alaveddy, Kankasanturai, Point Pedro, Chavakachcheri, Jaffna and Mannar. Typhoid fever was endemic throughout the year in Jaffna. Small outbreaks occurred at Vaddukodai and Vidaltivu. No cases of major infectious diseases occurred.

Eastern Province.—The year under review was, on the whole, a healthy one. There were no epidemics of any kind. As usual malaria was the most prevalent disease. It is endemic throughout the year, but with the onset of the north-east monsoon assumed an epidemic form. There has been a definite decrease in the number seeking treatment at hospitals and dispensaries. Control measures were very helpful in keeping down the incidence.

North-Western Province.—Due to insufficient seasonal rainfall which was only 57·09 inches for 1938 (*i.e.* 25·09 inches below 1937 and also below that of the epidemic year 1935) the economic conditions were not satisfactory. In spite of this handicap the incidence of malaria in 1938 was much lower than in the previous year. The usual seasonal rise in November was not felt appreciably in any part of the province but on the contrary a definite decrease was noted during this period at several stations. This improvement is attributable to the opening of quinine distribution centres and the control measures adopted in connection with the Malaria Control Scheme. The general health of the inhabitants this year was more satisfactory than during previous years and there were no epidemics of any special diseases.

North-Central Province.—Malaria is endemic throughout the province, but there is satisfactory statistical evidence of considerable reduction of its incidence in the Anuradhapura town itself. As compared with previous years, the incidence in the province, as a whole, also shows a slight but definite decline. There were several isolated outbreaks of enteric fever in the Anuradhapura town and its environments, which were quickly stamped out. Parangi continues to be prevalent and its incidence is highest in Tamankaduwa. The health of the people, on the whole, was satisfactory; there were no cases of major infectious diseases.

Province of Uva.—Typhoid fever showed an increase which was mainly due to the outbreak in the Badulla U. D. C. area. As regards malaria, the situation this year has been satisfactory. In montane and sub-montane districts conditions were normal, but in Uva low country the usual fever season began about the middle of September, reached its peak on December 15th and terminated at the end of March; during the rest of the year the incidence was low.

Province of Sabaragamuwa.—In Kegalla District, the incidence of malaria was severe from January to end of May. The situation during the rest of the year was normal. In the Kolonna korale and in the dry zone areas of Atakalan, Kadawata and Meda korales the usual fever season which began towards the end of last year terminated by the end of May. In the rest of Ratnapura District, the conditions were practically normal.

I.—GENERAL DISEASES.

The most prevalent general diseases of hospital in-patients were rheumatism, intestinal disorders (diarrhoea and enteritis), bronchitis and pneumonia.

The number of hospital cases according to diseases is given in the return at the end of this report, and the number of dispensary cases is given in section VI.

The following statement shows the numbers of cases and deaths of the more prevalent diseases dealt with in hospitals throughout the Island during the years 1934 to 1938 :—

		1934.		1935.		1936.		1937.		1938.
Rheumatism—										
Cases	..	3,934	..	3,643	..	4,284	..	4,641	..	5,404
Deaths	..	10	..	14	..	8	..	5	..	9
Intestinal Disorders—										
Cases	..	7,625	..	10,639	..	8,918	..	9,930	..	10,773
Deaths	..	1,045	..	2,163	..	1,093	..	1,194	..	1,399
Bronchitis—										
Cases	..	6,073	..	6,240	..	6,906	..	8,446	..	8,759
Deaths	..	279	..	336	..	323	..	358	..	256
Pneumonia—										
Cases	..	9,515	..	10,706	..	10,014	..	13,383	..	13,432
Deaths	..	3,054	..	4,205	..	4,069	..	4,270	..	4,149

Cancer.—

The number of hospital cases of cancer and other malignant tumours during the year was 1,444 with 179 deaths. The analysis of cancer cases treated is given in the next page.

Most of the operable cases attended the General Hospital, Colombo, for treatment—941 cases out of the 1,444 were treated at the General Hospital.

The total number of deaths in the Island from cancer and other tumours reported by the Registrar-General was 580 during the year.

Cancer Returns of In-patients in Hospitals for 1938.

SINHALESE.

Age.	Sex.	Cheek.		Tongue.		Penis.		Breast.		Uterus.		Palate, Jaw, and Mouth.		Skin and Extremities.		Stomach.		Caecum.		Rectum.		Liver.		Intestines.		Ovary.		Oesophagus.		Lymph Glands.		Other Sites.		Sites not specified.		Total.	
		C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.		
20-30	Male	9	—	1	—	6	—	4	—	11	—	3	—	1	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	—	—	27	1
	Female	3	—	1	—	24	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26	9	
31-40	Male	24	1	3	—	—	—	14	4	55	2	6	2	2	—	4	2	1	—	—	—	2	2	—	—	—	—	—	—	—	—	—	—	—	—	34	1
	Female	7	—	1	—	14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	91	11	
41-50	Male	28	2	6	—	—	—	—	—	—	—	12	—	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	84	6	
	Female	14	2	3	—	—	—	12	1	60	1	19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	111	5	
51-60	Male	81	5	12	—	19	4	7	—	58	5	15	1	3	—	2	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	159	14	
	Female	16	1	3	—	27	5	—	—	33	10	16	3	3	—	6	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	114	16	
61 and upwards	Male	67	3	15	—	3	—	6	—	—	—	18	1	3	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	157	15	
	Female	12	1	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	74	18	
Total	..	261	15	48	6	91	9	43	5	217	18	70	7	17	—	19	6	2	—	36	7	10	5	4	—	6	2	10	2	5	—	67	10	21	2	927	94

TAMILS.

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OTHER RACES.

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C = cases.

D = deaths.

2.—COMMUNICABLE DISEASES.

Tables of Communicable Diseases.—The following tables show the number of cases and deaths from the communicable diseases notified for the whole Island inclusive of the three Municipal towns, and their distribution according to months and provinces :—

TABLE I.

Notified Cases of Communicable Diseases with Deaths and Fatality Rates.

	Cases.	Deaths.	Fatality Rate.	Fatality Rate for 1937.
Chickenpox ..	7,315 ..	7 ..	·09 ..	·03
Cholera ..	— ..	— ..	— ..	—
Diphtheria ..	165 ..	24 ..	14·54 ..	15·55
Dysentery ..	4,989 ..	487 ..	9·76 ..	9·88
Enteric ..	2,670 ..	530 ..	19·85 ..	19·09
Measles ..	6,178 ..	14 ..	·23 ..	·35
Mumps ..	4,122 ..	4 ..	·09 ..	·26
Pulmonary tuberculosis ..	2,780 ..	806 ..	28·99 ..	33·09
Plague ..	9 ..	7 ..	77·77 ..	96·55
Smallpox ..	— ..	— ..	— ..	—
Whooping cough ..	620 ..	5 ..	·81 ..	1·21

TABLE II.

Distribution by Provinces of Notified Communicable Diseases.

Province.	Chicken-pox.	Cholera.	Diphtheria.	Dysentery.	Enteric.	Measles.	Mumps.	Pulmonary Tuberculosis.	Plague.	Smallpox.	Whooping Cough.
Western Province	4,115..	— ..	129..	1,861..	1,112..	1,679..	1,260..	1,651..	9 ..	— ..	349 ..
Central Province ..	884..	— ..	20..	162..	238..	768..	455..	242..	— ..	— ..	43 ..
Southern Province	1,038..	— ..	3..	881..	607..	1,119..	214..	330..	— ..	— ..	40 ..
Eastern Province..	62..	— ..	1..	89..	29..	251..	77..	29..	— ..	— ..	7 ..
Northern Province	327..	— ..	— ..	320..	253..	957..	1,451..	48..	— ..	— ..	93 ..
North-Central Province ..	3..	— ..	— ..	17..	21..	179..	23 ..	17..	— ..	— ..	9 ..
North-Western Province ..	189..	— ..	1..	965..	139..	431..	364..	221..	— ..	— ..	44 ..
Sabaragamuwa ..	591..	— ..	10..	666..	207..	617..	252..	207..	— ..	— ..	35 ..
Uva ..	106..	— ..	1..	28..	64..	177..	26..	35..	— ..	— ..	— ..
Total ..	7,315	—	165	4,989	2,670	6,178	4,122	27,80	9	—	620

TABLE III.

Distribution by Months of Notified Communicable Diseases, 1938.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Chickenpox—													
Cases ..	954..	831..	855..	509..	307..	209..	276..	477..	475..	698..	818..	906..	7,315
Deaths ..	— ..	— ..	— ..	1..	— ..	— ..	— ..	1..	3..	1..	— ..	1..	7
Cholera—													
Cases ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	—
Deaths ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	— ..	—
Diphtheria—													
Cases ..	6..	14..	13..	14..	9..	15..	17..	13..	17..	20..	13..	14..	165
Deaths ..	3..	— ..	4..	2..	— ..	5..	— ..	2..	3..	2..	1..	2..	24
Dysentery—													
Cases ..	639..	270..	234..	225..	221..	317..	425..	511..	699..	655..	518..	275..	4,989
Deaths ..	66..	31..	20..	20..	28..	31..	53..	49..	57..	46..	54..	32..	487
Enteric—													
Cases ..	191..	179..	260..	233..	247..	225..	224..	248..	214..	224..	189..	236..	2,670
Deaths ..	44..	35..	55..	56..	51..	37..	43..	61..	37..	40..	42..	29..	530

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Measles—													
Cases ..	803..	738..	1,033..	389..	326..	466..	493..	349..	280..	469..	459..	373..	6,178
Deaths ..	1..	—	5..	1..	2..	—	—	2..	—	1..	2..	—	14
Mumps—													
Cases ..	317..	330..	488..	246..	343..	398..	446..	365..	292..	365..	257..	275..	4,122
Deaths ..	—	—	1..	1..	—	1..	—	—	1..	—	—	—	4
Pulmonary tuberculosis—													
Cases ..	236..	155..	202..	204..	185..	235..	305..	255..	257..	273..	245..	228..	2,780
Deaths ..	77..	46..	76..	51..	52..	72..	82..	72..	75..	83..	58..	62..	806
Plague—													
Cases ..	—	2..	1..	1..	5..	—	—	—	—	—	—	—	9
Deaths ..	—	2..	—	—	5..	—	—	—	—	—	—	—	7
Smallpox—													
Cases ..	—	—	—	—	—	—	—	—	—	—	—	—	—
Deaths ..	—	—	—	—	—	—	—	—	—	—	—	—	—
Whooping cough—													
Cases ..	110..	51..	58..	24..	29..	90..	41..	29..	52..	87..	27..	22..	620
Deaths ..	—	—	1..	—	—	—	—	—	1..	2..	—	1..	5

Communicable Diseases.

(1) *Plague*.—There were 9 cases during the year with 7 deaths giving a fatality rate of 77·7. The incidence of the disease compared with the average for the previous 5 years (48) has decreased to 9. All the cases occurred within the Colombo Municipality and were of the bubonic variety.

The incidence in Colombo has been the lowest on record for many years, the previous years figures have been for 1937, 27 cases; for 1936, 39 cases; for 1935, 57 cases; and for 1934, 34 cases.

The last case of rat plague was on August 23, 1938, and the last case of human plague on May 29, 1938. There is some justification for feeling that the control of plague during the year has been due to H. C. N. fumigation that was undertaken of all grain, cotton, and other cargo likely to have infected rats or fleas from plague infected ports.

(2) *Cholera*.—This is a disease introduced from India. There were no cases during 1937 and 1938 in the Island.

(3) *Smallpox*.—This is also a disease introduced from India. There were no cases in 1938.

(4) *Chickenpox*.—7,315 cases were reported during the year with 7 deaths, giving a fatality rate of 0·09 per cent.

(5) *Diphtheria*.—165 cases were reported with 24 deaths giving a fatality rate of 14·54 per cent.

There were 110 hospital cases with 21 deaths. The total number of deaths for the Island was 39.

(6) *Measles*.—6,178 cases were reported during the year with 14 deaths giving a fatality rate of 0·23 per cent.

(7) *Mumps*.—4,122 cases were reported during the year with 4 deaths giving a fatality rate of 0·09 per cent.

(8) *Whooping Cough*.—620 cases were reported with 5 deaths giving a fatality rate of 0·81 per cent.

(9) *Enteric*.—There were 3,242 hospital cases with 696 deaths. The total number of deaths for the Island was 920.

The number of registered deaths does not indicate the actual mortality from this disease as some deaths registered as enteric fever in rural areas by lay Registrars are not cases of enteric fever because the last "typhoid state" is given as the cause of death instead of the proper disease itself.

(10) *Dysentery*.—There were 6,482 hospital cases treated with 796 deaths. The total number of deaths registered for the Island was 2,228 in 1938.

Of the hospital cases 2,961 were amoebic, 1,903 bacillary, and the balance 1,588 undefined.

4,989 cases were notified with 487 deaths giving a fatality rate of 9.76 per cent.

(11) *Influenza*.—There were 296,995 dispensary cases and 11,326 hospital cases with 148 deaths. The total number of deaths for the Island was 1,888.

(12) *Pulmonary Tuberculosis*.—There were 2,867 dispensary cases and 5,499 hospital cases with 1,363 deaths. The total number of deaths registered for the Island was 3,228.

2,780 cases were notified with 806 deaths giving a fatality rate of 28.9 per cent.

Please see section VI. for the special institutions for the treatment of tuberculosis.

(13) *Malaria*.—A report on this disease is given in section III.

(14) *Venereal Diseases*.—A report on this is given in section VI.

(15) *Parangi (Yaws)*.—There were 7,064 dispensary cases and 794 hospital cases with 3 deaths. The total number of deaths for the Island was 12.

The programme of work was the same as last year. The work done during the year by the Medical Officers of Health, Field Medical Officers, and one Itinerating Medical Officer is given below :—

Province.	Cases.			Number Treated.	Injections given.				No. of Cases at the end of Year.		
	Total.	Infective.	Non-infective.		1st	2nd	3rd	4th	Total.	Infectious	Non-infectious.
Western Province	12..	11..	1..	8..	1..	1..	2..	1..	5..	—	12
Central Province	482..	152..	330..	348..	79..	91..	204..	4..	378..	116..	186
Southern Province	1,239..	855..	384..	934..	589..	539..	688..	192..	2,008..	422..	785
Eastern Province	760..	200..	560..	752..	752..	457..	118..	12..	1,339..	179..	543
Northern Province	—	—	—	—	—	—	—	—	—	—	—
North-Western Province	353..	142..	211..	343..	323..	234..	123..	46..	726..	40..	234
North-Central Province	27..	9..	18..	14..	13..	10..	6..	—	29..	7..	20
Province of Sabaragamuwa	119..	116..	3..	117..	116..	103..	50..	6..	275..	22..	93
Province of Uva	2..	—	2..	2..	2..	2..	2..	—	6..	—	2
Total	2,994	1,485	1,509	2,518	1,875	1,437	1,193	261	4,766	786	1,875

(16) *Leprosy*.—During the year 1,929 cases with 76 deaths were treated at Government hospitals including the two asylums for the segregation of lepers under the Leper Ordinance. A report on the two asylums is given in section VII.

Leprosy Survey : Introduction.—During the first 8 months of the year the survey of the North-Western Province was continued and completed in August, 1938. In September, the Survey Medical Officers paid their annual visit to the Eastern Province and reviewed the work that was being carried on there. The survey of the North-Central Province was taken up and completed in October.

In the months of November and December the officers undertook a rapid follow-up survey of the more important endemic areas, in the Western and Southern Provinces, extending from Negombo to Hambantota, reviewing not only the progress of the anti-leprosy measures adopted, but also the progress of all cases on parole.

In February, Mr. Pany Burgess, Dr. Saunders, the President, and Epidemiologist respectively of the American Leprosy Foundation and Dr. H. W. Wade, the Medical Director of the Philippine Islands visited the Island and were shown the leprosy institutions and the work in connection with the survey and control of leprosy.

In June Dr. Oberdreff of the British Empire Leprosy Relief Association spent nearly a fortnight in Ceylon familiarizing himself with the leprosy work in the Island.

Dr. D. S. de Simon, Medical Officer-in-Charge, Leprosy Survey, attended the International Congress of Leprosy, Cairo, in March, 1938, as the official delegate from Ceylon. This visit enabled him to come into contact with the world's leading

leprosy workers and to assimilate knowledge on the progress of the leprosy investigation and control and the lines of work in other countries which have been of great value to the campaign against leprosy in the Island.

Staff.—The Leprosy Survey Staff consisted of two Medical Officers, two Apothecaries, Western Province; one Apothecary, Southern Province; one Apothecary, Eastern Province; and one Orderly at the Central Leprosy Office and Clinic, Maradana.

Areas Surveyed.—The areas surveyed during the year constituted about 7,025 square miles with a population of over 650,000. These include the following health areas, with their population and incidence :—

NORTH-WESTERN PROVINCE.

Kurunegala District.

No.	Area.	Population.	No. of Cases.
1 ..	F. M. O., Galgamuwa ..	19,882 ..	1 ..
2 ..	F. M. O., Maho ..	28,062 ..	7 ..
3 ..	F. M. O., Gokarella ..	35,333 ..	5 ..
4 ..	F. M. O., Wariyapola ..	53,203 ..	1 ..
5 ..	F. M. O., Narammala ..	33,442 ..	4 ..
6 ..	F. M. O., Polgahawela ..	46,238 ..	9 ..
7 ..	F. M. O., Kuliyaipitiya ..	44,306 ..	3 ..
8 ..	F. M. O., Pannala ..	45,420 ..	3 ..
9 ..	F. M. O., Bingiriya ..	28,862 ..	— ..
10 ..	M. O. H., Kurunegala ..	83,700 ..	2 ..

Chilaw District.

11 ..	F. M. O., Nattandiya ..	34,709 ..	1 ..
12 ..	F. M. O., Dankotuwa ..	43,634 ..	8 ..
13 ..	M. O. H., Chilaw ..	42,000 ..	7 ..

Puttalam District.

14 ..	F. M. O., Puttalam ..	17,115 ..	3 ..
15 ..	F. M. O., Mundel ..	22,285 ..	— ..

NORTH-CENTRAL PROVINCE.

16 ..	M. O. H., Anuradhapura U. D. C. ..	9,800 ..	5 ..
17 ..	Nuwaragam palata ..	36,352 ..	3 ..

Kalagam Palata.

18 ..	F. M. O., Kekirawa ..	20,708 ..	2 ..
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Tamankaduwa Palata.

19 ..	M. O., Polonnaruwa ..	7,907 ..	14 ..
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Hurulu Palata.

20 ..	M. O., Kahatagasdigiliya ..	23,923 ..	— ..
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In addition to the above, follow-up work was carried out in the Eastern, Western, and Southern Provinces.

Progress of the Survey.—The survey has been progressing satisfactorily year by year and at the end of 1938, nearly $\frac{3}{4}$ of the Island had been surveyed and brought under control measures. The area of work is extending and the control work, the main activities of which are segregation of open cases, searching out and treating closed cases and the follow-up of the discharged negatives together with the associated office work and the study of statistical data is increasing.

Treatment Centres.—A new clinic was opened at Hendala in January, 1938, making a total of 16 clinics, which have been operating during the year. 1,032 cases are scheduled to these clinics of whom 645 are for observation only and 387 for observation and treatment. 4,387 treatments were given at these clinics. As a result of the rapid re-survey done at the end of 1938 the number of cases for treatment will be reduced by about 30 per cent.

Statement of Work done in Treatment Centres.

Clinics.	No. of Cases in the Area.	No. for Observation.	No. for Treatment.	Total No. of Treatments.
1. Colombo ..	304	155	149	1,852
2. Kadawata ..	85	52	33	420
3. Lunawa ..	118	78	40	204
4. Hendala ..	26	16	10	158
5. Wadduwa ..	31	13	18	30
6. Kalutara ..	41	14	27	118
7. Beruwala ..	33	17	16	48
8. Horana ..	55	47	8	—
9. Pimbura ..	22	13	9	—
10. Bentota ..	20	15	5	43
11. Balapitiya ..	31	28	3	25
12. Galle ..	77	55	22	244
13. Weligama ..	100	80	20	337
14. Kalmunai ..	59	42	17	568
15. Kattankudi ..	19	15	4	54
16. Nindoor ..	11	5	6	286
Total ..	1,032	645	387	4,387

Training of Officers.—Wherever the survey has been conducted all officers concerned in dealing with the disease were trained in the methods of early diagnosis and treatment. Talks on leprosy were given in the schools and in the villages in the areas surveyed.

Senior Medical Students, Field Medical Officers and Sanitary Learners attended lectures and demonstrations at the Central Leprosy Clinic, Maradana.

Schools.—During the year 31,167 children were examined in 242 schools and 6 cases were detected. Only one case was becoming lepromatous and has been segregated.

Province.	No. of Schools.	Scholars.	Cases.
North-Western Province ..	191	27,170	5
North-Central Province ..	51	3,997	1
Total ..	242	31,167	6

Propaganda.—In addition to talks on leprosy in various places a section of leprosy for purposes of education was arranged and demonstrations given by the officers of the survey at the Hewagam Korale School Exhibition and Kalutara Health Exhibition.

Statistics.—During the year 1938 the total number of cases detected were 312 as against 281 in the previous year. There were 148 admissions into the two asylums, 31 readmissions, 87 negatives discharged on parole, 86 deaths, and 14 repatriations.

At the end of 1938 there were 2,519 known cases in the Island of whom 1,002 are in segregation in the two asylums, and 1,517 on parole, which include 257 cases discharged as negative. 22 are awaiting segregation.

Statement of Cases Segregated in Asylums and remaining outside on Parole to the end of 1938.

Province.	Segregated.	Outside.
Western ..	495	872
Southern ..	152	280
Eastern ..	111	144
Central ..	73	75
Sabaragamuwa ..	89	73
Uva ..	34	23
North-Western ..	19	26
Northern ..	20	14
North-Central ..	9	10
Total ..	1,002	1,517

B.—VITAL STATISTICS.

The following tables give the more important vital statistics for Ceylon :—

TABLE I.

Population, Births, Deaths, Immigration, and Infant Mortality since 1871.

	Average Annual Estimated Population (Mid-year Estimates for 1929-1938).	Average Annual Number of Births registered (Actual Numbers for 1929-1938).	Average Annual Number of Deaths registered (Actual Numbers for 1929-1938).	Excess of Registered Births over Deaths.	Excess of Immigrants over Emigrants.	Average Annual Birth Rate per 1,000 (Annual Rates for 1929-1938).	Average Annual Death Rate per 1,000 (Annual Rates for 1929-1938).	Average Annual Infant Mortality, i.e., Deaths of Children under 1 Year of Age per 1,000 Births (Annual Rates for 1929-1938).
1871-1880 ..	2,584,780	70,815	58,836	11,979	23,862	27.4	22.4	—
1881-1890 ..	2,888,104	83,664	69,238	4,426	10,398	28.9	24.0	158
1891-1900 ..	3,295,279	112,204	89,664	22,540	34,070	34.1	27.2	169
1901-1910 ..	3,838,750	145,962	110,347	35,615	17,735	38.0	28.7	180
1911-1920 ..	4,311,328	164,807	132,866	31,941	9,225	38.2	30.8	196
1921-1930 ..	4,920,028	194,611	128,916	65,695	14,880	39.5	26.2	182
1929 ..	5,171,938	198,005	135,274	62,731	18,541	38.3	26.1	187
1930 ..	5,253,210	205,106	133,708	71,398	9,874	39.0	25.4	175
1931 ..	5,325,354	199,170	117,453	81,717	31,581*	37.4	22.1	158
1932 ..	5,386,106	199,370	110,650	88,720	28,837*	37.0	20.5	162
1933 ..	5,514,516	209,032	114,690	94,342	58,170*	38.6	21.2	157
1934 ..	5,551,623	206,512	127,069	79,442	94,534	37.2	22.9	173
1935 ..	5,598,467	192,755	204,823	—	7,861*	34.4	36.6	233
1936 ..	5,631,000	192,060	123,039	69,021	7,965*	34.1	21.8	166
1937 ..	5,712,000	216,079	124,210	91,869	9,583	37.8	21.7	158
1938 ..	5,810,000	208,390	122,300	86,090	1,363*	35.9	21.0	161

* Excess of emigrants over immigrants.

TABLE II.

Vital Statistics by Provinces.

Province.	Population, 1938.	Area in Square miles.	Number of Births, 1938.	Number of Deaths, 1938.	Birth Rate per 1,000 of the Population, 1938.	Death Rate per 1,000 of the Population, 1938.	Infant Mortality Rate per 1,000 Births registered, 1938.
Western ..	1,566,000	1,432	47,976	27,874	30.6	17.8	131
Central ..	1,109,000	2,290	40,676	19,283	36.7	17.4	163
Southern ..	832,000	2,146	32,095	21,449	38.6	25.8	158
Northern ..	410,000	3,429	15,100	10,047	36.8	24.5	178
Eastern ..	223,000	3,840	9,196	6,745	41.2	30.3	205
North-Western ..	578,000	3,016	20,661	14,695	35.7	25.4	216
North-Central ..	97,000	4,009	4,134	3,592	42.6	37.0	263
Uva ..	349,000	3,277	14,028	7,386	40.2	21.2	157
Sabaragamuwa ..	646,000	1,893	24,524	11,229	38.0	17.4	135

TABLE III.

Vital Statistics by Urban and Rural Areas.

	Population Estimated to the Middle of 1938.	Births.		Deaths.		Maternal Deaths.		Infant Deaths.	
		Number.	Rate.	Number.	Rate.	Number.	Rate per 1,000 Live Births.	Number.	Rate per 1,000 Births.
Urban residents and non-residents in 39 proclaimed areas	835,000	33,187	39.7	25,427	30.5	1,000	30.1	5,291	159
For residents only ..	—	22,749	27.2	15,769	18.9	—	—	3,879	171
Rural areas	4,975,000	175,203	35.2	96,873	19.5	3,196	18.2	28,339	162
Whole Island	5,810,000	208,390	35.9	122,300	21.0	4,196	20.1	33,630	161

Stillbirths are registered only in the urban areas. During 1938 in the 37 principal towns, there were 2,353 stillbirths (including 1 monster, giving a rate of 73 per 1,000 live births).

TABLE IV.

Vital Statistics : (A) by Races and (B) by Communities.

Races and Communities.		Estimated Population at Mid-year, 1938.	Births.		Deaths.		Infant Deaths.			
			Number registered, 1938.	Rate per 1,000 Persons living, 1938.	Number registered, 1938.	Rate per 1,000 Persons living, 1938.	Number registered, 1938.	Rate per 1,000 Births registered, 1938.		
(A) Races—										
1.	All races	5,810,000	208,390	35.9	122,300	21.0	33,630	161		
2.	Europeans	11,000	131	11.9	78	7.1	5	38		
3.	Burghers and Eurasians	38,000	1,030	27.1	481	12.7	73	71		
4.	Sinhalese	3,896,000	143,886	36.9	81,869	21.0	21,892	152		
5.	Tamils	1,446,000	49,471	34.2	30,444	21.1	9,002	182		
6.	Moors	368,000	12,317	33.5	8,499	23.1	2,434	198		
7.	Malays	17,000	799	47.0	390	23.0	106	133		
8.	Others	34,000	756	22.2	539	15.9	118	156		
(B) Communities—										
1.	Ceylonese (i.e., total population less Europeans and Indians) on estates	5,128,000	182,854	35.7	109,678	21.4	29,269	160		
2.	European (including officials)	11,000	131	11.9	78	7.1	5	38		
3.	Indian immigrant population on estates	671,000	25,405	37.5*	12,544	18.5*	4,356	171*		

* per 1,000 of the mean population.

Indian Population on Estates.—Section 2 of the Medical Wants Ordinance, No. 9 of 1912, defines an "Estate" as "any estate in which labourers are employed having ten acres of land actually cultivated in tea, rubber, coffee, cocoa, cardamoms, camphor, pepper, or cinchona".

TABLE V.

Vital Statistics of Indian Population on Estates for the past Ten Years.

	Mean Population.	Births.		Deaths.		Infant Deaths.		Immigrants.	Emigrants.
		Number.	Rate.	Number.	Rate.	Number.	Rate.		
1929	731,177	25,064	34.3	18,382	25.1	5,338	213	105,095	104,411
1930	740,863	24,813	33.5	16,346	22.1	4,804	194	91,422	106,190
1931	685,527	23,441	34.2	14,231	20.8	4,303	184	68,337	91,573
1932	664,322	24,324	36.6	12,431	18.7	4,576	188	50,869	72,495
1933	618,314	24,335	39.4	11,688	18.9	4,397	181	32,898	88,969
1934	650,564	23,346	35.9	13,709	21.1	4,666	200	140,607	54,785
1935	679,201	25,759	37.9	18,133	26.7	5,094	198	43,018	43,036
1936	665,000	25,181	37.9	12,891	19.4	4,336	172	40,803	41,721
1937	664,000	25,495	38.4	12,591	19.0	4,321	169	51,427	47,924
1938	677,000	25,405	37.5	12,544	18.5	4,356	171	47,210	46,807

TABLE VI.

Number of Deaths for the Whole Island each Month for the past Five Years.

Month.	Number of Deaths, 1934.	Number of Deaths, 1935.	Number of Deaths, 1936.	Number of Deaths, 1937.	Number of Deaths, 1938.	Average Monthly Deaths, 1934-37.
January	11,541	36,251	15,330	12,936	13,869	17,813
February	9,964	26,550	12,708	11,479	11,351	14,411
March	9,105	19,065	11,251	9,804	10,790	11,855
April	8,786	15,928	9,968	9,519	9,440	10,495
May	9,116	16,688	9,450	9,445	10,117	10,721
June	8,739	15,450	8,961	8,912	9,328	10,148
July	9,476	16,242	9,366	9,549	9,304	10,769
August	9,967	14,561	9,538	10,115	9,818	10,691
September	8,540	10,888	8,277	10,054	8,875	9,257
October	9,910	10,913	8,770	10,209	9,824	9,744
November	12,198	10,872	9,344	10,651	10,158	10,502
December	19,728	11,415	10,076	11,537	9,426	12,361
Total	127,070	204,823	123,039	124,210	122,300	138,767

Causation of Deaths.—The registration of births and deaths is compulsory throughout the Island, but the causes of deaths given cannot be accepted as completely accurate since in the rural districts deaths are not usually medically

certified and the majority of the registering officers are not medical men. The Registrar-General compiles separately the vital statistics of the 39 principal towns in Ceylon and these figures are more reliable as regards the causes of deaths, since most of them are based on the certificates of medical practitioners.

TABLE VII.

Causes and Numbers of Deaths in the 39 Principal Towns for the past Three Years.

Causes.		Number of Deaths.		
		1936.	1937.	1938.
I.— <i>Infant Mortality</i>		4,614	5,328	5,291
(A) <i>One Week and under.</i>				
1. Prematurity	..	686	814	791
2. Debility	..	737	846	964
3. Convulsions	..	170	173	152
4. Tetanus	..	15	6	1
5. Bronchitis	..	4	1	4
6. Pneumonia	..	3	6	7
7. Other causes	..	94	136	175
(B) <i>Over One Week and under One Year.</i>				
1. Prematurity	..	96	132	138
2. Debility	..	629	697	726
3. Convulsions	..	444	451	368
4. Diarrhoea	..	89	143	203
5. Enteritis	..	411	411	385
6. Tetanus	..	12	4	6
7. Bronchitis	..	125	134	136
8. Pneumonia	..	475	659	572
9. Syphilis	..	21	29	34
10. Other causes	..	603	686	629
II.— <i>General Mortality (One Year and over)</i>		19,513	20,442	20,136
1. Plague	..	28	19	9
2. Smallpox	..	1	—	—
3. Chickenpox	..	2	4	—
4. Measles	..	10	15	5
5. Influenza	..	309	412	362
6. Enteric fever	..	520	573	566
7. Malaria and malarial cachexia	..	2,112	1,520	1,439
8. Cholera	..	1	—	—
9. Diarrhoea	..	630	669	590
10. Enteritis	..	702	684	786
11. Dysentery	..	487	502	584
12. Ankylostomiasis	..	637	571	630
13. Diseases due to other intestinal parasites	..	508	592	587
14. Cancer	..	273	284	287
15. Pulmonary tuberculosis	..	1,332	1,333	1,320
16. Other tuberculous diseases	..	106	100	107
17. Anaemia	..	61	67	82
18. Diabetes Mellitus	..	266	297	304
19. Paralysis	..	436	487	587
20. Convulsions	..	242	244	178
21. Tetanus	..	134	121	141
22. Heart disease	..	903	929	1,045
23. Bronchitis	..	394	347	428
24. Pneumonia	..	3,095	3,848	3,433
25. Other diseases of the respiratory system.	..	263	329	262
26. Bright's disease and nephritis	..	746	870	795
27. Puerperal eclampsia	..	101	116	107
28. Puerperal septicaemia	..	428	411	439
29. Accidents of childbirth	..	388	474	454
30. Accidents and negligence	..	533	592	602
31. Homicide	..	117	83	106
32. Suicide	..	77	107	101
33. Execution	..	41	36	26
34. All other causes	..	3,630	3,806	3,774
Total, all causes		24,127	25,770	25,427

TABLE VIII.

Deaths according to the Class of Diseases for the whole Island during the past Two Years.

	1937.	1938.
I.—Infectious and parasitic diseases—		
(a) Infectious and parasitic diseases (less tuberculous and venereal diseases)	16,397 ..	16,939
(b) Tuberculous diseases	3,552 ..	3,592
(c) Venereal diseases	136 ..	182
II.—Cancer and other tumours	612 ..	636
III.—Rheumatic diseases, nutritional diseases, diseases of the endocrine glands and other general diseases	6,811 ..	6,444
IV.—Diseases of the blood and blood-making organs	2,198 ..	2,300
V.—Chronic poisonings and intoxications	15 ..	7
VI.—Diseases of the nervous system and of the organs of special sense	15,260 ..	16,060
VII.—Diseases of the circulatory system	2,049 ..	2,160
VIII.—Diseases of the respiratory system	16,046 ..	15,071
IX.—Diseases of the digestive system	8,603 ..	8,904
X.—Non-venereal diseases of the genito-urinary system and annexa	1,949 ..	1,948
XI.—Diseases of pregnancy, childbirth, and the puerperal state	4,304 ..	4,196
XII.—Diseases of the skin and cellular tissue	10,328 ..	9,456
XIII.—Diseases of the bones and organs of locomotion	23 ..	17
XIV.—Congenital malformations	61 ..	56
XV.—Diseases of early infancy	9,749 ..	10,008
XVI.—Old age	6,256 ..	6,615
XVII.—Violent and accidental deaths	3,046 ..	3,046
XVIII.—Ill-defined causes and death	16,815 ..	14,663

TABLE IX.

Deaths due to Diseases of Special Interest in Ceylon for the whole Population during the past Five Years.

	1934.	1935.	1936.	1937.	1938.
1. Dysentery	2,279 ..	6,175 ..	2,217 ..	1,937 ..	2,228
2. Pulmonary tuberculosis	3,094 ..	3,387 ..	3,167 ..	3,145 ..	3,228
3. Infantile convulsions	12,939 ..	16,501 ..	11,323 ..	12,015 ..	12,430
4. Diarrhoea	8,047 ..	11,146 ..	7,123 ..	6,978 ..	7,322
5. Pneumonia	8,398 ..	11,431 ..	9,668 ..	11,008 ..	10,208
6. Ankylostomiasis	2,118 ..	2,644 ..	1,839 ..	1,708 ..	1,808
7. Dropsy	2,020 ..	2,381 ..	2,216 ..	1,701 ..	1,510
8. Anaemia	2,244 ..	2,645 ..	1,905 ..	1,988 ..	2,126
9. Intestinal parasites	4,372 ..	4,832 ..	3,077 ..	3,502 ..	3,409
10. Puerperal septicaemia	1,461 ..	1,647 ..	1,527 ..	1,453 ..	1,466
11. Malaria	2,333 ..	47,317 ..	7,620 ..	4,405 ..	4,771
12. Enteric fever	715 ..	690 ..	773 ..	880 ..	920
13. Rickets	4,878 ..	5,133 ..	3,599 ..	3,850 ..	3,519
14. Tetanus	266 ..	286 ..	285 ..	289 ..	302
15. Rabies	58 ..	85 ..	64 ..	54 ..	38
16. Cholera	— ..	22 ..	24 ..	2 ..	—
17. Influenza	2,305 ..	1,917 ..	1,583 ..	2,087 ..	1,888
18. Leprosy	104 ..	98 ..	69 ..	89 ..	76
19. Plague	32 ..	57 ..	44 ..	34 ..	12
20. Scarlet fever	— ..	— ..	— ..	— ..	—
21. Anthrax	1 ..	1 ..	4 ..	3 ..	3
22. Smallpox	10 ..	20 ..	4 ..	— ..	—
23. Diphtheria	32 ..	41 ..	33 ..	34 ..	39
24. Parangi	8 ..	9 ..	14 ..	9 ..	12
25. Pyrexia	15,467 ..	22,507 ..	14,520 ..	13,918 ..	12,038

The above table shows that infantile convulsions and pyrexia continue to be the two principal causes of death followed by pneumonia and diarrhoea.

TABLE X.

**Causes and Numbers of Deaths among the Indian Population on Estates
for the past Five Years.**

	1934.	1935.	1936.	1937.	1938.
1. Dysentery ..	491 ..	683 ..	337 ..	301 ..	265
2. Debility ..	2,620 ..	2,840 ..	2,430 ..	2,406 ..	2,314
3. Diarrhoea and enteritis ..	626 ..	897 ..	601 ..	531 ..	542
4. Pneumonia ..	2,242 ..	2,360 ..	1,925 ..	1,947 ..	1,760
5. Ankylostomiasis ..	835 ..	1,091 ..	719 ..	631 ..	700
6. Infantile convulsions ..	963 ..	1,174 ..	783 ..	849 ..	841
7. Dropsy ..	33 ..	52 ..	38 ..	39 ..	27
8. Pulmonary tuberculosis ..	230 ..	217 ..	227 ..	226 ..	215
9. Anaemia ..	17 ..	45 ..	23 ..	28 ..	44
10. Other diseases ..	5,652 ..	8,773 ..	5,810 ..	5,633 ..	5,836

III.—HYGIENE AND SANITATION.

A.—GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

The Malaria Control and Health Scheme during 1938 continued to operate in the same areas as in 1937. With the inauguration of this scheme in 1936 there were 3 groups of Medical Officers doing health work, viz., those in charge of health units, those in charge of district health work and the newest group of Field Medical Officers.

During the year under review the work of all the groups has functioned on one basis, viz., that of the health unit. This was made possible by smaller areas being assigned to both District Medical Officers of Health and Field Medical Officers.

There is no difference in the work therefore of Medical Officers of Health who are fully trained possessing the Diploma in Public Health and Field Medical Officers who are partially trained with 6 weeks practical training in public health work. The latter are guided in their work by monthly visits of experienced Medical Officers of Health who act as Supervising Officers.

Health Unit work and that of Field Medical Officers have been described in past annual reports.

A new departure that has been inaugurated is the placing of the dispensaries in charge of Apothecaries under the supervision of Medical Officers of Health and Field Medical Officers. Dispensaries are field institutions dealing chiefly with Malaria and Ankylostomiasis and by right should come under the supervision of the health staff whose two chief problems are these diseases. By this procedure it is proposed to change the functions of the dispensary from being a place for the mere dispensing of medicines to being a centre for all rural health work of the area. It will be a centre for health propaganda and for conducting various types of clinics, such as, ante-natal and well-baby, school clinics, parangi clinics in centres where the disease occurs, and venereal disease clinics. Special emphasis is being placed at the dispensaries on the effective treatment of malaria with all available drugs.

A type of work that has been developed during the year for villages in backward areas is for the Medical Officer of Health or Field Medical Officer of the area to visit them once a month, look up all expectant mothers, infants, pre-school and school children and attend to any conditions that need advice and treatment. Treatment for malaria, hookworm and yaws is given and those needing hospital attention are referred to the nearest hospital and the Village Headman makes himself responsible for seeing that they go to hospital. The transport of expectant mothers and destitute cases are met from Government funds. Instructions are left behind for any treatment before the next visit to be obtained from the nearest dispensary. At subsequent visits the people are looked up and effort made to maintain them in good health. Steps are also taken to educate them in health matters by visits to homes, talks, and lantern and cinema shows. The people are encouraged to keep their gardens clean, to store their refuse in manure pits, to boil their drinking water, to develop a vegetable garden, to provide windows for their houses and to get rid of mosquito breeding places. After their confidence has been secured by relieving them of some of their

physical handicaps through treatment, the construction of latrines is undertaken. If taken up earlier the response may not be satisfactory. The people are getting interested in this type of work.

With the establishment of Cottage hospitals the policy that is being followed is for the Medical Officer in charge to be given an area around the hospital for health work as well. The Sanitary Assistants and Midwives in these areas are placed under the supervision of the Medical Officer. This same policy is being followed in the case of the smaller hospitals and dispensaries in charge of Medical Officers. Medical Officers in charge of these institutions are new entrants who have either had experience of public health work in their capacity as Field Medical Officers or have had a practical training of 6 weeks in public health work. During the year, work on this basis was established at 2 Cottage Hospitals, one small hospital, and one dispensary. This policy is being continued.

Control of soil pollution received adequate attention during the year when 27,244 latrines (21,792 in 1937) were built.

In the provision of protected water supplies 61 new public wells and 746 private wells were constructed and 3,735 wells were improved.

In the control of communicable diseases, there have been 9 cases of human plague the lowest number in any year since the introduction of the disease into Ceylon. There have been no outbreaks in the provinces. The last case of plague occurred on August 23 so that Colombo has been free of human as well as rat plague for a continuous period of 4 months and 7 days. This freedom is assigned to the energetic measures taken in fumigating all grain and contact cargo arriving from plague infected ports. There have been no cases of cholera or smallpox, which when they occur are introduced from India. The incidence of typhoid and dysentery continues to maintain its high level. 2,202 cases of the former and 4,989 of the latter being reported. The control of these diseases depends on the more wide provision of latrines and protected water supplies. The incidence of diphtheria which is sporadic continues to show an increase from 135 in 1937 to 165 in 1938.

The incidence of malaria during the year showed no increase. In many localities it was below the normal for the previous 5 years. The Island-wide organization established as the result of the 1934-35 epidemic has functioned well in keeping the disease under control.

The hookworm campaign carried out 2,169,931 treatments.

The leprosy campaign which has completed its survey and organized its control work in the Eastern, Western, Sabaragamuwa and Southern Provinces completed the North-Western, North-Central and Central Provinces, and carried out follow-up work in provinces completed in previous years. At the end of the year there were 1,002 cases segregated at the 2 asylums, and 1,517 cases outside on parole.

The Island-wide survey of filariasis completed the North-Western and Southern Provinces. The demonstration in filariasis control in Dewamedi Hatpattu in the North-Western Province was continued. Regulations for the control of the disease are before the Executive Committee of Health for their approval.

The control of yaws has been placed on a satisfactory basis and the work was well organized during the year by each Medical Officer of Health and Field Medical Officer surveying all cases in his area and recording and treating them. All contacts are also noted and both cases and contacts are looked up and treatment given to those needing it every 6 months.

Maternity and child welfare work continues to be popular. The work was carried out at 311 centres as compared with 207 in 1937; at which 9,485 clinics were held as compared with 8,375 in 1937; with a total attendance of 76,108 expectant mothers as compared with 39,841 in 1937, 157,988 infants as compared with 88,479 in 1937 and 75,177 pre-school children as compared with 39,637 in 1937. In spite of this increased work it is rather disconcerting to find an increase in the infant mortality rate from 158 in 1937 to 161 in 1938 and in the maternal mortality rate from 19.9 in 1937 to 20.1 in 1938. An investigation into this is being arranged for.

The number of schools in which health work has been done increased from 3,106 in 1937 to 3,461 in 1938; the number of children medically inspected increased from 84,730 in 1937 to 94,648 in 1938; the defects found were 173,071 as compared with

124,540 in 1937; and the defects treated were 73,340 or 42·4 per cent. as compared with 36 per cent. in 1937. School health education has received greater interest and support.

Health work under Urban District Councils continues to be carried out satisfactorily and from the beginning of 1939 all Urban District Councils will be employing Medical Officers of Health of the department in charge of their health work.

I.—PREVENTIVE MEASURES.

(a) MOSQUITO-BORNE DISEASES.

(1) Malaria.

(a) *General*.—Malaria is the most prevalent disease in the Island and the number of hospital cases during 1938 was 54,413. The cases treated at the dispensaries and outpatients' departments of hospitals numbered 1,998,666 in 1938. There were 1,412 deaths in hospitals from malaria in 1938 giving a fatality rate of 2·6 per cent.

The number of malaria cases treated annually in hospitals and dispensaries during the last ten years is as follows :—

Year.	Cases treated in Hospitals.	Percentage of the Total Number of Patients treated in the Hospitals.	Cases treated in Dispensaries.	Percentage of the Total Number of Patients treated in the Dispensaries.
1934	41,551	16·5	2,293,224	44·5
1935	161,313	40·8	5,293,468	65·4
1936	73,192	22·5	2,873,463	47·7
1937	57,190	16·6	2,251,786	38·2
1938	54,413	15·1	1,998,666	33·9

The following table shows the hospital admissions and deaths on account of malaria in the different provinces for the past three years :—

	1936.		1937.		1938.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
General Hospital, Colombo	5,775	229	2,609	122	2,879	96
Western Province	7,842	262	5,112	111	5,742	145
Central Province	15,594	293	9,979	177	8,047	145
Northern Province	4,404	117	4,422	49	4,061	64
Eastern Province	2,964	41	4,093	11	2,246	45
Southern Province	7,411	189	6,995	97	7,366	281
North-Western Province	8,712	319	7,821	159	6,801	274
North-Central Province..	3,858	194	3,217	39	3,077	81
Province of Uva	7,210	104	6,608	56	4,864	81
Sabaragamuwa	9,422	282	6,334	167	9,330	200
Total	73,192	2,030	57,190	988	54,413	1,412

(b) *Malaria Control and Health Scheme*.—The organisation for the control of malaria in the Island was outlined in last year's report. There has been no change in the programme of work and no additional areas were taken up for want of medical personnel. There are 4 areas, viz., the Jaffna Peninsula, Galle District, Province of Uva, and Nuwara Eliya District, which require to be further divided up to enable the intensive type of health work to be made available to these populations as has been provided for the remainder of the Island.

All health work done in the Island is included under this scheme. In previous reports figures of work done in health units were given separately. In this report figures in regard to health unit work, district health work, and the malaria control and the health scheme are given together in the appropriate sections of this report as representing the health work of the Island.

(i) **Intensive Campaign in Special Areas.**

Anuradhapura.—The year was the sixteenth of anti-malaria activities in this town. The town covers an area of $9\frac{1}{4}$ square miles and anti-malaria activities were confined to an area of 6 square miles.

Staff.—The permanent staff consisted of a Medical Officer of Health, two Sanitary Assistants, one overseer, three kanganies and 36 labourers.

Oiling.—A total of 72,497 situations covering an area of 5,137,000 square yards was oiled during the year. 10,274 gallons of oil were used for the purpose.

Minor Works.—The minor works gang carried out the following work, viz., cleaning of 1,746 breeding places; clearing of 92,145 ft. of drains and channels; stone lining of 2,730 ft. of channels; planting of shade trees along 250 ft. of channels; filling of 72 borrow pits (85 cubes); cutting of 7,828 revetment pegs; and transporting 1 cube rubble and 5.9 square turf sods.

Maintenance of Elas.—Wan-ela (7,300 ft.), Toluwila-ela (8,200 ft.), Halpan-ela (17,600 ft.), Divulgahakotuwa-ela (8,042 ft.), Malwatu lane pond channel (1,200 ft.), outlet channel from drinking pond to Halpan-ela (3,000 ft.), were systematically cleared of debris and obstructions, and their side-drains maintained in good order by the ela patrol gang. Maintenance of the recently completed Issurumuniya channel was also taken over in December.

Maintenance of Major Drainage Works.—This item of work consisted of repairing erosions of sides of channels, revetting of pegs, building of masonry walls, turfing of sides, &c., on the seven channels mentioned above. Eleven cubes of earthwork, 18,066 pegs revetted, 8 cubes stone lining 6,314 squares turfing, repairing 23 masonry falls and 1 regulator, 35.87 square masonry work, and building of 11 new drains were some of the items of work done in this connection.

Fish Distribution.—A fresh survey of the wells in town was made and it was found that in place of the 254 wells according to the then existing records there were 324 wells to be controlled. Each well was examined once a month and fish "millions" were introduced when necessary. The larval rate in wells was maintained at a very satisfactory level throughout the year—the annual rate being 1.9 per cent.

Quinine Prophylaxis.—Distribution of quinine tablets to school children, Government labour gangs, and to the public was continued. Quinine mixture was also issued to the town and Railway Clinics and to schools. A total of 15,695 five-grain tablets, 12,475 three-grain tablets and 888 oz. of quinine mixture was distributed.

Filling, Minor Drainage and Clearing.—This was almost exclusively done by the convicts' brigade.

Several large pools at the foot of Basawakkulama bund, erosions along the courses of Tissawewa spill channel, Halpan-ela and the reservations along Issurumuniya were filled. Some filling was also done in the Malwatu-oya lane pond to ensure better drainage. In all 74 situations were filled and 592 cubes of earth were used for the purpose.

The full length of the Malwatu-oya lane pond channel was deepened as the former level was found to be inadequate to drain the whole pond completely. A swamp behind the Grand Hotel and another along the Outer Circular road were completely drained. A new side drain connecting with the Tissawewa spill channel was opened.

The reservation of the Tissawewa Spill Channel was cleared to an extent of 6,000 square feet.

Major Drainage Works : (a) Kohilawala Channel.—The large filthy swamp along Outer Circular road in A. M. C. section 8B which was about 900 ft. in length and 100 ft. in width was drained by opening up a channel 900 feet in length and by filling. This large mosquito breeding swamp was thus eliminated and the land reclaimed.

(b) Nakkavehera Channel.—This channel of 4,700 ft. was opened up to drain away a large swamp along the Outer Circular road in the vicinity of Nakkavehera. The channel traverses the town in a south to north direction draining the area of its storm water and waste water into the Malwatu-oya.

(c) *Issurumuniya Channel*.—6,211 ft. in length, was opened to drain off the stagnant pools and neglected ponds around Issurumuniya Temple. To this channel was connected the pools at the foot of Tissawewa, the seepage water from the tank and irrigation works and the surplus water. The channel drains the area into the Halpan-ela.

(d) *Wan-ela*.—An automatic flush was constructed at the lower end of the ela.

(e) *Halpan-ela*.—A syphon flush was constructed at the lower end of tract 3.

(f) *Malwatu-oya Clearing*.—6,500 ft. of the Malwatu-oya mainly between Mihintale road bridge and Dickson road bridge were taken for clearing of the river bed. In the process of the work, 33,005 square ft. of the banks were cleared, 288 cubes of earth-work done, and 5 islets with trees in the river were also removed.

General.—(a) The total rainfall for the year was 49·61 in. (b) Spleen and parasite surveys were conducted in March and September. The spleen rates in March were 68·5 per cent. and 36·8 per cent. for the under 12 years and over 12 years age-groups respectively of children in town, while for children outside town the respective rates were 87·2 per cent. and 71·4 per cent. In September the corresponding spleen rates were 26·1 per cent. and 13·2 per cent. (in town) and 51·6 and 9·1 per cent. (outside town).

The March parasite rate for the town was 4·9 per cent. out of 41 blood films examined. (M.T. & Qt. 1; Qt. 1.)

In September, the in-town parasite rate was 3·8 per cent. out of 262 examined (B.T. 5; Qt. 5).

(c) Anti-malaria measures were carried out at Puliyanikulam Agricultural Station from December 12, 1938. The work consisted of oiling of breeding places, Shell-tox spraying of houses and labourers lines, fish introduction to wells, distribution of quinine to the staff and labourers and clearing and maintaining drains and channels.

(d) The hospital attendance figures for town cases were 36,199 for all diseases and 18,909 for malaria. The outside town cases were 8,198 for all diseases, and 3,287 for malaria.

Kurunegala.—The Urban District Council area of $4\frac{3}{4}$ square miles was under malaria control activities during the year. The Protected Zone of $1\frac{3}{4}$ square miles lies in the heart of the town and the surrounding area forms the Control Zone. 1938 was the eleventh year of the Anti-Malaria Campaign.

Staff.—The Medical Officer of Health, Health Unit, was in charge and he had one Sanitary Assistant, one overseer, two kanganies, and 24 labourers. An extra overseer was attached for emergency river oiling work in the district.

Oiling.—5,778 gallons of Shell-malariol were used in treating breeding places. The efficiency rate varied between 97 per cent. and 100 per cent.

Minor Works.—Under this head, 2,412 drains of a total length of 522,254 ft. were realigned. The Bu-ela, Wan-ela and Gettuwana-ela were systematically cleared of floatage and obstructions and canalized to prevent formation of pools.

The Sanitary Engineering Division constructed two syphons on the Bu-ela for intermittent flushing of the stream and a sluice on the Maligawa channel for the same purpose.

Fish Distribution and Well Control Work.—The total number of wells in the town increased from 590 in January to 602 in December; 28,203 examinations were made of the wells and in 1,790 instances were found breeding anopheline larvae. The percentage of wells found positive to anopheline breeding for the whole year was 6·3. The lowest monthly percentage was 3·0 in June, and the highest 8·2 in October. Regular introduction of fish “millions” was carried out and in addition the wells were petrolized from October.

Filling.—A survey of all breeding places which could be filled was made at the beginning of the year and a programme for filling was mapped out. A total of 2,058 breeding places were filled with 1,596 cubes of earth.

Drainage.—The Urban District Council contributed Rs. 100 a month for permanent anti-malaria work. This money was utilized for the construction of a portion of the Maligawa channel at sub-section 5A.

General.—(a) Severe drought conditions prevailed during the year with a total rainfall of only 52·98 as against 72·65 in 1937.

(b) Two spleen examinations were carried out in March and September. 466 town children examined in March gave a spleen rate of 10·9 per cent. while 947 children examined in September gave a spleen rate of 19·6 per cent. The corresponding rates in Weudawili Hatpattu were 38·3 per cent. and 36·0 per cent. respectively.

(c) The hospital attendance figure for malaria from the town was 5,438 as against 8,473 in 1937, and 13,751 in 1936.

(d) Malaria Day was celebrated in a useful manner.

Railway Anti-Malarial Works, Maho.—Anti-malaria activities were continued within a radius of $\frac{1}{2}$ mile from Maho Railway Station.

Staff.—The Field Medical Officer, Maho, was in charge and he had a Sanitary Assistant, a kangany and labour force of 20 men for anti-malaria work. The Sanitary Assistant, in addition to his anti-malaria work, was engaged in general sanitary work at Ullalapola and Madurugama villages.

Oiling.—66,284 breeding places were treated with 1,766 gallons of oil.

Minor Works.—123,977 ft. of drains were cleared and maintained in good condition.

Fish Distribution.—There were 53 wells in the area at the beginning but 3 of them were closed subsequently. The remaining 50 wells were examined 1,223 times and fish "millions" introduced whenever found necessary.

Quinine Prophylaxis.—Quinine tablets were administered to the Railway staff and the anti-malaria labourers according to programme. A total of 5,281 five-grain tablets was used during the year.

Filling.—A great deal of filling was done in the controlled area. 660 pits and low-lying places were filled during the year. 2,404 cubes of earth were used for filling.

General.—(a) The scavenging of the bazaar area was done by Village Committee labour. The Railway area and the premises were scavenged by the anti-malaria gang of labourers.

(b) The rainfall for the year was 40·57 inches, the lowest on record for the last six years.

(c) The dispensary attendance figure for all diseases was 14,882 against 23,143 in 1937.

Chilaw.—The year was the eleventh of anti-malaria activities in this town and area under control was about 2 square miles.

Staff.—The Medical Officer of Health was in charge and had a staff of 2 Sanitary Assistants, 1 overseer, 1 kangany, and 23 labourers. An extra overseer was attached for emergency river oiling work.

Oiling.—The oil consumption was the lowest recorded for a year since the inception of the Campaign due to the drought conditions that prevailed. A total of 5,695 gallons of oil was used with an efficiency rate of 94·9 per cent.

Paris Green Spraying.—Bathing and drinking ponds were treated with Paris Green Soapstone Mixture. 1,900 lbs. of the mixture were sprayed with an efficiency rate of 82·5 per cent.

Minor Works.—9,362 situations were cleaned prior to treatment with oil or Paris Green mixture, 59,794 feet of drains were cleaned, levelled and graded, and 4,815 feet, of drains and channels were reduced in width by revetting of pegs and building up the sides.

Minor Drainage.—572 feet of the drain in sub-section 6 C was deepened and the sides built up. A flood outlet drain in sub-section 7 C was opened up to a distance of 1,383 feet after clearing 8,000 square feet of jungle. The sides of this drain were built up with pegs and fagots and two cart crossings over the drain were constructed.

Fish distribution to wells.—5,765 examinations of the 424 wells were made. In 3,706 instances “millions” were found thriving. “Millions” were introduced 2,453 times into wells. Anopheline breeding was observed 119 times (2·1 per cent.).

1,046 examinations were also made of gala wells and ‘millions’ introduced 321 times. Anopheline breeding was detected 48 times in gala wells (4·5 per cent.).

Quinine Prophylaxis in schools was carried out in January and February by the Campaign. Thereafter, the schools were asked to obtain their supplies from the local hospital. The Campaign staff and labour force were, however, given prophylactic quinine from September. In all 6,040 five-grain tablets and 6,984 three-grain tablets of quinine were distributed.

Filling (a) The Urban District Council provided Rs. 1,500 for the purchase of sea-sand and coir dust for filling. Thirteen gala wells, 1 built well, and low lying areas in sub-sections 5A, 5B, 4B, and 6C were filled. The total number of gala wells filled up from the beginning was 201. Sixteen gala wells and a low lying area which had been partly filled previously were completely filled up during the year.

(b) Seven borrow-pits and 3 lowlying areas in various parts of the town were filled with earth obtained from the vicinity. In addition to the above, sides of drains and channels which were revetted with pegs were filled to length of 4,056 feet and to depth and width of $7\frac{1}{2}$ feet and $1\frac{3}{4}$ feet respectively.

(c) The U. D. C. further placed its town rubbish at the disposal of the Campaign. With this material, 3 swamps, 2 low lying areas and 6 trenches were filled and layer of coir spread over the fillings, to prevent fly breeding. To cover fillings in one of the 3 swamps mentioned above, the owner of the land supplied at his own expense sea-sand and coir dust. He is further carrying on the filling of about 200 coconut trenches in his land.

General: (a) The total rainfall in 1938 was the lowest recorded at this station since the inception of the Campaign. Only 38·81 inches of rain fell during the year.

(b) Two spleen surveys were carried out in March and October. 481 children in town examined in March gave a spleen rate of 11·8 per cent., while 843 examined in October gave a rate of 7·4 per cent. The corresponding spleen rates in a school just outside the town were 54·2 per cent. and 28·9 per cent. (Numbers examined 59 and 83 respectively).

(c) The hospital attendance figure for malaria was 4,921 and that for all diseases in town 15,825 (31·0 per cent.).

(d) The Timilla-ela Drainage Works were nearing completion under the direction of the Sanitary Engineer.

Puttalam.—The year was the ninth of the Anti-Malaria Campaign at this station. The area covered by the anti-malaria activities was 2·12 square miles—nearly a fourth of the town.

Staff.—The Field Medical Officer was in charge of the Campaign and had a Sanitary Assistant, a peon, 2 kanganies, and a labour force of 18–20 men for carrying out the work.

Oiling.—A total of 8,416 breeding places covering an area of about 591,750 square yards was treated during the year. No oiling was done from June to November as the situations had dried up. The total oil consumption was 1,183½ gallons.

Maintenance and Minor Works. Removal of silt, repairing of breaches in sides, grading, levelling and setting of thorny shrubs to prevent damage by cattle were carried out over a total length of 92,137 feet of channels and 62,869 feet of drains.

A large pool 104 ft. by 101 ft. by 9 ft. was packed with herbage to prevent anopheline breeding.

Fish Distribution to Wells.—There were over 500 wells of various types within the control area and 5,555 examinations of these were done. Into 4,293 of them larvivoracious fish were introduced. Only 22 wells were found breeding anophelines.

Quinine Prophylaxis.—Systematic distribution of quinine was made in the 5 schools in the town. 4,860 five-grain tablets and 13,920 three-grain tablets were distributed in the schools and 2,973 five-grain tablets to the campaign labour force. The salt used was quinine sulphate.

Filling: (a) The U. D. C. gave its town refuse in January and February for filling breeding places and with this material 7 trenches in the settlement area were filled.

(b) Earth filling on a very large scale was one of the important permanent anti-malaria measures carried out here. In all 10 pools, 15 gala wells, 552 borrow pits, 34 trenches and 18 swamps were filled. The immediate effect of this work was reflected in a reduction by about half of the consumption of oil for the year.

Drainage Works.—Two causeways were constructed across the Nedunkulam outlet by the Sanitary Engineer.

General: (a) Two spleen examinations were carried out, one in February and the other in September.

In the February examination, the spleen rate for children in town was 25.9 per cent. (examined 405, positive 105) while the rate outside town was 41.7 per cent. (examined 115, positive 48).

In the September examination, the in-town rate was 10.0 per cent. (examined 450, positive 45); the outside town rate was 25.0 per cent. (examined 120, positive 30).

(b) The hospital attendance figures for all diseases in town were 5,897 and for malaria 2,013 (34.2 per cent.) which compare favourably with the corresponding figures for the year 1937—7,278 and 2,638 (38.2 per cent.).

(c) The Malaria Day was celebrated on a useful scale at this centre.

(d) The rainfall for the year was 29.99 inches, February and March falls registering 6.35 and 7.24 inches respectively.

June had no rain.

Badulla.—The main anti-malaria activities at this station were confined to the prevention of anopheline breeding in the rivers and were carried out up to the end of September, 1938. Active anti-malaria work was discontinued with effect from October 1, 1938, and the place was kept under observation since that date.

Staff.—The Medical Officer of Health was in charge and he had two Sanitary Assistants—one for carrying out anti-malaria work and the other for doing observation and efficiency work till September 30. Thereafter, only one Sanitary Assistant was stationed at this centre for carrying out observations. The labour force varied from 16 to 7 men and all except one, who remained to help the Sanitary Assistant, were discontinued. The overseer was transferred to another station.

Oiling.—This work was mainly confined to the oiling of the river margins and other breeding places in the beds of the rivers. Other breeding places in the various parts of the town were also oiled when necessary. 1,831 gallons of oil were sprayed.

Minor Works.—This item of work consisted of trimming and clearing of river margins, filling of sand pools and levelling water holding depressions in the river beds, and filling of borrow pits and stagnant pools in the town. 557 pits, 5 wells, 1,802 drains, 335 sand pools, 36 rock pools, and 525 depressions were cleaned. 116 depressions were levelled and 1,342 pits were filled.

Quinine Prophylaxis.—1,495 five-grain tablets of quinine were distributed among the staff and labour force.

River Training Works were carried out by the Division of Sanitary Engineering. An overseer was in charge.

(1) *General.*—The total rainfall for the year was 74.92 inches as against 68.19 inches in 1937.

(2) The hospital attendance figures for all diseases was 51,776 and for malaria 13,031 against 52,214 and 11,841 in 1937.

(3) The March spleen survey gave a rate of 6.2 per cent. for Badulla town as against 7.5 per cent. in 1937.

(4) With the cessation of anti-malarial work at the end of September, the place has been kept under observation particularly in regard to (a) anopheline breeding in the Badulla-oya, and in brick pits and other water collections, (b) prevalence of adult mosquitoes in the protected and control zones, and (c) malaria morbidity in Badulla town.

With regard to (a) above, the investigations carried out so far revealed the breeding of *A. culicifacies* (the malaria vector) on one occasion in the trained section No. 3 of the river and on two occasions in the untrained sections. No *A. culicifacies* breeding was observed in the brick pits, &c. As regards (b) above, anophelines were caught in houses but no *A. culicifacies* were found. As regards (c), 105 blood films taken at the hospital every Monday were examined and resulted in 16 positives (B. T. : 6 ; M. T. : 4 and Qt. : 6). Of the 16 positives, six cases were from the control zone and the rest from outside.

Trincomalee.—Maintenance of anti-malaria work was continued as in the past. The Urban District Council bore all expenses except the salary and allowances of the Sanitary Assistant. The area covered by the anti-malaria activities was $2\frac{7}{8}$ square miles.

Staff.—The Medical Officer of Health, Health Unit, was in charge and he had a Sanitary Assistant, an overseer, a head labourer, and a labour force of 7–12 men doing anti-malaria work.

Oiling.—Breeding places to the total area of about 1,276,750 square yards were treated with $2,553\frac{1}{2}$ gallons of oil mixture.

Maintenance.—All drains to a total length of 224,696 feet and the Sivan Tank were periodically weeded, cleaned and maintained in good condition.

Fish Distribution.—There were 1,049 wells in town and 6,161 examinations were made and fish “millions” introduced 2,999 times. Only 34 wells were positive to anopheline breeding (0.55 per cent.).

Quinine Prophylaxis.—Quinine tablets were distributed to children in the 11 schools in town. 5,295 five-grain tablets and 9,548 three-grain tablets of quinine were used for the purpose.

Filling.—90 pits and 5 pools in various parts of the town were filled with 58,254 cubic feet of earth.

The filling of the Horse Pond with town refuse was being continued and about one-third of it was filled at the end of the year. Refuse fillings were covered with a layer of gravel to prevent fly breeding.

General.—(a) The total rainfall for the year was 70.39 inches as against 58.36 in 1937.

(b) 446 children in town examined in March for enlarged spleen gave a spleen rate of 7.8 per cent.

China Bay.—Anti-malaria activities on Crown land at China Bay taken over by the Department of Medical and Sanitary Services in April, 1936, were continued during 1938. The staff consisted of one Sanitary Assistant, one to two kanganies, and 6–17 labourers.

Oiling.—3,366 breeding places at China Bay and Nachchikuda were treated with 1,709 gallons of oil mixture.

Maintenance.—(a) 3,366 breeding places and 289,506 feet of drains and channels were cleared and maintained in good condition.

(b) 1,293 feet sides of channels sloped for turfing. 10,737 square feet turfing of sides of channels done to prevent erosions. Silt was removed from 1,345 feet of channels. 1,323 pegs were revetted at the mouths of channels to prevent damage by floods. Jungle clearing along channels to a length of 17,410 feet was carried out.

Fish Distribution.—61 wells in China Bay, Periyakulam, and Nachchikuda were stocked with fish in May and July.

Quinine Prophylaxis.—59 children in Thirikkakudah School and the campaign labourers were given quinine. 303 five-grain tablets and 775 three-grain tablets of quinine were used.

Filling.—267 borrow pits and sides of channels, 1, 2, 5 and 6 were filled with 51,922 cubic feet of earth.

General.—The Sanitary Assistant attended to the general sanitation work of the adjoining villages in addition to his anti-malaria work.

Minneriya Development Scheme.—The staff consisted of a Sanitary Assistant, an overseer and a labour gang of 6–20 men. The Field Medical Officer, Polonnaruwa, visited the area twice a week or more often, if necessary, and was in charge of the malaria control and sanitary measures in the area.

Oiling.—The breeding places in both areas of anti-malaria work (Hingurakgoda and Hingurakgala) were systematically treated with Shell-Malariol. 3,106 gallons of oil were used in treating 49,130 situations.

Minor Works.—Under this item, a total of 13,091 breeding places were cleared prior to oiling; 625,849 feet of drains and channels were maintained in satisfactory condition; 7,424 feet of new drains opened to drain off large collections of seepage water; 527 bottom pits were filled with about 400 cubes of earth; and 2,239 pits were dug to bury water holding receptacles.

Paris Green Spraying was done in November over 296 breeding places with a view to train the Sanitary Assistant and the labour force in the proper method of its application.

Herbage packing as a means of preventing the breeding of *A. culicifacies* was carried out on 293 breeding places, which could neither have been filled or drained. 4,362 square yards of scrub jungle had to be cleared to obtain the necessary twigs and leaves. This measure is now discontinued.

Shell-Tox Spraying was carried out in the Hingurakgala and Hingurakdamana areas from October to December. Shell-toxing was done daily from October 1 to October 20 and thereafter twice or three times a week to destroy adult mosquitoes in huts. A total of 850 houses were sprayed with 28½ bottles of Shell-Tox.

Quinine Prophylaxis.—Distribution of quinine to colonists was not done by the Sanitary Assistant. Instead, quinine was supplied from the dispensary or the Peace Officer to applicants.

General.—(a) A total of 73·79 inches of rain fell in the area against 53·92 in 1937. The 1938 fall constitutes the highest rainfall for the last five years.

(b) Attempts made in rearing fish “millions” in a pool met with failure. A nursery is to be built according to type plan.

(c) A spleen and parasite survey of 67 colonists in the Hingurakgala area was carried out in May. A parasite rate of 25·4 per cent. and a spleen rate of 95·5 per cent. were obtained.

(d) Housing of the colonists continued to be in the same unsatisfactory condition as it was in the past few years. In the old area, the labourers were scattered far and wide, while in the Hingurakgala area the houses are in a localized area and some progress was observed in the construction of houses.

(e) General sanitation of the area was looked after by the Medical Officer, Apothecary and the Sanitary Assistant.

The public latrine served a useful purpose, but due to the absence of individual latrines soil pollution continued. The Government Agent has offered Rs. 15 to each colonist who puts up a latrine and it is expected that a number of latrines will be constructed in the near future.

(f) The water supply for drinking purposes was obtained from the irrigation channels and was not satisfactory.

(g) As regards the general health of the colonists, malaria was the most prevalent disease. The first visits to Hingurakgoda Dispensary for all diseases in 1938 were 10,893 and for malaria 4,808 against 7,262 and 2,860 in 1937. Among the colonists only the first visits for all diseases were 5,286 and for malaria 2,562 in 1938 against 3,524 and 1,312 in 1937. The increases in 1938 were due to the marked increase in population of the area. 102 cases were treated for malaria at Polonnaruwa Hospital. A few cases of diarrhoea occurred among the new colonists.

Two cases of measles occurred in the Colony and timely precautions checked the spread of the disease. There was one case of typhoid fever which proved fatal.

Hookworm treatment was administered twice to the colonists and the school children.

Child welfare clinics were conducted weekly and nearly 50 infants and pre-school children were provided with supplies of Lactogen and Cod Liver Oil.

(h) Health propaganda work was carried out by the Field Medical Officer, Apothecary and the Sanitary Assistant.

Kataragama.—Anti-malaria measures in connection with the Esala Festival at Kataragama were carried out from June 12 to August 11, 1938.

A Sanitary Assistant was in charge and he had a labour gang of one kangany and 6 men.

The Menik-ganga was regularly oiled to a distance of about half a mile above and below the Devale. The river bed and edges were thoroughly cleared of floatage and decomposing leaves at the beginning. 120 gallons of Diesel oil and 12 gallons of kerosene oil were used for oiling.

Spraying of Shell-Tox in houses was carried out systematically to destroy adult mosquitoes. The temporary quarters of the officers were also insecticized during the festival. The quantity of Shell-Tox used was 12 gallons.

The area of jungle cleared this year was larger than that of the previous years. A part of the clearings was filled up against the jungle to form a barrier while the rest was burnt.

Distribution of drugs, such as Atebrin, Plasmoquine and Quinine as a prophylactic against malaria was carried out by the Apothecary.

(ii.) General Campaign throughout the Island.

The following statement shows the amount of anti-malaria work done under the Malaria Control and Health Scheme outside the extensive campaign areas :—

Investigation of Breeding places of Mosquitoes.			
Number.			
	Surveyed.	With anopheline larvae.	Dealt with temporarily. Dealt with permanently.
<i>Artificial—</i>			
Borrow pits	.. 25,388 ..	2,530 ..	5,774 .. 9,351
Quarries	.. 1,146 ..	210 ..	230 .. 44
Wells	.. 24,068 ..	1,939 ..	1,947 .. 1,313
Drains	.. 3,427 ..	493 ..	1,168 .. 240
Irrigation channels	.. 1,478 ..	308 ..	215 .. 44
Coconut trenches	.. 9,813 ..	1,131 ..	1,717 .. 3,086
Paddy fields	.. 9,158 ..	893 ..	701 .. 2,655
<i>Natural—</i>			
Streams	.. 1,592 ..	205 ..	601 .. 135
Sandpools	.. 3,985 ..	678 ..	1,953 .. 163
Rockpools	.. 3,955 ..	983 ..	1,818 .. 129
Natural depressions	.. 946 ..	107 ..	157 .. 261
Swamps	.. 1,540 ..	114 ..	456 .. 39
Marshes	.. 1,400 ..	180 ..	65 .. 262

Blood films.—M.T. 453 ; B.T. 529 ; Qt. 714.

Control measures—

Fish nurseries established	..	..	394
Fish nurseries continuing	..	..	347
Wells—total	..	..	51,348
Number investigated	..	..	21,955
Number found with fish	..	..	4,670
Number found without fish	..	..	17,285
Number supplied with fish	..	..	2,992

Pollution—(with Herbage)—

Number of breeding places with anopheline larvae polluted	..	579
Number of pits polluted examined for larvae	..	486
Number with anopheline larvae	..	90

Filling—

Filling of breeding places, cubic feet	..	549,376
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Drainage—

Drainage established—yards	34,089
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Oiling—

Oil used—gallons	5,774
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Treatment : Prophylactic—

Number of schools taking treatment	1,829
Number of school children taking quinine treatment	..	312,552	
Number of other children taking quinine treatment	..	15,386	
Number of tablets given—Gr. V.	..	1,342,520	
Number of tablets given—Gr. III.	..	696,013	
Number of ounces of quinine mixture	..	40,310	

Curative—

Number of adults taking quinine	..	..	59,527
Number of children taking quinine	..	..	48,641
Number of tablets given—Gr. V.	..	..	99,540
Number of tablets given—Gr. III.	..	..	40,362
Number of ounces of quinine mixture	..	..	247,294
Number of injections (I.M.)	..	..	16,433
Number of injections (I.V.)	..	..	2
Number of quinine distribution centres	..	..	1,004
Number of quinine distributors	..	..	1,001
Quinine mixture issued by distributors	..	..	109,030(oz.)
Quinine mixture issued by M. O. H. and F. M. O.	..	..	145,483(oz.)
Number of quinine tablets issued by distributors..	..	..	239,677
Number of quinine tablets issued by F. M. O. and M. O. H.	..	..	209,836

The following statement shows the particulars in regard to treatment clinics as part of the malaria control and health scheme :—

Number of treatment clinics held—

(a) at schools	..	..	..	836
(b) at dispensaries	..	..	..	907
Number of visits paid to dispensaries	..	..	..	1,295

Number Treated.		At Treatment Clinics (Schools and Dispen- saries.)	At other visits to Dispen- saries.
Adults (excluding expectant and nursing mothers)	..	19,883	4,869
Expectant and nursing mothers	..	7,322	304
Infants	..	14,090	1,130
Pre-school children	..	9,231	1,564
School children	..	38,524	1,852
Total	..	89,050	9,719

Number of diseases dealt with—

Malaria	..	..	..	16,843	..	3,058
Hookworm	..	..	..	69,686	..	2,239
Parangi	..	..	..	2,148	..	265
Tuberculosis	..	..	..	185	..	31
Gonorrhoea	..	..	..	213	..	32
Syphilis	..	..	..	70	..	9
Malnutrition	..	..	..	8,283	..	365
Others	..	..	..	15,824	..	2,590
Total	..	..	..	113,252	..	8,589

(iii.) River Control.

A report on river control will be found under this section—(7) Sanitary Engineering.

(iv.) Investigative Work.

(a) Parasitological.

(1) Observations on the spleen and parasite conditions in selected villages and schools were continued periodically to determine their rate of approach to normal conditions after the Malaria Epidemic of 1934-35. The following areas were examined in this connection and periodical reports submitted:—Kandy, Kitulgala, Giriulla, Avissawella, Kurunegala and Kegalla. Balangoda area was examined for the first time in 1938. The following summary shows the results of the blood examinations:—

Area and Month of Examination.		Blood Examinations.					
		No.		P.R.	G.R.	P.R.*	G.R.*
		Examined.	Positive.				
Kandy	(January)	330	9	2.7	0.9	4.3	1.0
Kitulgala	(January)	240	5	2.1	1.2	1.5	1.0
Giriulla	(January)	287	24	8.4	3.5	3.6	1.2
Avissawella	(February)	170	3	1.8	0.6	0.7	0.7
Kegalla	(February)	238	21	8.8	4.6	15.1	3.9
Kurunegala	(February)	248	37	14.9	7.2	21.1	7.5
Kitulgala	(May)	150	0	0	0	2.1	1.2
Kandy	(May)	130	4	3.1	0.8	2.7	0.9
Giriulla	(June)	181	3	1.7	1.1	8.4	3.5
Balangoda	(June)	50	1	2.0	2.0	—	—
Avissawella	(July)	138	4	2.8	0.7	1.8	0.6
Kegalla	(July)	199	11	5.5	1.5	8.8	4.6
Kurunegala	(October)	249	28	11.2	3.6	14.9	7.2

* Corresponding rates at previous examinations.

The total number of blood films examined for purpose of these observations was 2,610.

(2) The investigations started in July, 1937 to determine the seasonal prevalence of malaria plasmodia in the dry, intermediate and wet zones of the Island were continued in 1938. The purpose of these investigations was given in detail in the annual report for 1937, and a detailed report will be made after the investigations are concluded in June, 1939.

7,911 blood films were examined in this connection during the year under review and the following summary will indicate the findings for the year for each zone:—

Zone.	Species.					
	No.		P.R.	B.T.	M.T.	Qt.
	Examined.	Positive.				
Dry zone	3229	319	9.9	62	56	208 (7)*
Intermediate zone	2824	138	4.8	27	31	83 (3)*
Wet zone	1858	87	4.7	21	18	49 (1)*
	7911	544	6.9	100	105	340

* Mixed infections.

It will be seen from the above summary that in each zone, the quartan parasite predominated, while benign tertian and malignant tertian parasites though present in almost equal numbers in all areas could not even together reach the number of quartans. These positions of the three species of malaria parasites were relatively the same from month to month in 1938 for each zone.

Speaking of individual stations in the dry zone, quartan predominated from month to month at Sammanthurai. At Nochchiyagama, only in the month of January was quartan less than the other two species. Pesalai, however, recorded lesser quartans in January-May and in August and December.

In the intermediate zone stations—Narammala, Rambukkana and Alawwa—the variations in the percentage prevalence of quartan were few. Narammala had lesser quartans in January and February; Alawwa in October; and Rambukkana had no quartans in December and its positives were 100 per cent. malignant tertian.

In the wet zone, Gampola and Kegalla had no quartans during the year; Avissawella had quartans only in January and February. The relatively large number of quartans in the wet zone was contributed by Owitigamuwa in the Matara District.

(3) An investigation to determine the percentage error in the clinical diagnosis of malaria at the out-patients departments of Matale Hospital and the dispensaries at Gampola, Wattegama, and Wahacotte started in September, 1937, was concluded in June, 1938. 786 blood films were examined in this connection and 296 were found positive.

(4) An experiment to determine the prophylactic value of totaquina tablets as against quinine bisulphate tablets was started in September, 1938, and will continue till March, 1939. For this purpose, six schools were selected and in two of them (Polonnaruwa and Nikaweratiya) totaquina is being administered. In two other schools (Galgamuwa and Vavuniya) quinine is being administered and the remaining two schools (Anamaduwa and Kekirawa) are being kept under observation as controls.

Up to the end of the year, 1,601 blood films were examined in this connection.

A scheme for testing the relative efficacy of quinine and totaquina on hospital indoor patients suffering from malaria was also drawn and the work is being carried out at the Avissawella Hospital.

(5) 8,340 blood films were examined for Medical Officers of Health, Field Medical Officers, hospitals and dispensaries in connection with their own investigations.

(6) Investigations into the seasonal behaviour of the malaria plasmodia were started on October 3, 1938, at Giriulla Hospital out-patients department and are being continued every Monday. For the year under review 251 blood films were examined on this account and 73 of them were positive to malaria parasites. In this instance, too, quartan parasites held the first place with 42, B.T. came next with 17; and M.T. last with 9, while 5 positives were unclassifiable. The asexual forms of the parasites were as a rule far more common than the sexual forms. The blood films were taken from patients diagnosed as suffering from malaria and coming for treatment for the first time.

(7) The following table of monthly summaries of blood films examined from all sources other than that of the annual parasite survey and two other investigations (Nos. 4 and 6 above) will show the preponderance of the quartan parasite in all parts of the Island.

1938.	No. Examined.	No. Positive.	Percentage of Species.			
			P.R.	B.T.	M.T.	Qt.
January	.. 2,651	.. 308	.. 11.6	.. 40.9	.. 37.0	.. 24.3
February	.. 1,742	.. 207	.. 11.8	.. 32.8	.. 33.8	.. 36.2
March	.. 1,209	.. 113	.. 9.3	.. 20.3	.. 31.8	.. 52.2
April	.. 563	.. 120	.. 21.3	.. 13.3	.. 31.6	.. 56.6
May	.. 2,509	.. 189	.. 7.5	.. 24.3	.. 24.3	.. 53.9
June	.. 1,478	.. 164	.. 11.0	.. 28.0	.. 25.0	.. 48.1
July	.. 1,626	.. 133	.. 8.1	.. 29.3	.. 22.5	.. 49.6
August	.. 1,129	.. 134	.. 11.9	.. 32.8	.. 20.1	.. 52.2
September	.. 1,286	.. 138	.. 10.7	.. 31.9	.. 5.1	.. 64.5
October	.. 2,877	.. 169	.. 5.9	.. 32.5	.. 9.5	.. 58.6
November	.. 1,968	.. 148	.. 7.5	.. 35.1	.. 7.4	.. 60.8
December	.. 1,459	.. 69	.. 4.7	.. 36.2	.. 15.9	.. 47.8
Total	.. 20,497	1,892	9.2	29.8	22.0	50.4

(8) An Island-wide parasite survey of ten per cent. of the boys in schools selected for the annual spleen survey was conducted in 1938.

The previous Island-wide malaria parasite survey was conducted in 1921. From time to time surveys of small areas were undertaken, *e.g.*, prior to the institution of malaria control measures in selected areas, during the great epidemic of 1934–35, &c.; but it was felt that an Island-wide survey was due once more, and as the staff for a spleen census was available, it was decided to take full advantage of that field personnel.

The findings during February–March, 1938, do not lay claim to any finality upon so complex a problem as the natural behaviour of the malaria plasmodia in such varying conditions of endemicity and severity of transmission as found in this Island. The results of future surveys will, we hope, build a more stable understanding and more dependable conclusions when compared with the initial and detailed survey of 1938. The present survey is, therefore, a placing of facts in systematic order for a preliminary study with ample reservations placed upon the interpretation of the available data.

In the survey conducted in 1921, and during many of the smaller surveys, the work was done principally by two or three officers. The parasite survey of 1938 (conducted during a short period of the year, *i.e.*, middle of February to the end of March) differed from that of all the other surveys in certain very important standardizations. For example, this survey was based upon the following criteria—(a) ten per cent. of the children examined at a school were examined for malaria parasites; (b) “thin” and “thick” blood smears were taken in each instance, (c) a hundred fields of the “thin” and twenty fields of the “thick” were examined (600 x) in this laboratory, (d) the total examination of slides took 6½ months, (e) there were about a hundred officers who contributed to the work in the field.

In the previous examinations, particularly in reference to the Island-wide survey of 1921, the survey lasted over two years, it was not confined to school children, only thin films were examined and no standard number of microscopic fields had been fixed upon.

One of the essential differences between the survey of 1938 and that of 1921 was the short time taken for the 1938 work. This is of great importance as it indicates to some degree the parasite prevalence in the school-going population of the Island during a specific period of the year. The next survey will be conducted on the same lines excepting that the percentage to be examined will be raised from 10 per cent. to 33 per cent. in the provinces with sparse school-going children, *viz.*, North-Central, Uva, Eastern and portions of Northern Province.

The period February–March is regarded as occurring in the wane of the usual malaria recrudescence over the greater part of the Island. In parts which manifest a May–June peak in the incidence of malaria, there also exists a rise in December and January, so that the charge of any partiality cannot be levelled against the scheme of investigations.

Though the personnel that contributed to the large number of blood films was considerable for the size of Ceylon, the actual number that carried out the blood examinations with frequent disruptions totalled only three. It is very imperative that better laboratory facilities should be made available for next year's work and that the laboratory staff be strengthened by two more technicians.

The total number of blood films examined was 14,653 out of which 664 were positive, giving the whole Island a rate of 4·5, as against a rate of 13·5 (5,040 examined, 684 positive) in 1921. The films were examined in relation to species, stage of growth of parasites and gametocyte prevalence.

In the table given below, the division of the Island is according to topographical features which are not only prominent geographically, but compel the malaria workers to take full cognisance of them. In the spleen rate distribution of the Island, the divisions show variations in the rates obtained and it is, therefore, very necessary to adhere to such distinctions or features so that we may read the story side by side.

The total number of blood films examined in 1938 is approximately three times more than in 1921. In many instances, the numbers examined in 1938 were considerably more than in 1921. The examination of thick films in 1938 should have probably contributed to a higher rate than in 1921, but this is not evident. On the other

hand, the restriction to specific number of fields (120 fields) in 1938 might have helped to keep the rates very much lower than in 1921. Nevertheless, the thick film method in 1938 should have given a higher rate than in 1921.

There is, however, the factor of a recent upheaval in the malaria parasite world in Ceylon and while conditions are still in a condition of flux, no dogmatic statement could be made or a dependable comparative analysis could be formulated. In the Western and Southern Provinces, the rates are remarkably close for both of the surveys. The epidemic (1934) did not involve the whole of the Western Province and hardly any of the Southern Province, though a localized epidemic involving the Matara District occurred, as recently as in 1937. The Province of Sabaragamuwa was extremely severely involved in the great epidemic, and from the results of our observation stations, it is shown that the spleen and parasite rates have come down a great deal. The total number of slides examined in 1938 is very much more than in 1921.

In the Central Province, the areas involved in the epidemic show a wider difference than in the results of 1921. But in the high montane region the rates are almost identical.

In the Province of Uva, although variations are shown, the discrepancies are not to be regarded as of special importance.

The North-Western Province shows a very marked drop in 1938. The numbers examined were very much more, but it is felt that the epidemic was responsible for the wide differences—7.5 per cent. in 1938, and 15.2 in 1921.

It is, however, in the dry zone provinces of Northern, North-Central and Eastern that we find marked differences. The areas in question have remained more or less the same as in 1921 except for a random establishment of a few colonization schemes. In these areas, the epidemic was not evident to the same degree as in the upper half of the Western and the entire North-Western Province.

Within the seventeen years that have elapsed better hospitalization and public-health mindedness have been established and the systematic distribution of quinine thrice weekly to children attending schools in hyper-endemic areas may have played some part. Although, distribution of quinine to school-children was stopped one month prior to the spleen-cum-parasite survey, it is highly probable that in the hyper-endemic regions quinine was got at in the local dispensary or hospital. Nevertheless, the significant feature obtained and described elsewhere is the low parasite rates obtained in the hyper-endemic regions of the Island. The survey was made about the end of the fever season and a definite pronouncement cannot be made upon findings obtained so differently and after the lapse of nearly two decades.

To the general reader, data by districts, provinces and similar demarcated revenue-earning areas afford considerable interest and proves a fascinating comparative study. To the more experienced malaria student who realizes the diversity of malaria producing conditions and vagaries in almost each province, the laying out of facts compartmented to suit administrative minds is almost regarded as an appendix to his report and a relatively unimportant computation.

However, in order to confirm to the general exposition of data in reports that contain numerous figures, particularly when they apply to an Island with marked administrative boundaries, the under-mentioned table has been compiled.

Table showing the Prevalence of Malaria Plasmodia by Provinces in March, 1938.

Province.	No. examined.	Percentages.		
		B.T.	M.T.	Qt.
Western ..	2,682 ..	13.3 ..	6.7 ..	80.0
Central ..	2,450 ..	10.7 ..	41.7 ..	50.5
Southern ..	1,654 ..	18.0 ..	40.5 ..	48.7
Northern ..	1,142 ..	39.3 ..	39.3 ..	25.0
Eastern ..	964 ..	25.6 ..	33.3 ..	44.9
North-Western ..	2,895 ..	16.1 ..	32.7 ..	52.5
Uva ..	595 ..	29.8 ..	29.8 ..	44.7
North-Central ..	465 ..	13.2 ..	28.9 ..	57.9
Sabaragamuwa ..	1,806 ..	33.3 ..	18.5 ..	48.1
Total ..	14,653	19.1	34.2	49.7

The difference between the sum of species and the number positive is due to mixed infections; with the exception of the Northern Province, quartan predominates.

The Provinces chiefly involved in the great epidemic (Western, Central, "below 3,000", and North-Western) gave very low *P. vivax* rates. The figure for *P. vivax* in Sabaragamuwa, however, is very high in comparison and it must be pointed out here that only a part of Sabaragamuwa was involved in the epidemic. The extremely low figure of *P. falciparum* in the Western Province is noteworthy, in addition to the highest quartan figure. The only objection to accepting the figures with satisfaction is that the Western Province is of low endemic malaria significance and that of 2,682 blood films only 15 proved positive.

The survey, as mentioned before, was carried out during February–March, 1938. The months coincide with the evanescence of the annual recrudescence of malaria in the particular provinces of Northern, Eastern, North-Western, North-Central and a larger portion of the Southern and Uva Provinces. In each of these provinces, malignant tertian holds a high place. There appears to be some correlation in the statement above, *i.e.*, malignant tertian was much higher than benign tertian when it is seen how low malignant tertian is in Sabaragamuwa, an essentially May–June malaria area.

For purposes of study, the Island has been divided into relatively well-defined zones of varying rainfall and it is not necessary to repeat in detail the different amounts of rainfall in each of the three zones.

The wet zone, which gets the full force of the south-west monsoon, has an annual rainfall of over 100 in. and a rainfall of over 40 in. during the south-west monsoon. In the foot-hills the rainfall is much heavier than elsewhere; the annual average being between 150 in. – 200 in. and the south-west monsoon rainfall being 80 in. – 100 in. The intermediate zone has an annual average of 75 in. – 100 in. and a rainfall of 20 in. – 40 in. during the south-west monsoon.

In the dry zone, the rainfall during the south-west monsoon is less than 10 in. and, over a great part, the annual average rainfall is below 50 in.

In the table attached, the intermediate zone has been divided into different altitudes and allowing for minor variations, the distinctions could be accepted for purposes of epidemiological study.

Similarly, the dry zone, entirely composed of the characteristics of low-country, with no elevation of any significance (except in small patches in the low-lands of Province of Uva) has been divided into zones of malaria endemicity.

The wet zone is essentially low-country, rising very slightly as the foot-hills are approached in the Province of Sabaragamuwa. The table attached combines the spleen rates and parasite rates found in March, 1938.

In the dry zone, and over the greater part of the intermediate zone, the annual severe seasonal recrudescence of malaria commences in November and ends about the latter part of February.

The noteworthy feature of the blood findings in the dry zone, is the low parasite rate with gigantic upward trend of the spleen figures. No axiom could be pronounced upon the results of one survey worked according to set standards, *e.g.*, number of fields to be examined for each blood slide, but a hypothesis is here led, that a hundred fields of "thin" and 20 fields of "thick" examined under the microscope appears insufficient for parasites to be detected in areas of hyper-endemicity. The contention might be led that the children in schools had received quinine. Distribution, however was discontinued at the end of January, 1938. In view of any possible influence upon the degree of parasite infestation in a hyper-endemic community. In areas where more communal life was noticed in the dry zone, the parasite rates were noticeably higher than in the surrounding sparsely populated or thinly scattered aggregations of human life.

In the wet zone, both the spleen and parasite rates were low.

In the dry zone, with the exception of the area north of Chavakachcheri (S. R. : 1.8; P.R. : 0.5) the two rates show no parallelism whatever. The number of blood films examined in Mannar Island and in the area south of Chavakachcheri up to Elephant Pass was small, but no anxiety in accepting the low parasite figures need be entertained when colossally high spleen figures, with high numbers of films examined, gave diminutive rates, *e.g.*, S.R. : 66.5, P.R. : 7.8, number of films examined 676.

In the intermediate zone, the home of irregular behaviour of malaria plasmodia in Ceylon, the low parasite rates at the end of a fever season need further thinking. It might be said that this area, highly affected during the epidemic of 1934-35, is now recovering its stability. This is not proved by the regularly large numbers that attend the treatment institutions so plentifully supplied in this area. This much, however, can be said that those attending for treatment are not so devastatingly ill as during the epidemic.

Looking at the columns showing species prevalence, the predominance of quartan is noteworthy. The lowest prevalence is shown by *P. vivax* for each of the three zones.

Pending further work, the month of March, 1938, might aptly be described as the month of *P. malariae*.

Zone.	Spleen Rate.	Blood Films.		Species.			
		No. Examined.	No. Positive.	P.R.	B.T.	M.T.	Qt.
<i>Intermediate Zone.</i>							
A. Upper broad section	.. 26.8..	3,191..	141..	4.4..	19..	57..	63
B. (a) Below 500 metres	.. 28.9..	988..	104..	10.5..	18..	37..	56
(b) 500-1,000 metres	.. 18.8..	655..	21..	3.2..	1..	8..	15
(c) Over 1,000 metres	.. 7.0..	39	2..	5.1..	1..	0..	1
	26.1	4,873	268	5.5	39	102	135
					(14.1)	(37.0)	(48.9)

Zone.	Spleen Rate.	Blood Films.		Species.			
		No. Examined.	No. Positive.	P.R.	B.T.	M.T.	Qt.
<i>Dry Zone.</i>							
1. North of Chavakachcheri	1.8..	628..	3..	0.5..	1..	1..	1
2. South of Chavakachcheri and Elephant Pass ..	33.6..	83..	3..	3.6..	1..	1..	1
3. The Islands and Delft ..	15.7..	135..	6..	4.4..	3..	4..	0
4. Mannar Island ..	13.1..	85..	1..	1.2..	1..	0..	0
5. Rest with North-Central Province ..	66.5..	676..	53..	7.8..	11..	15..	27
6. Puttalam District North of Chilaw, K'galla and Matale ..	53.9..	1,309..	152..	11.6..	25..	45..	86
7. Eastern Province ..	43.8..	964..	78..	8.1..	20..	26..	35
8. Uva and Southern (Ma- gam pattu and Giruwa pattu east) ..	29.7..	636..	52..	8.2..	14..	18..	23
	36.6	4,516	348	7.7	76	110	173
					(21.2)	(30.6)	(48.2)

<i>Wet Zone</i>	.. 4.9..	5,264..	48..	0.9..	13..	14..	21
					(27.1)	(29.2)	(43.8)

(b) *Spleen Survey.*—The third annual spleen survey of boys attending schools in the Island was carried out from February 20 to March 31. The records of this work were received in this laboratory in April and were analysed. The spleen rates

were worked out for each school surveyed, for each revenue sub-division, by altitudes, by river catchment areas of the Island. The following table shows the spleen rates for 1938 in the revenue districts of the Island :—

Name of District.	Number of boys examined.	Number Positive.			Spleen Rate.		
		Small.	Moderate.	Large.	1938.	1937.	1936.
Colombo ..	22,820 ..	996 ..	170 ..	6 ..	5.1 ..	11.4 ..	13.0
Kalutara ..	10,282 ..	92 ..	5 ..	0 ..	0.9 ..	1.9 ..	1.7
Kandy ..	14,407 ..	1,181 ..	875 ..	219 ..	15.9 ..	17.7 ..	32.8
Matale ..	4,021 ..	959 ..	923 ..	240 ..	52.8 ..	44.3 ..	55.2
Nuwara Eliya ..	4,151 ..	459 ..	161 ..	55 ..	16.3 ..	22.1 ..	22.1
Galle ..	6,450 ..	132 ..	24 ..	2 ..	2.4 ..	2.4 ..	1.4
Matara ..	6,850 ..	355 ..	265 ..	25 ..	9.4 ..	32.4 ..	15.1
Hambantota ..	2,799 ..	692 ..	839 ..	185 ..	61.3 ..	55.0 ..	63.6
Jaffna ..	12,784 ..	747 ..	363 ..	50 ..	9.1 ..	11.4 ..	19.4
Mannar ..	995 ..	51 ..	229 ..	35 ..	31.7 ..	59.1 ..	51.3
Mullaittivu ..	1,022 ..	312 ..	280 ..	196 ..	77.1 ..	75.7 ..	84.1
Batticaloa ..	7,799 ..	1,760 ..	1,230 ..	307 ..	42.3 ..	49.4 ..	43.3
Trincomalee ..	1,866 ..	548 ..	335 ..	49 ..	49.9 ..	51.7 ..	53.4
Kurunegala ..	15,390 ..	2,541 ..	2,863 ..	956 ..	41.3 ..	53.1 ..	75.1
Puttalam ..	1,741 ..	427 ..	543 ..	235 ..	69.2 ..	71.0 ..	77.7
Chilaw ..	6,582 ..	926 ..	407 ..	8 ..	20.4 ..	40.8 ..	43.8
Anuradhapura ..	3,952 ..	1,181 ..	1,109 ..	265 ..	64.7 ..	71.6 ..	77.6
Badulla ..	5,349 ..	689 ..	563 ..	137 ..	26.0 ..	25.3 ..	36.0
Ratnapura ..	6,506 ..	576 ..	248 ..	147 ..	14.9 ..	21.7 ..	26.7
Kegalla ..	9,107 ..	987 ..	541 ..	61 ..	17.4 ..	31.1 ..	59.4
Total ..	144,873	15,611	11,973	3,178	21.2	28.3	30.6

A grand total of 144,873 boys was examined and 30,762 of them were found to possess enlarged spleens. The spleen rate for the whole Island was 21.2 per cent. as against 28.3 per cent. in 1937 and 30.6 per cent. in 1936. The reduction in the spleen rate is considered satisfactory.

(10) Monthly summaries of meteorological conditions for each province were prepared from the records of studies made and were sent for the information of the Provincial Surgeons.

The south-west and the north-east monsoonal rains failed during the year and after careful study of the resultant situation, forecasts were made of likely repercussions on the malaria situation.

(11) During the latter part of the year, this Division undertook the inauguration and carrying out of malaria control activities in connection with the following Irrigation Agricultural Schemes: Minipe-ela, Elahera-ela, Wariyapola, Paranthan and Puliyanikulam Agricultural Stations, Nikaweratiya and Ambepussa Farms, Ridi Bendi-ela, Topawewa Irrigation Works. Routine anti-malaria work in connection with these schemes will, in future, be under the direction of the Superintendent, Anti-Malaria Campaigns and at the expense of the Department of Medical and Sanitary Services.

(c) *Entomological measures.*—Report on the Entomological measures will be found in Section IX., (8) Medical Entomology.

(2) **Dengue.**—There were 42 cases of dengue during 1938.

(3) **Filariasis.**—There were 107 cases of filarial diseases treated in hospitals in 1938 with one death and in addition 224 cases were treated as outpatients.

Filariasis Survey.—The investigations into the incidence and other factors connected with filarial infection commenced in 1937 by a special officer, Dr. W. L. P. Dassanayake, appointed for the purpose, were continued during the year in the Galle and Matara Districts of the Southern Province, including the Municipal town of Galle, covering an area of 1,133 square miles with a population of 646,845 (1931 census).

Clinical Cases.—645 cases in the Galle District and 265 cases in the Matara District with obvious clinical signs and symptoms of filariasis were detected and investigated. Out of these, 447 (49 per cent.) were cases of elephantiasis of the extremities, 441

(48 per cent.) were cases of lymphangitis of the extremities, 21 (2 per cent.) were cases of hydrocele, orchitis, and elephantiasis of the scrotum and one case elephantiasis of the vulva.

Varieties.—The types of filarial infection which have been detected are bancroftian (urban) and malayi (rural).

Distribution.—The survey revealed that—

(a) The urban type was restricted to localities where there was great congestion of population associated with facilities for heavy breeding of *Culex fatigans* such as stagnant drains—Galle and Matara towns being the chief areas.

(b) The rural type was the more predominant infection and was found in villages near tanks and seepage areas which were heavily infested with the floating water-plant *Pistia Stratiotes*. In these areas the *Mansonia* variety of mosquitoes, specially *Mansonia Uniformis* were found in abundance. The disease has been detected in 214 villages out of a total of 1,454 villages. Cases have been found in all the headmen's divisions in the Galle and Matara Districts. The distribution of the disease is very uneven. More than 80 per cent. of the cases detected are located in certain circumscribed foci where the disease is endemic. The source of infection of most of the remaining cases can be traced to these endemic foci. All the endemic foci are situated in the coastal region within one mile of the seacoast.

Species of the Parasite.—To determine the species of the parasite occurring in the areas investigated, blood films from 89 localities were taken during the night between 9 P.M. and 1 A.M. Out of the 5,410 persons examined 288 (5.3 per cent.) were found to have microfilariae in their blood. The highest microfilaria rate (23 per cent.) was obtained in Dandegedera, in Galle town. Microfilariae bancrofti (urban type) were found mainly in one part of Galle town, while in all other places microfilariae malayi (rural type) were found.

Clinical Types.—The clinical type of the disease that was found in the area investigated was the "limb" type. Out of the 910 cases investigated the left leg was affected in 72 per cent. of the cases and the right leg in 45 per cent. Recurrent adenitis of the inguinal, axillary and epitrochlear glands were common especially amongst the children in the endemic areas. Twenty-two cases with genital symptoms were also detected and they were restricted to the bancroftian type infested locality in Galle town. Genital symptoms were not found in areas where malayi type of infection occurs.

GALLE DISTRICT.

Chief Headman's Division.	Clinical Cases.		Blood films taken.	Blood films positive.	Per cent. positive.
	Elephan- tiasis.	Lymphan- gitis.			
Four Gravets (including Galle Municipality)	93	47	2,139	190	9
Talpe pattu	53	23	515	12	2.3
Wellaboda pattu	67	78	501	6	1.2
Bentota-Walallawiti korale	79	172	863	38	4.4
Hinidum pattu	3	2	—	—	—
Gangoda pattu	4	2	—	—	—
	299	324	4,018	246	6
		623			
Cases of Hydrocele, &c.	21				
Elephantiasis of Vulva	1				
Total	645				

Galle Four Gravets.—In this town both types of filariasis are found. The urban type occurs in Fort, China Gardens, Kaluwella, Jakotuwa and Talapitiya, while the rural type occurs at Galawaduboda, Minuwangoda, Kandewatta and Ussanagoda. At Dandegedera both types are found. The worst affected areas according to Municipal wards and divisions are divisions numbers 2, 3 and part of 6 and 7.

It will be interesting to know that out of the 189 cases found positive for microfilaria, 143 (80 per cent.) were amongst school children and young persons below 18 years of age.

Talpe Pattu.—Only the malayi type has been detected here, chiefly, in the villages of Habaraduwa, Meepay and Heenetigala where there are very heavy *Pistia* infestations.

Wellaboda Pattu.—Only the malayi type has been detected here too, except for one solitary case of bancroftian type at Ambalangoda town. There are three main endemic foci in this Chief Headman's Division and they are as follows :—

One near the Boosa Race Course, the other in two adjoining villages of Metiwela and Telwatta.

Bentota-Walallawiti Korale.—Only the malayi type has been detected mainly in the villages of Galboda, Kaikawela, Habakkala, Induruwa, Galagama and Gona-gala which are more or less contiguously situated. Very heavy *Pistia* infestations are found here especially in the water collection called "Nelunpokuna".

Hinidum Pattu and Gangaboda Pattu.—There are no endemic areas of filariasis here, the cases detected here have contracted the disease while residing outside these divisions.

MATARA DISTRICT.

Chief Headmen's Divisions	Clinical Cases.			Blood films positive.	Per cent. positive.
	Elephan- tiasis.	Lymphan- gitis.	Blood films taken.		
Four Gravets (including U. D. C., Matara)	23	45	642	36	5.6
Wellaboda Pattu	20	2	101	3	3
Weligam korale	74	60	649	4	0.6
Morawak korale	11	3	—	—	—
Gangaboda pattu	13	4	—	—	—
Kandeboda pattu	7	3	—	—	—
	148	117	1,392	42	3
Total	265				

Matara Four Gravets.—Out of the 68 clinical cases detected in four gravets 54 (79.4 per cent.) are located within the limits of the Urban District Council town of Matara. The largest number of clinical cases (22) in one single locality was detected at Nupe. This is the chief endemic focus of filariasis here. In this area especially in Kapu-ela near Rahula Vidyalaya heavy *Pistia* infestations occur. Though malayi type is the most predominant type of infection here, there is also a small focus of bancroftian infection at Nupe, where there are also facilities for heavy breeding of *Culex fatigans* mosquitoes.

Wellaboda Pattu.—There are no special endemic areas of rural filariasis here. The 22 clinical cases detected were most of them located in villages near the endemic focus in Matara Four Gravets. A very small focus of urban (bancroftian) type has also been detected at Dodampahala west village.

Morawak Korale, Gangaboda Pattu, and Kandeboda Pattu.—There are no special endemic areas here. Most of the clinical cases have contracted the disease while residing in other endemic areas.

Weligam Korale.—Only the rural type has been detected here. Out of the 134 cases detected 84 (63 per cent.) are restricted to villages near Kamburugamuwa tank, where there is a heavy *Pistia* infestation.

Control Work all over the Island.—The interest of all Revenue Officers, Headmen and Village Committee Members have been aroused by propaganda work; with their co-operation, the Medical Officers of Health and Field Medical Officers are getting *Pistia* plants removed from water-courses.

The Railway Authorities have undertaken to remove all *Pistia* on their lands.

Demonstration Work at Bandara Coswatta.—The investigations undertaken last year at Bandara Coswatta are proceeding. Reference—Medical Entomologist's report on filariasis.

Treatment.—Centres for treatment exist at Galle and Kurunegala hospitals where antimony preparations for intravenous injections are available. Arrangements for vaccine therapy, for those who need such treatment, have been made in collaboration with the Director, Bacteriological Institute.

Educational Work.—Actual demonstrations of how the mansonias species of mosquito laid its eggs on the leaf of the Pistia plant and how the larvae bred attached to its root were given in 214 villages where clinical cases have been detected. Full use was made of the set of lantern slides on filariasis prepared by this Department, depicting the main features regarding the causation and prevention of filariasis. 89 lantern lectures were being delivered. These lectures were very helpful not only in educating the public regarding the dangers of the pistia plant, but also in attracting them and overcoming the existing prejudices amongst them against taking of blood films in the night. In some places people have organized themselves and formed health leagues to destroy pistia plants in their villages. Revenue Officers and Headmen are taking a keen interest in getting the Pistia plant eradicated.

Three more sets of lantern slides on filariasis were prepared and distributed among the Field Medical Officers. A poster showing the cause, the spread and prevention of filariasis is being lithographed by the Survey Department and pamphlets in English, Sinhalese and Tamil on filariasis are under preparation and these are with the Government Printer.

Legislation.—Regulations have been framed under the Quarantine and Prevention of Diseases Ordinance for the eradication of the Pistia plant on which depends the breeding of the mansonias mosquito, the carrier of the malayi type of the disease which is the predominant variety. The regulations are now before the Executive Committee of Health.

(b) HELMINTHIC DISEASES.

The two main infestations are Ankylostomiasis (Hookworm Disease) and Ascariasis (Roundworm infestation). For the control of these the Ankylostomiasis Campaign was established in 1916. A re-organization of the campaign was commenced last year and completed this year, the personnel being distributed as follows:—

- 1 Superintendent—a Grade I. Medical Officer attached to the Head Office, supervision and control of helminthic diseases being one of his duties.
- 2 Clerks—attached to the Head Office.
- 8 Microscopists—7 attached to the Bacteriological Institute, Colombo; 1 attached to the General Hospital, Colombo, and De Soysa Lying-in Home to help in special research work.
- 2 Laboratory Attendants—attached to the Bacteriological Institute.
- 1 Peon—attached to the Head Office.
- 32 Dispensers and 6 Apothecaries distributed in the field.

Campaign Procedure.—The 32 Dispensers and 6 Apothecaries were placed under the immediate supervision of the Medical Officers of Health and Field Medical Officers. Every Medical Officer of Health and Field Medical Officer (78 Officers) had a Dispenser or an Apothecary under his control for such periods as were required to carry out mass treatment in his area. The Medical Officer of Health or the Field Medical Officer either directly supervised the work or attached them for supervision to a District Medical Officer, Apothecary-in-charge or a School Medical Officer.

This direct supervision of the Dispenser by the Medical Officer of Health and the Field Medical Officer, has increased his efficiency enormously. His programme of work including such items as village visits, house to house talks with charts and specimens of worms, &c., was constantly checked.

This arrangement also secured a greater measure of co-operation from the public. This was specially so in the estate areas where the realization of the fact that the Hookworm work of the Medical Officer of Health and the Field Medical Officer was a seasonal activity, made it increasingly possible to achieve the object of treating estates, villages, and schools during the period when the dispenser worked in an area.

The Sanitary Assistant who obtained his certificate for competency to assist at mass hookworm treatment is gradually taking the place in his area of the dispenser and the apothecary, thereby making the latter officers available for work elsewhere.

Certificate of Competency.—During the year, 80 Sanitary Assistants (Sanitary Inspectors) (a total of 145 up to end of 1938, out of 318) and one Public Health Nurse were issued certificates of competency to assist at mass treatment for worm infestation. Within the next couple of years it is hoped that all Sanitary Assistants will possess certificates of competency, thereby gradually eliminating the ankylostomiasis dispenser—the Sanitary Assistant and the Medical Officer of Health or the Field Medical Officer taking over all the problems of mass treatment in their areas.

Certificates of competency were also issued to 62 estate dispensers approved by the Director of Medical and Sanitary Services making a total of 340 up to end of 1938, thereby further facilitating the work on estates.

Drugs used in Mass Treatment.—Work carried out by Dr. P. B. Fernando, Professor of Medicine, Ceylon Medical College, and Visiting Physician, General Hospital, Colombo, demonstrated the safety of Tetrachlorethylene even in one-and-half drachm doses for adults and proved the need for maximum doses for effective expulsion of hookworms. Consequently it was decided to discontinue combined treatment for hookworm and roundworm for the adult. Instead it was thought advisable that adults should be treated for hookworms only, neglecting the factor of roundworms, with doses ranging from 45 minims to 1 drachm. Children between the ages of 2 years and 10 years were to be treated for roundworm infestation with chenopodium in castor oil; and if they showed evidence of hookworm infestation they were to be treated for hookworm with Tetrachlorethylene on a subsequent occasion. After a limited trial in the field at two Health Units this practice was extended to three out of the nine provinces. As the results appear promising, this mode of administration will be adopted for 1939 throughout the Island.

An impure stock of Tetrachlorethylene was received from the manufacturers. It was noticed that freshly opened bottles emitted fumes; samples were examined by the Government Analyst and found to be not up to B. P. C. standard. The stock was destroyed, the makers replacing it with the standard variety. A paper on "Decomposition of Tetrachlorethylene" will be published in the Journal of the Ceylon Branch of the British Medical Association, January, 1939.

Investigation.—The method of investigation for the rate and intensity of infestation was also altered this year. Examination of specimens before and after treatment was confined to three provinces instead of nine, thereby doing a similar number of examinations in a smaller area and lesser population. During 1937, 18,421 before treatment and 4,687 after treatment specimens were examined by Stoll's method giving an average infestation rate of 81·4 per cent. before treatment and 62·2 per cent. after treatment and an average intensity of infestation rate of 1,500 and 800 eggs per gramme of faeces before and after treatment respectively.

During 1938, 17,975 before treatment and 5,163 after treatment specimens were examined by Stoll's method giving an average infestation rate of 75·5 per cent. before treatment and 61·4 per cent. after treatment and an average intensity of infestation for the three provinces of 1,300 before and 900 after treatment per gramme of faeces.

Research Work.—Professor P. B. Fernando carried out an investigation on "Tetrachlorethylene in the treatment of Ankylostomiasis with special reference to Toxicity". The report will be published in the Indian Journal of Medical Research—January, 1939. It is a very valuable contribution and places Tetrachlorethylene as a drug which could be safely administered to cases even where there is cardiac, renal or hepatic inefficiency. Further the findings showed that the drug should be given in doses ranging from half a drachm to a drachm at least (adult dose) to cause efficient expulsion of worms. These facts were made known to all officers.

Work on compost with a view to finding whether it would cause infestation when it was ready to be sent out as manure, was undertaken by Dr. L. Nicholls and Dr. Samson Goonewardene. They came to the conclusion that in the process of compost making the temperature rose to such degrees as to destroy hookworm larvae. The risk of infestation therefore did not exist. This will be published in the Ceylon Journal of Science for February, 1939.

In July the Ceylon Branch of the British Medical Association held a special session at which Ankylostomiasis was the main subject discussed. Professor Fernando opened the discussion with a paper on Ankylostomiasis in Ceylon. This paper is now published in the Journal of the Ceylon Branch of the British Medical Association (September, 1938). The next paper was by Dr. S. F. Chellappah, Assistant Director of Sanitary Services, Ceylon, who gave an exhaustive account of the work and progress of the campaign in Ceylon. This paper is published in the Journal of the Ceylon Branch of the British Medical Association—November, 1938. Copies of this publication were distributed amongst the Medical Officers of Health and Field Medical Officers. Dr. G. A. W. Wickremasuriya outlined his investigations into complications that could arise when pregnancy is associated with ankylostomiasis.

Statistics.—The following tables give the statistics for the Island during 1938 :—

TABLE I.

Ankylostomiasis Treatments by all Agencies in 1938 and 1937.

Agencies.	Treatments, 1938.						1937. Total.	
	First.		Subsequent.		Total.			
Government Institutions :—								
(1) At Institutions	1,278,684	..	49,161	..	1,327,845	..	1,443,893
(2) Outside Institutions	82,236	..	4,613	..	86,849	..	30,483
Campaign Staff :—								
(1) School children	174,563	..	—	..	174,563	..	151,035
(2) Estate labourers	274,430	..	—	..	274,430	..	244,499
(3) Villagers	99,640	..	—	..	99,640	..	92,795
Health Units	76,693	..	—	..	76,693	..	62,150
Mandapam Camp	41,937	..	—	..	41,937	..	42,182
Estate Medical Staff	72,415	..	15,559	..	87,974	..	96,336
Total	..	2,100,598		69,333		2,169,931		2,163,373

TABLE II.

Ankylostomiasis Treatments given by all Agencies, and Average Egg-count per c.c. per Person and Percentage infected before and after Treatment, by Provinces, for the year 1938.

Province.	Treatments.			Microscopical Examinations by Stoll's method only.					
				Before treatment.			After treatment.		
	First.	Subsequent.	Total.	Number examined.	Average egg-count.	Percentage infected.	Number examined.	Average egg-count.	Percentage infected.
Eastern ..	108,157	2,567	110,724	23	3000	91.3	5	500	40.0
North-Western ..	267,840	8,934	276,774	5,854	1,600	79.4	1,032	1,400	71.3
Sabaragamuwa ..	278,330	9,362	287,692	3,603	1,100	76.4	1,261	700	62.9
Southern ..	272,319	16,376	288,695	126	1,000	74.7	—	—	—
Western ..	433,469	10,661	444,130	1,010	1,500	73.9	159	400	44.0
Central ..	412,378	17,798	430,176	7,267	1,100	72.3	2,706	800	57.9
Northern ..	94,356	1,229	95,585	14	1,100	71.4	—	—	—
North-Central ..	47,091	500	47,591	78	800	62.8	—	—	—
Uva ..	144,721	1,906	146,627	—	—	—	—	—	—
Mandapam Camp ..	41,937	—	41,937	—	—	—	—	—	—
Total for 1938 ..	2,100,598	69,333	2,169,931	17,975	1,300	75.5	5,163	900	61.4
Total for 1937 ..	2,095,543	67,830	2,163,373	19,421	1,500	81.4	4,687	800	62.2

TABLE III.

Ankylostomiasis Treatments at Government Hospitals and Dispensaries in 1938.

Province.	Attendance (First Visits).	Treatments.			Percentage of treatment to First Visits.
		First.	Subsequent.	Total.	
Uva	233,338	66,524	776	67,300	28.8
Sabaragamuwa	585,059	158,349	3,356	161,705	27.6
Western	1,253,171	333,184	9,479	342,663	27.3
Eastern	367,379	83,627	2,567	86,194	23.5
Central	661,963	140,011	8,374	148,385	22.4
Southern	1,035,058	207,312	15,300	222,612	21.5
North-Western	1,068,746	187,908	7,665	195,573	18.3
Northern	364,649	63,300	1,144	64,444	17.7
North-Central	354,907	38,469	500	38,969	11.0
Total for 1938	5,924,270	1,278,684	49,161	1,327,845	22.4
Total for 1937	6,001,186	1,393,987	49,906	1,443,893	24.1

TABLE IV.

Ankylostomiasis Treatments given by the Medical Officers of the Department outside their Institutions without the aid of the Campaign Staff during 1938.

Province.	Schools.		Estates.		Villages.		Total.	
	Number.	Number treated.	Number.	Number treated.	Number.	Number treated.	Number	Number treated.
Central	12..	1,602..	70..	25,119..	9..	602..	91..	27,323
North-Western	23..	2,080..	1..	135..	41..	14,720..	65..	16,935
Uva	6..	410..	30..	12,974..	11..	538..	47..	13,922
Western	26..	2,323..	18..	5,153..	20..	5,413..	64..	12,889
Sabaragamuwa	18..	1,300..	13..	1,493..	10..	5,210..	41..	8,003
Northern	32..	1,871..	—	—	18..	1,932..	50..	3,803
Southern	10..	648..	2..	461..	16..	2,829..	28..	3,938
North-Central	1..	36..	—	—	—	—	1..	36
Total for 1938	128	10,270	134	45,335	125	31,244	387	86,849
Total for 1937	73	4,741	58	17,918	33	7,824	164	30,483

TABLE V.

Ankylostomiasis Treatments given by Campaign Staff in Schools, Estates and Villages, outside Health Unit areas, during 1938.

Province.	No. of units dealt with.			Census in Schools.	Treatments.				No. of School Children treated : to Census.
	Schools.	Estates.	Villages.		School Children.	Estate Labourers.	Villagers	Total.	
North-Central	57..	—	92..	4,847..	3,627..	—	4,959..	8,586..	74.8
North-Western	355..	37..	191..	43,556..	30,910..	2,782..	19,775..	53,467..	71.0
Central	293..	493..	255..	43,798..	30,192..	142,677..	20,684..	193,553..	68.7
Uva	56..	136..	84..	6,962..	4,507..	45,955..	4,569..	55,031..	64.7
Sabaragamuwa	292..	223..	95..	33,142..	20,960..	63,059..	9,467..	93,486..	63.2
Eastern	125..	—	109..	13,085..	7,531..	—	10,572..	18,103..	57.6
Northern	410..	—	43..	45,414..	23,723..	—	3,615..	27,338..	52.2
Southern	337..	24..	152..	50,031..	24,759..	4,259..	16,819..	45,837..	49.5
Western	398..	70..	43..	61,299..	28,354..	15,698..	9,180..	53,232..	46.3
Total for 1938	2,323	983	1,064	302,134	174,563	274,430	99,640	548,633	57.8
Total for 1937	2,057	882	1,021	260,764	151,035	244,499	92,795	488,329	57.9

TABLE VI.

Number of Schools, Estates, and Villages treated by the Campaign Staff under the supervision of various Officers of the Department during the Year 1938.

Supervising Officers.	Schools.	Estates.	Villages.
Medical Officers of Health of Districts ..	452 ..	93 ..	105
Field Medical Officers ..	1,017 ..	433 ..	574
District Medical Officers and Assistants ..	304 ..	407 ..	108
School Medical Officers ..	193 ..	— ..	10
Apothecaries in charge of dispensaries ..	351 ..	50 ..	267
Superintendent, Ankylostomiasis Campaign ..	6 ..	— ..	—
Total for 1938 ..	2,323	983	1,064
Total for 1937 ..	2,057	882	1,021

TABLE VII.

Treatments given by the Campaign Staff on Estates during the Year 1938.

Supervising Officers.	No. of Estates treated.	Census.	Number treated.	Percentage treated to Census.
Field Medical Officers ..	433 ..	130,442 ..	106,351 ..	81·5
Medical Officers of Health of Districts ..	93 ..	31,035 ..	25,214 ..	81·2
Apothecaries in charge of Dispensaries ..	50 ..	13,847 ..	11,018 ..	79·6
District Medical Officers and Assistants ..	407 ..	168,903 ..	131,847 ..	78·1
Total for 1938 ..	983	344,227	274,430	79·7
Total for 1937 ..	882	306,514	244,499	79·8

TABLE VIII.

Ankylostomiasis Treatments given by Health Units in 1938 and 1937.

Health Unit.	1938.	1937.
Matara ..	11,517 ..	9,318
Panadura ..	11,315 ..	10,006
Kalutara ..	10,272 ..	9,565
Kurunegala ..	10,251 ..	9,311
Dehiwala ..	9,089 ..	7,117
Kegalla ..	8,938 ..	7,224
Kadugannawa ..	8,884 ..	6,247
Trincomalee ..	6,427 ..	3,362
Total ..	76,693	62,150

TABLE IX.

Ankylostomiasis Treatments at Mandapam Camp during 1938.

Month.	Number arrived.	Number treated.	Percentage treated.
January ..	1,384 ..	1,156 ..	83·5
February ..	2,114 ..	1,758 ..	83·2
March ..	2,972 ..	2,688 ..	90·4
April ..	3,450 ..	3,029 ..	87·8
May ..	4,482 ..	3,854 ..	86·0
June ..	5,780 ..	5,118 ..	88·5
July ..	6,883 ..	6,327 ..	91·9
August ..	4,175 ..	3,894 ..	93·9
September ..	5,827 ..	5,276 ..	90·5
October ..	3,836 ..	3,241 ..	84·7
November ..	3,464 ..	2,942 ..	84·9
December ..	3,006 ..	2,654 ..	88·2
Total for 1938 ..	47,373	41,937	88·5
Total for 1937 ..	52,146	42,182	80·9

TABLE X.

Ankylostomiasis Treatments reported as given by Estate Medical Staff during 1938.

Province.	Census of estates treated.	Treatments.			Percentage of Total treatments to census.
		First.	Subsequent.	Total.	
Southern	10,541	3,741	1,050	4,791	45.5
Western	16,960	3,587	1,083	4,670	27.5
Central	243,990	42,626	9,405	52,031	21.3
Sabaragamuwa	75,076	12,707	2,853	15,560	20.7
North-Western	3,165	510	38	548	17.3
Uva	62,695	9,244	1,130	10,374	16.4
Total for 1938	412,427	72,415	15,559	87,974	21.3
Total for 1937	393,993	78,808	17,528	96,334	25.8

TABLE XI.

Intestinal Parasites found in the course of Microscopical Examinations during 1938.

	Before treatment.		After treatment.		Multiple Parasitic Infestation.	
	Number.	Percent- age infected.	Number.	Percent- age infected.	Before Treat- ment.	After Treat- ment.
Specimens examined	31,713	—	10,208	—		
Infected with hookworms	22,208	70.0	5,920	58.0	Harbouring no parasite	2,955
Infected with round worms	20,814	65.6	5,862	57.4	With one kind of parasite	7,631
Infected with whip worms	18,651	58.8	4,958	48.6	With two kinds of parasite	9,060
Infected with thread worms	535	1.7	105	1.03	With three kinds of parasite	11,902
Infected with tape worms	11	.03	—	—	With four kinds of parasite	165
Total examined before and after treatment	41,921	—	—	—	Total infected with some kind of parasite	28,758

(c) VACCINATION.

Vaccination against smallpox which was used to be done by special vaccinators under the supervision of Medical Officers of hospitals was during the year placed under the supervision of Medical Officers of Health and Field Medical Officers. Vaccination work was also carried out by Sanitary Assistants in the areas of their work after receiving certificates of proficiency in vaccination.

In areas under the supervision of Field Medical Officers and Medical Officers of Health the inspector of vaccination has ceased to inspect and in two provinces, Eastern and North-Western, the posts have been suppressed. With the rearrangement of the work it has been possible to exercise better supervision and to get better and more work done. In time the grade of vaccinator will disappear and he will be replaced by the Sanitary Assistant who will carry out vaccination as a seasonal activity in his area. In the majority of places 100 per cent. of the previous year's births have been vaccinated. In a few areas it has exceeded this number.

The following table gives the number of vaccination performed according to provinces during the year 1938 :—

Province.	Primary Vaccination.				Re-Vaccination.			
	Total.	Successful.	Unsuccessful.	Unknown.	Total.	Successful.	Unsuccessful.	Unknown.
Western	38,528	32,928	1,248	4,352	813	141	103	569
Central	41,835	36,237	1,268	4,330	256	43	62	151
Eastern	6,025	4,802	752	471	39	39	—	—
Northern	12,499	9,460	1,509	1,530	405	53	19	333
North-Western	19,748	16,530	845	2,373	—	—	—	—
Southern	31,581	26,092	1,563	3,926	86	20	5	61
North-Central	4,161	3,812	71	278	19	6	4	9
Sabaragamuwa	25,175	20,931	883	3,361	824	90	24	710
Uva	10,764	9,956	98	710	5	3	—	2
Total	190,316	160,748	8,237	21,331	2,447	395	217	1,835

A vaccine station for the preparation of calf lymph is maintained by Government (*vide* section IX. of this report).

The percentage of successful primary vaccination was 84·46.

2.—GENERAL MEASURES OF SANITATION.

Water Supply.—In urban areas 39 out of 130 towns are provided with pipe-borne supplies, some of which are inadequate in quantity. Two towns, viz.: Hatton-Dikoya and Gampola had their supplies augmented. Chilaw had its water supply improved by means of a filtration plant with provision for removal of iron. Numerous schemes have been worked out for new pipe-borne supplies and for the augmentation of existing supplies. A sum of 2 million rupees have been earmarked out of the recent 100 million loan for water supplies. Four towns with pipe-borne supplies have availed themselves of the concession provided by the Department of free periodical bacteriological examination of their water and 46 samples were examined during the year.

In rural areas the people are inadequately provided with protected water supplies. They depend chiefly on wells. Till such time as protected water becomes available they are being taught to boil all drinking water. During the year a survey of rural water supplies was carried out in areas under Sanitary Assistants with the object of securing funds in the 1939-40 Estimates for the provision of protected wells.

The survey revealed that :

- 8,322 villages obtained their drinking water from—
- 3,366 public and 127,089 private wells.
- 524 villages obtained it from 1,964 springs.
- 517 villages obtained it from rivers and streams.
- 645 villages obtained it from tanks and
- 73 villages mostly in up-country area had pipe-borne supplies.

The following is a statement of the condition of the wells and springs.

			Protected.	Unprotected.
Public wells	..	..	1,707	1,659
Private wells	..	..	22,742	104,347
Springs	..	..	106	1,858

A very rough estimate of the cost of protecting unprotected wells and constructing new wells to the villages surveyed at the rate of one protected well per hamlet is about twenty lacs of rupees.

The routine work of the department in regard to water supplies has been to get existing wells protected from pollution. The work in this connection is as follows :—

Wells constructed.—

Public	..	..	..	61
Private	..	..	..	746
Inspections of wells	..	..	..	252,358
Number of wells found unprotected	..	..	..	98,993
Number of wells improved (a) partly	..	..	..	2,964
(b) radically	..	..	..	771

The Department carries out the bacteriological examination of water and collects water for chemical examination which is carried out by the Government Analyst. During the year.—

Samples taken for bacteriological examination	..	..	63
Number found unfit for human consumption	..	..	9
Samples taken for chemical examination	..	..	47
Number found unfit	..	..	9

Disposal of Excreta.—In urban areas with a sanitary organization the bucket latrine is in vogue with disposal of night soil by trenching. In a few localities disposal is by composting while in two places is by incineration.

In rural areas the type of latrine is the pit variety of which types are the deep pit, bored-hole and the mound. The bored-hole, while a satisfactory type of latrine is not favoured by the villager as he has to find 4 or 5 neighbours to assist him in

boring the pit while he is willing to dig his put at leisure and therefore he favours the deep pit latrine. The mound latrine is the type used in high sub-soil water areas. At best it is a makeshift. Now in such areas Village Committees are coming forward to conserve bucket latrines and a cheap variety of which can be constructed for Rs. 20 and this is being encouraged.

The water carriage system is available in Colombo and in individual houses at Nuwara Eliya and on estates.

The Department has type plans for all varieties of latrines. A rotating fund is also provided for making cement concrete squatting plates. Loans from this fund are made available to voluntary organizations through Medical Officers of Health and Field Medical Officers. Plates are sold to poor people on the instalment plan and in many instances recoveries are not possible.

Some Urban District Councils have undertaken aided schemes of latrine construction for the poor people in their areas.

A five-year programme of latrine construction was begun in 1937 with the object of getting each Sanitary Assistant to have a definite plan of work and a goal to reach. It has created interest and many Sanitary Assistants get 25 to 30 latrines built per month, the standard being 12.

During the year good progress was made in latrine construction, a total of 27,244 latrines being built as compared with 21,792 in 1937. The details of work done during the year is as follows :—

Newly constructed.—

	1938.	1937.
Public latrines	50	21
In U. D. C. towns	5	5
In S. B. towns	11	6
In V. C. areas	34	10
Private latrines	26,614	21,169
Bucket	5,039	4,359

Pit—

Deep pit	21,338	16,329
Bored-hole	135	179
Mound	102	302
School latrines	580	602

Latrines rendered to sanitary type—

Public	72	—
Private	1,227	1,072
School latrines	99	88

Scavenging and Disposal of Refuse.—Proper systems of scavenging are in vogue in all Urban District Councils and Sanitary Board towns. Storage of refuse is carried out in private bins and in many towns communal bins have been provided by the local authority. Sweeping of roads and drains is arranged according to a programme. The refuse is transported in carts and in many towns carts have been displaced by motor lorries. Disposal is by dumping and incineration, incineration in an incinerator, burial, composting, and by filling up of low-lying land.

In rural areas the people are being encouraged to store their refuse in manure pits to be utilized later as manure.

Drainage.—The following is a statement of surface drains provided to towns and bazaar areas.

	Towns.	Bazaars.
Number provided with cement drains—		
Completely	26	28
Partially	87	79
Number not provided with cement drains	17	192

The need of adequate drainage is keenly felt in many towns. Plans have been prepared for some towns but the cost of construction has prevented the work being put in hand.

Licensed trades.—The following is a statement of inspections made and action taken on licensed premises other than food handling establishments.

Offensive Trades.		Nuisances									
		Existing.		Inspected.		Inspections.		created.	abated.		
Desiccating mills	43	..	40	..	483	..	104	..	48
Fibre dyeing	7	..	7	..	33	..	5	..	2
Fibre mills	121	..	111	..	966	..	197	..	83
Hide Stores	20	..	17	..	270	..	49	..	44
Kilns—brick	305	..	268	..	1,279	..	254	..	132
Kilns—lime	196	..	182	..	2,021	..	214	..	142
Kraals—coconut husks	2,356	..	624	..	1,177	..	116	..	78
Kraals—fishing	37	..	14	..	15	..	—	..	—
Manure Stores	30	..	30	..	495	..	59	..	53
Plumbago Sheds	24	..	23	..	85	..	—	..	—
Quarries—Cabook	43	..	39	..	288	..	34	..	21
Quarries—Metal	235	..	219	..	1,245	..	126	..	26
Soap Manufacturing	15	..	15	..	164	..	154	..	87
Others	54	..	54	..	373	..	204	..	69

Other Licensed Premises.					Nuisances	
	Existing.	Inspected.	Inspections.	Defective.	Defects	Radically
				corrected.	improved.	
Laundries ..	530	511	3,439	1,692	879	21
Lodging houses ..	74	72	1,572	442	266	8
Galas and cattle sheds ..	141	140	2,055	1,891	997	33

Anti-plague Measures.—Intensive anti-plague measures undertaken have yielded encouraging results. Colombo has been free from plague since August 23 and there have been no cases of plague in the provinces during the year. In Colombo all cargoes of grain and contact cargo from plague-infected ports were fumigated with liquid hydrocyanic acid. All the granaries have been regularly fumigated similarly. Systematic fumigation of rat holes with calcium cyanide has been undertaken by the Municipality with effective results. Commercial premises have been improved by cementing of floors, cement plastering of walls up to 4 feet from the floor and storing goods on platforms in conformity with anti-plague regulations.

Outside Colombo in the various towns most of the local authorities have undertaken fumigation of rat holes with calcium cyanide as a regular procedure every 6 months. Associated with fumigation is the cleaning of the premises fumigated. Storage of rice under rat proof conditions is also being undertaken to a greater extent. Rice in quantities of 15 bags and less are stored in bins and in quantities over this in grain stores. Commercial premises have also been improved as required by the anti-plague regulations.

The following is a statement of the work done in this connection :—

Commercial premises inspected for rat holes ..	21,760
Rat holes found ..	80,720
Rat holes closed ..	75,222
Number of rats caught ..	140,805
Number of rats examined ..	1,195
Number found infected ..	Nil

Anti-fly Measures.—Fly nuisance still continues to be a special problem in some towns. With improved sanitary conditions and by special measures against breeding places, the nuisance has been reduced to a certain extent. 43,746 out of the 48,550 breeding places of flies detected were dealt with.

Sanitary Inspections.—The inspection of private premises forms one of the routine duties of the Sanitary Assistant. In the course of his inspection, he endeavours as much as possible to get premises cleaned up in his presence, collections of rubbish burnt or buried and other defects attended to whenever practicable. In addition to this work, he gives talks on sanitation and personal hygiene to groups of villagers while on inspection.

The following is a statement of work done :—

(a) *Private Premises*.—Out of 1,391,759 private premises, 434,713 were inspected and received 1,084,235 inspections. 607,489 defects were detected of which 427,640 were remedied.

(b) *Railway Premises* :—

		Inspected.	Inspections.	Defects.	Defects rectified.
1. <i>Stations</i> .—					
Premises	..	198	3,710	728	635
Drains	..	168	2,801	704	565
Latrines	..	367	5,624	1,007	690
Urinals	..	207	3,559	462	369
Water supplies	..	120	1,897	392	185
2. <i>Bungalows</i> .—					
Premises	..	688	8,965	1,757	1,505
Drains	..	634	8,522	1,573	1,310
Latrines	..	844	9,995	1,047	780
Compounds	..	661	8,076	1,729	1,525
Water supplies	..	359	3,744	468	322
3. <i>Lines</i> .—					
Premises	..	629	8,569	1,557	1,086
Drains	..	462	6,833	1,957	1,193
Latrines	..	435	6,049	1,805	1,084
Compounds	..	450	6,970	2,516	2,109
Water supplies	..	153	2,157	322	149

3.—SCHOOL HEALTH WORK.

Schools and School Population.—The number of schools excluding the unregistered and special type schools is 4,913 and the school population amounts to 741,925. The total number of schools in which health work has been carried out during the year increased to 3,461. Of these 996 were primary, 2,123 junior secondary, 309 senior secondary, 30 collegiate and 3 training; 586 were boys; 558 girls, and 2,317 mixed schools; 1,413 Government, 1,931 Government-aided, and 117 unaided. These schools are distributed by Provinces as follows :—Western 1,074, Central 401, Southern 435, Northern 551, Eastern 131, North-Central 30, North-Western 458, Uva 16, and Sabaragamuwa 365.

The total school population dealt with in these schools amounts to 609,628 of which 353,427 are boys and 256,201 are girls; 109,760 are in primary, 397,919 in junior secondary, 87,780 in senior secondary, 14,073 in collegiate, and 96 in training schools. The school population dealt with classified by Provinces is as follows :—Western 217,489, Central 72,870, Southern 89,961, Northern 81,008, Eastern 14,245, North-Central 3,121, North-Western 70,085, Uva 3,063, Sabaragamuwa 57,786.

Personnel.—The personnel engaged in school health work during the year is given in Table I. below :—There is a decrease of 11 District Medical Officers. Much of the work done previously by the District Medical Officers was taken over by the Field Medical Officers newly appointed in their areas :—

TABLE I.

Province.	School Medical Officer.	Medical Officer of Health.	Field Medical Officer.	District Medical Officer.	Lady Medical Officer.	School Health Work.
Western	5*	8	3	—	—	6
Central	1	4	10	3	—	1
Southern	2†	4	7	1	—	2
Northern	1	1	3	2	—	2
Eastern	—	2	3	—	2	—
North-Central	—	1	1	—	—	—
North-Western	—	2	14	—	—	—
Uva	—	1	—	3	—	—
Sabaragamuwa	—	2	11	—	—	—
Total	9	25	52	9	2	11
Increase over 1937	1	1	24	—	1	1

* Including S. M. O., Dehiwela, Assistant M. O. H., Kalutara, and S. M. O., Panadura.

† Including S. M. O., Matara.

Visits to Schools.—In addition to the visits paid for routine survey of schools, health education, hookworm treatment, correction of defects at school clinics, &c., total visits paid for medical examination alone amounted to 8,957 giving an average of 5.3 visits per school. If visits paid for the other activities mentioned above are included the average number of visits per school would be very much higher than that for the previous year.

Activities Carried out: Medical Inspection of School Children.—1,689 schools were visited for medical inspection of school children.

TABLE II.

Scholars examined.

Province.	Total.	Boys.	Girls.	Primary.	Junior Secondary.	Senior Secondary.	Collegiate.	Training.
Western ..	21,074 ..	12,154 ..	8,920 ..	2,480 ..	11,091 ..	6,042 ..	1,419 ..	42
Central ..	11,419 ..	7,188 ..	4,231 ..	2,682 ..	7,283 ..	973 ..	481 ..	—
Southern ..	15,248 ..	9,551 ..	5,697 ..	1,107 ..	11,231 ..	2,851 ..	59 ..	—
Northern ..	9,478 ..	5,697 ..	3,781 ..	4,308 ..	2,305 ..	2,809 ..	56 ..	—
Eastern ..	6,720 ..	4,739 ..	1,981 ..	4,592 ..	1,967 ..	161 ..	— ..	—
North-Central ..	917 ..	588 ..	329 ..	71 ..	818 ..	28 ..	— ..	—
North-Western ..	14,045 ..	8,745 ..	5,300 ..	3,231 ..	10,273 ..	541 ..	— ..	—
Uva ..	1,274 ..	677 ..	597 ..	545 ..	615 ..	114 ..	— ..	—
Sabaragamuwa ..	14,473 ..	9,352 ..	5,121 ..	1,692 ..	9,822 ..	2,959 ..	— ..	—
Total ..	94,648	58,691	35,957	20,708	55,405	16,478	2,015	42

Percentage to total scholars examined 62.09 .. 37.91 .. 21.88 .. 58.54 .. 17.41 .. 2.13 .. .04

The following table III. gives the number of pupils examined, defects found and corrected :—

TABLE III.

Schools visited for Medical Inspection of Children.

Province.	Schools examined.	First.	Second.	Third.	Special.	Total.	Number Defective.	Percentage Defective.	Number of Defective Children.	Defects per Defective Child.
Western ..	332 ..	17,917 ..	2,711 ..	324 ..	122 ..	21,074 ..	15,946 ..	75.7 ..	34,105 ..	2.1
Central ..	193 ..	10,786 ..	528 ..	44 ..	61 ..	11,419 ..	9,199 ..	80.6 ..	23,397 ..	2.5
Southern ..	276 ..	13,971 ..	967 ..	310 ..	— ..	15,248 ..	11,191 ..	73.4 ..	26,762 ..	2.4
Northern ..	163 ..	7,714 ..	1,358 ..	347 ..	59 ..	9,478 ..	8,132 ..	85.8 ..	18,563 ..	2.3
Eastern ..	104 ..	6,316 ..	403 ..	1 ..	— ..	6,720 ..	5,985 ..	89.0 ..	12,544 ..	2.1
North-Central ..	30 ..	843 ..	29 ..	45 ..	— ..	917 ..	602 ..	65.6 ..	943 ..	1.6
North-Western ..	298 ..	12,320 ..	1,474 ..	251 ..	— ..	14,045 ..	11,861 ..	84.4 ..	28,404 ..	2.4
Uva ..	16 ..	1,086 ..	29 ..	— ..	159 ..	1,274 ..	475 ..	37.3 ..	534 ..	1.1
Sabaragamuwa ..	277 ..	10,763 ..	1,347 ..	232 ..	2,131 ..	14,473 ..	13,010 ..	89.9 ..	27,839 ..	2.1
Total ..	1,689	81,716	8,846	1,554	2,532	94,648	76,401	80.6	173,091	2.3
Percentage to total examined ..	—	86.34 ..	9.35 ..	1.64 ..	3.67 ..	—	—	—	—	—

In spite of the fact that 548 schools and about 10,000 scholars in excess of those of the previous year were examined in 1938 the defects per defective child have remained practically at the same level.

It is usual to detect a larger number of defects per defective child when schools are examined for the first time and when previous correction of defects has not been made. But as the average number of defects per defective child has remained the same as that of previous year it would indicate that for the same number of schools and scholars there have been defects per defective child in 1938 as compared with 1937. It also means that attempts have been made by the teachers and Medical Officers to get minor defects corrected to a larger extent this year than the previous year so as to prevent their continuance in the following year.

The examination of scholars by different groups of Medical Officers is given in Table IV. below :—

TABLE IV.
Number of Scholars.

Province.	S. M. O.	M. O. H.	M. O. H., H. U.	F. M. O.	M. O.
	9.	14.	11.	52.	11.
Western ..	13,900*	2,147	4,147	880	—
Central ..	2,539	2,406	577	5,685	212
Southern ..	5,068	2,136	2,583	5,419	42
Northern ..	3,866	—	—	4,964	648
Eastern ..	—	1,709	981	3,412	618
North-Central ..	—	286	—	631	—
North-Western ..	—	644	1,762	11,639	—
Uva ..	—	686	—	—	588
Sabaragamuwa ..	—	367	1,702	12,404	—
Total ..	25,373	10,381	11,752	45,034	2,108

* Includes S. M. O., Dehiwala and Panadura.

2. **Correction of Defects.**—The following tables (V. and VI.) give the nature of defects detected at the medical inspection of children, the percentage each defect forms to total defects, the number of defects of each kind by provinces, defects corrected and their percentages and the number of each defect corrected in different provinces.

TABLE V.
Defects Found.

Defect.	Total.	Percentage to Total.	W.P.	C.P.	S.P.	N.P.	E.P.	N.C.P.	N.W.P.	Uva.	Sab.
Malnutrition ..	20,863	12.1	5,867	2,616	2,275	3,065	1,096	92	2,847	18	2,987
Uncleanliness ..	9,391	5.4	1,483	1,411	1,656	1,805	643	52	1,289	3	1,049
Unvaccinated ..	5,985	3.5	1,538	499	1,003	702	375	54	762	50	1,002
Eyes ..	1,748	1.0	539	212	266	18	61	3	103	11	535
Ears ..	1,470	.84	164	663	235	37	15	6	215	4	131
Defective vision ..	1,518	.85	618	384	156	153	5	—	96	14	92
Defective hearing ..	120	—	12	37	7	17	1	4	31	2	9
Enlarged glands ..	2,970	1.7	681	999	461	3	2	—	687	11	126
Enlarged spleen ..	4,413	2.5	3	402	823	315	782	148	1,926	6	8
Lymph glands ..	511	.3	74	7	57	1	5	—	162	—	205
Dental caries ..	4,775	2.8	246	950	718	162	211	—	871	172	1,445
Teeth and gums ..	21,801	12.6	6,985	2,790	2,179	2,724	1,371	66	2,485	74	3,127
Nose ..	454	.26	245	51	8	25	12	—	61	4	48
Adenoids and tonsils ..	9,696	5.6	2,045	1,825	1,757	578	690	6	1,648	14	1,133
Anaemia ..	13,747	7.9	1,761	2,597	3,534	1,488	607	70	2,196	9	1,485
Heart ..	967	.56	160	221	330	12	34	6	168	—	36
Lungs ..	276	.16	59	31	52	43	10	6	33	1	41
Hernia ..	16	—	2	4	2	2	3	—	1	—	2
Orthopaedic ..	150	—	38	22	45	15	8	—	19	—	3
Nervous system ..	90	—	4	8	6	3	5	—	—	—	64
Rickets ..	65	—	36	3	—	—	1	—	25	—	—
Skin ..	2,731	1.6	886	351	199	189	58	17	441	36	554
Scalp ..	435	.25	34	25	24	32	283	—	19	1	17
Hookworm ..	37,686	21.7	6,529	3,426	6,166	3,307	3,735	36	5,469	40	8,978
Malaria ..	7,425	4.3	51	604	1,099	898	1,150	101	2,486	10	1,026
Abnormal behaviour ..	22	—	4	2	1	2	8	1	1	—	3
Mental deficiency ..	43	—	7	8	—	5	7	2	11	—	3
Speech ..	105	—	32	8	9	40	2	4	5	1	4
Scabies ..	2,727	1.6	393	115	384	875	378	29	420	18	115
Pediculosis ..	16,723	9.1	2,875	2,132	2,884	1,510	532	217	3,221	19	3,333
Ringworm ..	527	.3	162	36	41	95	26	5	152	1	9
Other defects ..	3,641	2.1	572	958	385	442	428	18	554	15	269
Total ..	173,091	100	34,105	23,397	26,762	18,563	12,544	943	28,404	534	27,839

TABLE VI.

Defects corrected.

Defects.	Total found.	Corrected.	Percent- age corrected.	W.P.	C.P.	S.P.	N.P.	E.P.	N.C.P.	N.-W.P.	Uva.	Sab.
Malnutrition	20,863	6,986	33.5	1,516	1,121	784	664	341	2	1,563	5	990
Uncleanliness	9,391	5,368	57.2	793	637	1,004	1,274	418	29	721	1	491
Unvaccinated	5,985	2,330	38.9	644	115	463	320	80	14	285	28	381
Eyes	1,748	576	32.9	58	78	84	1	17	—	9	9	320
Ears	1,470	843	57.3	33	399	144	16	5	1	137	2	106
Defective vision	1,518	230	15.2	111	39	38	31	—	—	—	2	9
Defective hearing	120	8	6.6	1	—	3	4	—	—	—	—	—
Enlarged glands	2,970	827	27.8	326	399	25	—	—	—	39	—	38
Enlarged spleen	4,413	1,200	27.2	—	156	472	44	31	—	497	—	—
Lymph glands	511	28	5.5	3	—	24	—	1	—	—	—	—
Dental caries	4,775	1,505	31.5	38	316	231	20	70	—	568	23	239
Teeth and gums	21,801	4,526	20.8	994	552	697	870	480	4	372	4	553
Nose	454	72	15.9	43	1	3	1	2	—	1	—	21
Adenoids and tonsils	9,696	1,858	19.2	394	217	424	70	281	—	393	3	76
Anaemia	13,747	5,512	40.8	471	1,026	1,911	210	160	6	1,120	7	601
Heart	967	259	26.8	14	184	49	1	1	1	—	—	9
Lungs	276	60	21.4	11	9	17	6	2	—	8	—	7
Hernia	16	—	—	—	—	—	—	—	—	—	—	—
Orthopaedic	150	5	3.3	—	—	3	—	2	—	—	—	—
Nervous system	90	13	14.4	2	—	1	—	—	—	—	—	10
Rickets	65	18	27.7	—	—	—	—	1	—	17	—	—
Skin	2,731	922	33.7	237	43	75	32	28	3	171	33	300
Scalp	435	76	17.2	7	5	10	14	27	—	6	—	7
Hookworm	37,686	25,665	68.1	4,125	2,486	3,782	1,678	2,654	14	3,938	24	6,964
Malaria	7,425	3,511	47.3	44	187	251	504	571	14	1,514	9	417
Abnormal behaviour	22	—	—	—	—	—	—	—	—	—	—	—
Mental deficiency	43	1	2.3	—	—	—	—	1	—	—	—	—
Speech	105	4	3.8	4	—	—	—	—	—	—	—	—
Scabies	2,727	1,367	50.1	245	23	293	391	172	13	157	11	62
Pediculosis	16,723	7,842	46.9	1,114	984	1,625	690	240	99	1,383	16	1,691
Ringworm	527	151	28.7	36	8	35	10	5	—	56	—	1
Other defects	3,641	1,577	43.3	183	597	142	162	199	4	178	2	110
Total	173,091	73,340	42.4	11,447	9,582	12,590	7,013	5,789	204	13,133	179	13,403

The more common defects found at the inspections were in order of magnitude as follows :—

Defect.	% to Scholars examined.	% to Total Defects.
Hookworm	39.8	21.7
Teeth and gums	23.03	12.6
Malnutrition	22.04	12.1
Pediculosis	17.7	9.1
Anaemia	14.5	7.9
Adenoids and tonsils	10.2	5.6
Uncleanliness	9.9	5.4
Malaria	7.8	4.3
Unvaccinated	6.3	3.5
Dental Caries	5.05	2.8

The above accounted for 85 per cent. of the total defects detected.

Hookworm Infestation.—As usual this disease tops the list of defects found on medical inspection. 39.8 per cent. of the scholars examined revealed this defect and this disease formed 21.7 per cent. of the total defects. The prevalence of this disease is high in the general population and though the diagnosis has been based on physical examination and symptoms and not on microscopic examination of stools it is not unlikely that the infestation rate has been found to be high although the intensity may not have been severe. Compared to the previous year the percentage of children showing this defect is higher this year and this may partly be due to a large number of children suffering from the disease in the areas where school examination has been done by the Field Medical Officers for the first time in 1938 and where no previous treatment for this disease has been administered. Whatever the reason, the fact remains that a good deal has yet to be done to bring this disease under control by way of prompt adequate treatment and by construction, maintenance and use of sanitary latrines.

Disease of Teeth and Gums.—27.2 per cent. of the scholars examined revealed dental caries and disorders of teeth and gums. The defects under these two heads together form 15.3 per cent. of the total defects found in the scholars. Compared

with the previous years' figures there is a reduction in the percentage that this defect forms to the total defects. Dental caries forms 2·8 per cent. of total defects in 1938 as against 4·1 per cent. in 1937, 7·4 per cent. in 1936, and diseases of teeth and gums form 12·6 per cent. of total defects in 1938 as against 13·6 per cent. in 1937, and 17·5 per cent. in 1936. The incidence of dental caries shows a reduction in the rate for the year under review being 50 per 1,000 scholars examined as against 61 for 1937 and 103 for 1936.

The Mobile Dental Clinic which itinerated chiefly in the Western Province carried out a number of corrections of defects of teeth and gums in 1937 with the result that there has been a definite decrease in the number of defects found under this head in the year 1938. This mobile clinic has proved to be immensely popular and has supplied a very pressing need in the rural and urban areas.

The different types of dental treatment given by the dental van are as follows :—

Extractions	..	..	..	1,900
Sealing	..	..	..	1,263
Temporary relief	..	..	..	210
Dressing	..	..	..	18

These treatments were given with the aid of the Medical Officer of Health or Field Medical Officer who planned out the programme of correction of defects in school children and arranged for them to attend the clinic run by the dental van. In addition to the school children, the adults were also attended to.

In the year under review the dental van extended its itinerary to other provinces and carried out a good amount of work the result of which it is hoped will be reflected in the reduction of dental defects in school children in 1939.

It must however be admitted that one mobile clinic can but meet only a fraction of the need in this direction and that a large number of defects might remain uncorrected for want of facilities. The experience gained with regard to the usefulness of the mobile clinic is encouraging and attempts are being made to provide facilities of dental treatment in an increasing measure every year. Following are the total treatments given by the mobile clinic to children at each of the places mentioned :—

Kalutara ..	..	705	Nattandiya ..	..	189
Trincomalee ..	..	291	Moratuwa ..	..	351
Tangalla ..	..	321	Kuliyapitiya ..	..	264
Ratnapura ..	..	391	Pannipitiya ..	..	177
Matale ..	..	406	Various centres close to	..	
Veyangoda ..	..	272	Colombo ..	..	24

In addition to the work done by the mobile clinic, dental defects were corrected at dental chambers attached to the following colleges in Colombo and its suburbs. A new dental chamber was opened in Ampitiya English School, Kandy, about the middle of the year under review.

TABLE VII.

Record of Treatment at Dental Clinics of the following schools :—

	Number treated.	Extractions.	Fillings.	Dressings.	Scalings.	Number with diseased Gums.
St. Peter's College ..	643	112	400	15	94	—
Good Shepherd Convent ..	581	163	346	98	63	—
Zahira College ..	365	110	127	—	128	—
Milagiriya Girls' English School ..	299	100	244	—	13	—
St. Thomas' College ..	330	198	89	—	43	—
Ampitiya English School, Kandy ..	221	270	221	12	34	3

Malnutrition.—This condition formed 12·1 per cent. of the total defects. Of the children examined 22 per cent. revealed varying degrees of under-nourishment as against 14 per cent. in 1937. The large increase in the number of pupils examined particularly in the malarious parts of Southern Province, Sabaragamuwa, and in

Northern Province and Eastern Province by the newly appointed Field Medical Officers as compared with the number examined in 1937 explains the apparent increase in the rate of incidence of this defect.

Recently a good deal of propaganda work has been done by this Department and the Department of Agriculture with regard to the dietetic values of Ceylon food and also about nutrition in general, as a result of which increased interest is being taken by the public in the matter.

Midday meals are being given in schools either under the Government Scheme controlled by the Director of Education or with the aid of local authorities or by voluntary organizations developed in different areas for the purpose. These midday meals when properly drawn up on the principle of balanced dietary or when milk is issued help a good deal in correcting apparent and gross under-nourishment. 33·5 per cent. of these defects were corrected in 1938.

The number of schools provided with midday meals is shown below by provinces :—

W.P.	C.P.	S.P.	N.P.	E.P.	N.C.P.	N-W.P.	Uva.	Sab.
200 ..	70 ..	110 ..	188 ..	43 ..	24 ..	162 ..	4 ..	72

Pediculosis.—17·7 per cent. of the children examined were found with this defect and it formed 9·1 per cent. of the total defects found. This defect is chiefly found in girls' schools. 46·9 per cent. of these defects were corrected mostly in areas where School Nurses and Public Health Nurses have been working. In other places the school teachers can easily take up this matter as the correction involves little or no technical knowledge and equipment necessary is cheap and easily available. In fact it should form a practical demonstration in the Health Education methods adopted by the Teachers.

Anaemia.—This condition was observed in 14·5 per cent. of children examined and the defect formed 7·9 per cent. of total defects. The condition is obviously due to malaria, hookworm and general malnutrition—advanced degree of this defect being due to the first two diseases. 40·8 per cent. of the defects were corrected.

Tonsils and Adenoids.—This defect contributed 5·6 per cent. of the total defects and was present in 10 per cent. of children examined. Satisfactory correction of this defect in its advanced stages can only be done in large hospitals. Hence only 19·2 per cent. of the defects were corrected for want of facilities in the rural areas.

Uncleanliness.—9·9 per cent. of the children examined showed this defect which formed 5·4 per cent. of the total defects. In the performance of routine health education procedures the teachers carry out a good deal of correction of this defect. Where nurses have been available they have also corrected it in the schools promptly. 57 per cent. of this defect were corrected.

Malaria.—The percentage of children found suffering from malaria at the medical inspections rose by ·4 per cent. A large number of pupils from malarious areas were examined and yet there was no appreciable increase in the rate of incidence of this defect. The prophylactic treatment in the hyper-endemic areas and the organization and operation of various quinine treatment centres for preventing relapses and curing the disease are responsible for keeping the figure low. The percentage of children found with enlarged spleen was 4·7 which indicated that the effects of previous attacks of malaria had not altogether disappeared and that a more rigorous and sustained quinine treatment was necessary. School teachers have been of great help in connection with prevention and control of malaria and it is hoped that greater co-operation will be forthcoming in the ensuing year.

Unvaccinated.—Protection against smallpox by vaccination was found missing in 6·3 per cent. children examined and this defect formed 3·5 per cent. of the total defects found in 1938, as against 5 per cent. of children and 3·4 per cent. of total defects for 1937. The slight increase in the number of children found unprotected may have been due to a larger number of new children examined for the first time by the Field Medical Officers in the remote areas where intensive seasonal vaccination could not have been carried out as thoroughly as in more accessible areas.

Correction of defects at School Clinics.—The following statement shows by provinces the number of centres, the number of clinics held and the defects dealt with at them.

TABLE VIII.

School Clinics.

	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.
Number of Centres	199..	96..	85..	78..	24..	—	174..	1..	157..	814
Number of Clinics	870..	316..	375..	356..	31..	—	292..	14..	212..	2,466
Malnutrition	5,396..	1,071..	296..	73..	246..	—	1,252..	—	599..	8,933
Uncleanliness	1,330..	512..	239..	697..	274..	—	657..	—	399..	4,108
Unvaccinated	432..	42..	199..	359..	—	—	253..	—	239..	1,524
Eyes	1,064..	55..	220..	—	6..	—	8..	7..	320..	1,680
Ears	442..	317..	79..	—	—	—	129..	—	103..	1,070
Nose	135..	—	8..	—	—	—	1..	—	21..	165
Enlarged glands	—	426..	20..	—	—	—	2..	—	38..	486
Enlarged spleen	—	156..	150..	—	—	—	435..	—	—	741
Tonsils and adenoids	724..	234..	79..	12..	—	—	192..	—	52..	1,293
Anaemia	1,562..	1,047..	1,442..	—	43..	—	997..	—	537..	5,628
Heart	25..	183..	—	25..	—	—	—	—	7..	240
Lungs	57..	9..	181..	—	—	—	—	—	—	247
Nervous system	—	—	189..	—	—	—	—	—	10..	199
Skin	268..	92..	289..	—	3..	—	118..	26..	296..	1,092
Hookworm	2,691..	6,304..	3,041..	2,307..	383..	—	4,777..	—	5,321..	24,824
Malaria	52..	186..	262..	410..	256..	—	850..	—	393..	2,409
Scabies	1,088..	14..	347..	1,219..	—	—	94..	6..	31..	2,799
Pediculosis	1,089..	594..	158..	31..	86..	—	728..	5..	1,177..	3,868
Teeth and gums	26..	483..	1,470..	11..	170..	—	240..	2..	227..	2,629
Dental caries	2,523..	496..	—	54..	—	—	112..	—	318..	3,503
Defective vision	16..	3..	30..	—	—	—	—	—	2..	51
Other diseases	2,013..	773..	517..	1,618..	709..	—	474..	—	147..	6,251
Total	20,933	12,997	9,216	6,816	2,176	—	11,319	46	10,237	73,740

(3) *Sanitation.*—Routine Survey of Sanitation was carried out by the Medical Officers of Health and Field Medical Officers of 3,461 schools. Sanitary surroundings for children while at school are of extreme importance and the most essential requirement in this connection is the provision of sanitary latrines, urinals and protected water supply. These not only concern the health of the school child directly but also have a great educative value. The statement made with regard to the inadequacy of latrines and urinals in schools in proportion to the number of scholars in the last year's report is reiterated. Of 3,461 schools inspected over 400 schools had no latrines and about 2,000 schools no protected source of water supply. For 609,682 scholars there were only 6,885 seats of latrines in other words 1 seat per 85 scholars, 1,625 urinal compartments or 1 per 375 scholars. A certain amount of progress has been made in these sanitary requirements in Government Schools through the Rural Education District Committees. Much remains to be done particularly in the schools under private management.

The following table will show the state of sanitation in the schools surveyed :—

TABLE IX.

	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.
Schools	1,074..	401..	435..	551..	131..	30..	458..	16..	365..	3,461
School children	217,489..	72,870..	89,961..	81,008..	14,245..	3,121..	70,085..	3,063..	57,786..	609,628
Schools with latrines	1,007..	341..	398..	462..	83..	30..	371..	16..	335..	3,043
Total seats	2,386..	860..	879..	1,093..	201..	64..	715..	40..	647..	6,885
Schools with urinals	199..	103..	56..	143..	30..	3..	40..	2..	70..	646
Total urinal compartments	562..	231..	220..	338..	40..	5..	92..	4..	133..	1,625
Schools with protected wells	487..	92..	173..	250..	72..	8..	241..	2..	156..	1,481

(4) *Health Education* continues to be the keynote of all health activities and the teachers contribute the best agents for carrying out the work in schools. With a view to equipping the school teachers for this important task, training classes for teachers have been held in an increasingly larger number of centres year after year. During 1938, 52 classes were held and 1,577 teachers trained as against 27 classes and 1,025 teachers in 1937, and 22 classes and 876 teachers in 1936.

TABLE X.

Health Education.

Province.	No. of Training Classes.		No. of teachers trained.
	Commenced.	Completed.	
Western ..	11	11	454
Central ..	9	5	199
Southern ..	6	4	301
Northern ..	9	7	198
Eastern ..	4	—	96
North-Central ..	—	—	—
North-Western ..	4	3	116
Uva ..	—	—	—
Sabaragamuwa ..	9	5	213
Total ..	52	35	1,577

The following tables show the routine health education procedures and health instructions and other activities connected with Health Education carried out in the schools in the different provinces.

TABLE XI.

Number of Schools carrying out Procedure.

Health Education Procedures.	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.	
										1938.	1937.
1. Daily morning inspection	938	339	390	337	127	29	402	15	360	2,937	2,315
2. Scoring of health habit booklet	565	246	196	105	62	13	275	11	205	1,678	1,068
3. Weighing and measuring	533	175	116	61	32	11	219	13	215	1,375	863
4. Use of handkerchief	441	134	109	52	2	11	171	7	131	1,058	628
5. Proper storage of drinking water	521	232	175	272	33	13	255	11	137	1,649	1,072
6. Use of individual drinking cup	461	93	127	72	14	18	199	7	112	1,103	612
7. Pupil participation, &c.	718	241	295	192	88	25	328	15	268	2,170	1,293
8. Midday meals	200	70	110	188	43	24	162	4	72	873	465
9. Health clubs	84	3	34	28	1	—	15	—	20	185	85
10. Organized play	720	234	291	232	94	25	328	16	306	2,246	1,664

TABLE XII.

Number of Schools carrying out Instruction.

Health Instruction.	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.	
										1938.	1937.
1. Direct teaching	852	250	342	357	82	19	278	16	330	2,526	1,825
2. Teaching by correlation	568	198	221	128	63	13	184	12	254	1,641	1,066
3. Posters, scrapbooks, &c.	416	127	139	66	32	7	166	6	160	1,119	660
4. Dramatization	154	21	33	30	7	6	28	2	46	327	146
5. Health Songs and debates	179	32	72	75	31	—	21	5	48	463	300
6. Field visits	285	118	97	74	54	5	67	2	153	855	568

TABLE XIII.

Other Activities.

Other Activities.	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.	
										1938.	1937.
1. Parent Teachers' Association	238	39	111	154	11	—	83	2	97	735	436
2. School Health Demonstration	121	2	34	53	23	—	5	5	34	277	78

Compared with the figures for the previous year it would be observed that considerable progress has been made with regard to the health education procedures and health instructions.

(5) *Control of Communicable Diseases.*—Notified incidence of communicable diseases in schools by provinces is given in the following table:—

TABLE XIV.

Province.	Chickenpox.	Diphtheria.	Dysentery.	Enteric.	Measles.	Mumps.	Phthisis.	Whooping-Cough.
Western ..	321 ..	4 ..	140 ..	45 ..	535 ..	335 ..	8 ..	73
Central ..	233 ..	7 ..	9 ..	4 ..	261 ..	185 ..	— ..	7
Southern ..	230 ..	— ..	35 ..	23 ..	702 ..	106 ..	3 ..	5
Northern ..	347 ..	1 ..	42 ..	43 ..	902 ..	1,468 ..	— ..	124
Eastern ..	3 ..	— ..	2 ..	5 ..	23 ..	20 ..	— ..	—
North-Central ..	— ..	— ..	3 ..	— ..	141 ..	16 ..	— ..	9
North-Western ..	28 ..	— ..	90 ..	5 ..	227 ..	157 ..	3 ..	35
Uva ..	54 ..	— ..	— ..	12 ..	33 ..	11 ..	— ..	—
Sabaragamuwa ..	81 ..	— ..	56 ..	8 ..	355 ..	107 ..	— ..	6
Total ..	1,297	12	377	145	3,179	2,405	14	259

Except diphtheria there had been an increased incidence of all other communicable diseases in the schools, this year than in 1937. It might be that more cases have been detected in 1938, which in previous years escaped detection. With the daily morning inspection introduced as a Health Education procedure one would normally expect detection of communicable diseases in children and as this activity becomes increasingly introduced in schools the greater will be the chances of detection and notification of the communicable diseases.

Quinine Administration.—More schools have been dealt with but a less number of scholars have been treated in 1938, than in 1937. In Central Province and Southern Province the number treated has been very much less. In hyper-endemic areas prophylactic use of quinine in schools during malarial seasons has been continued.

TABLE XV.

Quinine Administration.

	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.
Schools ..	71 ..	235 ..	111 ..	153 ..	76 ..	30 ..	443 ..	6 ..	176 ..	1,301
Scholars ..	16,737 ..	35,604 ..	16,463 ..	12,357 ..	6,400 ..	3,121 ..	56,716 ..	574 ..	30,226 ..	178,198

Hookworm Treatment.—2,304 schools were visited for hookworm treatment and 207,068 scholars were treated. Treatment for hookworm disease is being availed of in increasing numbers year after year and much of the response is due to the interest the teachers have taken in the matter.

TABLE XVI.

Hookworm Treatment.

	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.
Schools ..	586 ..	310 ..	341 ..	153 ..	120 ..	30 ..	403 ..	15 ..	346 ..	2,304
Scholars ..	51,193 ..	36,687 ..	29,906 ..	12,357 ..	9,615 ..	2,294 ..	37,950 ..	1,415 ..	25,651 ..	207,068

Anti-Typhoid Inoculation.—With the co-operation of the school teachers this very important measure of protecting the school child from the endemic disease of typhoid fever by inoculation has been carried out with great success. Number of children protected by 2nd inoculation increased by 10,707 over the previous year. The Central Province alone provided one-third of the total inoculations and occupied the highest place in all provinces in this activity.

TABLE XVII.

Anti-Typhoid Inoculation.

	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.
First ..	9,249 ..	12,441 ..	4,653 ..	7,311 ..	398 ..	— ..	2,070 ..	753 ..	4,100 ..	40,975
Second ..	7,322 ..	10,185 ..	3,391 ..	5,388 ..	259 ..	— ..	1,213 ..	727 ..	3,300 ..	31,785

Anti-Smallpox Vaccination.—Primary vaccination is compulsory. It is also a requirement which is insisted upon by the Education Department before admissions

to schools and into examinations. Inspite of it the presence of about 6,000 unvaccinated children in schools is a clear indication of the lack of attention paid to this important public health measure. 8,297 total vaccinations were done in 1938.

TABLE XVIII.

Anti-Smallpox Vaccination.

	W.P.	C.P.	S.P.	N.P.	E.P.	N.-C.P.	N.-W.P.	Uva.	Sab.	Total.
Primary	1,342..	702..	779..	1,742..	1,698..	10..	541..	35..	899..	7,748
Secondary	316..	—	16..	115..	20..	—	49..	—	33..	549
Total	1,658	702	795	1,857	1,718	10	590	35	932	8,297

4.—LABOUR CONDITIONS.

The following report deals with the sanitary conditions of estates scheduled under the Medical Wants Ordinance and with the health of labourers employed thereon and the medical facilities available to them :—

Staff.—The staff was the same as that employed in the previous year, viz., 3 Inspecting Medical Officers, and 2 Assistants. They were engaged throughout the year in rebate and sanitary inspections, advisory visits and all matters relating to housing, food and general health of the estate labour population. 728 estates were visited for sanitary inspection. It is necessary that estates should be inspected at least once a year but this is not possible with the present staff. The question of entrusting the work of medical supervision and inspection of estates to Medical Officers of Health and Field Medical Officers is under consideration.

Estate Sanitation.—The sanitary conditions on the larger estates inspected during the year were, on the whole, satisfactory. A reduction in the number of scavenging labourers, absence of dust bins and incinerators and the inadequacy of latrine accommodation were chiefly responsible for the unsatisfactory sanitary conditions prevailing on some of the estates.

Medical Aid.—There are 64 Government hospitals and 111 Government dispensaries in charge of qualified Medical Officers and Apothecaries to render medical aid within the areas of the estates medical districts. In addition to these, the estates maintained 99 private hospitals and 666 private dispensaries. An improvement in the standard of efficiency of the estate institutions could only be effected by gradual replacement of "approved" dispensers by qualified Medical Officers or Apothecaries whenever vacancies occur.

Line Accommodation.—As a result of the reduced labour force employed on a fair number of estates, chiefly rubber, many sets of lines have been abandoned. Where these were of back to back type, especially if they were deficient in floor area only, recommendation has been made to have the rooms converted into over-size single rooms by putting in archways or lintels in the middle partition walls. By doing this, non-standard lines deficient in floor area can be converted into standard sets, use can be made of unoccupied lines, and large families can easily be accommodated in them. The advantages of housing families with children of different ages in a large room divided into parts are obvious and this improvement is worthy of adoption on a wider scale.

Out of the 728 estates inspected 32 estates have closed the lines. The overcrowding on the balance 696 estates has decreased considerably.

	1935.	1936.	1937.	1938.
Number of estates having non-overcrowded lines	357	428	467	625
Number of estates having slightly over-crowded lines	7	9	16	25
Number of estates having over-crowded lines	22	21	23	19

Line Construction.—Fair progress was made during the year in line construction. On most estates the lines constructed were of the "single" type and many of them were provided with cooking places and chimneys. Back to back lines in sets of 4 rooms with fire-places and a common chimney were adopted on a few estates.

Type plans of these lines were available to Superintendents of estates only after May and there is no doubt that this type will be appreciated especially in up-country and mid-country both by Superintendents and labourers, in preference to even single lines. Of the 107,543 rooms inspected 82,628 were up to standard requirements in all respects.

Latrine Accommodation.—For some time past, the provision of new latrines and the replacement of existing ones have been neglected on some estates. Reduced labour forces, or the total abandonment of lines due to financial depression, and restriction are the main factors which have been responsible for bringing about the poor sanitary conditions noted on some estates. Towards the latter part of the year there was increased activity in making good this sanitary deficiency. The mere provision of latrines would not prevent soil pollution. The exertion of the combined influence of the whole staff is necessary to make the labourers use the latrines provided for them and to educate them on the advantages of using the latrines. Dry earth (bucket type) latrines are more popular among the labourers than the pit type. A few estates have provided water-borne sanitation. Several estates have provided conveniences in the way of small commodes for the use of children who are unable to make use of latrines. In order to ensure the proper use of latrines, the following points are stressed :—

- (a) Proper location of latrines.
- (b) Maintenance of cleanliness of latrines.
- (c) Supply of water and also provision of ablution rooms.
- (d) Provision of easy, direct and well kept paths.
- (e) Lighting of latrines at night.
- (f) Training of children in creches and schools to use commodes or latrines.
- (g) Regular supervision of work of conservancy labourers by the Estate Dispenser.

The following table shows the latrine accommodation on estates inspected since 1935 :—

	1935.	1936.	1937.	1938.
Provided sufficient number of latrines ..	269	252	326	516
Provided insufficient number of latrines ..	97	194	160	170
Provided no latrines ..	12	13	20	42

Water Supply.—About 70 per cent. of the estates inspected had provided a pure water supply. Superintendents of estates fully appreciate the importance of a pure water supply for drinking. In many estates the sources of the water supply are adequately protected. It should be the endeavour of every Superintendent to provide a piped water supply on their estates wherever circumstances permit.

Maternity and Child Welfare.—During the course of the year it was gratifying to note that Superintendents of estates evinced great interest in making provision for maternity and child welfare.

Generally speaking, it is necessary for an estate having 700 or more resident working labourers to employ a midwife, and a group of small estates with the resident working labourers aggregating 700 to share the services of a common midwife with neighbouring estates.

Except when an estate is situated in close proximity to a hospital with accommodation for maternity cases, arrangements should be made where possible to provide a delivery room together with one or more lying-in rooms, fully equipped, for estate confinements at the rate of one lying-in room for every 250 resident working labourers.

Early in the year, a type plan of maternity ward for estates was prepared by the Department. 110 estates had, up to the end of 1938, constructed maternity wards in conformity with the type plan. The number of registered midwives in estates totalled 170 on December 31, 1938, and the number of estates served by them was 327.

The infant death rates of the different estate districts for the last five years are given below :—

	1934.	1935.	1936.	1937.	1938.
Kandy ^H ..	227	204	191	182	181
Matale ^M ..	200	270	145	152	159
Nuwara Eliya ^N ..	236	202	204	209	194
Badulla ^{→ mod} ..	175	171	156	149	171
Ratnapura ^{mod} ..	165	157	132	140	142
Kegalla ^H ..	116	251	103	109	137
Colombo ^H ..	182	211	128	151	150
Kalutara ^H ..	139	135	115	142	129
Galle ^H ..	144	135	117	124	103
Matara ^H ..	199	245	224	163	145
Kurunegala ^M ..	182	740	184	197	165

Ankylostomiasis Treatment.—Good progress was made in carrying out mass treatment on estates of resident as well as of non-resident labourers. In the majority of cases treatments were carried out by the Medical Officers of Health or Field Medical Officers of the areas. 319,765 persons were treated on estates and 41,937 at Mandapam Camp.

Estate Health Work.—The work done by Medical Officers of Health and Field Medical Officers was as follows :—

746 estates with resident labour came under the intensive health activity areas. Out of the 389 estates which co-operated 376 received 572 visits. Ninety-five out of the 337 defects detected were rectified in those estates.

626 mothers and 643 infants were under care. Thirty-four estates received 156 visits from nurses and 120 estates received 514 visits from midwives. There were 1,110 ante-natal visits and 667 post-partum visits with 153 deliveries.

131 communicable diseases were reported and 130 of them were dealt with.

Health Education work was carried out in the estates. Twenty lectures with lantern and 32 lectures without lantern were given. The nurses gave 47 talks and the sanitary assistants 16. The estimated attendance was 12,265.

5.—HOUSING AND TOWN PLANNING.

In areas under Urban District Councils and Sanitary Boards and in certain areas outside these the Housing and Town Planning Ordinance is in force. In them a permit has to be obtained before a building is constructed or alteration effected and buildings are systematically inspected and action taken on those that are insanitary and unfit for human habitation.

The following is a statement of work done in connection with the enforcement of the requirements of this Ordinance.

Applications for :—

New buildings—

Number received	..	..	3,790
Number reported on	..	..	3,712

Alterations and additions—

Number received	..	..	1,951
Number reported on	..	..	1,906

Insanitary dwellings—

Number reported on	..	..	1,234
Closing orders obtained	..	..	158
Improved—Voluntarily	..	..	252
Compulsorily	..	..	50
Demolition orders obtained	..	..	73
Demolished	..	..	200

6.—FOOD IN RELATION TO HEALTH AND DISEASE.

Nutrition.—Please see Section IX. with regard to the work of the Nutrition Division.

Meat Inspection.—All cattle slaughtered are inspected before slaughter kept in pounds for 24 hours. Slaughtering in areas under local authorities is carried out in slaughter-houses maintained by them. The work has been satisfactorily carried out. 72,394 heads of cattle were inspected and 69,022 passed for slaughter.

Of the 30,082 goats inspected 28,269 were passed as fit for slaughter.

Milk Supply.—In the absence of a Milk and Dairies Ordinance, the control of the milk supply is still a matter of difficulty. The common adulterant is water. There is no control over the sale of milk in rural areas while there is a fair measure of control in all town areas.

There were 642 licensed dairies. 672 samples of milk were examined, 412 of which were found adulterated.

Food unfit for Human Consumption.—483 cases of food unfit for human consumption were dealt with as compared with 195 in 1937.

Food Handling Establishments.—The Sanitary Board and Urban District Council towns, all food handling trades, viz., bakeries, tea and coffee boutiques, eating-houses, dairies, vegetable, fish-meat stalls are licensed yearly on the recommendation of the Medical Officer of Health or Field Medical Officer.

The Sanitary Assistants inspect them regularly and see that they are maintained in a clean and sanitary state in accordance with by-laws relating to them.

The following is a statement of work done in regard to food handling establishments.

Food handling establishments.	Existing.	Inspected.	Inspections.	Defects.	Defects corrected.	Radically improved.
Aerated water manufactory ..	36 ..	36 ..	534 ..	394 ..	200 ..	3
Bakeries ..	1,006 ..	985 ..	16,728 ..	17,473 ..	11,261 ..	459
Dairies ..	642 ..	607 ..	7,984 ..	5,775 ..	3,976 ..	339
Eating-houses ..	1,249 ..	1,239 ..	16,128 ..	13,176 ..	9,508 ..	398
Fish stalls ..	372 ..	370 ..	30,495 ..	4,360 ..	3,566 ..	42
Meat stalls ..	515 ..	510 ..	34,855 ..	7,174 ..	5,302 ..	238
Vegetable stalls ..	774 ..	772 ..	35,490 ..	4,986 ..	3,478 ..	77
Tea and coffee boutiques ..	5,823 ..	5,668 ..	55,670 ..	37,483 ..	25,768 ..	1,414

7.—SANITARY ENGINEERING.

Malaria Emergency River Oiling.—During the early part of the year it was found necessary to undertake emergency oiling measures at Alawwa, Mawanella, Giriulla, Rambukkana, Makandura, Dikwella, Hali-ela, Nalanda, and Rattota owing to the increase of *A. culicifacies* breeding in the river beds. In October similar conditions were in evidence around Madola and an emergency gang was sent to that centre.

Five trained oiling overseers were retained at the permanent centres for this duty but it is proposed in future that the Sanitary Assistants stationed in the affected areas take charge of the field work and for the overseers to act as relief men in extensive and outlying areas.

The cost of emergency oiling work amounted to Rs. 9,206.16 as against R. 3,593 for the previous year.

River Control Surveys and Clearing.—Permanent control measures in the rivers has now become one of the most important items in the Division's activities. Continued progress in this connection has been made both in regard to preliminary surveys of rivers and in the construction of works.

Surveys were made of 138 miles of rivers and streams and 120 miles were completed and plotted. Schemes for new improvements were drawn up covering 35 miles of rivers and special surveys and plans were prepared for contract works for river control and syphon installations for 1939.

New works have mainly been confined to those areas most affected during the epidemic of 1934-35.

River Clearing.—River clearing of the Malwatu-oya at Anuradhapura was completed between the intake of the Halpan-ela and the Toluwila-ela junction. This covers the whole of the section affecting the campaign area.

The removal of trees and logs from the bed of this river has effected a considerable improvement in the channel by reducing pooling conditions during the dry season.

Over 1,653 large trees and logs were removed from this stretch of river which is about 3 miles in length. The cost of the work done during the year was Rs. 2,559·59 making a total of Rs. 4,059·59 for the whole section.

Similar work was taken up at Mawatagama, Boyawalana, and in other sections, work is at present in hand on the Minneriya-oya near Minneriya.

Channel Control.—The control of river channels by the construction of permeable revetments and spur dikes was continued at Badulla and Alawwa, and new sections were taken up at Mawanella, Teldeniya, Attanagalla, Ambepussa, Katugastota, and Rattota; most of these were completed during the year.

More extensive use was made of concrete tetrahedron blocks in the Alawwa and Attanagalla sections as this form of construction was found to be particularly suited to streams subjected to strong cross currents.

Spur dikes and mattresses of rubble enclosed in heavy hog-wire mesh were used to advantage on several sections where excessive scour called for special treatment. These were largely used on the Ambepussa-oya and on the tributaries of the Badulla-oya.

The total length of river sections now controlled by permanent measures is 10 miles, an increase of $7\frac{1}{2}$ miles during the year.

Rock Pool Sealing.—Filling, draining and sealing of rock pools was carried out at Badulla, Mawanella, Hiriwaduna, Peradeniya, and Katugastota. Similar work is in progress at Taldena and Hali-ela.

Over 27,500 square feet of rock pools were filled and sealed during the year.

Automatic Syphon Flushing.—Automatic flushing devices were installed at Galigamuwa, Warakapola, Kegalla, Mawanella, Nanu-oya, Karandapone, Anuradhapura, Ulapane, and Tuntota.

Two general types of syphons were designed (a) earthenware pipe syphon, (b) concrete block or mass concrete syphon. The former being used for streams of 12 to 15 feet in width and the latter for larger streams.

The largest syphon barrage was installed on the upper reaches of the Maha-oya at Mawanella. It is constructed of masonry and concrete on a rock foundation and is 145 feet in length with a height of 4·25 feet. This barrage contains 12 concrete block type syphons and 9 flood-gates. The water storage above the dam is approximately 2 million gallons and during normal dry weather periods the syphons discharge an average of 33,700 gallons per minute. The flush is effective for a distance of over 5,000 feet below the dam.

In the smaller installations of similar construction the average discharge ranges between 2,000 and 6,500 gallons per minute.

Observations are being made at a number of these installations, to ascertain the efficiency of the various types and the effects produced in the reduction of larvæ in the channels.

In the design of flushing syphons for this purpose it is necessary to create a critical velocity in the bed which will definitely prevent the possibility of heavy anopheline breeding. From experimental investigations so far carried out this critical velocity appears to be in the region of 1·75 to 2 feet per second.

Schemes are in hand for the expansion of river flushing devices and it is proposed to construct over 28 additional installations during 1939.

Permanent Works at Anti-Malaria Campaign Centres.—The construction and improvement of drainage channels at Issurumuniya, Nakkavehera, and Kohilawala in the Anuradhapura area were put in hand and completed. Improvements also were made to the Divulgahakotuwa channel. The work consisted of aligning, grading and cutting new earthen channels of approximately 12,660 feet in length. The slopes of all channels were turfed throughout and concrete and masonry drop walls provided. These channels deal with the drainage of about 21 areas of swamps, much of which already has been prepared for cultivation. The Issurumuniya channels of 6,900 feet in length were completed; Kohilawala swamp was drained by a new channel of 960 feet in length; and Nakkavehera swamp was drained by cutting and deepening a 4,800 feet channel.

At Trincomalee a sea outlet was constructed for draining the swampy area at Uppuveli. The work incorporated the cutting of a pilot channel through the sand dune and laying a 232 feet line of 2 feet reinforced concrete pipes on 3 feet concrete cylinders in the sea. The work was difficult as it was frequently held up by high tides. The purpose of the work is to allow drainage to escape to the sea at all times. Formerly this was checked by the formation of sand bar except at times of heavy flood when the bars became breached.

At Chilaw considerable progress was made with the construction of drainage lines. The original meandering drains have been retraced and the water now confined in properly aligned channels constructed of wooden pegs and mangrove wattle revetments. Channels of this type have been constructed between the large ponds in the centre of the town and the water level of the remaining ponds maintained at a much lower level. The upper swamp has been completely filled and drained.

A main outfall channel was cut to relieve the flood waters of the Timilla tank. This channel is 1,200 feet in length and has a direct connection to the Deduru-oya. The construction involved 625 cubes of earth cutting and 542 cubes earth filling and the construction of a concrete bridge over the channel.

At Puttalam two causeways were constructed at the Nedunkulam tank spill to control the overflow waters from this tank which originally spread over a large low-lying area.

At Kurunegala the drainage channel at Maligawa was realigned and paved throughout and flushing syphon provided. Two syphon installations were put under construction on the Bu-ela and one installation on the outlet channel below Kurunegala tank bund.

Water Supplies : Investigations and Soil Surveys.—Soil surveys were carried out at Hambantota and Tangalla in connection with the proposed town supplies. At Hambantota the investigations were undertaken with the object of ascertaining whether the sand dunes lying to the south-west of the town would yield a sufficient supply for a water borne scheme. The results of the investigations showed that the quantity available consistent with quality was very limited, and could not be expected to meet more than $\frac{1}{3}$ rd of the town's requirements.

At Tangalla further soil investigations were made in the Kirama-oya valley between Nalagama and Wagogoda where forty-one borings were sunk. Samples of water from the borings indicated excessive CO_2 in each case most of which could be dissipated by aeration. Recommendations were made regarding the treatment of the water. Investigations were made for proposed water supplies for the towns of Pelmadulla, Jaffna, Huluganga, Kadugannawa, Hali-ela, and Panwila and for the supplies to over 25 hospitals and other institutions. The disinfection of augmentation works was carried out at Wattegama, Gampola, and Kurunegala and lime treatment was installed at Kandana Hospital.

Recommendations were made for the treatment of water to Elpitiya Hospital and Hiripitiya Dispensary and for special precautions at Panadure Hospital. Microscopical examination was made of the Giriulla Hospital supply and recommendations made for overcoming the iron bacteria in this water.

Drainage.—Surveys were made and plans prepared for town drainage schemes for Mannar, Dehiwala-Mt. Lavinia, and Alutgama. Full reports accompanied these schemes. Hospital drainage schemes were prepared for Hambantota and Negombo and recommendations made regarding the disposal of flood water and drainage at Lunawa Hospital.

Specification and bill of quantities and complete set of plans were prepared for the Sanitary proposals at Tataparai Camp where the work is shortly to be put in hand.

Recommendations were made regarding the sanitary drainage of Dandagamuwa Hospital and for alterations to the town drainage of Maskeliya.

Miscellaneous.—Proposals were framed for the treatment of wash water from rubber factories and recommendations were made *re* experimental plants for dealing with trade waste waters from distilleries and desiccating mills.

Plans.—During the year 485 plans were prepared and 182 prints were obtained.

B.—MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

Health Education forms the dominant motive in public health work of to-day. This fact is fully appreciated by the officers of the Department and persistent efforts are being made to educate the public in all matters pertaining to health.

Health Education work is carried out by Medical Officers of Health, Field Medical Officers, School Medical Officers, Public Health Nurses, Sanitary Assistants, Anky. Dispensers and Midwives.

Health Education in Schools.—Much attention is being paid to Health Education work in schools, where with the co-operation of the Department of Education a large amount of work is being done by Medical Officers, Sanitary Assistants and Nurses. In addition to the 9 School Health Nurses each of the 38 Public Health Nurses and 308 Sanitary Assistants is expected to carry out completely the Health Education procedures laid down by the Department in two schools every year.

The same procedure as last year was followed in regard to Health Education work in schools and the training of teachers in this work. Nine teachers were awarded the joint certificate issued by the Education and Medical Departments for passing the examination held at the end of the training course and also for satisfactorily carrying out for six months the practical application in their classes of the principles of health learnt by them.

The course in Health Education in connection with the Rural School training centre of the Department of Education at Mirigama was continued.

In order to equip school teachers for the important task of Health Education in their respective schools training classes for teachers have been held for both teachers in training as well as for those in service. During 1938, 52 classes were held and 1,577 teachers attended them, as against 1,025 teachers in 1937, and 22 classes and 876 teachers in 1936.

The number of schools in each province where Health Education procedures are being followed is given in Table XI. of Section III.—sub-section (3) School Health Work.

The Challenge shield provided by the Society of Medical Officers of Health of Ceylon for competition among elementary schools for the school that carries out the best programme of School Health Work as outlined by the Department was awarded to Kalutara Methodist Mixed School.

Training of laymen in Health Work.—A new feature in the training of laymen in health work are the classes opened this year in consultation with the Government Agents for Village Headmen. These classes have been held in 36 centres in different parts of the Island and 541 headmen have been trained. The syllabus drawn up for the course includes not only lectures but also practical work in their respective villages. Certificates are granted only when the practical application of the knowledge has been found satisfactory by the Medical Officer of Health or the Field Medical Officer of the respective area.

Talks and Demonstrations of Auxiliary Personnel.—The Public Health Nurses and School Health Nurses carried out a large amount of educational work by routine talks and demonstrations during their home visits and at the clinics held in connection with Maternity and Child Welfare and School Health Work. Through group talks in the villages the Sanitary Assistants helped in the spread of a knowledge of hygiene and Sanitation among the masses. The routine talks and demonstrations by the Ankylostomiasis Dispensers, in connection with the hookworm treatment campaign, helped to enlighten the people with regard to the causation and prevention of this disease. The number of all such talks given during the year were :

School talks	..	..	..	12,907
Village talks	..	..	..	30,350
Clinic demonstrations in the homes	..	..	..	9,375

General Health Instruction.—General health publicity and mass Health Education is being carried out by means of (a) leaflets and pamphlets, (b) posters, (c) press articles, (e) "Health News" or bulletins, (e) radio talks, (f) cinema and lantern lectures, (g) health days, health weeks and exhibitions and (h) health leagues.

(a) *Leaflets and Pamphlets*.—During the year the following new leaflets were issued.

(1) Anti-malaria instructions to constructional departments, (2) Rabies, (3) Illustrated leaflet on hookworm, (4) Illustrated folder on hookworm, (5) Advice to patients suffering from syphilis, (6) Advice to patients suffering from gonorrhoea. The number of leaflets issued to the public during this period is as follows :—

	English.	Sinhalese.	Tamil.
Care of Expectant Mother ..	650	10,050	7,000
Malaria (1) ..	222	16,935	6,110
Do. (2) ..	1,062	16,425	5,600
Hookworm ..	2,412	10,485	10,100
Infantile Convulsions ..	637	7,700	2,575
Bubonic Plague ..	300	6,700	2,100
Pamphlet on Rabies ..	4,000	—	—

(b) *Posters*.—A fourth poster on hookworm making a set of 4 posters with the 3 already put out was issued. New posters on malaria and filariasis are under preparation.

(c) *Press Articles*.—Regular contributions on health subjects are being sent to the local press and are given due prominence in the 3 English dailies and in the Sinhalese and Tamil Dailies and Weeklies. During the year 26 such communiques were issued to the press.

(d) "*Ceylon Health News*".—This is a publication issued by the Department once in two months and is specially meant to educate the health worker. The increasing demand for it speaks for its growing popularity. The following numbers were issued during the year :—

Volume 7 No. 5—special feature—Nutrition.
Volume 7 No. 6—special feature—Malaria.
Volume 8 No. 1—special feature—Childwelfare.

The first issue of the "*Sinhalese Health News*," a four-paged leaflet of foolscap size, was published during the year. Of the 4,000 copies published 2,000 were distributed to vernacular schools through the Department of Education, while the other 2,000 were distributed to members of Health Leagues, Village Committees, and others interested in rural health work. Volume 1 Nos. 1 and 2 of this publication have been already issued.

Arrangements are being made to issue a similar publication in Tamil.

(e) *Broadcast Talks*.—Radio talks have proved an effective means of spreading knowledge of health, 22 talks in English, 20 in Sinhalese, and 19 in Tamil, covering quite a large number of subjects connected with health, were given by the officers of the Department during the year.

The possibilities of putting over the air, health songs and health plays and thus giving the health message a novel form are being investigated.

(f) *Cinema Shows and Lectures*.—A new cinema film of about 4,000 feet on "Town and Rural Sanitation—depicting a day in the life of a Sanitary Assistant," which was shot locally was released and is proving very popular.

During the year, lectures were delivered by various officers of the Department. Of these 192 were with the aid of the cinema, 1,749 with the aid of the lantern and 2,044 without the cinema or lantern.

Taking by provinces the number of lectures delivered in each province is as follows :—

Province.	No. of lectures delivered.
Northern ..	234
North-Central ..	33
North-Western ..	868
Eastern ..	347
Central ..	774
Uva ..	96
Sabaragamuwa ..	623
Western ..	602
Southern ..	408

(g) *Health Exhibitions, Health Days, Competitions, &c.*—During the year under review 13 health exhibitions were held at the following places:—Baddegama, Kadugannawa, Jaffna, Wahacotte, Ambalangoda, Kandana, Marawila, Dumbara, Kotte, Veyangoda, Colombo, Weligama, Kalutara.

The Michael Guneratne Shield Competition for 1938 was awarded to the Teldeniya Exhibition Committee.

A special mass health propaganda activity organized during the year was the All-Island Malaria Day on August 20, commemorating the 41st Anniversary of the discovery of malaria transmission by the late Sir Ronald Ross. This was made an occasion for an Island wide anti-malaria and general health drive and resulted in the organizing and carrying out of clean-up campaigns, demonstrations and exhibitions even in remotest villages.

The success which attended the observance of the "Malaria Day" this year has encouraged the Department to organize an All-Island Malaria and Health Week during next year.

(h) *Health Leagues.*—Health Education work through the formation of voluntary organizations, such as, health leagues, referred to in the last administration report, has been carried out to a much greater extent than in previous years as a larger number of leagues have come into being during the year. The total number of health leagues and other voluntary associations carrying on health work is now 314 of which 147 were organized during this year.

Health Museum.—A separate building (the old Bacteriological Institute) has been secured for the Public Health Museum where Departmental exhibits and educational materials would be housed and arranged in different sections. It will serve as a model health educational centre for the general public as well as for the health worker. Arrangements are being made to equip it. Already an attractive Neon sign showing the malaria mosquito biting the upper arm of a person and alternately sucking up the blood and injecting malaria parasites has been installed in front of the building.

Education of the Professional Worker.—The Medical Officers of Health held special conferences and meetings of their Society during the months of March, June, September, and December. One issue of the "Transactions" of the Society was published during the year.

Nine conferences of the Medical Officers of Health and Field Medical Officers working under the Malaria Control Scheme were held during the year. These are convened by the respective Supervising Officers of the area and were held in the following centres:—

1938		
March	..	.. Matara.
April	..	.. Kurunegala.
May	..	.. Colombo (Head Quarters).
July	..	.. Vavuniya.
July	..	.. Kandy.
August	..	.. Batticaloa.
October	..	.. Matara.
November	..	.. Ratnapura.
December	..	.. Kurunegala.

In all Health Units and in some of the areas of the District Medical Officers of Health, conferences of the Sanitary Officers of the respective areas are being regularly held and at these conferences various matters of importance connected with their work are discussed.

The Sanitary Assistants have an Association of their own and their seventh annual conference was held in December at the St. Peter's College Hall, Bambalapitiya. This conference was a unique one in that for the first time it was opened by a Governor of the Island, His Excellency Sir Andrew Caldecott, having graciously condescended to do so. The proceedings are published in their journal "The Sanitary Inspector."

The Public Health Nurses held their annual conference in August at Kandy. This conference was opened by Mrs. Wodeman, the wife of the Officer Administering the Government at that time, and the programme included several discussions of professional interest. Their annual journal "The Public Health Nurse" contains a record of the proceedings of their previous conference.

The conference of midwives was held on May 28, 1938, at Panadure. They issue a journal called "The Ceylon Midwife".

C.—TRAINING OF HEALTH PERSONNEL.

Sanitary Assistants (Inspectors).—The training class for Sanitary Assistants which was commenced in September, 1937, was completed in March, 1938. Forty sat for the examination of the Royal Sanitary Institute held in Colombo by the Local Board of Examiners and 31 passed. A new class was commenced with 35 students in September, 1938, and continued during the remainder of the year. Only men who have passed the London Matriculation examination or an equivalent examination are selected for training. At the end of the year there were 310 Sanitary Assistants in service.

Public Health Nurses.—Two training classes were conducted during the year. The first class commenced in January with 8 nurses of whom two were discontinued as unsatisfactory and 6 completed the course in June. The second class commenced in July with 3 nurses who completed their course in December. At the end of the year there were 47 nurses in service.

Midwives.—They are given an 18 months' course, of which one year is at the Lying-in Home and 6 months at a Health Unit where they acquire experience in district work and in maternity and child welfare work. The candidates are selected by a competitive examination among those who have passed the Junior School Certificate examination. A total of 60 candidates were selected and admitted for training to the Lying-in Home and 58 candidates of the previous year who passed out of the Lying-in Home were assigned for training at health units.

Post-graduate Training.—All Medical Officers selected for public health work are given one month's training at the training centres at Kalutara and Panadura total-mune health units in general health work and 2 weeks at the Torrington square laboratories in malaria work. Seven Medical Officers received this training. In addition one Medical Officer from Bengal was trained in health unit work. Nine Conferences with Supervising Officers, Medical Officers of Health and Field Medical Officers were held during the year at Colombo 1, Kurunegala 2, Kandy 2, Ratnapura 1, Matara 2, Vavuniya 1.

D.—RECOMMENDATIONS FOR FUTURE WORK.

The recommendations for future work are the same as those outlined in last year's report and action in regard to matters mentioned is being taken.

The only additional matter that is receiving attention is the placing of Medical Officers of Health and Field Medical Officers in charge of estate sanitation in their respective areas. Up to now special Inspecting Medical Officers have carried out this activity.

IV.—PORT HEALTH WORK AND ADMINISTRATION.

Ceylon is guarded against the introduction of dangerous infectious disease from abroad by the health service at each of its ports and by the two quarantine camps at Mandapam and Tataparai in Southern India. The chief sources of danger to the Island are (a) the grain traffic from Rangoon and other Burmese ports, in respect of plague and (b) the passenger and immigrant labour traffic between Southern India and Ceylon by the Dhanuskodi-Talaimannar and the Tuticorin-Colombo routes, in respect of Cholera and Smallpox.

The quarantine arrangements and procedure are under the control of the Quarantine Department and the technical work of the department is performed by Medical Officers, Medical Officers of Health, Apothecaries, Sanitary Assistants and Vaccinators of the Department of Medical and Sanitary Services who are seconded for service under the Quarantine Department. The port of Colombo has a whole-time staff of two Medical Officers of Health and three Medical Officers, while at the 15 minor ports the local Medical Officers give part of their time to the work. The surveillance of travellers after arrival at their destinations in Ceylon is also carried out by Medical Officers of the Department.

Colombo Port : Situation of Office and Personnel.—The Port Health Office is situated in the Customs Building, Passenger Jetty. The staff consists of one Port Health Officer and four assistants, one of whom is solely in charge of Indian Immigration. There are also a Supervisor of the Quarantine and Disinfecting Station, and a Chief and four Assistant Fumigation Inspectors.

Shipping.—During the year 2,709 British and Foreign vessels called and were granted pratique in Colombo. This figure is 79 less than that for 1937.

The number of Indian Sailing craft which entered the port was 227 ; 24 more than the figure for 1937.

Three Seaplanes from Malaya called at the port.

Infected Vessels.—No vessels arrived with cases of quarantinable diseases. Sixty-two vessels arrived in Colombo with cases of infectious diseases on board, viz. :—Measles 96, Chicken-pox 24, Mumps 12, Scarlet Fever 6, Typhoid Fever 4, Dysentery 3, Diphtheria 1, Whooping Cough 1.

Seven out of the 147 cases were isolated ashore and the remainder on the vessels themselves. Two vessels arrived with cases of suspected cholera which subsequently were proved to be negative.

Bills of Health.—During the year 1,745 Bills of Health were issued ; of this number 178 were issued to vessels which paid the consolidated rate, which included payment for Bills of Health ; 35 were issued free to warships, and one was cancelled.

Colombo Airport (Ratmalana).—The first planes arrived at the Airport on January 19, 1938. The quarantine duties in connection with the air port are done by the Port Health Officer and his three Assistants in rotation.

Pratique was granted to 224 Mail Planes and one private plane ; and 268 crew and 80 passengers arrived during the year.

Aircraft regulations, modelled on the International Convention for Aerial Navigation, 1933, have been drafted and are awaiting sanction.

International Seafarers' Clinic.—This Clinic, situated in the Port Health Office, affords free treatment and advice for venereal diseases to seamen of all nationalities ; and an account of its work appears in Section VI. of this report.

First Aid for Accidents.—The Port Health Officers attended to 24 cases of injury resulting from accidents in the Port Commission area. An equipped portable first aid cabinet has been supplied during the year. Another has been ordered for the use of the fumigation staff.

Registration of Births and Deaths.—The Port Health Officers acting in the capacity of Medical Registrars of the Fort area, recorded 12 deaths and 5 births.

Preventive Inoculation.—(a) *Anti-Smallpox.*—Vaccination against smallpox is carried out at the Port Health Office, the office of the Assistant Port Health Officer for Immigration and at the Disinfecting Station.

All passengers arriving from India are required to be vaccinated unless they bear scars of successful recent vaccination, or are in possession of vaccination certificates issued during the previous three years.

Apart from these, 33 outward passengers were vaccinated at their own request at the Port Health Office, and fees for this service amounting to Rs. 113 were credited to revenue.

(b) *Anti-Cholera.*—The crew of the ss. " Contractor " was inoculated free against cholera on the occurrence of a case of suspected cholera in August.

Seven outgoing passengers were inoculated at their request and fees amounting to Rs. 17 were credited to revenue.

(c) *Anti-Typhoid.*—The crew, numbering 52, of two Maldivian sailing craft were given 1st and 2nd injections of anti-typhoid vaccine free on account of the occurrence of two cases of typhoid fever amongst them. The disease was contracted before arrival in Colombo.

Passenger Traffic with India.—All passengers leaving Colombo for Tuticorin by steamer, excepting first class passengers, are medically examined prior to embarkation. Of the 44,710 passengers so examined, 273 were found unfit for the voyage and detained.

All passengers arriving in Ceylon from India are required to undergo a period of surveillance unless they have been placed in quarantine at Mandapam or Tataparai, South India. Nine cases of chicken-pox and 2 cases of measles which were detected amongst them were removed to the Infectious Diseases Hospital, Angoda.

Quarantine and Disinfecting Station, S.W. Breakwater.—Indian seamen numbering 947 were quarantined here until the arrival of their vessels in the harbour, and housing charges amounting to Rs. 2,469.75 were paid to revenue. These crews also undergo daily medical inspection.

Incoming passengers from India numbering 54,195 and 94 members of crews were disinfected.

The number of cradles of soiled linen from ships subjected to steam disinfection was 893. Seventeen cradles of soiled linen were disinfected free of charge to Government and the Navy.

Inspection of damaged foodstuffs.—Twenty-seven consignments of foodstuffs which were damaged were inspected and reported on by the Port Health Officers in the Customs Warehouses and Chalmers Granaries. The condemned portions of the cargo were destroyed at the Municipal Destructor, or dumped into the sea under the supervision of the Customs Preventive Staff.

Water Supply to ships.—Thirty-eight water boats owned by 4 companies are in use. They are thoroughly cleaned out once a quarter and their interiors are cement washed. After this process is completed each one is inspected by a Port Health Officer, before it is passed as fit for use.

Samples of water are collected periodically and sent for chemical and bacteriological examination, and samples from all the water boats were so examined during the year. Only one sample was unfavourably reported on. The water boat was promptly cleaned out and cement washed again, and a further sample of water proved satisfactory.

An experiment carried out to ascertain the effects of stagnation of residual water in the boats between the quarterly cleaning proved that the quality of the water was unaffected.

Sanitary improvements to water boats and bacteriological examination of water boatmen to ascertain their condition as carriers of typhoid and dysentery organisms, have been suggested and the quarantine regulations will shortly be revised to enable these measures to be carried out.

Sanitation of the Port Commission Area.—The three Assistant Port Health Officers make inspections and submit monthly reports on three separate sections of the Port Commission area to the Director, Quarantine Department, who forwards copies of each report to the Chairman, Colombo Port Commission, for action thereon.

There is a general improvement in the cleanliness and equipment of the trades premises, and also in the sanitary state of roads, drains and latrines.

The Port Commission have effected the following improvements during the year ; viz., bubbling fountains for drinking water, model eating-houses and tea boutiques, addition of two latrines of 4 compartments each and two extra latrine compartments and 2 urinals ; erection of concrete refuse bins.

The Port Commission maintains a staff of one trained Sanitary Assistant, one sub-overseer, 5 kanganies, 103 labourers and one rat trapper.

Anti-Plague Measures : (a) *Rat trapping.*—Regular rat trapping is carried out in the Port Commission area (excluding the Harbour Engineer's yard) and in the Chalmers Granaries and Manning Markets by the staff of the Colombo Municipality. The number of rats trapped for the year has been 659 in the Customs area and 608 in the Chalmers Granaries and Manning Markets.

In the Harbour Engineer's yard, during the year 330 rats were trapped. One of them was found to be plague-infected.

All rats trapped or picked up dead are sent daily to the City Microbiologist for examination for plague infection.

(b) *Fumigation of Lighters.*—All lighters used for the transport of cargo in the harbour are fumigated once a month, the pot-method of sulphur fumigation being employed under the supervision of the Inspector of sulphur fumigation. Of the

478 registered lighters in the port, 430 have been fumigated on an average each month, the remaining 48 are either being commissioned for service in the lake or undergoing repairs. 631 dead rats were collected from these lighters after fumigation, but none of them was found to be plague-infected.

(c) *Rat Certificates.*—Ships leaving Colombo for Australian and Dutch ports have to be in possession of a rat certificate—two types of which are in use. One used for vessels which have not been moored alongside a quay certifies that (a) the vessel has not gone alongside a quay, (b) all barges in the harbour are regularly fumigated once a month under the supervision of the Port Health Officer and (c) rat trapping is regularly carried out in the Customs premises and warehouses.

The other used for vessels which have gone alongside a quay certifies that the following protective measures were taken against the ingress of rats from the shore to the vessel, viz., (a) approved rat guards were fitted on all mooring ropes and steam hoses, (b) the gangway was lighted from dusk to dawn and guarded and (c) rat trapping is regularly carried out in the Port Commission area which included the pier.

These certificates are necessary as Colombo was during the year a plague-infected port. A fee of Rs. 21 is charged for each certificate, and a sum of Rs. 1,323 was credited to revenue from the issue of 63 certificates.

(d) *Fumigation of Vessels.*—All vessels entering the port are required to be in possession of a valid deratization or deratization exemption certificate in strict conformity with Article 28, of the International Sanitary Convention. Apart from this requirement any vessel which enters dry dock or goes on a slipway has to be fumigated previously if on inspection the vessel is found to harbour rats.

Fumigation is done with sulphur or liquid H C N. Sulphur fumigation is done by the Harbour Engineer's staff with the use of a Clayton apparatus, while cyanide fumigation is carried out by the Port Health Officer's staff.

During the year 5 vessels were fumigated, 2 with sulphur and 3 with liquid H C N. Deratization exemption certificates were issued to 10 ships.

(e) *Fumigation of Granaries.*—All occupied stores at the Chalmers Granaries and Manning Markets are fumigated with liquid H C N, free of charge, once in six months on an average.

Of the 137 stores in the Chalmers Granaries 128 were fumigated twice for the year, the remaining 9 not being fumigated as they were unoccupied.

Of the 59 stores in the Manning Markets 18 were fumigated twice for the year, the remaining 41 were not fumigated as they were either not occupied or not used for the storage of grain.

The number of rats recovered after fumigation was 224 from the Chalmers Granaries and 15 from the Manning Markets. One rat found dead in a refuse bin at the Chalmers Granaries was discovered to be plague-infected and consequently 7 stores, which were within 100 feet of the refuse bin, were promptly fumigated with liquid H C N.

All stores in the Chalmers Granaries have been rendered fit for fumigation by structural improvements to the walls and roofs.

The efficiency of fumigation of the Granaries is demonstrated by the following facts :—

- (1) The average number of rats trapped per month has been reduced from 78 in 1936 to 42 in 1938.
- (2) The average number of rats killed per fumigated store has fallen from 4 in 1936 to less than 1 in 1938.

Regulations have been framed for incorporation in the quarantine regulations, requiring owners, occupiers and lessees of stores, lighters and other vessels to hand over to the Port Health staff all rats trapped, killed by fumigation or found dead.

(f) *Fumigation of Merchandise from Plague-infected Ports.*—Fumigation of plague-suspect cargo was started in September, 1936. Experiments were carried out by the Port Health Officer to test the efficiency of fumigation with live rat fleas in wire gauze tubes.

The experiments showed that :—

- (1) the H C N gas penetrated to all parts of the lighters in which the cargo was fumigated ;
- (2) all fleas on the surface of and 4 inches within the rice bags were killed with the concentration of gas normally used ;
- (3) three-fourths of the concentration of gas normally used killed all fleas on the surface of and 4 inches within the rice bags ;
- (4) half of the concentration of gas normally used will not kill all fleas.

Since the inception of fumigation in September, 1936, there have been no outbreaks of plague in the interior of Ceylon, and the number of cases of plague in the Island has been reduced from 77 in 1932, 57 in 1933, 35 in 1934, 60 in 1935 and 57 in 1936 to 29 in 1937 and 10 in 1938.

It might therefore be safely concluded that this measure has achieved its purpose in preventing the introduction of fresh plague infection into the Island.

During the year 4,589,733 packages of plague-suspect cargo have been fumigated.

Rat Flea Survey.—A rat flea survey was carried out by the Colombo Municipality during the latter part of the year in the Customs area, the granaries and in cargo lighters and the result disclosed a high cheopis index in one of the Fort warehouses. In this warehouse from the 26 rats trapped 132 fleas were collected, 117 of which were *X. cheopis* and 15 *X. astia*. Intensive rat trapping in warehouses is urged and rat proofing is recommended.

The following statement shows the rats trapped in the Port Commission premises and in lighters :—

Port	Commission	(excluding	No. of rats.	No. of fleas.	No. of <i>X. astia</i> .	No. of <i>X. cheo- pis</i> .	Cheopis Index.	% Cheopis.
lighters)	248	.. 562	.. 313	.. 249	.. 1·004	.. 44·31
Lighters	17	.. 30	.. 17	.. 13	.. ·77	.. 43·33

Minor Ports.—634 Steamers and 1,892 sailing vessels called at the fifteen minor ports. 365 of the steamer visits were at Talaimannar in connection with the ferry service to India. All passengers arriving at Talaimannar had passed through Mandapam Quarantine Camp or had been inspected by Medical Officers of the camp. No passengers are permitted to land at the other small ports in the northern part of the Island and ships discharging cargo at these ports must be licensed. This is a necessary precaution since the shipping is mostly engaged in coastwise traffic with small ports in districts of Southern India where smallpox and cholera are generally endemic, while a few boats bring rice from Burmese ports.

Mandapam and Tataparai Camps.—A report on these camps will appear in the Administration Report of the Quarantine Department for 1938.

V.—MATERNITY AND CHILD WELFARE.

Maternity and child welfare work carried out in the various parts of the Island consisted of care at institutions such as hospitals and maternity homes, health centres and at homes of the individuals. The institutions concerned in this work were the Lying-in Home, Colombo, the district hospitals some of which are provided with special maternity wards, the maternity homes provided by local authorities in their towns and by philanthropic individuals and communities in the rural areas where hospital facilities were not easily available.

At the health centres of which 311 were in existence in 1938 care was given through ante-natal, post-natal and child welfare clinics. At homes care of mothers and children was given by the Public Health Nurses and Midwives.

The work consisted chiefly of medical supervision, obstetrical aid at labour and education of mothers and little mothers in mother craft. The institutions were chiefly concerned with providing obstetrical care preceded by a certain amount of ante-natal supervision particularly of abnormal cases. Bulk of the ante-natal and post-natal care was given at the health centres where regular ante-natal clinics were held every week. In the year under review several post-natal clinics were developed in areas where intensive health work was carried out and it is expected that these

clinics would be organized in other areas as more personnel becomes available for maternity and child welfare work. The care of the infant and the pre-school child was given solely through the child welfare clinics and through domiciliary visits by the Public Health Nurses. As a very large proportion of mothers were confined at homes, particularly in the rural areas and smaller towns, obstetrical care to them in normal cases was given by the midwives. In areas like the health units where personnel is available these midwives worked under the direct supervision of the Public Health Nurses. Every year it becomes increasingly evident that there is a rising demand for institutional care of maternity cases. The number of maternity beds in hospitals is therefore increased, and new maternity wards are opened in the district hospitals to cope with the demand. Moreover, some of the local authorities of smaller towns are taking an increasing interest in this service and providing maternity homes in their respective areas. Philanthropic individuals and bodies in rural areas are also coming forward and donating to Government maternity homes built and equipped by them. Personnel employed by the Government for this work in addition to the District Medical Officers in charge of hospitals consisted of 27 Medical Officers of Health, 51 Field Medical Officers, 5 Women Medical Officers, 30 Public Health Nurses and 271 trained midwives.

Details of work done—Maternity beds in hospitals.—At the De Soysa Lying-in Home in Colombo there were 166 beds and out of the remaining 100 Government hospitals, excluding jail hospitals and asylums, with a total of 9,150 beds, 79 had maternity wards with 507 beds in 1938. The other hospitals though not provided with separate maternity wards took in maternity cases in their general wards and gave necessary obstetrical care. During 1938 five new maternity wards were built at Balapitiya, Mullaitivu, Chilaw, Aranayake and Ridigama hospitals with 35 beds.

Maternity Homes.—In 1938, eight maternity homes with 68 beds were run by Urban District Councils, voluntary associations and missionary bodies at an approximate cost of Rs.22,903 the average cost per patient varying from Rs. 4 to Rs.17. In these homes were employed 9 Nurses in 6 homes, 9 resident midwives and 7 attendants in 4 homes. Some of these homes were supervised directly by the Public Health Nurses and 9 of them gave a part of their time to the work in the maternity home. 1,246 cases were admitted during the year of whom 1,003 had received pre-natal care. 954 mothers delivered normally and the midwife supervised by the Public Health Nurses whenever possible conducted the deliveries. In 53 cases care of the Medical Officer became necessary at labour. There were 7 maternal deaths, 21 infant deaths and 38 stillbirths. These maternity homes rendered very useful service to the community and were successful in preventing several maternal and infant deaths particularly of premature babies which would have undoubtedly occurred were it not for the close and intensive care given to such mothers and babies by the Medical Officers of Health and the Medical Officers in these homes.

Health Centres and Clinics.—At the De Soysa Lying-in Home ante-natal clinics were regularly held to which 8,660 mothers paid 11,386 visits. At post-natal clinics 312 mothers paid 1,118 visits. For lack of facilities for follow-up work before and after labour, visits paid to this institution per mother could not be expected to be satisfactory.

In the year under review the Medical Officers of Health and Field Medical Officers organized 104 additional health centres thus bringing the total to 311. During the year the Ministry of Local Administration made available a sum of Rs. 100,000 for aiding the local authorities in rural areas in establishing maternity and child welfare centres and with a view to developing maternity and child welfare work. This gave a great stimulus in promoting child welfare centres and work in the village committee areas. These health centres provided the place at which ante-natal, post-natal and child welfare clinics were held. 9,485 ante-natal and child welfare clinics were held.

Visits paid to these clinics during the year were as follows :—

	1937.	1938.
Expectant Mothers	39,841	76,108
Infants	88,479	157,988
Pre-school children	39,637	75,177

Several post-natal clinics were organized in the health unit areas and as the work was only started this year satisfactory attendance could not be expected so early.

Midwives and their work.—271 trained midwives under supervision were provided by Government of whom 78 were at hospitals, ninety-six at health units and 97 under the Malaria Control and Health Scheme; 298 were employed by the local authorities and 170 by the estates, making a total of 739 midwives. Owing to a constant demand for increased midwifery service in the rural areas 206 new midwives were appointed by all these three authorities combined during the year under review. In addition to these midwives, there is a number of them doing private work. The midwives employed by the Government and the local authorities rendered obstetrical service in their respective areas under the supervision of Medical Officers of Health and Field Medical Officers. Public Health Nurses in health unit areas gave them direct supervision. They had 38,448 mothers under care, they paid 456,302 ante-natal visits. They delivered 33,391 mothers and paid to them 229,723 post-natal visits.

The total number of midwives registered in the Island under Ordinance No. 26 of 1927 amounts to 884. During 1938 the areas of Batticaloa Urban District Council, Kaduwella, Wattagama, Hikkaduwa and Dodanduwa were brought under the operation of section 57 of the Ordinance in order to prohibit practice in these areas by untrained and uncertificated midwives.

Public Health Nurses and their Work.—Public Health Nurses were employed chiefly by the Government. A few were employed by the Urban District Councils. At the end of 1938 there were 47 Public Health Nurses including 8 School Health Nurses. Although 10 new Nurses were selected and trained at the Kalutara Health Unit, during this year 5 left service and hence reduced the effective increase to 5 only for 1938. In addition to these 5 vacancies, 3 new appointments were sanctioned for 1938–39, and the appointments would be made in the coming year. There is a dearth of Nurses in the hospitals and hence recruitment to Public Health Nursing which is made from among the hospital Nurses, is considerably retarded.

The Public Health Nurses worked directly under the supervision of the Medical Officers of Health. The Government Public Health Nurses worked in the health unit areas. They had 21,993 mothers, 28,811 infants and 26,374 pre-school children under care to whom they paid 76,108, 157,988 and 75,177 home visits respectively.

Women Medical Officers.—There were 5 Women Medical Officers as in 1937 and their work was carried out on the same lines as in the previous year.

These 5 Doctors paid 4,856 home visits and attended to, in the individual homes and at the dispensary, 227 mothers at child birth, 680 puerperal cases, 2,427 sick expectant mothers, 3,109 sick infants and 5,565 sick pre-school children. They held 960 clinics at 15 centres to which 2,055 expectant mothers paid 6,126 visits; 997 infants paid 7,107 visits; and 821 pre-school children paid 6,207 visits.

Voluntary Associations.—These auxiliary bodies bearing different names such as Social Service Leagues, Child Welfare Associations and Health Leagues were of great assistance to the existing organizations for child welfare work. In the year under review their number assisting in child welfare work increased from 60 to 102. They provided in many instances the health centres, and in almost all instances food for needy infants and mothers. The local authorities in some of the places where these associations were operating contributed towards the finances of these bodies.

The total income of these associations as far as is known amounted to Rs. 53,004 during this year of which Rs. 43,398 or 81·9 per cent. was expended on maternity and child welfare work. Twenty-one Urban District Councils, 14 Sanitary Boards and 65 Village Committees contributed to the finances of these voluntary organizations.

Infant Mortality.—The following statement gives in tabular form the figures relating to infant deaths and infant mortality rates for 1937, 1938 and the average for 10 years (1928–1937.)

Infant deaths.		Whole Island.	Urban Areas.	Rural Areas.
1937	..	.. 34,180	.. 5,328	.. 28,852
1938	..	.. 33,630	.. 5,291	.. 28,339
Average 1928–1937	..	.. 35,971	.. 4,683	.. 31,288

Infant mortality rates.	Whole.	Urban.	Rural.	Ceylonese.	Indian Immi- grant.	Euro- pean.
1937	.. 158	.. 168	.. 157	.. 157	.. 169	.. 41
1938	.. 161	.. 159	.. 162	.. 160	.. 171	.. 38
Average 1928-1937	.. 177	.. 186	.. 176	.. 175	.. 191	.. 30

Maternal Mortality.—The following table sets out the figures of maternal deaths and the maternal death rates for 1937, 1938 and the average for 10 years (1927-1937).

Maternal deaths.	Whole Island.	Urban.	Rural.
1937	.. 4,304	.. 1,001	.. 3,303
1938	.. 4,196	.. 1,000	.. 3,196
Average 1928-1937	.. 4,213	.. 814	.. 3,398

Maternal mortality rates.	Whole Island.	Urban.	Rural.
1937	.. 19.9	.. 31.6	.. 17.9
1938	.. 20.1	.. 30.1	.. 18.2
Average 1928-1937	.. 20.2	.. 31.8	.. 19.2

In areas where intensive work on health units lines was possible to be carried out owing to personnel being available the infant death rates and maternal death rates are given in the Table below :—

Health Units.	Infant. Death Rate.	Maternal Death Rate.
H Matara ..	.. 129	.. 9.7
M Kadugannawa ..	.. 134	.. 17.4
M Trincomalee ..	.. 170	.. 22.4
M Kurunegala ..	.. 211	.. 32.3
H Padukka ..	.. 119	.. 5.9
H Moratuwa ..	.. 144	.. 10.3
H Kegalla ..	.. 122	.. 11.9
H Panadura ..	.. 120	.. 11.18
M Horana ..	.. 91	.. 8.7
H Dehiwala ..	.. 115	.. 14.8
H Kalutara ..	.. 104	.. 10.8

Stillbirths.—Information on stillbirths is available only for the proclaimed towns. During 1938 there were 2,353 stillbirths.

VI.—HOSPITALS DISPENSARIES AND VENEREAL DISEASES CLINICS.

HOSPITALS AND DISPENSARIES.

General Remarks.—All parts of the Island are generously provided by the State with hospitals and dispensaries. In and around Colombo are the General Hospital (911 beds), Lying-in Home (166 beds), Eye Hospital (130 beds), Women's Hospital (46 beds), Childrens' Hospital (129 beds), Female Venereal Diseases Hospital (29 beds), Police Hospital (36 beds), Tuberculosis Hospital (352 beds), Hospital for chronic cases and convalescents (163 beds), Tuberculosis Sanatorium (72 beds), and Infectious Diseases Hospital (168 beds). In addition there are the Prison Hospitals, Lunatic Asylum, and Leper Asylums mentioned in Section VII. with accommodation for more than 3,500 patients. Elsewhere there are 98 Government Hospitals with 6,904 beds and a Tuberculosis Sanatorium with 44 beds. The number of hospital beds provided by Government is approximately 2 per 1,000 of population. Four new Cottage Hospitals were opened during the year.

The number of dispensaries, central (246) and branch (169) and visiting stations (303) maintained by Government was 718 in 1938. The following special institutions were maintained for the treatment of out-patients :—King Edward VII. Memorial Anti-Tuberculosis Institute, Colombo; Grenier Ear, Nose and Throat Clinic, Colombo; Dental Institute, Colombo; and special Ophthalmic Clinics at the Kandy, Galle, Jaffna, Batticaloa, and Badulla Hospital and Dental Clinics at Kandy and Galle.

During the year under review, the number of estate hospitals maintained by the proprietors of estates was 99, and the number of estate dispensaries was 666.

359,844 in-patients, with 20,167 deaths giving a mortality rate of 5·6 per cent. were treated in the various Government hospitals. In the Government dispensaries and out-patient departments attached to Government hospitals 5,895,205 patients who paid 8,990,695 visits were treated.

The diseases treated at hospital out-patient departments and dispensaries were as follows :—

I.—Communicable Diseases.

Enteric fever	..	..	282
Fevers of obscure causation	..	..	2,321
Malarial fever	..	..	1,860,547
Cerebral malaria	..	..	328
Malarial cachexia	..	..	137,602
Malarial cirrhosis	..	..	189
Measles	..	..	1,191
Whooping cough	..	..	3,115
Diphtheria	..	..	9
Influenza	..	..	296,995
Mumps	..	..	492
Dysentery (all forms)	..	..	28,757
Amoebic hepatitis and liver abscess	..	..	42
Leprosy	..	..	31
Erysipelas	..	..	76
Chickenpox	..	..	115
Dengue	..	..	70
Yaws	..	..	7,064
Hydrophobia	..	..	20
Tetanus	..	..	26
Pulmonary tuberculosis	..	..	2,867
Other tubercular diseases	..	..	244
Syphilis (all varieties)	..	..	8,005
Soft chancres	..	..	699
Gonorrhoeal complications (arthritis, rheumatism) &c.	..	..	4,797
Gonorrhoea (acute and chronic)	..	..	22,196
Filarial diseases	..	..	224
Acute rheumatic fever	..	..	3,431
Puerperal fever	..	..	3,186

II.—General Diseases.

Malignant tumours—carcinoma, sarcoma	..	..	60
Non-malignant tumours	..	..	5,746
Chronic rheumatism	..	..	345,992
Arthritis (acute and chronic)	..	..	7,285
Diabetes mellitus	..	..	1,743
Anaemias (of unknown causation)	..	..	60,062
Goitre	..	..	3,710
Leukaemias	..	..	756
Acute poisonings	..	..	109
Other general diseases	..	..	916

III.—Local Diseases.

Diseases of the nervous system	..	..	38,390
Diseases of the eye	..	..	77,685
Diseases of the ear	..	..	63,668
Diseases of the heart and blood vessels	..	..	7,220
Diseases of the lungs and pleura	..	..	337,350
Diseases of the gastro-intestinal tract	..	..	612,122
Diseases of the liver and gall bladder	..	..	4,868
Diseases of the urinary system	..	..	31,004
Diseases of the generative systems	..	..	75,695
Diseases of the spleen	..	..	7,443
Diseases of the lymphatic system	..	..	5,811
Diseases of the skin and cellular tissues	..	..	326,227
Diseases of the bones and joints	..	..	6,726
Ankylostomiasis	..	..	306,792
Other helminthic diseases	..	..	548,572
Ulcers	..	..	387,253
General injuries	..	..	37,748
Local injuries	..	..	146,203
Other local diseases	..	..	62,588

REPORT ON COLOMBO HOSPITALS.

A brief summary of the work done in the chief Colombo hospitals is given below :—

General Hospital, Colombo.—The number of patients treated in the hospital during 1938 was 33,493 (1,531 paying and 31,962 non-paying patients).

There were 2,789 deaths and the percentage of deaths to those treated was 8.3. The daily average sick in hospital was 1,338.77.

The maximum and minimum number of patients in hospital on any one day during the year was as under :—

	Maximum.	Minimum.
Paying Section ..	90 on 11.11.38	66 on 7.5.38.
Non-paying section ..	1,492 on 21.1.38.	1,122 on 16.4.38

The number of operations performed was 4,629 of which 4,035 were performed in the hospital and 594 (minor operations) at the out-patients' department.

The total number of patients treated at the out-patients' department amounted to 118,773, and the number of visits paid was 311,890 with a daily average of 856.

An out-patient clinic for diseases of women is held on Tuesdays and Thursdays between 9.30 A.M. and 12 noon. 1,317 new patients (2,565 visits) were examined and treated during 1938.

An out-patient diabetic clinic was started in 1934 and is held once a week. The total number of patients treated from the beginning to the end of 1938 was 912 patients (male 611 and females 301). The number according to age periods was

20 to 30 ..	63	60 to 70 ..	133
30 to 40 ..	163*	70 to 80 ..	23
40 to 50 ..	253	80 to 100 ..	2
50 to 60 ..	275		

* Larger number nearer 40.

About 24 patients attend daily at the out-patient department for Insulin treatment.

Pathological Department.—The staff consists of a fulltime Pathologist, two Assistant Pathologists and four laboratory assistants. The following number of specimens was examined and reported upon during 1938 :—

Urine	..	..	47,183
Faeces	..	..	22,058
Gastric contents	..	..	2,826
Sputa	..	..	4,946
Blood	..	..	26,144
Cerebro-spinal fluid	..	..	1,629
Smears	..	..	927
Tissue sections, General Hospital	..	..	1,014
Tissue sections, Outstation Hospitals	..	..	493
Tissue Sections, Post-mortem room	..	..	509
Blood Transfusion service	..	..	806
			<hr/> 108,535 <hr/>

283 post-mortems were held during the year.

X-ray Department.—16,734 patients in the non-paying section and 1,316 patients in the paying section, making a total of 18,050 patients underwent X-ray examination. These examinations necessitated the use of 28,000 films and the taking of about twice as many radiograms. In the electro-therapeutic section 13,056 sittings were given to non-paying patients (including patients from the 2nd class paying wards from whom no charges are recovered) and 1,003 sittings to paying patients, making a total of 14,059.

204 cases had radium treatment for different diseases, chiefly cancer. A building for housing a deep ray therapy plant is under construction.

The Ear, Nose and Throat Department.—The Grenier Ear, Nose and Throat Clinic is held at the Out-Patient Department, General Hospital, on three afternoons a week—Tuesdays, Thursdays and Saturdays—from 1 to 4 P.M. and the Surgeon-in-Charge is allotted 10 beds (6 for males and 4 for females) in the wards of the hospital for

cases requiring indoor treatment. 10,383 new out-patients were treated during the year. The total number of visits made by the new and old patients was 17,957.

In addition, there is the school children's clinic—694 children (891 visits) attended the clinic.

The number of patients treated in the wards was 557 (males 316 and females 241). 660 operations—both major and minor—were performed.

Dental Institute, Colombo.—The professional staff consists of one Dental Surgeon, one Assistant Medical Officer, one House Surgeon, two Apothecary assistants, a Matron and a Nurse.

28,579 new patients were treated during the year under review, as against 25,198 in 1937. The total number of visits made by the new and old patients was 49,148.

The number of patients was made up as follows :—

Patients sent from hospital wards	..	..	3,554
Children attending the school clinic	..	..	2,026
Other patients	..	..	22,999
			<hr/> 28,579

The following treatments were given :—

Extractions	..	..	28,206
Cleaning and filling	..	..	6,476
Dressing	..	..	14,466

Thirty-three cases were operated on at this institute and 15 cases of fracture of the jaw were treated.

A mobile dental service consisting of one motor van with the necessary equipment in charge of a Medical Officer, an apothecary and attendants, was started in June, 1937, and the total number of cases treated were 5,070, of which, 1,900 were extractions, 1,263 were scalings, 210 were temporary relief and 18 were dressings.

De Soysa Lying-in Home.—There is accommodation for 166 patients. The professional staff consists of one Medical Superintendent, 1 Obstetrician, 1 Obstetric Registrar, 1 Obstetric Tutor and 4 House Officers.

The number of cases under treatment in 1938 was 10,875 and the daily average number of patients was 204.45. The mortality rate was 1.49.

There were 162 maternal deaths, 306 miscarriages and 520 stillbirths.

The number of live births was 6,292. Of these infants, 5,779 left the hospital alive while 513 died after delivery. 722 obstetric operations were performed during the year, necessitating the use of forceps in 284 cases, craniotomy in 37 cases, decapitation of child in 2 cases, version in 50 cases, evacuation of the uterus in 87 cases, manual removal of placenta in 68 cases, induction of labour in 33 cases, Caesarean section in 8 cases, and 153 minor operations. In 50 cases of placenta praevia, 27 infants were born alive and 23 were dead, 42 mothers recovered and 8 died. In 94 cases of accidental haemorrhage, 8 mothers died. 1,387 cases of pre-eclampsia were treated with 26 deaths. Of the 83 cases of eclampsia treated during the year 67 mothers recovered and 16 died. There were 137 cases of twins.

A district midwifery service in the Colombo Municipality area attended to 55 cases of confinements, conducted by medical students under the supervision of a specialist officer of the staff of the Lying-in Home. This Medical Officer also attended 104 calls by midwives working in the same area.

The institution continued to be the chief training school for midwives in the Island.

The Victoria Memorial Eye Hospital.—There are 7 beds and 1 cot in the paying section and 114 beds and 8 cots in the non-paying section of this hospital. The professional staff consists of 1 Surgeon-in-Charge, 1 second Surgeon, 1 Refractionist, and 1 House Surgeon.

31,872 new out-patients were treated during the year. The total number of visits made by the new and old patients were 80,022.

There were 224 in-patients remaining in hospital at the beginning of the year and 3,690 patients were admitted during the year. 3,629 patients were discharged and 15 died. The daily average number of in-patients was 258.90.

The total number of ophthalmic operations performed on in-patients during the year was 897 and on out-patients 1,958.

The second Surgeon visited the Leper Asylum, Hendala, four times during the year for the treatment of eye diseases. The total number of cases treated was 133 of which 111 were new cases.

The school clinics which are held on Tuesdays and Fridays at 2.30 P.M. continued to be well attended. 530 children (1,474 visits) received treatment.

An ultra violet ray apparatus and a diathermy apparatus are in use.

The Lady Havelock Hospital for Women and Lady Ridgeway Hospital for Children.—There are 6 paying and 40 non-paying beds in the Women's hospital. During the year 2,516 patients were treated (104 paying and 2,412 non-paying) with a daily average of 57. There were 83 deaths with a mortality rate of 3.4 per cent. The number of major operations performed was 337.

In the Children's hospital there are 129 non-paying beds. During the year 3,459 patients were treated, with a daily average of 121. The number of deaths was 798, with a mortality rate of 23.2 per cent.—this rather high rate was due to the large number of cases of pneumonia and gastro-intestinal disorder dying within 24 hours of admission.

In the training school for nurses attached to these hospitals there were 61 pupils. The professional staff of these hospitals consists of the Medical Officer-in-Charge, a visiting Gynaecologist, and two Women House Officers.

Female Venereal Diseases Hospital.—The total number of patients treated during the year was 702, and the daily average of patients was 28.0. There was one death during the year. The principal diseases treated were syphilis (300 cases) and gonorrhoea (301 cases).

Usually female cases of syphilis and gonorrhoea in the acute stage are treated in this hospital and when hospital treatment is not necessary they attend as out-patients (*vide* report under Venereal Diseases Clinic in this section) for continuation of treatment.

There is an out-patient department at this hospital where general diseases among women and children are treated and during the year 42,825 patients (83,482 visits) were dealt with.

The Infectious Diseases Hospital (Angoda), Colombo.—There remained 90 patients in hospital at the end of 1937 and 3,880 patients were admitted during the year making the total treated 3,970. Of these 262 cases proved fatal, giving a mortality rate of 6.5 per cent.

The following are some of the infectious diseases treated and the number of deaths in 1938 :—

		No. Treated.	Deaths.
Influenza ..	..	8	—
Pneumonia ..	..	71	34
Dysentery ..	..	359	43
Smallpox ..	..	—	—
Enteric fever ..	..	190	49
Measles ..	..	291	6
Whooping cough ..	..	31	2
Diphtheria ..	..	51	7
Mumps ..	..	281	—
Plague ..	..	6	5
Chickenpox ..	..	1,407	2
Enteritis and colitis ..	..	687	90
Malaria ..	..	221	8

REPORT ON OUTSTATION HOSPITALS.

Of the provincial hospitals those of Kandy and Galle are the largest and most important.

Kandy Hospital.—There are 320 beds and the medical staff consists of a Superintendent, Physician, Surgeon, Assistant Surgeon, Ophthalmic Surgeon, and 5 House Officers. The hospital is also a Nurses' training school and 51 pupils were under

training with one European Matron, 1 Ceylonese Matron, 6 Nursing Sisters, and 14 qualified nurses. A class for training attendants was started in June with 11 pupils, but at the end of the year only 4 remained.

There were 17,265 patients treated in 1938. The daily average sick in hospital was 584·15. The percentage of deaths to total treated was 5·89.

The following table gives the principal diseases treated and the number of deaths :—

	No. Treated.	Deaths.
Enteric fever	152 ..	43
Malaria	2,062 ..	35
Dysentery	31 ..	1
Pulmonary tuberculosis	195 ..	35
Ankylostomiasis	815 ..	41
Pneumonia	583 ..	179
Veneral diseases	592 ..	2

There were 1,074 operations performed with 67 deaths.

There is an institute for Eye, Ear, Nose, and Throat Disease and also a Dental Clinic which was started in October, 1938. Three wards are allotted for indoor cases, and 1,813 indoor patients were treated in 1938. The number of outdoor patients treated were 14,327 who paid 31,508 visits. The number of operations performed was 2,271 of which 333 were major and 1,938 minor operations.

Galle Hospital.—This hospital is situated in Mahamodera, a suburb of Galle, and is near the sea. It has at present accommodation for 290 patients.

The staff consists of a Medical Superintendent, Visiting Physician, Visiting Surgeon, Eye Surgeon, and 4 House Officers, 1 part-time Radiologist and a Dental Surgeon. This hospital is also a training centre for Nurses and attendants with a European Matron, 1 Ceylonese Matron, 1 Nursing Sister and 15 qualified nurses. There were 14 pupil nurses in training.

The total number of in-patients treated during the year was 15,521 with a daily average of 380·11. Out of these 928 died giving a percentage of 5·85 deaths.

The following were the chief diseases treated :—

Diseases.	Cases.	Deaths.
Pneumonia	622 ..	148
Dysentery	167 ..	25
Pulmonary tuberculosis	210 ..	52
Enteric fever	346 ..	100
Malaria	1,105 ..	53
Ankylostomiasis	436 ..	14

There were 636 major and 298 minor surgical operations performed during 1938.

In the casualty room 1,674 cases were attended to. In the laboratory 23,048 specimens were examined ; of these 3,966 were blood, 11,582 urine and 5,942 faeces, others 1,558.

In the eye, ear, nose, and throat department 12,731 outdoor cases (30,052 visits) and 1,557 indoor cases were treated and 274 major and 299 minor operations were carried out.

An X'ray department is functioning and is in charge of a trained technician.

In the dental clinic 4,676 cases (7,277 visits) were attended to during the year.

In addition there are other clinics, viz., venereal diseases, tuberculosis, diabetes, filariasis, and leprosy.

TUBERCULOSIS.

There are four special institutions for tuberculosis in Ceylon, viz., The King Edward VII. Anti-Tuberculosis Institute, Colombo, the Ragama Hospital, the King Edward VII. Sanatorium at Kandana, and King Edward VII. Sanatorium at Kankasanturai. The institute in Colombo and the two sanatoria were built and equipped from the King Edward VII. Memorial Anti-Tuberculosis Fund, but are maintained by Government.

The Anti-Tuberculosis Institute.—The institute is situated in a central part of Colombo and in addition to the usual clinic rooms has X'ray apparatus, a laboratory and artificial sunlight apparatus, and serves as a centre for expert diagnosis and

treatment. There are no beds at the institute but patients requiring indoor treatment are sent to Kandana, Kankesanturai or Ragama according to the nature of the case and as accommodation permits. The nurses attached to the institution pay visits to patients' homes and arrange for contacts to attend at the institute for medical examination. 4,336 new out-patients (12,299 visits by new and old patients) were treated at the Institute.

In order to popularize the Institute, patients suffering from lung conditions other than tuberculosis were treated.

The Ragama Anti-tuberculosis Hospital.—The hospital for tuberculosis at Ragama is 12 miles away from Colombo and is easily accessible by rail and road. It contains 352 beds and is intended for the treatment of advanced or moderately advanced cases of pulmonary tuberculosis.

The number of patients remaining at the end of 1937 was 343 and the number of admissions during 1938 was 1,128. There were 441 deaths. 644 patients were discharged.

The number remaining in hospital on December 31, 1938, was 386. The daily average number of patients in the hospital was 377.27.

Treatment is based on (1) Rest, (2) Graduated exercise, (3) Symptomatic treatment, (4) (a) Artificial pneumothorax, (b) Artificial light, (5) Education.

The staff is trained to maintain discipline among the patients with regard to rest and graduated exercises. The patients are given regular talks on the benefit of these methods of treatment. Besides regulated walks, patients have regular breathing exercises and odd light jobs in the wards and gardening.

Those requiring operative treatment or artificial light treatment are sent to the General Hospital, Colombo.

Patients are given regular talks on—

- (1) How to take care of themselves,
- (2) How to avoid spreading tuberculosis,
- (3) How to avoid getting it,
- (4) How to preserve children from it,
- (5) The earliest signs and the importance of early diagnosis and treatment,
- (6) The regimen to be carried out on returning home from hospital,
- (7) Importance of rest, graduated exercises and discipline.

The King Edward VII. Sanatorium at Kandana.—This Sanatorium is 14 miles from Colombo and has accommodation for 72 patients. A preventorium for 20 children has been completed and is being equipped.

The total number of patients treated during 1938 was 223, with 4 deaths. Out of 158 patients discharged, 27 were cured and in 42 cases the disease was arrested, 7 patients were much improved, 14 were improved, 32 condition same, 3 became worse, 15 were transferred to Ragama Hospital being unsuitable for sanatorium treatment, and 18 transferred to Kankesanturai Sanatorium. At the end of 1938, 61 patients remained, and the daily average number of patients was 65.81.

Treatment is based on rest and occupational therapy, drugs playing only a secondary part. A time table to suit each individual requirement is displayed and enforced.

Talks on both curative as well as the public health aspects of the disease are regularly given.

Artificial pneumothorax was tried in 13 cases; in 4 cases it had to be abandoned owing to adhesions. Out of the other 9, in 7 cases the disease was arrested, in one improvement was noticed, and one got worse.

Pneumoperitoneum was induced in 4 cases, in 3 of which symptoms disappeared and in one no result was obtained.

Gadusan (Copper-Morrhuate) has been very successfully used in the treatment of tubercular glands and sinuses.

Solganol B Oleosum was tried in 4 cases only owing to want of the drug.

Gelatin-Acriflavine Compound is being tried by intra-pulmonary and intracavitary methods.

Cod liver oil, guaicol, and creosote are regularly used for routine treatment; otherwise drugs are employed only to relieve symptoms.

Each ward in the Sanatorium has been provided by well-wishers with a radio set for the use of the patients.

The King Edward VII. Sanatorium at Kankesanturai.—This sanatorium on the coast of the Northern Province has accommodation for 44 patients—12 for paying patients, and 32 for non-paying patients. A fee of Rs. 2 per day is charged.

The total number of patients treated during 1938 was 122. Of the 84 patients discharged the disease became arrested in 49 cases, much improved in 18 cases, condition same in 8 cases, worse in 8 cases and one died.

The principles of sanatorium treatment consisting of rest, graduated exercises, correct feeding, routine, discipline and education were enforced. Strictly regulated hours of rest form an essential feature in treatment. A return to graduated exercises too early in course of treatment has been given up in accordance with the more modern methods of sanatorium treatment. A balanced diet with a sufficiency of proteins and vitamins is given. Supplementary measures adopted were collapse therapy in selected cases, injections of Colloidal Calcium with Ostelin and Vitamin D and Aminobiase to improve the general resistance and Gold injections in the form of Solganol B Oleosum and Myocrysin in suitable cases.

By way of drugs, Guaicol Carb for its beneficial action after excretion by the bronchial mucous membrane and cod liver oil were used as a routine in the absence of any contra indications.

VENEREAL DISEASES.

There are three venereal diseases clinics in Colombo, viz., at the General Hospital (out-patient), the Port Surgeon's Office (out-patient), and Female Branch Hospital (in-patient and out-patient).

Venereal Diseases Clinic, General Hospital, Colombo.—This clinic takes place daily, except on Sundays, commencing at 2 P.M.

In the clinic, 4,552 new patients (viz., syphilis 1,213, soft sore 128, and gonorrhoea 3,211) who together with the old patients paid 22,409 visits, were treated.

All cases requiring indoor treatment are admitted to a ward in the General Hospital.

Port Venereal Clinic for Seamen.—This is a clinic held in a special room at the Port Surgeon's Office, established under the Brussels International Agreement, 1924. Colombo not being a terminal port, only 54 seamen came for treatment during the year; of these 26 cases were syphilis which received Salvarsan treatment, 4 were soft chancre and 24 were gonorrhoea.

Venereal Diseases Clinic at the Female Branch Hospital.—The number of persons treated in the clinic during the year was—

Cases.	1938.
Syphilis	954
Soft chancres	21
Gonorrhoea	1,822
Yaws	11
Other diseases	133
	<hr/> 2,941

These 2,941 new patients and the old patients paid 8,094 visits during 1938.

Venereal Diseases Clinic at the Kandy Dispensary.—This clinic is held on two evenings a week—Mondays and Saturdays. The cases treated during the year were 396 (1,862 visits) for syphilis 189 cases, soft chancre 1, gonorrhoea 194 and yaws 12.

Venereal Diseases Clinic at the Galle Dispensary.—This clinic is held on every Saturday. 249 syphilis cases and 523 parangi cases were attended to during the year. In addition to the particulars given in respect of the five clinics, 7,841 in-patients (with 76 deaths) in the various hospitals and 35,697 out-patients at dispensaries and out-patients' department of hospitals in the Island were treated for venereal diseases during the year.

MEDICAL INSTITUTIONS AIDED BY GOVERNMENT.

The following institutions received financial aid from Government during the year :—

- (1) The Victoria Home for the Incurables.
- (2) Welimada Mission Hospital.
- (3) McLeod Hospital, Inuvil.
- (4) Green Memorial Hospital, Manipay.
- (5) Wesleyan Deaconess Institute, Puttur.
- (6) The Talawa Medical Mission.
- (7) The Denipitiya Medical Mission.

HOSPITAL RETURNS, &c.

Charts and returns of hospital will be found at the end of this report.

VII.—PRISONS AND ASYLUMS.

PRISONS.

The number of hospitals maintained exclusively for prisoners remained unchanged at nine. At the Welikada Prison Hospital, there is a small ward of 10 beds for females; elsewhere hospital accommodation is provided only for male prisoners, females being sent to the local civil hospital.

On the whole the health of the prisoners was satisfactory. In Welikada Prison, there was a higher percentage of enteritis during the months of June and July owing to the abnormal condition of the weather and the scarcity of fresh fish.

In Mahara Prison, dysentery, diarrhoea were prevalent and even regular chlorinations of the water had hardly any effect in controlling the disease.

In Kandy and Jaffna, the health of the prisoners was very good.

The average number of prisoners and work of the Prison Hospitals are as follows :—

Name of Prison.	Daily Average in Prison.	Number of Hospital Beds.	Daily Average Sick in Hospital.	Total Number of In-patients treated.	Total Number of Out-patients treated.	Total Number of Deaths.	Death Rate Percentage of In-patients in Hospital.	Chief Diseases treated (for meaning of figures please see Key* below).
Welikada	166.32	180	102.87	2,555	14,536	24	.93	1, 3, 4, 5, 6, 7, 9, 12, 14, 16, 17
Welikada Remand	318.44	—	—	—	8,209	—	—	1, 3, 5, 12, 17, 18
Hulftsdorp	167.77	—	—	—	8,319	—	—	1, 3, 5, 15, 17, 18
Mahara	759.06	55	31.48	1,468	15,992	22	1.43	1, 2, 3, 5, 17
Bogambara	482.64	35	15.03	526	11,257	—	—	1, 2, 5, 7, 12, 15, 17
Jaffna	297.57	15	3.22	186	3,111	1	.53	1, 2, 17
Negombo	62.87	16	4.73	148	2,207	1	.67	1, 3, 5, 10, 14, 17
Galle	95.17	12	5.40	159	850	—	—	1, 17
Anuradhapura	107.00	12	3.86	139	1,792	—	—	1, 10, 17
Badulla	35.68	3	.44	24	239	—	—	1, 3
Batticaloa	52.35	5	2.53	60	494	—	—	1, 3, 5, 8, 10, 13, 17
	3,774.67	333	169.56	5,265	67,006	48	91	

* Key referred to :—

- | | | | |
|-----------------|--------------------|-------------------|-----------------------------|
| 1. Malaria | 5. Influenza | 9. Chickenpox | 13. Abscess |
| 2. Diarrhoea | 6. Pneumonia | 10. Skin diseases | 14. Pulmonary tuberculosis. |
| 3. Dysentery | 7. Enteritis | 11. Enteric | 15. Rheumatism. |
| 4. Eye diseases | 8. Conjunctivitis | 12. Mumps | 16. Measles |
| | 17. Other diseases | 18. Anky. | |

ASYLUMS.

(a) The Lunatic Asylum, Angoda.

The Government Lunatic Asylum is situated at Angoda, about 6 miles from Colombo and can now accommodate 2,512 inmates including suitable accommodation for 12 paying patients which has been provided during the year.

During the year the average daily number of inmates was 3,148—the largest number on any one day being 3,263 and the lowest 3,028.

The statistics for 1938 are as follows :—

Asylum.

Certified Lunatics.	Males.	Females.	Total.
Remaining at beginning of the year	1,852	948	2,800
Admitted ..	821	418	1,239
Total treated ..	2,673	1,366	4,039
Discharged ..	505	306	811
Died ..	175	93	268
Remaining at the end of the year	1,993	967	2,960

House of Observation.

Uncertified persons under Observation.

Remaining at beginning of the year	148	81	229
Admitted ..	1,581	789	2,370
Total treated ..	1,729	870	2,599
Transferred to Asylum ..	802	415	1,217
Discharged ..	741	341	1,082
Died ..	38	33	71
Remaining at end of year ..	148	81	229

The following table gives an analysis of the deaths during the year :—

	House of Observation.	Lunatic Asylum.	Total.
Ankylostomiasis ..	1	7	8
Bronchitis ..	1	4	5
Cardiac failure ..	1	1	2
Cellulitis ..	—	4	4
Cerebral haemorrhage ..	1	2	3
Colitis ..	11	39	50
Dysentery ..	11	46	57
Cancer ..	—	3	3
Epilepsy ..	1	3	4
General debility ..	9	16	25
Influenza ..	1	8	9
Pulmonary tuberculosis ..	7	62	69
Pneumonia ..	8	22	30
Typhoid fever ..	3	14	17
Thrombosis ..	—	3	3
Other diseases ..	16	34	50
	71	268	339

The following table shows the number of cases of infectious diseases which occurred during 1938 :—

	Inmates 1938.	Attendants 1938.
Chickenpox ..	760	61
Dysentery ..	315	—
Enteric fever ..	88	2
Erysipelas ..	2	—
Influenza ..	—	—
Leprosy ..	7	—
Mumps ..	70	—
Measles ..	1	—
Poliomyelitis ..	—	—
Pulmonary tuberculosis ..	179	—
	1,422	63

315 cases of dysentery occurred after a drought during June, July, and August. An epidemic of chickenpox with 760 cases spread among all sections of the asylum population. The peak of the epidemic was reached in October, 1938. There were 179 cases of tuberculosis and the incidence of this disease is partly due to the overcrowding of the dormitories which afford opportunities for the dissemination of tubercle bacilli.

The number of cases of injury to patients by themselves was 196 by other patients 241 and by attendants one.

There have been no cases of restraint or seclusion.

The male patients were employed mostly in industrial and agricultural work and in maintaining the asylum grounds in good order. The female patients made uniforms for the staff and other articles for asylum use.

Games and sports were carried on as usual. The two tennis and volley ball courts and a cricket ground besides several indoor games were largely used by the patients and attendants.

Newspapers and magazines were supplied by Government for the staff and inmates.

5,394 simple laboratory examinations of blood, sputum, faeces, urines, and other clinical tests were made. All other examinations are made at the Bacteriological Institute.

Professor Mapother, Professor Superintendent, Maudsley Hospital, London, visited Ceylon at the request of the Ceylon Government to report upon the re-organization of the psychiatric services in Ceylon. His recommendations have been published in Sessional Paper XIII. of 1938. Steps are being taken to give effect to the recommendations made.

(b) Leper Asylums.

There are two Leper Asylums, one at Hendala, 7 miles from Colombo, and the other on the Island of Mantivu, 3 miles from Batticaloa in the Eastern Province.

Hendala Leper Asylum.—The Asylum is in charge of a Medical Superintendent with two Medical Officers as assistants and other auxiliary staff.

The statistics of the hospital are given below :—

	Ceylonese.		Indians.		Total.
	Males.	Females.	Males.	Females.	
Remaining on December 31, 1937 ..	554	137	72	16	779
Admitted during 1938 ..	102	17	26	8	153
Discharged during 1938 ..	56	5	14	5	80
Died during 1938 ..	45	5	6	2	58
Remaining on December 31, 1938 ..	555	144	78	17	794

Of the 153 admissions, 115 were new cases and 38 were re-admissions. The admissions during the year represented the following types :—

N ²	—	—	12	L ²	—	—	68
N ³	—	—	44	L ³	—	—	14
L ¹	—	—	15				
				Total			153

The new admissions were from the following provinces :—

	Ceylonese.		Indians.		Total.		Grand Total.
	M.	F.	M.	F.	M.	F.	
Western ..	59	10	9	2	68	12	80
Southern ..	20	4	2	1	22	5	27
Sabaragamuwa ..	10	1	4	1	14	2	16
Central ..	5	2	8	4	13	6	19
Northern ..	1	—	—	—	1	—	1
Uva ..	4	—	2	—	6	—	6
North-Western & North-Central	3	—	1	—	4	—	4
	102	17	26	8	128	25	153

There were 794 cases remaining on December 31, 1938, and represent the following types :—

	N ¹ .	N ² .	N ³ .	L ¹ .	L ² .	L ³ .	Total.
Males ..	36	71	104	123	188	101	623
Females ..	9	19	16	15	55	45	159
Children (under 12 years)	—	1	—	6	5	—	12
Total ..	45	91	120	144	248	146	794

The school which was established in 1920 is continuing.

The Scout Troop which was inaugurated in 1931 has lost many young scouts as they were discharged from the asylum. The elder members appear indifferent.

The same remarks in regard to the general condition of the patients made in the last Administration Report apply.

Special Treatment of Leprosy.—During 1938 the treatment consisted of—

- (1) Routine treatment on admission.
- (2) Treatment of the disease itself.
- (3) Treatment of complications and sequelae of leprosy.
- (4) Treatment of intercurrent diseases.
- (5) Surgical treatment.
- (6) Experimental treatment.

1. *Routine Treatment.*—This consists in giving all patients soon after admission a dose of chenopodium as a vermifuge; examining for scabies, ringworm, &c., and suitably treating such and a course of quinine treatment for the malarial subjects.

2. *Treatment of the disease itself.*—The drugs in this institution have been restricted to hydnocarpus oil, the esters of chaulmoogra (E. C. C. O.) and chaulmoogra oil itself.

The hydnocarpus oil itself is obtained in bulk and is creosoted and sterilized here. The esters come ready for injection. The esters and the oil are administered as injections intradermally or intramuscularly. For intradermal use the oil is preferred. Esters are given intramuscularly, and never intradermally.

In addition to the injections, the patients are given, when necessary, oil for inunction. Chaulmoogra is also given in capsules orally when, for some reason or other, the patients are unable to take the injections. Oral administration of the oil is discouraged as it sets up a mucous gastritis which often is intractable.

In the treatment of the earlier neural cases (N¹ and N²), the patients are given two injections a week—on one of the days they get an intradermal injection of the oil and on the other an intramuscular injection of oil or esters, as deemed best.

In the treatment of the earlier lepromatous cases (L¹ and L²) two intramuscular injections per week were given, either of the oil or of the ester.

The advanced neurals and lepromatous (N³ and L³) get one injection a week more or less as a placebo. The year is divided into three terms and at the beginning

of a term the dosage of the injections is $\frac{1}{2}$ c.c. This is gradually increased till the 5 or 6 c.c. stage is reached and further increased with special care. Some going up to 9 to 10 c.c. The larger dosage can be borne only by a small number.

The individual treatment card system started last year is very useful and helpful. Each time the patient comes for his injection his card shows at a glance how regular he has been, and how many he has been given. The patients themselves are averse to the larger dosage. The Eye Surgeon visits periodically and prescribes for the patients.

3. *Treatment of complications and sequelae of leprosy.*—In leprotic reactions (periodic with or without fever), opening dose, daily injections of adrenaline (10m) for 3 to 5 days, and a calcium chloride mixture are given as a routine. When necessary, ephedrine is prescribed, as also other suitable drugs. During this period hydriocarpus injections are not given. In cases of neural pains due to inflammation, contracture and pressure, treatment with sedatives, and injections into the nerves and nerve stretching are given. The mainstay, however, is opium in its many forms and there were no cases of nerve abscess due to this. Cases of intractable pruritis are treated with ointment and alkaline mixtures when the cause is local. When however the cause is secondary to nerve degeneration temporary relief only can be afforded.

Phthisis, whether tubercular or leprotic, nephritis, hepatitis, gastritis, be it secondary to chaulmoogra or due to the sedentary life, are treated on usual lines. Haemoptysis, diarrhoeas, &c., secondary to internal leprotic ulcers or other causes are given individual attention.

4. *Treatment of intercurrent diseases.*—Bronchitis, pneumonia, malaria, cholecystitis, &c., receive the treatment necessary.

5. *Surgical treatment.*—When necessity arises such operations, as excisions of bones, removal of larger sequestra, amputations of digits and extremities, are undertaken by the officers of the institution. All eye operations when necessary are done by the Eye Surgeon.

6. *Experimental treatment.*—Zimbyl copper which was started in 1937 was discontinued this year as the results were not satisfactory. Sheep serum was given a fair trial but no good results were obtained. It has now been discontinued but it will be tried in future series. Prontosil tablets have been tried in a few (10) cases for generalized ulceration with secondary pyogenic infection. The results so far are good and it is intended to continue this year when occasion arises. Prontosil injections were not available. Mercurochrome, 2 per cent. solution is occasionally given in leprotic fevers, but is viewed with disfavour by the patients. A few antimony infections were given again this year but results are not very satisfactory. Haemoplastine was administered to an intractable case of lacerine leprosy, with haemorrhagic tendencies and secondary pyogenic infection. The result in this case was marvellous.

Mantivu Leper Asylum.—This institution is situated on an island of about 160 acres in a large lagoon near Batticaloa. Male patients are housed in 24 two-roomed cottages each with its own kitchen, and in a number of hospital wards. There is accommodation for 180 patients. The female patients all live under hospital conditions in wards.

At the end of 1937 there were 208 lepers remaining in the asylum. There were 31 admissions (including 7 readmissions) during 1937 and 29 cases were discharged. There were 15 deaths and the percentage of deaths to total treated was 6.2. The daily average number of patients in 1938 was 202.5. There were 195 lepers remaining on December 31, 1938.

VIII.—METEOROLOGY.

The following report was prepared by the Superintendent, Colombo Observatory :—

Rainfall.—The rainfall for the year was generally below normal except in the hill-country where it was generally above average particularly on the eastern slopes and between the hill-country and the coast directly east of it. The largest deficits were 53·42 inches at Hallayan, 47·11 inches at Carney, and 42·87 inches at Ratnapura, while the largest excesses were 48·63 inches at Kenilworth, and 30·18 inches at Kobonella. The highest totals for the year were 267·88 inches at Kenilworth and 215·33 inches at Norton Bridge, while the lowest totals were 24·46 inches at Palatupana and 25·74 inches at Marichchukkaddi.

Temperature.—The low-country stations with highest and lowest mean shade temperatures for 1938 were Mannar, with 82·0°F, and Galle, with 79·9°F. The figures for Colombo and Kandy were 80·7°F. and 77·0°F. respectively, while Nuwara Eliya at an elevation of over 6,000 feet, had a mean shade temperature of 59·8°F. The highest shade temperature recorded during the year was 97·5°F., at Anuradhapura, on October 13. The lowest shade temperature this year at low-country stations was 62·1°F., at Anuradhapura, on November 15. The lowest shade temperature recorded during the year at Nuwara Eliya was 35·9°F., on February 14. The highest shade temperature in Colombo in 1938 was 92·4°F., on January 29, and the lowest, 66·8°F., on November 14. The mean daily range for 1938 (the difference between the mean of maxima and the mean of the minima) was greatest at Badulla, 17·2°F., and lowest at Jaffna and Galle, 8·0°F.

Returns.—Meteorological returns for the towns of Colombo and Nuwara Eliya are given below :—

Colombo.

Month.	Temperature.					Rainfall.																		
	Mean Solar	Mean Mini-	Mean Shade	Mean Shade	Mean	Amount in Inches.	Degree of Humidity.		General Directions.		Average Force., Miles.													
	Maxi-mum.	mum on Grass.	Maxi-mum.	Mini-mum.	tempera-ture.		Day.	Night.	A.M.	P.M.														
						Inches.	Days.	%	%															
January	..	—	..	68·9	..	87·7	..	72·6	..	80·2	..	1·74	..	12	..	70	..	90	..	NE	..	Variable	..	127
February	..	—	..	70·2	..	86·2	..	73·9	..	80·0	..	5·97	..	13	..	76	..	93	..	Variable	..	W	..	106
March	..	—	..	71·9	..	86·6	..	74·8	..	80·7	..	8·14	..	16	..	74	..	90	..	Variable	..	W	..	90
April	..	—	..	73·8	..	86·8	..	75·3	..	81·0	..	15·57	..	27	..	76	..	91	..	Variable	..	WSW	..	96
May	..	—	..	76·3	..	87·1	..	79·5	..	83·3	..	3·48	..	19	..	76	..	82	..	WSW	..	WSW	..	134
June	..	—	..	75·6	..	86·1	..	78·7	..	82·4	..	1·94	..	17	..	74	..	82	..	WSW	..	WSW	..	155
July	..	—	..	73·7	..	84·4	..	76·8	..	80·6	..	4·10	..	13	..	75	..	84	..	WSW	..	WSW	..	145
August	..	—	..	74·3	..	84·4	..	76·8	..	80·6	..	4·77	..	24	..	78	..	86	..	SW	..	WSW	..	148
September	..	—	..	74·2	..	84·6	..	76·9	..	80·8	..	5·74	..	19	..	79	..	86	..	WSW	..	WSW	..	142
October	..	—	..	70·9	..	85·3	..	74·2	..	79·8	..	4·86	..	16	..	74	..	90	..	WSW	..	WSW	..	110
November	..	—	..	69·4	..	86·3	..	73·1	..	79·7	..	3·82	..	7	..	68	..	88	..	Variable	..	WNW	..	94
December	..	—	..	70·1	..	86·1	..	72·7	..	79·4	..	4·63	..	14	..	73	..	90	..	NE	..	NNW	..	124

Nuwara Eliya.

Month.	Temperature.					Rainfall.																		
	Mean Solar Maxi-mum.	Mean Mini-mum on Grass.	Mean Shade Maxi-mum.	Mean Shade Mini-mum.	Mean tempera-ture.	Amount in Inches.		Degree of Humidity.		General A.M.	Directions. P.M.	Average Force. Miles.												
						Inches.	Days.	Day.	Night.															
								%	%															
January	..	—	..	45·1	..	67·1	..	49·1	..	58·1	..	4·00	..	13	..	78	..	90	..	—	..	—	..	—
February	..	—	..	45·4	..	69·9	..	48·5	..	59·2	..	6·70	..	17	..	74	..	93	..	—	..	—	..	—
March	..	—	..	48·3	..	69·5	..	50·8	..	60·2	..	6·32	..	24	..	80	..	93	..	—	..	—	..	—
April	..	—	..	49·5	..	71·1	..	52·6	..	61·8	..	7·78	..	23	..	79	..	97	..	—	..	—	..	—
May	..	—	..	49·8	..	71·2	..	53·9	..	62·6	..	2·60	..	10	..	76	..	91	..	—	..	—	..	—
June	..	—	..	52·8	..	64·1	..	55·5	..	59·8	..	15·41	..	23	..	84	..	88	..	—	..	—	..	—
July	..	—	..	50·7	..	66·3	..	53·9	..	60·1	..	15·92	..	20	..	82	..	91	..	—	..	—	..	—
August	..	—	..	51·4	..	66·7	..	54·2	..	60·4	..	4·28	..	22	..	83	..	91	..	—	..	—	..	—
September	..	—	..	52·2	..	65·2	..	54·3	..	59·8	..	12·28	..	27	..	87	..	91	..	—	..	—	..	—
October	..	—	..	47·2	..	67·3	..	49·8	..	58·6	..	2·07	..	17	..	82	..	90	..	—	..	—	..	—
November	..	—	..	46·6	..	67·3	..	49·5	..	58·4	..	5·52	..	12	..	72	..	87	..	—	..	—	..	—
December	..	—	..	49·0	..	67·4	..	50·8	..	59·1	..	9·28	..	16	..	78	..	93	..	—	..	—	..	—

IX.—SCIENTIFIC.

(1) BACTERIOLOGICAL INSTITUTE.

The examinations carried out at the Bacteriological Institute for the year were :—

Nature of Specimens.	Official.	Private.	Total.	Positive.	Negative.
Blood for examination for typhoid "H" ..	5,269 ..	39 ..	5,308 ..	1,818 ..	3,490 ..
"O" ..	2,074 ..	3 ..	2,077 ..	473 ..	1,604 ..
Blood for examination for Para-typhoid A "H" ..	2,235 ..	25 ..	2,260 ..	101 ..	2,159 ..
"O" ..	78 ..	9 ..	87 ..	9 ..	78 ..
Blood for examination for <i>B. columbensis</i> "H" ..	3,440 ..	17 ..	3,457 ..	297 ..	3,160 ..
"O" ..	302 ..	3 ..	305 ..	46 ..	259 ..
Blood for Weil Felix Reaction ..	115 ..	1 ..	116 ..	5 ..	111 ..
Blood for examination for <i>B. typhosus</i> ..	270 ..	— ..	270 ..	179 ..	91 ..
Blood for examination for Wassermann test ..	11,155 ..	145 ..	11,300 ..	2,065 ..	8,647 ..
Blood for examination for Khan test ..	89 ..	18 ..	107 ..	36 ..	71 ..
Blood for examination for malaria parasites ..	2,937 ..	139 ..	3,076 ..	219 ..	2,857 ..
Human material for examination for <i>B. pestis</i> ..	52 ..	— ..	52 ..	5 ..	47 ..
Rats for examination for <i>B. pestis</i> ..	95 ..	— ..	95 ..	— ..	95 ..
Sputa for examination for <i>tubercle bacilli</i> ..	1,186 ..	75 ..	1,261 ..	209 ..	1,052 ..
Sputa for examination for <i>pneumococci</i> ..	52 ..	— ..	52 ..	37 ..	15 ..
Urine for bacteriological examination ..	547 ..	43 ..	590 ..	— ..	— ..
Urine for chemical examination ..	1,070 ..	72 ..	1,142 ..	— ..	— ..
Secretions for <i>gonococci</i> ..	2,275 ..	37 ..	2,312 ..	292 ..	2,020 ..
Secretions for examination for <i>B. leprae</i> ..	22 ..	1 ..	23 ..	6 ..	17 ..
Faeces for examination for <i>B. dysenteriae</i> ..	1,888 ..	11 ..	1,899 ..	126 ..	1,773 ..
Faeces for examination for <i>E. histolytica</i> only ..	149 ..	213 ..	362 ..	7 ..	355 ..
Faeces for ova and intestinal parasites ..	814 ..	40 ..	854 ..	476 ..	378 ..
Evacuations for cholera vibrio ..	8 ..	— ..	8 ..	— ..	8 ..
Scrapings for spirochaetes ..	19 ..	28 ..	47 ..	4 ..	43 ..
Faeces and urine for <i>B. typhosus</i> ..	4 ..	— ..	4 ..	1 ..	3 ..
Specimens for examination for <i>B. Anthrax</i> ..	4 ..	— ..	4 ..	1 ..	3 ..
Miscellaneous specimens ..	1,707 ..	64 ..	1,771 ..	— ..	— ..
Water for bacteriological examination ..	73 ..	15 ..	88 ..	— ..	— ..
Total ..	37,929	998	38,927	—	—

The doses of vaccine prepared and issued were :—

Nature of Vaccine.	Official.	Private.	Total.
Autogenous vaccine (10 doses) ..	175 ..	36 ..	211 ..
T. A. vaccine (doses) ..	83,870 ..	423 ..	84,293 ..
Gonococcal vaccine (doses) ..	55,565 ..	72 ..	55,637 ..
Anti-plague vaccine (doses) ..	80 ..	— ..	80 ..
Anti-cholera vaccine (doses) ..	500,300* ..	77 ..	500,377 ..
<i>B. coli</i> vaccine (doses) ..	100 ..	20 ..	120 ..
Staphylococcal vaccine (doses) ..	100 ..	20 ..	120 ..
Streptococcal vaccine (doses) ..	200 ..	— ..	200 ..
Total ..	640,390	648	641,038

* 500,000 doses of anti-cholera vaccine was issued free to China through the League of Nations Health Organisation's Eastern Bureau, Singapore.

The following table shows the specimens of faeces received from four institutions for examination for *E. histolytica* and *B. dysenteriae* :—

Name of Institution.	Number of Specimens.	<i>E. histolytica</i> .	<i>B. dysenteriae</i> .	Mucus.	Mucus and Blood.	Giardia Flagellates, &c.	Percentage in which <i>E. histolytica</i> or <i>B. dysenteriae</i> were present when mucus and blood were present.
Mahara Jail ..	374 ..	1 ..	11 ..	265 ..	248 ..	12 ..	4.84
Prison Hospital, Colombo ..	629 ..	9 ..	14 ..	455 ..	410 ..	11 ..	5.6
General Hospital, Colombo ..	135 ..	5 ..	7 ..	112 ..	101 ..	2 ..	11.88
Lunatic Asylum ..	664 ..	57 ..	67 ..	531 ..	521 ..	16 ..	23.8

(2) PASTEUR INSTITUTE.

The number of patients who received preventive inoculation against rabies and treatment of the infecting wound was 1,687 (in-patients 846, and out-patients 841).

Of the above, 1,370 were actually bitten, *i.e.*, 81·21 per cent. The others were considered to be at slight risk, such as possibility of infecting cuts or scratches.

The distribution was as follows :—

(a) By Province.		(b) By Race.		(c) Source of Infection.	
Western	807	Sinhalese	1,283	Dog	1,591
Central	103	Tamils	254	Human	23
Southern	486	Burghers	102	Cats	14
Sabaragamuwa	47	Europeans	17	Monkeys	5
Northern	85	Moors	27	Goats	6
North Western	49	Malays	3	Rats	34
Uva	106	Chinese	1	Jackal	8
North-Central	2			Cow	6
Eastern	1				
South India	1				
	1,687		1,687		1,687

In 397 cases the biting animal was found positive by microscopic tests ; in 706, the animal was found clinically positive ; in 474 it was only suspected to be rabid ; while in 110 the animal was alive and well after ten days' observation and therefore considered to be not rabid.

A carbolized vaccine consisting of 1 per cent. suspension of fixed virus brain and spinal cord of rabbits in $\frac{1}{2}$ per cent. carbolic acid in normal saline—the strains of fixed virus used were Paris and Lindula.

Those bitten on the head or severely on the body were given 18–21 injections ; others bitten superficially or scratched, 14 injections ; and those who were only licked by or had handled suspected animals 7 daily injections of 5 c.c. each.

Inquiries are sent out at the end of the 3rd and 12th months after treatment direct to the literate patients, or to some responsible person in the case of others. Up to date 4 cases of hydrophobia have been reported and these are considered failures in treatment.

The following microscopical examination of brains for rabies were carried out :—

Dogs	409	Goat	1
Jackals	2	Bull	1
Cats	2		
Monkeys	3		420
Cow	2		

The following are the results giving the provinces from which the heads or brains of dogs were received :—

Province.	Positive.	Negative.	Unfit.	Total.
Western	98 A	60 C	36 E	194
Central	22	14	12	48
Southern	45 B	22 D	33 E	100
North-Western	8	6	4 F	18
Uva	23	8	10	41
Northern	5	2	2	9
Sabaragamuwa	2	5	1	8
Eastern	—	1	1	2
	203	118	99	420

- A.—1 bull, 1 cow, 1 cat.
 B.—1 cow.
 C.—3 monkeys.
 D.—1 goat.
 E.—2 jackals.
 F.—1 cat.

(3) OTHER LABORATORIES.

The following table gives the number of examinations reported from the laboratories attached to the De Soysa Lying-in Home, Victoria Memorial Eye Hospital and to outstation hospitals :—

Name of Institution.	Urine.	Faeces positive for Hookworm.	Faeces negative for Hookworm.	Blood positive for Malaria.	Blood negative for Malaria.	Other Examinations.	Total.
Victoria Memorial Eye Hospital	3,149	30	2	10	96	6,674	9,961
Lying-in Home	5,891	2,265	1,761	23	597	1,031	11,568
<i>Outstations.</i>							
Kandy	13,840	2,406	3,270	704	4,141	5,086	29,447
Galle	11,582	3,986	1,665	799	2,331	2,735	23,098
Kurunegala	3,704	1,457	777	939	1,948	1,992	10,817
Badulla	4,399	2,335	661	218	763	903	9,279
Ratnapura	3,334	1,763	500	361	1,030	768	7,756
Jaffna	3,218	1,018	543	164	592	1,098	6,633
Anuradhapura	2,190	278	572	399	983	531	4,953
Batticaloa	1,666	700	592	61	264	619	3,902
Trincomalee (2 months)	126	23	70	3	62	11	295
Mandapam Camp	300	71	107	58	105	9,114	9,755

(4) MANDAPAM CAMP LABORATORY.

The work of the laboratory consists of the examination of pathological and bacteriological specimens from the dispensary and hospital.

The number of specimens examined during the year were 9,755 as detailed below :—

Pathological Specimens.

1. Examination for Mycobacterium leprae and Mycobacterium tuberculosis	461
2. Examination of blood for absolute and differential count	8
3. Examination for Corynebacterium diphtheriae	1
4. Examination for Streptococci pneumoniae	1
5. Examination of blood for bile	2
6. Examination for protozoal infection of blood	163
7. Examination for protozoal infection of the gastro-intestinal tract	19
8. Examination of urine	300
9. Examination for helminthic infection	178

Bacteriological Specimens.

10. Examination for vibrio carriers	8,542
11. Bacteriological examination of water	69
12. Widal's	11
Total	9,755

The combined Leishman and Giemsa staining was continued in the examination of blood for protozoa, and gave excellent results. The differential diagnosis of different species of the plasmodium is made easy by this method.

448 persons were examined for leprosy and of them 101 were found to be infected with it. Eighty-four cases were from among passengers (this included 3 Ceylonese), 16 from estate labourers, and 1 from repatriates.

8,542 specimens were bacteriologically examined for cholera carriers. Three strains for cholera vibrios and 52 strains for a typical vibrios have been isolated, and 62 other vibrios were met with during examination.

(5) RESEARCH INSTITUTE.

The new Institute was occupied towards the end of 1937, and the research work of the various departments has been organized during 1938. Many of the latest methods which could not be used because of the confined space of the old building, have been introduced.

Bacteriology : Typhus.—In 1937, Dr. L. B. E. Seneviratne examined 434 specimens of blood from patients in various hospitals in Ceylon for agglutination with proteus OX19 and OXK; of these six were positive with OXK. During 1938, samples of

serum from five patients having fever have been found positive for typhus. The cases were one each from Polonnaruwa, Nuwara Eliya, and Avissawella and two from Colombo.

The agglutination was positive with OXK strain in two cases, one from Colombo and one from Avissawella. In the other three cases the agglutination was positive with OX19, revealing two types of typhus in Ceylon.

Guinea pigs were infected with the emulsified clots of blood of the three patients whose sera were positive with OX19. The infections, given intraperitoneally, were followed by fever and typical scrotal swelling.

Infections from an emulsified clot of blood from one patient (whose serum was positive with OXK) into the interior chambers of the eyes of rabbits were followed by turbidity of the aqueous humour and iritis.

The blood of the rabbits developed agglutinins against OXK, and Rickettsia-like bodies were found in smears from Descemet's membrane stained by Giemsa.

This work on typhus was carried out by Mr. T. Velayudapillai.

Typhoid.—All specimens of blood sent for agglutination reactions are now cultured for *S. typhi* or other organisms by clot culture. Many media have been tested for this purpose such as Wilson & Blairs', desoxycholate and other media. The most successful was found to be a medium containing bile, yeast extract, and brilliant green.

Among 1,801 specimens which were examined for agglutination and were negative 34 were positive by clot culture for *S. typhi*.

All specimens of blood for agglutination with *S. typhi* are also examined against *S. columbensis*, *S. paratyphi* A. & B., proteus OX19 and proteus OXK.

Among 1,820 specimens 272 were positive against *S. columbensis*.

Tuberculosis.—Recently all specimens sent for examination for tubercle bacilli, and which are negative microscopically are examined by cultural methods. The microscopical examinations are by the usual methods of staining for acid fast bacilli in the centrifuged deposit of the specimen.

Jansen-Lowenstein medium is used for the primary cultures.

The following table shows that among 192 specimens 31 were positive microscopically and the 161 which were negative were cultured and 24 were positive :—

Specimen.	Total.	Microscopically			Percentage.
		Microscopically positive.	negative, culturally positive.		
Sputum	133	28 (21%)	15	11.3	
Pus (Empyema, &c.)	29	3 (10.3%)	7	24	
C. S. Fluid	13	0	1	6.3	
Urine	9	0	1	11.1	
Others	8	0	0	—	
Total	192	31 (16%)	24	12.5	

Thus about 25 per cent. were found positive which had been missed by microscopical examination.

Helminthology.—The method of disposal of night soil by composting has been introduced into Ceylon, and as it is proposed to sell the compost to cultivators, it is necessary to be certain that temperature generated by fermentation is sufficient to destroy the ova of hookworms and round worms. With the assistance of Dr. Samson A. Gunawardana an investigation concerning the rate of helminthic ova in compost heaps was carried out. The following were the conclusions :—

- The temperature of the compost heaps invariably rises to over 50°C after each charge of night soil.
- The fermentation is greatest at the junction of the refuse with the night soil, and there the temperature rises to over 60°C.
- It may be safely concluded that all parts of compost heaps reach a temperature of at least 50°C for many hours.
- The temperature within the compost heaps is not affected by moderately heavy rainfalls.

- (e) The ova and larvae of *Necator americanus* are destroyed when heated to 40°C for 24 hours, 42°C for 12 hours, and 45°C for 2 hours.
- (f) Many ascaris ova and helminth larvae were found in the final compost. But the ascaris ova could not develop larvae and were presumably dead. The helminth larvae were not necators.

A paper has been published on this subject. (L. Nicholls and S. A. Gunawardana, 1939.)

(6) NUTRITION DEPARTMENT.

The department was started in February, 1938. The work done during 1938 is summarised as follows :—

Field Work.—(a) About 4,000 children were examined for signs of malnutrition such as sore mouth, phrynoderma, and Bitot's spots.

(b) About 1,500 children were given a more comprehensive examination which included heights, weights, and the A. C. H. Index.

(c) The incidence of Bitot's spots has been studied in detail, and a paper on this subject is being published.

Lectures on Nutrition and Dietetics.—(1) Lectures have been given to the following :—

- (a) Students being trained as teachers in the Government Training College.
- (b) Teachers who have attended the Government Training College for a refresher course.
- (c) Students who are being trained as Sanitary Assistants.

(2) Arrangements have been made for a course of lectures to fifth year medical students.

(3) Other lectures suitable for the general public have been given.

Propaganda.—(1) The department has helped to arrange stalls at a number of Health Exhibitions.

(2) A "popular" booklet with coloured charts has been prepared and is in the press.

(3) Propaganda posters on nutrition have been prepared. These will be suitable for schools and popular lectures.

(4) Sets of lantern slides are being prepared. These will be suitable for lectures by Medical Officers.

(5) Models in hominit and celerit have been prepared.

Co-operation with other Departments.—Correspondence has taken place between this department, the Agricultural (including the Veterinary) and the Marketing Board on the production and distribution of various local foodstuffs.

Hospital Diets.—This department has undertaken a study of the diets and kitchen organization of Ceylon hospitals with a view to—

- (1) Improve the quality of the diets as far as local economic circumstances permit.
- (2) Improving kitchen practice.
- (3) Eliminating certain undesirable features in the present system.

A small committee including the Professors of Surgery and Medicine has worked on this subject in co-operation with the Medical Superintendent and the Sisters of the General Hospital.

A report on this subject is being prepared.

Research (1) *Fermented Milk.*—It has been shown that the fermentation of milk in Ceylon is brought about by yeasts, a lactobacillus and streptococcus lactis. The last is the main lactic acid producer and the acidity of the milk reaches as high as 3 per cent. lactic acid equivalent. The organisms of typhoid and dysentery die out rapidly in this fermented milk.

A paper on this subject has been published. (L. Nicholls, A. Nimalasuriya, and R. de Silva, 1939.)

(2) *The A. C. H. Index*.—This has been studied from the measurements of 1,500 children. Attempts have been made to correlate low indices with various signs of malnutrition.

(3) *Experiment on Calcium Metabolism*.—(a) The bones of a number of stillborn babies of malnourished mothers have been analysed.

(b) Calcium balance experiments have been carried out. Some interesting results have been the outcome of this work especially as concerns children with a low calcium intake.

(c) The urinary calcium has been determined for many children of the upper and lower classes and important results have been obtained.

(7) GOVERNMENT VACCINE ESTABLISHMENT.

Calf lymph was prepared from 549 calves, averaging about 5 grammes from each calf. A gramme of lymph is sufficient to vaccinate about 450 subjects.

Samples of seed lymph were obtained from the Lister Institute fortnightly and others were prepared at this Institute. The Lister Institute supply was sufficient to vaccinate 52 calves and our preparations were used for the remaining 497 calves.

The method of preparation and issue of the glycerinated lymph has been the same as in previous years.

174,302 tubes of lymph sufficient to vaccinate about 522,906 subjects were issued during the year. Of this number 817 were sold.

The percentage of successful vaccinations calculated from the weekly returns from 185 vaccinating officers was 97·8 per cent.

There is always in reserve a quantity of lymph sufficient to meet a 3 months' normal demand.

(8) MEDICAL ENTOMOLOGY.

Teaching.—Lectures and demonstrations (field and laboratory) on Medical Entomology with special reference to malaria, and anopheline mosquitoes were given during the year to classes of Sanitary Learners and to Field and Laboratory Assistants. Those of the latter who had received appointments in the Division were given a preliminary course of training of three months in the laboratory and one at a field station. In all, 81 officers attended courses, involving over 60 special lectures and demonstrations. Two Supervising Officers and six Field Medical Officers appointed to the Malaria Control Scheme were also given instruction.

Malaria Campaigns.—The Medical Entomologist continued to serve as a member of the Malaria Committee, and in this capacity devoted much time to the business involved. As in previous years this included the preparation of memoranda relating to the more technical aspects of malaria control in Ceylon, and reports on the work at the Malaria Campaign centres. Several tours of inspection were made to these centres in the course of the year.

A trained Field Assistant (Entomological) was stationed at each of these centres, and was placed at the disposal of the Medical Officer of Health in charge of the campaign. The chief lines of work of these Assistants were (a) those directly associated with the various control measures in progress, and (b) those having as their object the collection of data which would show the effects of the anti-larval work as a whole.

Under (a) routine examinations to determine the efficiency of the work of the oiling gangs, and similar examinations of secondary breeding places of *A. culicifacies* not under regular treatment were undertaken; and in several stations also the assistants helped with the work of controlling the breeding of *anopheles* in wells by means of larvivorous fish. Under (b) comparative investigations to determine the relative prevalence of the different species of *anopheles* in the inner (protected zone) and outer control zones, and outside the campaign area were carried out in each zone or area once every two weeks. Dissections and examinations of the adult anophelines collected were undertaken, and infections with malaria parasites recorded. Graphs and charts giving the results obtained under each head (adult prevalence, larval prevalence, and species distribution) in each of the different areas were maintained in each campaign centre. Although the bulk of the laboratory

work associated with these investigations is done locally by the Field Assistants themselves, it sometimes becomes necessary for part of it to be done at the central laboratory in Colombo. During the year over 52,000 examinations (including nearly 4,000 dissections) of mosquitoes were made in this connection in Colombo.

In December, a series of comparative experiments using Paris Green dust mixture (2 per cent. by weight with soapstone diluent), and Paris Green emulsion (200 c.c. Paris Green, 400 c.c. kerosene oil, and 1 gram egg albumen—25 c.c. of this mixture to 5 litres of water) were carried out on rice fields at Minneriya by a senior Field Assistant. The results were not conclusive owing chiefly to the fact that the types of sprayers used did not prove altogether satisfactory for dispersion of the emulsion. The indications obtained from the experiments, however, were—

- (a) that Paris Green dust was more efficient and more rapid in its action on *anopheles* larvae, and
- (b) that with the types of sprayers available, Paris Green in dust form was more suitable for application to rice fields owing to its range of dispersion being considerably increased by wind action.

Further experiments will be undertaken using machines which are considered to be more suitable for spraying the emulsion.

Malaria Observation Stations.—Detailed accounts of the investigations—their nature, scope, and objects—under this head were given in my reports for the years 1935, 1936, and 1937. The only changes introduced were the inclusion of eight additional Observation Stations—four in the southern epidemic zone, and four in the eastern littoral—and the placing of the field work relating to the emergency oiling measures under the Field Officers of the Malaria Control Scheme. The number of Observation Stations included in the scheme is now 54, against 46 last year.

The following table gives some indication of the amount of field and laboratory work performed in connection with this scheme :—

Malaria Observation Stations.

Summary of Work, January-December, 1938.

Locality.	Adult Mosquitoes.						Larvae.		
	No. of Stations.	Houses Examined	Night Trap ping- (Hours)	Mosquitoes collected and examined.		Mos- quitoes dissected infected (Ano- pheles). Malaria*.	Mos- quitoes infected with examined.	Potential breeding places examined.	Anopheles larvae collected and examined.
				Anophelines.	Culicines.				
Epidemic zone.									
(a) Western area	20	17,026	8,580	63,287	61,919	21,876	23	22,087	240,130
(b) Southern area	8	4,135	2,048	14,386	20,557	4,223	10	6,118	37,306
Non-epidemic zone (Wet Zone)	4	2,182	1,195	13,374	34,804	2,905	Nil	5,183	31,833
Eastern Hill zone	4	1,873	1,198	32,836	9,475	7,547	2	3,925	68,282
Eastern littoral	4	2,397	822	7,904	5,431	1,275	Nil	1,949	16,810
Jaffna Peninsular	5	4,341	1,212	11,413	3,378	2,453	Nil	3,040	75,031
Total	54	31,954	15,055	143,200	135,564	40,279	35	42,302	469,392

* Infections with malaria parasites were found in *A. culicifacies* only.

Epidemic Zone : (a) *Western Area.*—No changes were made during the year in regard to the work or to the stations selected for observation purposes in this extensive area of country. River conditions became definitely dangerous in January and throughout large areas notably along the Maha-oya, the upper catchment of the Deduru-oya, and the upper catchment of the Kelani-ganga pooling was extensive and was accompanied by a marked increase in the breeding of *A. culicifacies*. These conditions were due to the partial failure of the early monsoon rains, and they arose several weeks earlier than is normally the case in the areas concerned. The probability, therefore, was that the intermonsoon dry period would be considerably prolonged and that *A. culicifacies* would become unusually abundant at a not distant date. The outlook for February and March was considered grave, and anxiety was felt lest a serious outbreak of malaria should occur. Immediate preventive action

was taken and from the middle of January onwards extensive oiling of the beds of the main rivers and associated streams was in progress. Fortunately, in February, exceptional rains occurred which flushed the river and stream beds and relieved the situation. Throughout the rest of the year *A. culicifacies* was, as usual, most prevalent in the stations associated with the Deduru-oya—particularly in those situated in, or bordering upon, the dry zone proper. In the upper catchment (intermediate zone), heavy breeding again occurred in the river and stream beds in June, October, and November when further treatment with oil was given. The majority (19) of the mosquitoes, (23) found infected with malaria parasites, were obtained from this area; 6 occurred in the lower catchment area in January, February, March, and August, 2 in the intermediate area in July and December, and 11 in the upper catchment in February, April, June, July, August, November, and December. In the hill stations (Matale and Rattota) of the Amban-ganga—Sudu-ganga—catchment, conditions on the whole were satisfactory. Oiling at, and in the neighbourhood of, Rattota became necessary, however, in March, May, and November. Three infections, all from the dry zone station (Galewela) in this area were observed in *A. culicifacies* in May, June, and December. In the western catchment of the Mahaweli-ganga (Kandy area), extensive breeding of *A. culicifacies* occurred only at Talatu-oya in May and June when oiling was undertaken. Along the Maha-oya, conditions became unsatisfactory at one time or another at several stations, particularly Rambukkana (in June and August), Makandura (in March), Alawwa (in July), Giriulla (in August), and Kegalla (in November). Oiling was carried out whenever necessary. A single infection (oöcysts) was observed in *A. culicifacies* obtained from Alawwa in March. Conditions along the Kelani-ganga, and in the catchment of the Attanagala-oya remained satisfactory from January until the close of the year. No infections with malaria parasites in mosquitoes were found.

(b) *Southern Area*.—An additional four stations were opened in this area in May, 1938. The previous four stations representing the area were situated in the southern portion in the vicinity of Matara and Tangalla. The newly opened stations—Balangoda (Madola), Godakawela, Ratnapura (Kahangama), and Ketandola—are situated in the northern portion with elevations ranging from approximately 100 ft. to 1,700 ft. As pointed out in last year's report the change in climatic conditions in this part of Ceylon takes place with remarkable abruptness, and in some areas the normal boundaries of the wet and dry zones are separated by a matter of some five or six miles only. Balangoda and Godakawela are situated within a few miles of the normal dry zone boundary, whereas Ratnapura and Ketandola, although actually only from 10 to 12 miles away as the crow flies, are well within the normal wet zone boundary.

In all of the more northerly situated stations anophelines were very scanty in dwellings until December when moderate catches were obtained from Godakawela. Catches from traps were greater, but were not heavy when compared with those obtained from other areas. The predominant species were *A. vagus*, *A. hyrcanus*, *A. jamesi* and *A. subpictus*, but *A. culicifacies* was prevalent at Godakawela in November and December, and was present in smaller numbers at Madola in August, October, and December. A single infection with malaria parasites (in *A. culicifacies*) was found at Madola in October; the total number of mosquitoes dissected being 1,021. *A. culicifacies* was breeding heavily in the river bed (Wey-ganga) at Madola in May and from September to November, but was seldom found at the other stations. Breeding of anophelines in ground water collections was not severe, and *A. culicifacies* larvae were found rarely and in small numbers; they occurred occasionally in gem pits at Kahangama and in fallow rice fields at Godakawela in December.

In the southern stations *A. culicifacies* was prevalent only at Beliatta (situated close to the dry zone boundary). At this station it occurred throughout the year, but was most numerous from October to December; breeding was not confined to the river bed and larvae were frequently found in irrigation channels, drains, borrow-pits and occasionally in rice fields. Nine infections (3 sporozoites and 6 oöcysts) were observed in this species in August, September, November, and December. *A. culicifacies* appeared in small numbers at Akuressa in November, and at Deiyandara in January, February, and September.

Non-Epidemic Zone (Wet Zone).—

Although over 45,000 adult and larval anophelines were collected from the four stations in this area during the year, only two were *A. culicifacies*. These were larvae and were obtained from an irrigation channel at Nagoda in August, and from a drain at Baddegama in December. Catches of adult mosquitoes from dwellings and human baited traps were very poor, while those from cattle baited traps were usually large. The predominant species were *A. jamesi* and *A. hyrcanus*. No infections with malaria parasites were seen in nearly 3,000 dissections. Breeding in the river beds was negligible except in June and July and in September and December, when it became of moderate intensity; in ground water collections, however, it was severe throughout the year.

Eastern Hill Zone.—

The catches of adult anophelines were heavy throughout the year, but the great majority were obtained from the animal baited traps and, except at Taldena, during August to December, the numbers obtained from dwelling-houses were low. The predominant species were *A. vagus*, and *A. hyrcanus*, the latter being particularly prevalent from May to July and in November and December. *A. culicifacies* only became numerous during the latter part of the year at Taldena; in the adult stage it was relatively scanty throughout, at the other three stations. Two infections with malaria parasites (sporozoites) were observed in specimens from Taldena in November and December. Breeding of anophelines in the river beds at all stations was considerable whenever conditions permitted. In January and February *A. hyrcanus* and *A. varuna* were the chief species present, in March *A. maculatus*, *A. culicifacies*, and *A. vagus*, and from May onwards *A. vagus* was predominant. *A. culicifacies*, however, occurred to a greater or less extent in the rivers and streams at all the stations; but was especially numerous at Taldena, and at Hali-ela in January and October. Oiling was undertaken whenever conditions appeared to be dangerous. Breeding in ground water collections and rice fields was heavy during every month of the year, the predominant species being *A. vagus*, *A. hyrcanus*, and *A. varuna*; *A. maculatus* was prevalent in March. *A. culicifacies* larvæ were found only occasionally and in small numbers in situations other than the river and streams.

Eastern Littoral.—

Four stations situated in the central portion of the eastern littoral were selected for investigation work which was commenced in May of this year. These stations were Valaichchenai, Batticaloa, Kalmunai, and Kokoddicholai; and the scheme of work was exactly similar to that undertaken in all other areas. Nearly 8,000 adult anophelines were collected from these stations during the period May to December. Approximately 25.1 per cent. of these were obtained from dwellings, and the rest from human (9.3 per cent.) and animal (65.6 per cent.) baited traps. The predominant species in both houses and traps was *A. subpictus*; but other species found were *A. pallidus*, *A. hyrcanus*, *A. jamesi*, and *A. vagus*. *A. culicifacies* adults were found scantily from September to December, they were more numerous at Kokoddicholai and Batticaloa than at the other stations. Over 1,200 mosquitoes (including 46 *A. culicifacies*) were dissected, but no infections with malaria parasites were observed. The potential breeding places examined each month included wells, tanks, borrow-pits, drains, ponds, low-lying swampy areas and gala-wells (water storage pits used chiefly for gardening purposes), streams at Valaichchenai and Kalmunai, and the river (Manalpiddi-arū) at Kokoddicholai. A total of 16,810 anopheline larvae were collected and identified. These were referable to species, of which the most prevalent were *A. subpictus*, *A. pallidus*, *A. hyrcanus*, *A. jamesi*, and *A. culicifacies*.

A. culicifacies was invariably breeding in the river bed at Kokoddicholai, and occasionally in the streams at Valaichchenai as well as in ground water collections; at Batticaloa the chief breeding places of this mosquito were the "gala" wells, borrow-pits and trenches, but it also occurred in unbuilt drains, wells, and pools.

Jaffna Peninsula.—

Breeding of anophelines in ground water collections was heavy and continuous throughout the year at all five stations in this area, although during the latter part of the dry season the number of breeding places existing was much reduced. *A. subpictus* was greatly predominant. *A. culicifacies* occurred at all stations, and was most prevalent from December to March; it was relatively more numerous at Pallai and Idaikurichchi. Adults of this species were obtained in much larger numbers from dwellings, than from the human and animal baited traps. It was breeding in all types of ground water collections notably wells, sandy pools and ponds, borrow-pits and kernies (stone-built tanks), and also in the flood outlet channel (Valuki-arū) near Manipay. No infections with malaria parasites were found in 2,453 mosquitoes (all species of anophelines) dissected.

Ratmalana Aerodrome: Examination of Aircraft for Mosquitoes.—Mosquito surveys of the aerodrome site and its vicinity were carried out in 1934 and 1937 (*vide* reports for those years). In continuation of this work examinations of aircraft arriving at and departing from the aerodrome, for the presence of mosquitoes and other insects, was commenced in June, 1938. The aircraft in question were all small 4–5 seater, Waco-type planes which offered little opportunity for the carriage of insects. In all, 62 aircraft—30 arrivals and 32 departures—were examined over a period of approximately four months. No mosquitoes were found in the planes, and insects of any kind were rarely seen. From the arrivals, two specimens of *Musca sorbens*, one of *M. vicina*, one *Sarcophaga* (sp. incert.), and one small Hymenopteron were collected; and from the departures a single Dipteron (Anthomyid) was obtained.

In October the examinations were discontinued, the work being suspended until such time as changes—whether in the type of planes, route or programme—are introduced.

Filariasis.—Accounts of the investigations carried out by the Department under this head were given in the report for 1937 (pp. C 41 and C 110). Examinations of blood films forwarded by the Medical Officer of Health in charge of the preliminary survey of the Island were continued, the results being as follows:—

Locality.	Films examined.	Films showing <i>microfilariae</i> .			
		<i>mf. bancrofti</i> .	<i>mf. malayi</i> .	Doubtful.	
Southern Province—					
Galle Municipality and vicinity..	1,956 ..	137 ..	4 ..	12	
Hambantota District (27 villages)	1,403 ..	1 ..	87 ..	—	
Total	3,359	138	91	12	

Entomological investigations in association with the experimental control measures undertaken in a group of villages (Ellegedara, Wellegedara, Pallegama, and Andiya-kotuwa) forming one of the highly endemic foci of Filariasis in the North-Western Province were continued during the year on the same lines as previously reported. The control measure in force is the removal of *Pistia stratiotes* from all tanks, ponds, channels and other water collections in the vicinity of the villages (protected zone), and in the surrounding country within a radius of one mile (outer control zone). The plant, which as a rule is intimately associated with the breeding habits of what are at present regarded as the chief mosquito carriers (*Mansonia* spp.) of the disease, is collected and destroyed whenever it reappears within the control zones. The interval between clearances averages about two months, except from June to September when conditions are hot and dry and apparently unfavourable to the propagation of the plant. The initial examination (in 1937) of the night blood of persons living in these villages gave a mean microfilaria index of 49·6; blood films taken in March and August, 1938, by the Field Medical Officer in charge of the area gave mean indices of 36·4 and 26·3 respectively. The latter findings, however, include examinations of films taken from new-comers to the villages—none of whom has yet shown infection.

The results of the entomological work in respect of the relative prevalence of *Mansonia* and other mosquitoes are summarized below :—

Mosquito Prevalence.

Experimental villages (*Pistia* control area) and Magulagama (No *Pistia* control).

Locality.	Total mosquito catch per hour.					Mansonia catch per hour.				
	Jan.-April.	May.	June.	July-Sept.	Oct.-Dec.	Jan.-April.	May.	June.	July-Sept.	Oct.-Dec.
Experimental area—										
(a) Inner Control Zone (Protected Zone)	.. 16.6—30.5 ..	21.3 ..	2.0 ..	6.3—13.5..	27.5—34.3 ..	0.8—2.8 ..	3.2 ..	0.5 ..	Nil—0.2 ..	Nil
(b) Outer Control Zone	.. 13.3—27.0 ..	30.0 ..	5.5 ..	2.0—10.1..	14.8—35.1 ..	0.6—1.4 ..	6.0 ..	1.2 ..	Nil—1.6 ..	Nil
Magulagama—										
(a) Village	.. 12.6—25.1 ..	38.2 ..	15.0 ..	6.3—14.2..	15.0—37.5 ..	0.9—3.7 ..	18.8 ..	11.5 ..	0.9—1.7 ..	Nil—0.5
(b) Outside village	.. 15.4—33.1 ..	23.4 ..	5.3 ..	5.5—11.3..	9.8—22.4 ..	0.6—2.2 ..	8.5 ..	3.0 ..	0.7—1.8 ..	Nil

The total catch amounted to 9,063 mosquitoes of which 4,552 were obtained from the control zones, and 4,511 from Magulagama. The most prevalent species were *Anopheles subpictus*, *A. fuliginosus*, *A. hyrcanus*, *A. jamesi*, *M. uniformis*, *C. tritaeniorhynchus*, *C. whitmorei*, *C. gelidus*, *Aedes pipersalatus* and *A. pallidostriatus*.

Infections with immature worms similar to larval forms of *Filaria* were found as follows :—

- (a) Protected Zone : Dissections 1,382. Infections 7. (*M. uniformis* 3, *Aedes pipersalatus* 2, *Culex tritaeniorhynchus* 1, *Anopheles hyrcanus* 1.)
- (b) Outer Control Zone : Dissections 688. Infections 4. (*M. uniformis* 1, *A. pipersalatus* 2, *A. hyrcanus* 1.)
- (c) Magulagama : Dissections 2,228. Infections 15. (*M. uniformis* 8, *A. pipersalatus* 3, *A. hyrcanus* 3, *C. bitaeniorhynchus* 1.)

These results bring the total number of mosquitoes found infected with filaria worms in this area to 46 (8,651 dissections). These infections occurred in nine different species of mosquitoes of which the more important were *M. uniformis* (25 infections), *A. pipersalatus* (8 infections), *A. hyrcanus* (5 infections), and *C. tritaeniorhynchus* (3 infections).

It will be observed from the table above that in each of the areas examined the prevalence of *Mansonia* was highest in May, but that in the Protected zone the catching rate (3·2) was much less than that (18·8) found in the village of Magulagama where no control is exercised. On the other hand there was comparatively little difference in the catching rates found in the Outer Control zone (6·0) and in the corresponding area (8·5) adjoining Magulagama. In June, the *Mansonia* catching rates decreased in all areas, but the reduction was relatively greater in the controlled than in the uncontrolled areas. A comparison with the results obtained in June, 1937, prior to the institution of control measures, is also of interest. The *Mansonia* rates in this month were : Protected zone 11·3, Outer Control zone 10·5, Magulagama village 11·8, Magulagama (outside) 20·0.

During the year evidence was obtained which indicated that *Mansonia* mosquitoes in Ceylon are not solely or even necessarily associated with *Pistia stratiotes* in their early stages. In the course of the investigations at the above villages, egg masses and larvae of these mosquitoes were occasionally found on other aquatic plants (*Hygrophiza aristata*, *Saccislepas interrupta*, and *Hymenachne amplexicaulis*) ; and at Watawala (altitude approximately 3,000 feet) where *Mansonia* adults are abundant at certain seasons, *Pistia* was not found, and the mosquitoes were breeding in association with partially submerged 'gahala' plants (*Colocasia antiquorum*).

Rat-Flea Surveys.—The identification of rat-fleas collected in the course of surveys conducted by Medical Officers of Health in various parts of Ceylon was continued. During the year 3,298 rat-fleas were sent to the laboratory for identification. These were all obtained from towns situated in the low-country of Ceylon.

Summaries of the results are given in the table below :—

Town.	Date of Survey (1938).	Number of Premises.	Number of Rats.	Number of Fleas.	Gross Flea Index.	<i>X. cheopis</i> Index.
Trincomalee	.. May	.. 118	.. 367	.. 644	.. 1·8	.. 0·06
Kurunegala	.. June-August	.. 35	.. 99	.. 326	.. 3·3	.. 0·81
Anuradhapura	.. June-August	.. 4	.. 13	.. 41	.. 3·2	.. 0·54
Jaffna Peninsula—						
Jaffna	.. } June-July	.. { 80	.. 377	.. 822	.. 2·2	.. Nil
Kankasanturai		.. { 8	.. 40	.. 137	.. 3·4	.. Nil
Point Pedro		.. { 13	.. 35	.. 164	.. 4·7	.. Nil
Kayts Island		.. { 23	.. 149	.. 369	.. 2·5	.. Nil
Galle	.. July-September	.. 21	.. 163	.. 795	.. 4·9	.. 0·88

Trincomalee.—*Xenopsylla cheopis*—the plague flea—formed 3·4 per cent. of the total flea catch, the rest being *X. astia*. The gross flea index and the *X. cheopis* index (1·8 and 0·06) were less than those (4·2 and 0·4) found by Hirst in 1930.

Kurunegala.—The results obtained from the sample examined were very similar to those found in 1936, when the gross flea index was 3.0 and the *X. cheopis* index 0.73. Prior to and during the plague epidemic in this town (1932), the *X. cheopis* index ranged from approximately 2.0 to 2.5.

Anuradhapura.—The sample of fleas submitted was too small to give reliable data.

Jaffna Peninsula.—With the exception of a single *Ctenocephalides felis* from Jaffna town, all the fleas in the samples received were *X. astia*. The only previous records from this district are those of Hirst (1931) who also found *X. astia* predominant, but identified single specimens of *X. cheopis* among the collections received from Kankasanturai and Kayts Island. The gross flea index (4.7) now obtained from rats from Point Pedro is considerably higher than that (2.4) recorded by Hirst.

Galle.—The results obtained from the survey carried out by the Municipality during the period September, 1936, to September, 1937, were given in last year's report. Although the mean flea indices (gross flea index 4.9 *X. cheopis* index 0.88) now obtained show very little difference from those found last year (5.1 and 0.9 respectively), the indices for some of the commercial areas showed considerable improvement.

MISCELLANEOUS.

Biting Midges.—In September a number of minute black midges were obtained from the foreshore at Hambantota. These midges were biting viciously during the morning and were attacking human beings and cattle. The act of biting was practically painless, but within a few hours intensely irritating localized popular eruptions arose at the site of the bite and lasted for several days. On examination at the laboratory the midges were identified as a species of *Acanthoconops*, Carter, closely allied to *A. albiventris*, Meig and *A. myersi*, Tonn. This is the first occasion on which a member of this group of the Ceratopogoninae has been recorded from Ceylon.

Bugs.—Observations on the bionomics of the large cone-nosed bug *Triatoma rubrofasciata* (Sinh. 'Lay-boiya' = blood-drinker) which was last year reported infesting dwellings of primitive construction in certain districts of the Southern Province, were made in the laboratory. Bugs were reared from eggs laid by females collected from infested houses; the larvae were isolated in tubes and were given frequent opportunities of feeding on both human and rabbit blood. Usually the bugs fed avidly and became engorged in from 8 minutes (younger stages) to 20 minutes. In human beings the reaction following the bite was often severe. Development was slow and from the egg to adult stage occupied from 10 to 13½ months. During this period the bugs fed on from 11 to 16 occasions, and it was noted that those which fed more frequently developed more rapidly. The life-history as observed in the laboratory was as follows:—

Eggs—incubation period	..	..	12 to 15 days
Larval stage	..	..	15 to 25 days
Nymphal stages—			
1st	..	..	30 days to 17½ weeks
2nd	..	..	13 days to 11 weeks
3rd	..	..	7 to 12 weeks
4th	..	..	6 to 11½ weeks
5th	..	..	8½ to 17 weeks

Actually the shortest period observed for complete development from egg to adult was 297 days, and the longest period 404 days, *i.e.*, approximately 10 and 13½ months respectively. The average length of life of the adults has not yet been ascertained, but individuals have lived in the laboratory from 24 days to over 60 days.

Beetles.—An additional case of the so-called "beetle disease" (Sinh. Kurumini Mandama) was recorded during the year. These collections (21 specimens) of beetles

obtained from freshly passed stools of three children living at Kottegoda (near Matara) were forwarded for identification by the Medical Officer of Health, Matara. The children were a boy and two girls, from 3 years to $4\frac{1}{2}$ years of age. Samples of the faeces were also examined, but no eggs or larvae of the beetles were observed. Some of the beetles subsequently oviposited in the laboratory.

All the specimens received were referable to the species *Onthophagus bifasciatus*, Fabr. (cf. report for 1936, p. C 109).

(9) PUBLICATIONS.

A. The following papers were published during the year :—

De Saram, G. S. W. : The toxicity of some methyl derivatives of benzene with special reference to pseudocumene and heavy coal tar naphtha, J. Path. and Bact. XLVI, (I). Acute haemorrhagic encephalitis associated with acute rheumatism, Ibid. XLVI (3) (with 3 others). The liver and atropine disposal, Ibid XLVI (3).

Fernando, P. B. : Treatment of Malaria—Antiseptic, Madras. October, 1938.

Nicholls, L. ; Nimalasuriya, A. and de Silva, R. : Preparation of fermented milk (curds). Ceylon J. Sc. Vol. V—Pt. I. Sec. D.

Paul, M. A. : An unusual accident—Medical Press and Circular, XCVI, 5170.

Hill, W. C. O. : Right duodenal hernia—Brit. J. Surgery XXV, 496.

B. The following publications by officers of the department appeared in the Journal of the Ceylon Branch of the British Medical Association for 1938 :—

Attygalle, N. : Bleeding in the early months of pregnancy.

Abhayaratne, O. E. R. : The care of childhood in Ceylon.

Coray, G. H. : Traumatic rupture of the spleen.

Caldera, R. : Bleeding in early pregnancy.

Chellappah, S. F. : (1) Public health aspects of ankylostomiasis. (2) Progress of public health in Ceylon.

Das Gupta, B. C. : Care of the child in Ceylon.

Dassanayake, W. L. P. : Early manifestations of filariasis.

De Saram, G. S. W. : Air raid precautions.

Fernando, P. B. : (1) Diseases of the coronary vessels and aorta. (2) Ankylostomiasis in Ceylon.

Fernando, C. F. : (1) Tropical typhus. (2) Rheumatic carditis.

Gunawardene, H. O. : (1) Benign and malignant hypertension. (2) Some aspects of cardiac and renal failure associated with hypertension and albuminuria.

Gunawardene, T. H. : Common diseases of children that influence mortality.

Jayasuriya, J. H. F. : (1) Tropical liver abscess. (2) Modern advances in the surgery of lung and pleura. (3) Splenic anaemia. (4) Cysts of the spleen reports of two cases.

Jayawardene, M. D. S. : Ante-natal and post-natal care in Ceylon.

Karunaratne, W. A. E. : Pathology of the amoebic abscess of the liver.

Leanage, D. J. T. : Congenital heart disease.

Nicholls, L. : The starting of a nutrition department in Ceylon.

Navaratnam, S. L. : Bleeding in early pregnancy.

Peiris, M. V. P. : Tropical abscess of the liver.

Ramanathan, S. : Intra abdominal hernia with strangulation.

Ratnayake, May : Bleeding in early pregnancy.

Rajasingham, A. S. : Penetrating wounds of the chest.

Sinnadurai, N. : Heart disease as a cause of sudden death.

Sivalingam, V. : (1) Malaria. (2) Some observations on the malaria epidemic.

Wijerama, E. M. : (1) Tropical abscess of the liver. (2) Notes on two cases of tropical typhus.

Wickremasinghe, W. G. : Care of childhood in Ceylon.

X.—MISCELLANEOUS.**(1) MEDICAL EDUCATION.**

The following relevant extracts are taken from the report of the Registrar, Ceylon Medical College, for the year 1938 :—

The steady progress made at the college during recent years consequent on the suggestions of Sir Richard Needham in 1932 was maintained during the year. A special feature of the improvements effected during the year was the re-organization of the teaching staff of the Anatomy, Physiology, and Pathology Departments.

Dr. P. K. Chanmugam who followed a two years' course of training under the late Prof. H. H. Woollard of University College, London, was appointed Lecturer in Anatomy.

Special lectures are now being given by the Professor on the anatomy of the living subject. The Junior and Senior Students now receive separate lectures in embryology. A class in practical neuro-anatomy is contemplated as soon as the new wing that has been constructed is complete for use.

Special apparatus and models have been purchased for illustrating the classes on the anatomy of the living subject (Ophthalmoscopes, laryngoscopes, specula, models showing cutaneous nerve areas and models of constitutional types).

Dr. M. L. Corera of the Staff of the Physiology Department who proceeded to the United Kingdom to follow a special course of study returned and resumed duties in March, 1938. Dr. S. F. Jayawardena, also of the same Department of the College, who had proceeded for further study returned in December, 1937, having obtained the B.Sc., Physiology, and followed a special course of study in Pharmacology. He was appointed to the post of Lecturer in Pharmacology *vice* Dr. J. S. de Silva, who retired. Dr. A. A. Hoover, B.Sc. (Hon.), Ph.D. (Lond.), was appointed to the newly created post of Lecturer in Bio-Chemistry.

Dr. G. S. W. de Saram, who followed a special course of study in Pathology in the United Kingdom, was appointed Pathologist, General Hospital, and Lecturer in Pathology.

Much progress has been made in the teaching of Bacteriology and Parasitology too since the laboratories were moved to the new building. The museum is being arranged on the principles adopted by the Wellcome Museum of Medical Science, and it is hoped to develop a small model museum of parasitology in accordance with modern developments, organization and technical methods based on the new system of visual teaching.

In the Forensic Medicine Department facilities are now available for the preservation of museum specimens. Various scientific instruments of intrinsic value in the investigation of crime have been added during the year.

Dr. F. O. B. Ellison, Professor of Physiology and Registrar, left the College in August, 1938, on retirement from the service. Pending the appointment of a successor to Prof. Ellison, Prof. W. C. O. Hill, was deputed to act as Registrar in addition to his own duties. Dr. Ellison's duties as Professor of Physiology were shared among the Assistants in the Physiology Department, under Prof. Hill's administrative control.

Research.—The Professor of Surgery has undertaken the investigation of buccal carcinoma or cancer of the cheek and mouth which is the commonest type of cancer in Ceylon. The problem of this disease is being investigated from two angles. Very detailed clinical records are kept of the cases that come for treatment, and a special form is used for recording in detail the habits of patients with regard to the chewing of betel. These records will in time furnish valuable statistical evidence as to the habit of betel chewing, being the cause of this type of cancer.

Dr. V. Kathirgamatamby went on nine months' leave to Europe in January, 1938, and Dr. A. S. Rajasingham, acted as Lecturer in Anatomy during his absence.

Dr. G. S. Sinnathamby, was on six months' leave from March, 1938, and during his absence Dr. B. E. Fernando, acted as Lecturer in Elementary Surgery to apothecary students and Dr. M. V. P. Peiris, took the Applied Anatomy classes.

Dr. G. Cooke was away in Europe for five months since August, 1938, and during his absence the classes in Systematic Medicine were taken by Dr. V. P. de Zoysa.

Detailed figures relating to the work in the college during the academic year 1937–38 are given below :—

Medical.

Number of students qualified for L.M.S.	..	17
Number of students admitted who have passed the Pre-medical	..	26
Total number of medical students on the rolls on October 1, 1937	..	132
Total number of medical students on the rolls on January, 1938	..	126
Total number of medical students on the rolls on May, 1938	..	121
Total number of medical students on the rolls on September, 1938	..	112

Results of Examinations—Medical.

	1937. December.		1938. March.		1938. June.		1938. July.		1938. September.		Total.	
	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.
Pre-medical	..	—	..	—	65	15	..	—	46	23	111	38
1st Professional, Part I.	..	—	31	18	..	—	..	—	19	13	50	31
1st Professional, Part II.	18	10	3	3	..	—	..	—	..	—	21	13
2nd Professional, Part I.	..	—	6	6	..	—	9	9	..	—	15	15
2nd Professional, Part II.	..	—	11	6	..	—	19	16	..	—	30	22
Final	6	3	9	5	..	—	15	9	..	—	30	17

Apothecaries.

Number on the rolls in October, 1937	..	67
Number on the rolls in May, 1938	..	55

Results of Examination.

	1937. December		1938. March.		1938. July.		Total.	
	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.
1st Apothecaries	..	—	15	14	21	12	36	26
2nd Apothecaries	8	7	7	3	21	7	36	17
Pharmacists	13	5	..	—	..	—	13	5

Results of Midwives' Examinations.

	1937. December.		1938. March.		1938. June.		1938. September.		Total.	
	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.	Sat.	Passed.
Class I.	1	1	..	—	..	—	..	—	1	1
Class II.	10	7	..	—	..	—	..	—	10	7
New rules	22	19	33	25	20	19	12	10	97	73

Revenue and Expenditure.

	Rs.	c.
Revenue for the financial year	..	61,070 30
Expenditure	..	232,900 14

(2) KING EDWARD VII. (MEMORIAL) ANTI-TUBERCULOSIS FUND.

The Anti-Tuberculosis Institute in Colombo, the Kandana Sanatorium and the Kankasanturai Sanatorium were built and equipped from the fund. A Children's ward at Kandana has been built from this fund and it is proposed to transfer any balance left to the King George V. Memorial Fund.

(3) CIVIL MEDICAL STORES.

The following are extracts from the report of the Superintendent, Civil Medical Stores :—

The expenditure under drugs, dressings, instruments, &c., is as follows :—

Drugs, dressings, &c. :—			1936-37. Rs.	1937-38. Rs.
Crown Agents	..	..	465,512	576,335
Local purchases	..	..	60,932	104,512
Do. Paying patients	..	..	22,714	25,260
			<hr/> 549,158	<hr/> 706,107
Quinine	..	..	451,761	430,930
Instruments	..	..	78,447	56,712
Opium	..	..	6,010	6,263
Stationery	..	..	9,642	15,963
Printed forms	..	..	41,717	44,883
Transport	..	..	1,595	1,855

The number of requisitions dealt with is as follows :—

			1936-37.	1937-38.
Civil, drugs, half-yearly	..	..	709	713
Civil, drugs, intermediate	..	..	3,220	3,594
Civil, quinine	..	..	2,693	2,647
Civil, sera	..	..	1,341	1,420
Civil, provisions	..	..	500	510
Civil, instruments	..	..	2,313	2,488
Civil, stationery and printed forms, half-yearly	..	..	1,119	1,112
Civil, stationery and printed forms, intermediate	..	..	2,863	3,541
Estates, drugs, half-yearly	..	..	1,277	1,312
Estates, drugs, intermediate	..	..	417	210
Estates, quinine	..	..	1,187	1,225
Estates, printed forms	..	..	1,322	1,783
Naval, drugs	..	..	54	42
Total			<hr/> 19,015	<hr/> 20,697

The issues of the principal quinine preparations were as follows :—

			1936-37.	1937-38.
Quinine sulphate and bisulph	..	lbs.	19,091	18,953
Quinine mixt. conc.	..	..	50,590	51,099
Quinine tablets grs. III. and V.	..	No.	5,545,525	5,369,625

- The cost of drugs issued to estates during the year 1937-38 was Rs. 273,898.
- Preparations manufactured during the period cost Rs. 37,247. If imported the cost would have been about Rs. 80,389.

(4) SALE OF OPIUM TO REGISTERED CONSUMERS AND AYURVEDIC PHYSICIANS.

The Moratuwa opium depôt, which had been housed in a private building, was closed in July, 1938, and opium sales were started at Panadura and Moratuwa hospitals. Of the 49 depôts now in existence, only one, viz., Maradana depôt, is now housed in a private building the rest being in Government hospitals and dispensaries.

The total number of registered consumers during 1938 was 1,832, and out of these 1,644 obtained eating opium and 188 smoking opium.

There were 3,547 registered ayurvedic physicians who obtained opium for medicinal purposes.

438 pounds of eating opium were sold to registered consumers and 224 pounds to ayurvedic physicians, which realized a total sum of Rs. 69,542.59, 75 pounds of smoking opium were sold to consumers realizing Rs. 10,457.

The total amount realized by the sale of both eating and smoking opium was Rs. 80,000.23.

(5) BUILDING REQUIREMENTS.

Of the major schemes of extensive additions, that of the second stage of the Nurses Training School is nearing completion. The second stage of extensions to the De Soysa Lying-in Home, Colombo, is also nearing completion. Work in connection with the three storey ward at the General Hospital has commenced. Plans have been prepared for the construction of a block of 6 operating theatres and work will be started in 1939. Site for the King George V. Memorial Tuberculosis Hospital at Welisara has been acquired and plans and estimates are in course of preparation. The site for the new hospital at Kalutara has also been acquired and work has just started. The new hospital at Hambantota is nearing completion. Four Cottage Hospitals were completed and opened, viz., Akkaraipattu, Murunkan, Muthur, and Kahatagasdigiliya and those at Divulapitiya, Pallegama, Ankumbura, Mawata-gama, Talawa, and Pungudutivu are making rapid progress.

Six villas to accommodate 12 paying patients were built at the Lunatic Asylum, Angoda, and are in use. Of the additions sanctioned for the rebuilding of Trincomalee Hospital, the two-storey ward of 34 beds was completed and work in connection with the administration block is in progress. Two permanent light construction wards were added to the Kandy Hospital in addition to the five temporary wards provided at that institution and the first block of new buildings commenced. Two additional wards were also built at Moratuwa. A new up-to-date outpatient department was attached to the Badulla Hospital. Building operations in connection with the Department of Pathology, Ceylon Medical College, have commenced.

Work on the Social Hygiene Clinic and Ward and the Tuberculosis Ward at the Jaffna Hospital have made considerable progress.

Of the five items of buildings, the cost of which is to be met from Loan Funds, no progress was made in respect of (a) The New Outpatient Department, General Hospital, Colombo, (b) The Mental Hospital, Colombo, and (c) the Home for Incurables since acquisition of land has not been completed. But the scheme for the acquisition of quarters for the General Hospital resident staff has made appreciable headway. The proposal to establish a Leper Asylum at Urugaha is yet in its preliminary stage.

(6) GENERAL REMARKS.

Malaria Control and Health Scheme.—The routine in regard to this has been well established and the department is in a position to deal immediately with any emergencies that may arise. The effectiveness of the organization was demonstrated in connection with the drought which commenced towards the end of the year resulting in pool formation in rivers and streams with consequent breeding of anopheles culicifacies in large numbers. The prompt handling of situations as they arose by the field organizations had no doubt the effect of preventing an epidemic of malaria. When field officers have gained more experience in dealing promptly with emergency conditions it is hoped that the seasonal increase in malaria would be effectively controlled. This seasonal increase assumes alarming proportions when adverse climatic conditions result in failure of crops with consequent distress. The lower resistance to disease which follows is the main cause of the heavy incidence of malaria and of increased death rate. A malaria control scheme alone is therefore inadequate to deal with the problem of epidemic malaria in rural areas. Schemes must be devised and carried out with the object of improving the economic condition of the people. Until this object is achieved the menace of epidemic malaria would continue and would need special measures to cope with it.

The introduction of a comprehensive Public Health Ordinance and a Pure Food and Drugs Act will be of great help towards the progress of public health in Ceylon.

Plague.—The situation in the past as regards plague in Ceylon was menacing but during this year there is a considerable decrease in the number of cases—the last case of human plague was on May 29, 1938. There is every reason to believe that the reduction is due to cyanide fumigation in Colombo port of all grain, cotton and other cargo likely to have infected rats or fleas from plague-infected ports. It is proposed to adopt similar regulations at other ports in Ceylon and steps have already been taken to introduce cyanide fumigation at Galle.

Leprosy Survey.—Two medical officers were trained in India in this work and have carried out a survey. At the end of the year nearly three-fourths of the Island has been surveyed and steps are being taken to introduce effective control measures. The main activities are segregation of open cases, searching out and treating early cases in non-infective stage and the follow-up of the discharged negative cases. It is hoped eventually to bring this disease under control by the application of modern methods of prevention and treatment. The lack of accommodation in the existing institutions for the segregation of open cases is a serious obstacle to the effective control of the disease. A site for the establishment of a Leper Asylum has been selected and investigations are being made with regard to its suitability. A sum of Rs. 330,000 has been appropriated under the Public Works Loan Ordinance (1937) for a Leper Hospital.

Ankylostomiasis Campaign.—The staff of the campaign has been reduced and the dispensers and apothecaries have been placed under the supervision of the Medical Officers of Health and Field Medical Officers of whom there are about eighty scattered throughout the Island. This supervision has increased their efficiency. So far, a total of 145 sanitary assistants and one public health nurse have qualified to assist at mass treatment for worm infestation. Investigations which have been carried out with regard to tetrachlorethylene have demonstrated the safety of the drug even in $1\frac{1}{2}$ drachm doses for adults.

Sanitary Engineering.—The work undertaken during the year 1937 by the Sanitary Engineer in regard to the prevention of breeding of mosquitoes in rivers and streams was continued. Two types of automatic syphon flushing devices were installed in various rivers and streams and observations are being made to ascertain the efficiency of the two types and the effects produced in the reduction of larvae. The work carried out on the Badulla-oya was completed and all further work has been stopped as the efficiency of the work is now under investigation with a view to introducing the same control work to other river sections.

School Health Work.—Good progress has been made with health work in schools, and many schools in remote parts of the Island received attention for the first time during the year. While it has not been possible to carry out the full scheme in every school taken up for health work each of the activities—sanitation, medical inspection, treatment of defects, control of communicable diseases and health education—has been increasingly carried out. There is satisfactory co-operation among the authorities concerned, viz., the parent, the teacher, the school manager, the Education Committee, the Education Department, and the Medical Department, in the welfare of the school child, with the result that in schools in which work has been introduced the work is getting consolidated and in the schools newly taken up for work satisfactory interest is being displayed.

Health Education.—This has made good headway. Every recognized method of education of the public is being made use of. Special attention is being paid to educating the school child in health matters through the establishment of health education procedure in schools, which is receiving every encouragement. During the year the publication of the Health News in Sinhalese was commenced. An All-Island Malaria Day was successfully held. A new film locally prepared on small town and rural sanitation has been released. What is chiefly needed in connection with the work is the services of an artist photographer attached to this division so that the necessary health material may be prepared.

Nutrition.—A department of Nutrition has been organized and work is being carried on at the Bacteriological Institute under the supervision of its Director who has been engaged in nutritional research for several years. Details of the work done during the year under review are given in section X (6).

From the interim reports submitted by the Sub-committee appointed to investigate into the diets and organization of hospital kitchens, it appears clear that the investigation would yield fruitful results.

Social Hygiene.—An Ordinance prohibiting the treatment of venereal diseases by unqualified practitioners and advertising of remedies for such ailments was enacted in the year under review but its provisions are to be enforced fully only in proclaimed

areas. Before an area could be proclaimed it is required that Government should provide all facilities for the adequate treatment of venereal diseases. In order to meet this requirement a scheme has been drawn up to provide a social hygiene clinic, fully equipped and staffed on modern lines, in every out-patient department attached to the larger hospitals in the Island. It is hoped to open several such clinics during the next year.

Practice of Dentistry.—A Dental Hospital and School for post-graduate instruction of medical practitioners was started early in 1938, with six students. The course is one of 2 years duration and is based on similar courses given in British Dental Schools. At the end of the course the successful students are entitled to the Licence in Dental Surgery of the Ceylon Medical College. The Medical Ordinance was amended by Ordinance No. 35 of 1938, giving power to the Medical College Council to grant this licence.

The need for a local school of dentistry was pointed out in my report for 1937, and it is hoped to train a sufficient number of dentists to man the department and also the ranks of the private practitioner. Until a sufficient number of qualified dentists is available it would not be possible to prohibit the unqualified Chinese dental mechanics from practising. These mechanics carry out the commoner operations of dental surgery employing crude and unscientific methods and using cheap and inferior material. In many cases such crude treatment is followed by serious complications and several instances of these could be quoted from the records of the Dental Institute. If this quack and unskilled practice is allowed to continue the incidence of oral cancer in this country is bound to increase in course of time.

In order to make qualified dental treatment available to the poor the department has drawn up a scheme to provide every large hospital in Ceylon with a Dental Clinic in charge of a qualified Dental Surgeon. All arrangements have been made to start four such clinics in outstations next year.

Nursing Staff.—A Sister Tutor with teaching experience has been recruited to organize the training of nurses and take charge of the Nurses' Training School which is under construction. A syllabus of instruction based on the course provided in English schools has been drawn up and it is hoped to start a 3 years' course of training for Nurses early in 1939. The scheme includes provision for a year's post-graduate training of a number of candidates selected from the nurses in the department with a view to appointing them to the grade of Ceylonese Sisters. Among the candidates recently recruited for training there are several with superior general educational qualifications and it is expected that some of them will duly qualify as Sisters thus obviating the necessity for recruitment from abroad.

Overcrowding in Hospitals.—My remarks under this head in the report for 1936 still hold good. An attempt was made to restrict admission to the General Hospital, Colombo, by the issuing of a notice, which is prominently displayed in all outstation hospitals and dispensaries, that patients from outstations should produce a letter from the local medical officer recommending admission to the General Hospital and that such patients require expert or special treatment that is not available at the local hospital. This rule has had very little effect.

The inmates of our hospitals may be classified into 5 groups :—

- (1) Those actually in need of in-door treatment.
- (2) Those fit for out-patient treatment but unable to maintain themselves as they are not fit to work.
- (3) Incurable cases of illness.
- (4) The aged and crippled.
- (5) The debilitated and ill-nourished unemployed.

On a rough estimate only about 60 per cent. of cases fall into the first category and hospital accommodation is required only for this group.

When economic conditions are adverse as at present the number of those falling to the last four groups increase. Most of the bigger hospitals are overcrowded to the extent of 50 per cent. and some even more. One grave result of the excess in overcrowding is that the staff cannot give adequate attention to the serious cases of acute illness for which a hospital is actually intended and thus the main object of establishing hospitals is defeated.

In these circumstances as refusal to admit cases unsuitable for hospital treatment is likely to cause hardship and suffering, it would, therefore, be advantageous for Government to give grants to social service organizations to run convalescent homes, maternity waiting rooms, home for the aged, the crippled, and the incurable, &c.

Instead of providing new hospitals and enlarging existing hospitals indefinitely with consequent increase of trained staff, equipment and annual maintenance charges, it would be far cheaper for Government to subsidize social service or other organizations to run the various institutions already mentioned. Private organizations could run their institutions much cheaper than Government could do and admissions to hospitals could be strictly confined to those in need of indoor treatment.

S. T. GUNASEKARA,

Director of Medical and Sanitary Services.

Colombo, May 27, 1939.

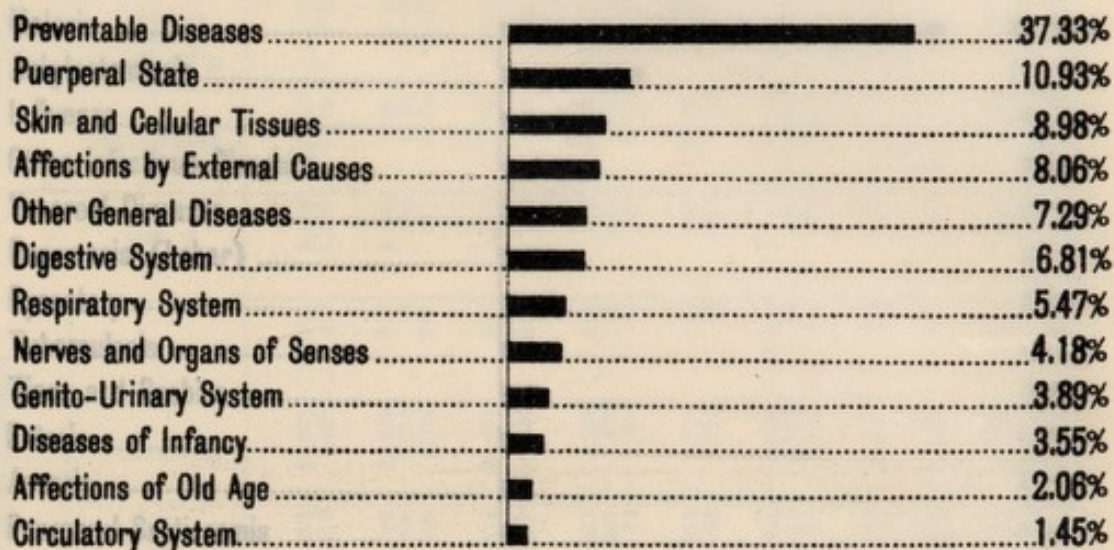
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President of the United States and Vice President of the United States

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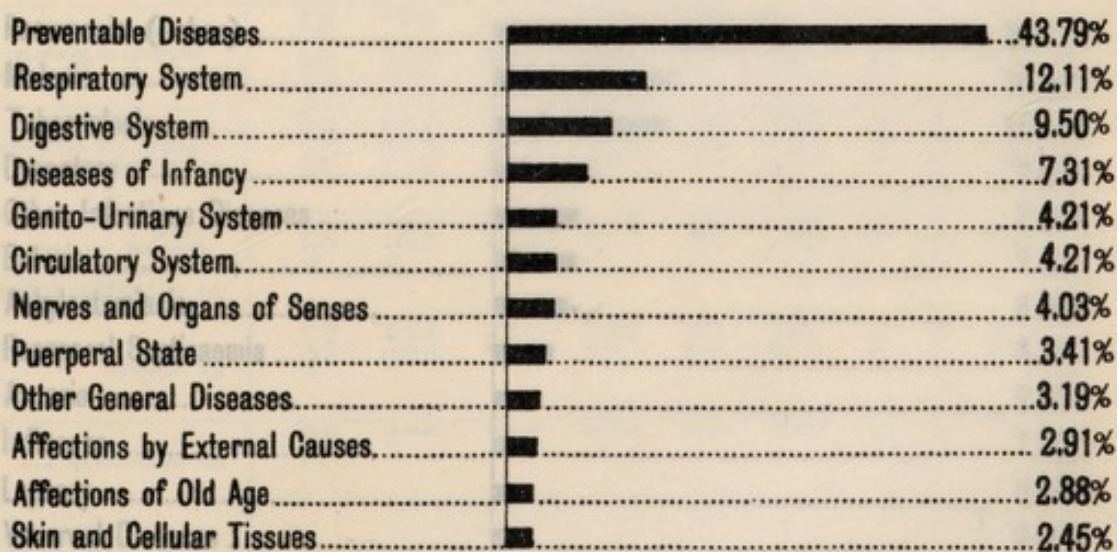
**A—Chart showing the General Systemic and Preventable Diseases
treated at the Government Hospitals during the year 1938 .**

Total Cases 359,844 .

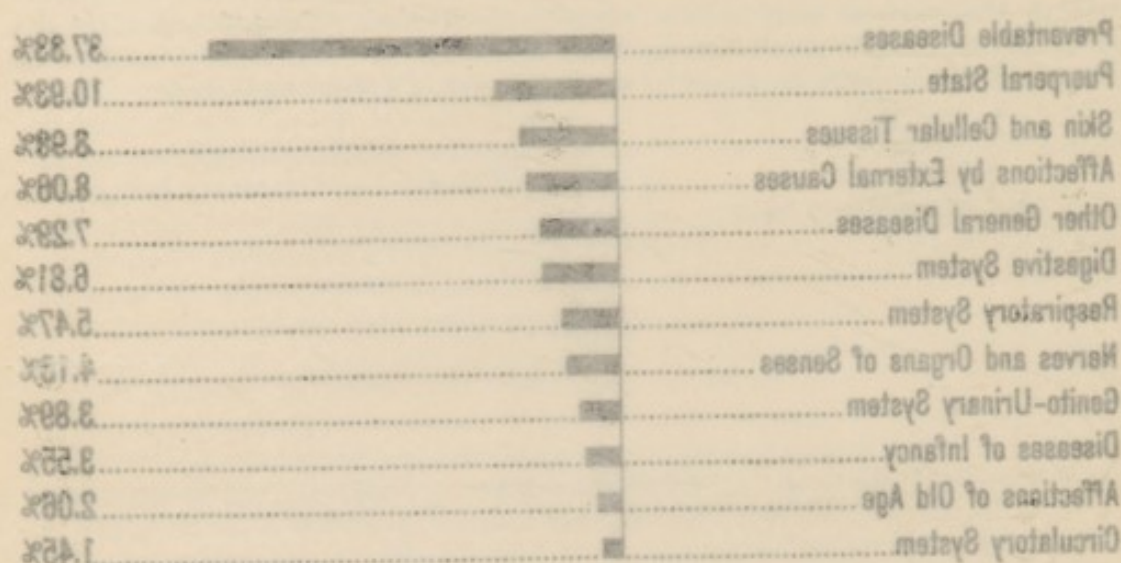


**B—Chart showing deaths from General Systemic and Preventable Diseases
treated at the Government Hospitals during the year 1938 .**

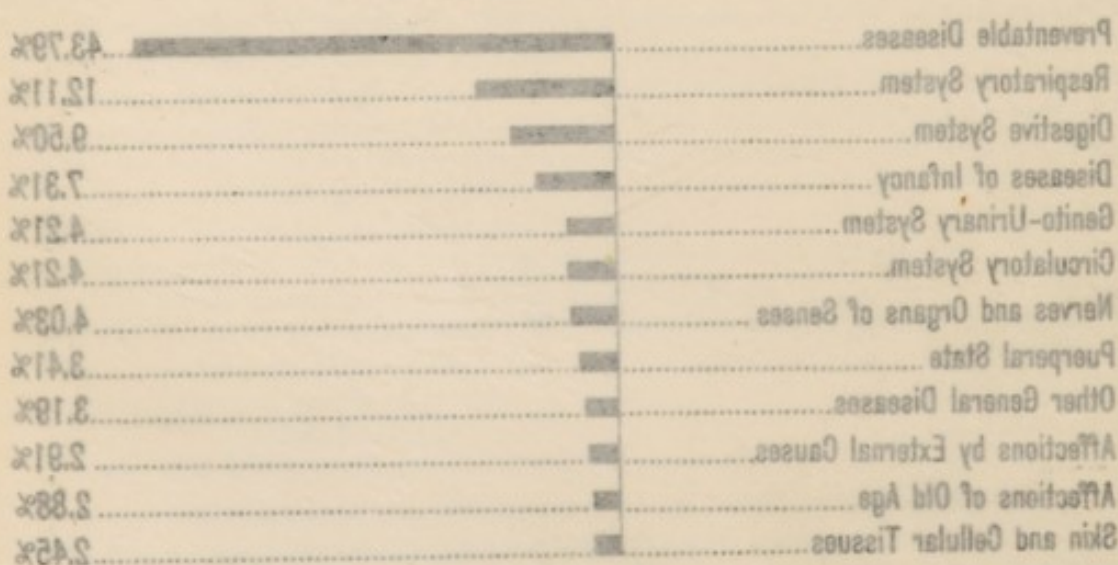
Total Deaths 20,167 .



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Total Cases 352,844.

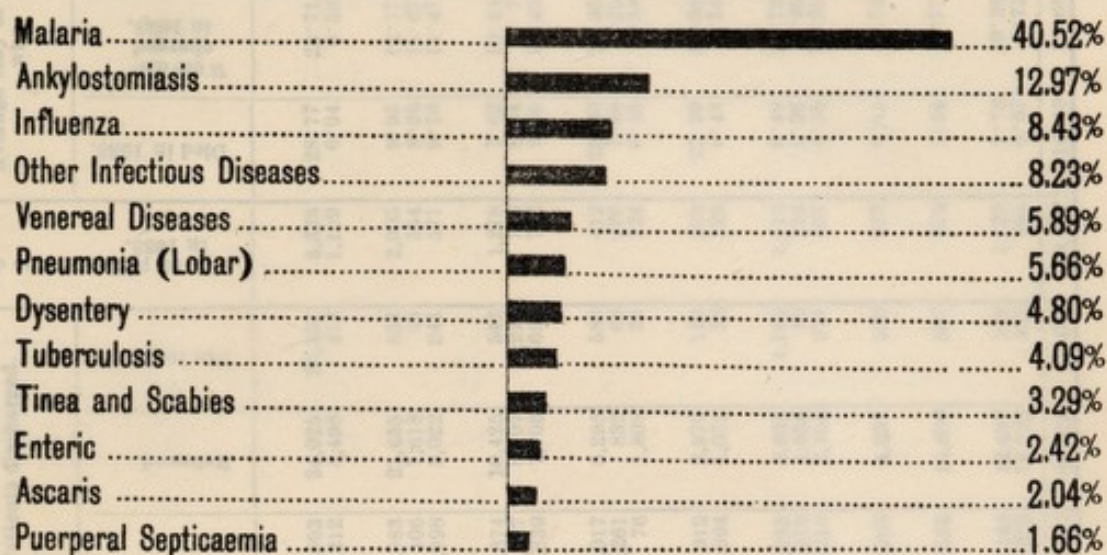


B—Chart showing deaths from General Systemic and Preventable Diseases treated at the Government Hospitals during the year 1938.
Total Deaths 20,167.



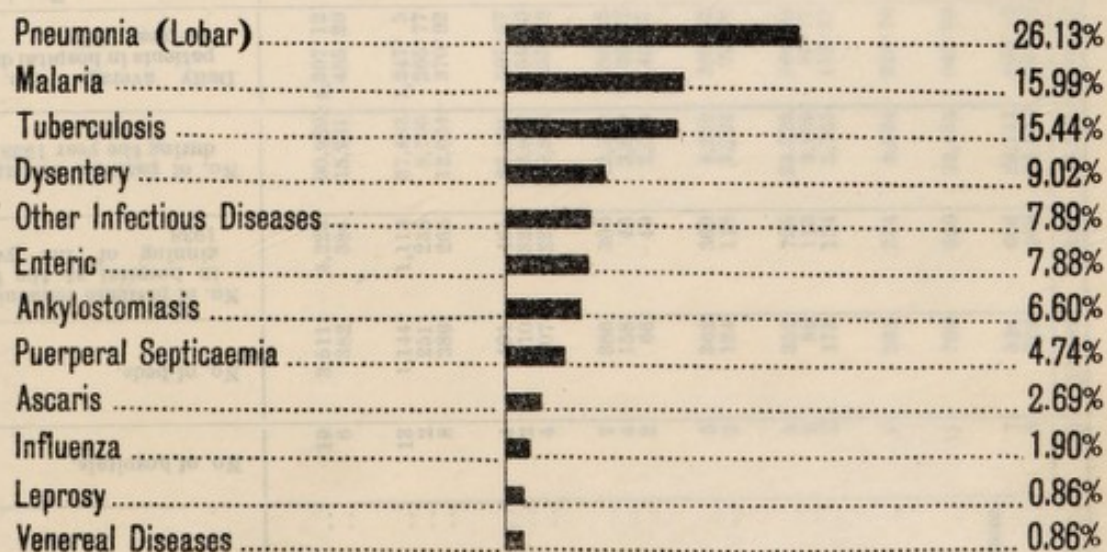
C—Chart showing Cases of Infectious Diseases treated at the Government Hospitals during the year 1938 .

Total Cases 134,315 .

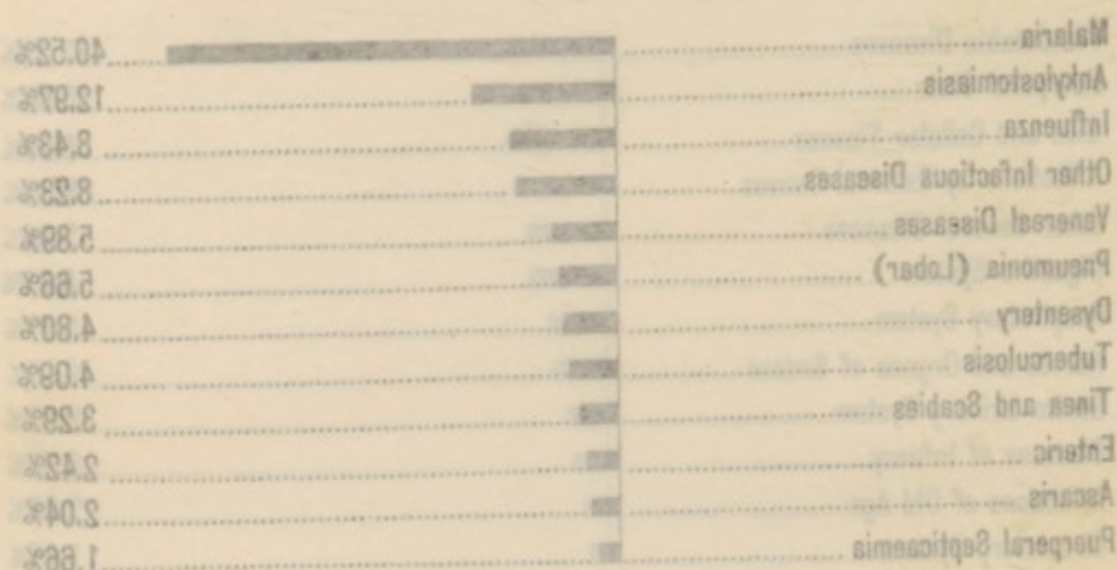


D—Chart showing deaths from Infectious Diseases at the Government Hospitals during the year 1938 .

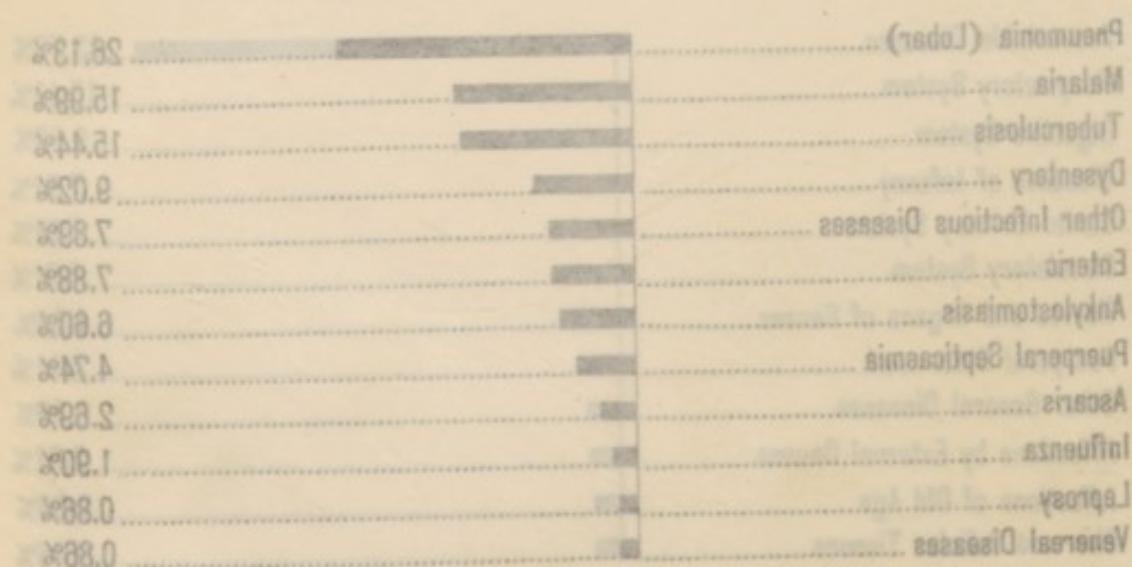
Total deaths 8,830 .



C-Chart showing Cases of Infectious Diseases treated at the Government Hospitals during the year 1938. Total Cases 134,315.



D-Chart showing deaths from Infectious Diseases at the Government Hospitals during the year 1938. Total deaths 8,830.



I.—Hospital Returns.

Province and District.	No. of hospitals.	No. of beds.	No. of patients remaining in hospital at the beginning of the year 1938.	No. of patients admitted during the year 1938.	Daily average No. of patients in hospital during the year 1938.	Attendants.					Patients discharged.			No. of patients who died in 1938.	Average stay of patients, who			Specify the longest period for which any inmate has stayed.
						Nurses doing no other work.		Servants partially or not at all employed as nurses.			Cured.	Relieved.	Not improved.		Died in 1938.	Were discharged in 1938.	Were remaining in 1938.	
						Day nurses.	Night nurses.	Not nurses.	Partial day nurses.	Partial night nurses.								
<i>Western Province.</i>																		
— Colombo	19	3,511	4,223	90,929	4,307.12	540	93	621	197	127	31,093	34,025	20,557	6,338	28.77	23.71	27.31	730
— Kalutara	6	382	384	18,251	485.29	10	1	40	8	1	8,212	8,498	414	1,109	6.94	9.52	11.21	286
<i>Central Province.</i>																		
— Kandy	13	1,144	1,118	37,483	1,247.5	74	17	72	36	20	13,083	21,655	852	2,005	9.95	12.77	13.37	258
— Matale	2	251	235	8,706	265.77	5	—	16	5	5	406	7,618	83	554	8.26	11.67	9.75	167
— Nuwara Eliya	8	389	265	12,064	370.92	11	2	37	—	2	6,098	5,022	241	571	9.16	11.47	12.67	1,358
<i>Southern Province.</i>																		
— Galle	4	491	465	23,191	597.37	31	6	108	—	1	10,874	10,425	542	1,278	7.62	10.24	8.12	112
— Matara	2	210	321	13,972	359.63	4	—	19	—	3	3,527	8,797	1,275	704	8.34	9.7	6.88	204
— Hambantota	4	207	221	9,366	255.82	3	—	22	—	—	7,839	7,703	632	742	9.36	10.49	10.12	119
<i>Northern Province.</i>																		
— Jaffna	7	386	300	12,371	359.95	13	2	47	7	1	6,017	5,295	583	412	23.20	17.35	20.61	365
— Mannar	4	158	46	3,362	93.37	2	—	27	—	—	2,261	832	68	176	7.69	8.25	8.74	343
— Mullaitivu	2	66	49	2,024	45.37	—	—	6	7	—	76	1,808	25	124	6.35	8.38	10.5	89
<i>Eastern Province.</i>																		
— Batticaloa	5	362	360	4,259	359.82	13	3	22	—	1	912	2,979	150	239	27.29	40.68	63.85	6,245
— Trincomalee	2	124	118	3,226	93.76	5	—	16	—	—	1,994	1,071	28	123	6.48	8.54	10.32	93
<i>North-Western Province.</i>																		
— Kurunegala	5	352	725	23,523	768.29	3	—	29	—	—	12,083	8,693	1,130	1,613	6.49	12.78	8.17	397
— Puttalam	2	82	113	3,109	88.77	7	—	9	—	—	1,219	1,538	89	222	6.96	9.93	9.12	98
— Chilaw	2	175	134	5,765	173.57	—	—	3	14	1	2,310	2,704	214	501	8.58	11.20	10.84	94
<i>North-Central Province.</i>																		
— Anuradhapura	4	231	234	8,524	226.70	4	1	37	—	2	3,305	4,237	520	473	6.41	8.75	11.0	144
<i>Province of Uva.</i>																		
— Badulla	11	709	659	22,435	640.66	13	9	40	22	8	10,559	10,606	397	879	7.54	8.77	8.28	319
<i>Province of Sabaragamuwa.</i>																		
— Ratnapura	7	524	604	22,741	608.9	16	1	49	12	8	8,446	12,687	302	1,123	7.72	10.36	9.40	2.3
— Kegalla	6	528	568	23,303	643.15	11	—	25	32	7	9,079	12,735	331	981	6.67	9.75	11.24	488
Total	115	10,282	11,242	348,604	11,990.47	765	135	1,245	340	187	139,393	168,928	28,433	20,167	10.49	12.68	14.8	6,245

II.—Cases treated according to Diseases.

Diseases.	Remaining in Hospital at end of 1937.	Admissions in 1938.	Deaths in 1938.	Total Cases treated in 1938.	Remaining in Hospital at end of 1938.
I.—EPIDEMIC, ENDEMIC, AND INFECTIOUS DISEASES.					
Enteric Group—					
(a) Typhoid Fever ..	101	2,621	623	2,722	159
(b) Paratyphoid A ..	7	18	5	25	—
(c) Paratyphoid B ..	4	1	1	5	—
(d) Type not defined	25	470	67	495	52
Typhus ..	—	7	—	7	—
Relapsing Fever ..	3	25	4	28	—
Undulant Fever ..	13	177	28	190	10
Malaria—					
(a) Tertian ..	1,166	46,076	718	47,242	939
(b) Quartan ..	13	989	8	1,002	13
(c) Aestivo-autumnal	14	721	32	735	29
(d) Cerebral Malaria	17	564	357	581	5
(e) Cachexia ..	98	4,740	289	4,838	120
(f) Blackwater ..	—	15	8	15	—
Smallpox ..	—	—	—	—	—
Measles ..	26	811	4	837	13
Whooping Cough ..	4	332	9	336	4
Diphtheria ..	5	105	21	110	4
Influenza ..	173	11,153	148	11,326	194
Mumps ..	52	896	—	948	8
Cholera ..	—	—	—	—	—
Dysentery—					
(a) Amoebic ..	90	2,871	357	2,961	80
(b) Bacillary ..	57	1,846	246	1,903	34
(c) Undefined or due to other causes	56	1,532	193	1,588	36
Plague—					
(a) Bubonic ..	1	7	7	8	—
(b) Pneumonic ..	—	—	—	—	—
(c) Septicæmic ..	—	3	3	3	—
(d) Undefined ..	—	—	—	—	—
Leprosy ..	1,007	322	76	1,329	1,011
Erysipelas ..	10	325	41	335	6
Acute Poliomyelitis ..	4	12	1	16	—
Encephalitis Lethargica	2	10	—	12	—
Epidemic Cerebro-spinal Fever	—	8	4	8	—
Other Epidemic Diseases—					
(a) Rubella (German Measles)	—	10	—	10	—
(b) Varicella (Chickenpox)	70	2,016	1	2,086	143
(c) Kala-azar ..	—	—	—	—	—
(d) Dengue ..	—	47	—	47	1
(e) Yaws ..	29	765	3	794	41
Rabies ..	—	14	11	14	2
Tetanus ..	15	461	208	476	15
Tuberculosis, Pulmonary and Laryngeal	603	4,896	1,363	5,499	703
Tuberculosis of the Meninges or Central Nervous System ..	12	17	13	29	—
Tuberculosis of the Intestines or Peritoneum ..	13	92	18	105	8
Tuberculosis of the Vertebral Column ..	1	62	9	63	3
Tuberculosis of Bones and Joints ..	7	41	5	48	6
Tuberculosis of other organs—					
(a) Skin or Subcutaneous Tissue (Lupus) ..	—	42	3	42	3
(b) Bones ..	8	7	—	15	2
(c) Lymphatic System ..	12	212	20	224	13
(d) Genito-urinary ..	—	11	—	11	1
(e) Other organs ..	1	33	2	34	—

II.—Cases treated according to Diseases—*contd.*

Diseases.	Remaining in Hospital at end of 1937.	Admissions in 1938.	Deaths in 1938.	Total Cases treated in 1938.	Remaining in Hospital at end of 1938.
I.—EPIDEMIC, ENDEMIC, AND INFECTIOUS DISEASES—<i>contd.</i>					
Tuberculosis disseminated—					
(a) Acute	14 ..	8 ..	4 ..	22 ..	—
(b) Chronic	19 ..	39 ..	8 ..	58 ..	—
Syphilis—					
(a) Primary	35 ..	1,159 ..	8 ..	1,194 ..	29
(b) Secondary	26 ..	577 ..	7 ..	603 ..	28
(c) Tertiary	12 ..	191 ..	4 ..	203 ..	7
(d) Hereditary	3 ..	78 ..	32 ..	81 ..	2
(e) Period not indicated	10 ..	436 ..	4 ..	446 ..	19
Soft Chancre	12 ..	238 ..	— ..	250 ..	5
A.—Gonorrhoea and its complications	90 ..	3,955 ..	12 ..	4,045 ..	128
B.—Gonorrhoeal Ophthalmia	— ..	15 ..	— ..	15 ..	2
C.—Gonorrhoeal Arthritis	44 ..	951 ..	8 ..	995 ..	54
D.—Granuloma Venereum	— ..	9 ..	1 ..	9 ..	1
Septicaemia	— ..	139 ..	81 ..	139 ..	1
Filarial Diseases	2 ..	105 ..	1 ..	107 ..	5
Acute Rheumatic Fever	7 ..	236 ..	10 ..	243 ..	7
Other Infectious Diseases	4 ..	85 ..	22 ..	89 ..	2
Other Diseases	1 ..	18 ..	— ..	19 ..	3
II.—GENERAL DISEASES NOT MENTIONED ABOVE.					
Cancer or other malignant Tumours of the Buccal Cavity	9 ..	561 ..	52 ..	570 ..	30
Cancer or other malignant Tumours of the Stomach or Liver	8 ..	65 ..	26 ..	73 ..	2
Cancer or other malignant Tumours of the Peritoneum, Intestines, Rectum	8 ..	70 ..	20 ..	78 ..	2
Cancer or other malignant Tumours of the Female Genital Organs	9 ..	346 ..	33 ..	355 ..	22
Cancer or other malignant Tumours of the Breast	2 ..	73 ..	7 ..	75 ..	2
Cancer or other malignant Tumours of the Skin	— ..	63 ..	4 ..	63 ..	2
Cancer or other malignant Tumours of Organs not specified	7 ..	223 ..	37 ..	230 ..	10
Tumours non-malignant	20 ..	834 ..	16 ..	854 ..	36
Chronic Rheumatism	125 ..	5,279 ..	9 ..	5,404 ..	137
Scurvy (including Barlow's Disease)	— ..	52 ..	9 ..	52 ..	—
Pellagra	— ..	1 ..	— ..	1 ..	—
Rickets	7 ..	301 ..	77 ..	308 ..	12
Diabetes (not including Insipidus)	30 ..	891 ..	97 ..	921 ..	52
Beri-Beri	— ..	11 ..	1 ..	11 ..	—
Anaemia—					
(a) Pernicious	10 ..	400 ..	29 ..	410 ..	11
(b) Other Anaemias and Chlorosis	38 ..	1,580 ..	63 ..	1,618 ..	50
Diseases of the Pituitary Body	1 ..	8 ..	— ..	9 ..	2
Diseases of the Thyroid Gland—					
(a) Exophthalmic Goitre	2 ..	37 ..	3 ..	39 ..	2
(b) Other diseases of the Thyroid Gland, Myxoedema	3 ..	76 ..	3 ..	79 ..	1
Diseases of the Para-Thyroid Glands	2 ..	6 ..	1 ..	8 ..	—
Diseases of the Thymus	— ..	95 ..	1 ..	95 ..	—
Diseases of the Supra-Renal Glands	1 ..	8 ..	1 ..	9 ..	—
Diseases of the Spleen	5 ..	57 ..	3 ..	62 ..	1

II.—Cases treated according to Diseases—*contd.*

Diseases.	Remaining in Hospital at end of 1937.	Admissions in 1938.	Deaths in 1938.	Total Cases treated in 1938.	Remaining in Hospital at end of 1938.
II.—GENERAL DISEASES NOT MENTIONED ABOVE— <i>contd.</i>					
Leukaemia—					
(a) Leukaemia ..	2	15	5	17	—
(b) Hodgkin's Disease ..	8	7	2	15	—
Alcoholism ..	2	49	1	51	1
Corrosive Acids ..	—	68	15	68	1
Metallic Poisons ..	—	16	—	16	—
Vegetable Alkaloids ..	—	28	3	28	—
Ptomaine Poisoning ..	9	37	5	46	1
Other Acute Poisonings ..	—	124	7	124	1
Other General Diseases—					
Auto-intoxication ..	—	556	14	556	9
Purpura Haemorrhagica ..	7	6	3	13	—
Haemophilia ..	4	5	1	9	—
Diabetes Insipidus ..	1	38	—	39	5
Undefined ..	16	652	6	668	8
III.—AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES.					
Encephalitis (not including Encephalitis Lethargica) ..	5	21	11	26	2
Meningitis (not including Tuberculous Meningitis or Cerebro-spinal Menin- gitis) ..	9	178	135	187	2
Locomotor Ataxia ..	2	56	5	58	—
Other affections of the Spinal Cord ..	1	143	20	144	5
Apoplexy—					
(a) Haemorrhage ..	14	173	119	187	4
(b) Embolism ..	5	34	18	39	1
(c) Thrombosis ..	13	252	63	265	10
Paralysis—					
(a) Hemiplegia ..	24	558	88	582	44
(b) Other Paralysis..	23	270	24	293	12
General Paralysis of the Insane ..	—	16	2	16	1
Other forms of Mental Alienation ..	3	176	22	179	6
Epilepsy ..	14	463	34	477	21
Eclampsia, Convulsions (non-puerperal)					
5 years or over ..	5	50	14	55	—
Infantile Convulsions ..	6	525	166	531	8
Chorea ..	—	28	—	28	1
A.—Hysteria ..	14	466	—	480	6
B.—Neuritis ..	28	632	5	660	20
C.—Neurasthenia ..	10	295	3	305	3
Cerebral Softening ..	2	121	43	123	4
Other affections of the Nervous System, such as Paralysis Agitans ..	13	380	8	393	17
Affections of the Organs of Vision—					
(a) Diseases of the Eye ..	131	2,654	1	2,785	151
(b) Conjunctivitis ..	18	1,171	1	1,189	24
(c) Trachoma ..	3	55	—	58	—
(d) Tumours of the Eye ..	2	50	—	52	—
(e) Other affections of the Eye ..	275	4,545	13	4,820	302
Affections of the Ear or Mastoid Sinus	19	1,014	12	1,033	26

II.—Cases treated according to Diseases—*contd.*

Diseases.	Remaining in Hospital at end of 1937.	Admissions in 1938.	Deaths in 1938.	Total Cases treated in 1938.	Remaining in Hospital at end of 1938.
IV.—AFFECTIONS OF THE CIRCULATORY SYSTEM.					
Pericarditis ..	9 ..	123 ..	26 ..	132 ..	4
Acute Endocarditis or Myocarditis ..	17 ..	273 ..	63 ..	290 ..	11
Angina Pectoris ..	6 ..	101 ..	5 ..	107 ..	—
Other Diseases of the Heart ..	— ..	— ..	— ..	— ..	—
(a) Valvular—Mitral ..	30 ..	794 ..	215 ..	824 ..	29
Aortic ..	12 ..	175 ..	38 ..	187 ..	8
Tricuspid ..	— ..	25 ..	11 ..	25 ..	1
Pulmonary ..	1 ..	40 ..	11 ..	41 ..	1
(b) Myocarditis ..	25 ..	1,018 ..	296 ..	1,043 ..	42
Diseases of the Arteries—					
(a) Aneurism ..	1 ..	22 ..	3 ..	23 ..	2
(b) Arterio-Sclerosis ..	11 ..	74 ..	1 ..	85 ..	3
(c) Other diseases ..	10 ..	53 ..	5 ..	63 ..	—
Embolism or Thrombosis (non-cerebral)	3 ..	147 ..	21 ..	150 ..	7
Diseases of the Veins—					
Haemorrhoids ..	32 ..	888 ..	8 ..	920 ..	25
Varicose Veins ..	6 ..	93 ..	— ..	99 ..	1
Phlebitis ..	7 ..	127 ..	6 ..	134 ..	4
Diseases of the Lymphatic System—					
Lymphangitis ..	14 ..	195 ..	8 ..	209 ..	4
Lymphadenitis, Bubo (non-specific)	20 ..	339 ..	2 ..	359 ..	13
Other ..	— ..	— ..	— ..	— ..	—
Haemorrhage of undetermined cause ..	12 ..	31 ..	9 ..	43 ..	2
Other affections of the Circulatory System ..	13 ..	459 ..	112 ..	472 ..	5
V.—AFFECTIONS OF THE RESPIRATORY SYSTEM.					
Diseases of the Nasal Passages—					
Adenoids ..	15 ..	182 ..	13 ..	197 ..	2
Polypus ..	6 ..	66 ..	— ..	72 ..	1
Rhinitis ..	13 ..	103 ..	— ..	116 ..	1
Coryza ..	— ..	74 ..	3 ..	74 ..	1
Affections of the Larynx—Laryngitis ..	9 ..	205 ..	10 ..	214 ..	1
Bronchitis—(a) Acute ..	78 ..	4,450 ..	124 ..	4,528 ..	93
(b) Chronic ..	108 ..	4,123 ..	238 ..	4,231 ..	137
Broncho-Pneumonia ..	109 ..	3,707 ..	1,161 ..	3,816 ..	64
Pneumonia—(a) Lobar ..	159 ..	7,362 ..	2,307 ..	7,521 ..	179
(b) Unclassified ..	51 ..	2,044 ..	681 ..	2,095 ..	67
Pleurisy, Empyema ..	32 ..	972 ..	103 ..	1,004 ..	39
Congestion of the Lungs ..	4 ..	17 ..	8 ..	21 ..	—
Gangrene of the Lungs ..	4 ..	180 ..	22 ..	184 ..	2
Asthma ..	46 ..	2,930 ..	42 ..	2,976 ..	65
Pulmonary Emphysema ..	6 ..	30 ..	2 ..	36 ..	—
Pneumothorax ..	1 ..	35 ..	8 ..	36 ..	6
Other affections of the Lungs—Pulmonary Spirochaetosis ..	2 ..	144 ..	28 ..	146 ..	8
VI.—DISEASES OF THE DIGESTIVE SYSTEM.					
A.—Diseases of Teeth or Gums—					
Caries, Pyorrhoea, &c. ..	18 ..	998 ..	3 ..	1,016 ..	13
B.—Other affections of the Mouth—					
Stomatitis ..	6 ..	401 ..	9 ..	407 ..	10
Glossitis, &c. ..	— ..	51 ..	1 ..	51 ..	1

II.—Cases treated according to Diseases—*contd.*

Diseases.	Remaining in Hospital at end of 1937.	Admissions in 1938.	Deaths in 1938.	Total Cases treated in 1938.	Remaining in Hospital at end of 1938.
VI.—DISEASES OF THE DIGESTIVE SYSTEM— <i>contd.</i>					
Affections of the Pharynx or Tonsils—					
Tonsillitis	20	966	17	986	15
Pharyngitis	10	309	42	319	5
Affections of the Oesophagus	2	57	5	59	1
A.—Ulcer of the Stomach	4	326	11	330	3
B.—Ulcer of the Duodenum	14	28	1	42	12
Other affections of the Stomach					
Gastritis	5	221	—	226	3
Dyspepsia, &c.	27	1,431	24	1,458	25
.. ..	30	1,386	4	1,416	26
Diarrhoea and Enteritis—					
Under two years	63	1,592	288	1,655	25
Diarrhoea and Enteritis—					
Two years and over	139	4,976	620	5,115	70
Colitis	77	3,837	486	3,914	111
Ulceration	—	89	5	89	—
Sprue	—	157	2	157	3
Ankylostomiasis	457	16,959	583	17,416	480
Diseases due to Intestinal Parasites—					
(a) Cestoda (Taenia)	2	89	5	91	2
(b) Trematoda (Flukes)	—	90	34	90	4
(c) Nematoda (other than Anky- lostoma)	—	—	—	—	—
Ascaris	42	2,860	240	2,902	48
Trichocephalus Dispar	—	1	—	1	—
Trichina	—	6	—	6	—
Dracunculus	—	—	—	—	—
Oxyuris	1	1	—	2	—
(d) Coccidia	—	10	—	10	5
(e) Other parasites	—	73	—	73	3
(f) Unclassified	—	61	3	61	37
Appendicitis	19	1,039	62	1,058	17
Hernia	13	918	40	931	23
A.—Affections of the Anus Fistula, &c.	20	682	16	702	—
B.—Other affections of the Intestines	—	—	—	—	—
Enteroptosis	1	140	26	141	2
Constipation	16	1,101	10	1,117	15
Acute Yellow Atrophy of the Liver	—	7	2	7	—
Hydatid of the Liver	1	16	9	17	—
Cirrhosis of the Liver—					
(a) Alcoholic	11	190	60	201	3
(b) Other forms	17	252	50	269	12
Biliary Calculus	5	74	3	79	—
Other affections of the Liver—					
Abscess	10	357	38	367	14
Hepatitis	9	621	21	630	29
Cholecystitis	13	188	14	201	5
Jaundice	6	374	16	380	8
Diseases of the Pancreas	2	12	5	14	—
Peritonitis (of unknown origin)	5	232	84	237	5
Other affections of the Digestive System	33	2,166	88	2,199	45

II.—Cases treated according to Diseases—*contd.*

Diseases.	Remaining in Hospital at end of 1937.	Admissions in 1938.	Deaths in 1938.	Total Cases treated in 1938.	Remaining in Hospital at end of 1938.
VII.—DISEASES OF THE GENITO- URINARY SYSTEM (non-venereal).					
Acute Nephritis	87	1,689	245	1,776	54
Chronic Nephritis	54	1,846	410	1,900	68
A.—Chyluria	—	47	1	47	3
B.—Schistosomiasis	—	10	—	10	—
Other affections of the Kidneys, Pyelitis, &c.	36	1,541	81	1,577	40
Urinary Calculus	9	843	10	852	12
Diseases of the Bladder-Cystitis	17	876	38	893	27
Diseases of the Urethra—					
(a) Stricture	22	453	6	475	8
(b) Other	14	831	9	845	26
Diseases of the Prostate—					
Hypertrophy	6	87	7	93	13
Prostatitis	3	134	1	137	—
Diseases (non-venereal) of the Genital Organs of Man—					
Epididymitis	18	277	2	295	8
Orchitis	15	410	1	425	7
Hydrocele	14	463	1	477	13
Ulcer of Penis	20	310	—	330	13
Other	—	—	—	—	—
Cysts or other non-malignant Tumours of the Ovaries					
Salpingitis	7	216	7	223	11
Abscess of the Pelvis	10	433	9	443	9
Uterine Tumours (non-malignant)	10	84	2	94	3
Uterine Haemorrhage (non-puerperal)	4	282	2	286	7
A.—Metritis	3	201	2	204	5
B.—Other affections of the Female Genital Organs					
Displacement of Uterus	33	864	4	897	31
Amenorrhoea	5	363	—	368	20
Dysmenorrhoea	2	319	—	321	21
Leucorrhoea	15	452	—	467	3
Other undefined	—	—	—	—	—
Diseases of the Breast (non-puerperal)—					
Mastitis	5	90	—	95	4
Abscess of Breast	8	270	1	278	10
VIII.—PUERPERAL STATE.					
A.—Normal Labour	721	27,406	172	28,127	926
B.—Accidents of Pregnancy—					
(a) Abortion	37	1,732	24	1,769	17
(b) Ectopic Gestation	1	171	14	172	15
(c) Other accidents of Pregnancy	86	3,142	154	3,228	135
Puerperal Haemorrhage	11	88	39	99	1
Other accidents of Parturition	9	489	103	498	12
Puerperal Septicaemia	70	2,162	399	2,232	56
Phlegmasia Dolens	—	51	5	51	3
Puerperal Eclampsia	10	492	101	502	16
Sequelae of Labour	25	1,039	55	1,064	34
Puerperal affections of the Breast	8	128	—	136	12
Pregnancy (ante-natal)	81	3,783	20	3,864	171

II.—Cases treated according to Diseases—*contd.*

Diseases.	Remaining in Hospital at end of 1937.	Admissions in 1938.	Deaths in 1938.	Total Cases treated in 1938.	Remaining in Hospital at end of 1938.
IX.—AFFECTIONS OF THE SKIN AND CELLULAR TISSUES.					
Gangrene	22	428	87	450	22
Boil	—	—	—	—	—
Carbuncle	21	460	14	481	17
Abscess	10	772	10	782	57
Whitlow	108	4,176	51	4,284	152
Cellulitis	299	5,643	263	5,942	316
A.—Tinea	1	115	—	116	—
B.—Scabies	113	4,194	3	4,307	149
Ulcer	274	7,741	21	8,015	334

Other Diseases of the Skin—

Erythema	23	306	—	329	11
Urticaria	10	305	2	315	9
Eczema	70	3,975	21	4,045	113
Herpes	—	147	—	147	2
Psoriasis	16	256	2	272	12
Elephantiasis	7	106	1	113	3
Myiasis	1	23	—	24	1
Chigoes	14	621	3	635	23
Cutaneous Leishmaniasis	237	6,341	17	6,578	259
Other undefined	—	—	—	—	—

X.—DISEASES OF BONES AND ORGANS
OF LOCOMOTION (OTHER THAN
TUBERCULOUS).

Diseases of Bones—Osteitis	21	393	12	414	23
Diseases of Joints—Arthritis	50	1,199	16	1,249	32
Synovitis	15	162	—	177	2
Other Diseases of Bones or Organs of Locomotion	1	130	2	131	6

XI.—MALFORMATIONS.

Malformations—Hydrocephalus	—	8	2	8	—
Hypospadias	—	47	1	47	—
Spina Bifida, &c.	1	7	—	8	—

XII.—DISEASES OF INFANCY.

Congenital Debility	206	9,735	870	9,941	130
Premature Birth	6	512	240	518	3
Other affections of Infancy	22	1,605	151	1,627	26
Infant neglect (infants of three months or over)	27	788	82	815	6

XIII.—AFFECTIONS OF OLD AGE.

Senility—Senile Dementia	172	6,995	540	7,167	237
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XIV.—AFFECTIONS PRODUCED BY
EXTERNAL CAUSES.

Suicide by Poisoning	—	22	9	22	—
Corrosive Poisoning (intentional)	—	33	11	33	1
Suicide by gas poisoning	—	1	—	1	—
Suicide by hanging or strangulation	—	1	1	1	—
Suicide by drowning	—	3	—	3	—
Suicide by firearms	—	—	—	—	—
Suicide by cutting or stabbing instru- ments	—	5	2	5	—
Suicide by jumping from a height	—	—	—	—	—
Suicide by crushing	—	—	—	—	—
Other Suicides	—	—	—	—	—
Food Poisoning—Botulism	—	20	1	20	—

II.—Cases treated according to Diseases—*contd.*

Diseases.	Remaining in Hospital at end of 1937.	Admissions in 1938.	Deaths in 1938.	Total Cases treated in 1938.	Remaining in Hospital at end of 1938.
XIV.—AFFECTIONS PRODUCED BY EXTERNAL CAUSES— <i>contd.</i>					
Attacks of Poisonous Animals—					
Snake Bite	—	47	3	47	—
Insect Bite	—	72	—	72	1
Other accidental Poisonings ..	5	166	15	171	2
Burns (by Fire)	63	999	127	1,062	53
Burns (other than by Fire) ..	9	298	20	307	7
Suffocation (accidental) ..	—	8	4	8	—
Poisoning by Gas (accidental) ..	—	100	23	100	4
Drowning (accidental) ..	—	12	—	12	—
Wounds (by Firearms) ..	12	443	21	455	21
Wounds (by cutting or stabbing instruments) ..	113	4,667	62	4,780	139
Wounds (by Fall)	132	6,235	28	6,367	169
Wounds (in Mines or Quarries) ..	10	209	1	219	4
Wounds (by machinery) ..	94	2,513	15	2,607	62
Wounds (crushing, <i>e.g.</i> , Railway accidents, &c.) ..	44	739	21	783	16
Injuries inflicted by Animals, Bites, Kicks, &c. ..	31	655	3	686	11
A.—Over fatigue	—	—	—	—	—
B.—Hunger or Thirst	—	5	1	5	1
Exposure to Heat—					
Heatstroke	—	1	—	1	—
Sunstroke	—	5	—	5	—
Lightning Stroke	—	8	—	8	—
Electric Shock	1	24	1	25	—
Murder by Firearms	—	2	2	2	—
Murder by cutting or stabbing instruments ..	—	311	3	311	8
Murder by other means	—	1	1	1	—
Infanticide (murder of an infant under 1 year) ..	—	—	—	—	—
A.—Dislocation	17	344	1	361	15
B.—Sprain	13	350	51	363	60
C.—Fracture	112	2,848	213	2,960	144
Other external Injuries ..	274	11,813	128	12,087	321
Deaths by violence of unknown cause ..	—	64	9	64	2
XV.—ILL-DEFINED DISEASES.					
Sudden deaths (cause unknown) ..	—	4	4	4	—
A.—Diseases not already specified or ill-defined— ..	—	—	—	—	—
Ascites	14	577	21	591	31
Oedema	6	35	5	41	3
Asthenia	12	799	35	811	22
Shock	11	82	36	93	—
Hyperpyrexia	3	56	2	59	1
Other	185	7,325	25	7,510	106
B.—Malingering	56	2,224	33	2,280	88



