

292
1.53 THE
PASTEUR INSTITUTE

OF
SOUTHERN INDIA, COONOOR

Annual Report of the Director

TOGETHER WITH

**The Forty-Fifth Annual Report of the
Central Committee of the
Pasteur Institute Association
1951-'52**

AND

**Scientific Report
1952**

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1953

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ANNUAL REPORT OF THE DIRECTOR

I. INTRODUCTION

The Association of the Pasteur Institute of Southern India which was founded in 1906 is a private body registered under the Societies Act 1860. The income of the Association is derived partly from voluntary contributions, partly from endowments and partly from revenue accruing from the sale of vaccines. The affairs of the Association are governed by a Central Committee which is composed partly of ex-officio and partly of elected members. Every person who subscribes not less than Rs. 5 annually to the funds of the Institute is entitled to membership of the Association provided that he shall have been accepted as a member by the Central Committee. Every member is entitled to attend at, and take part in all meetings of the Association, to receive free copies of the reports and other publications of the Association, and, in the event of his requiring it, to receive free treatment by inoculation against rabies or against any other disease in so far as the Association may be in a position to provide such treatment.

The objects of the Association are to make available effective means of preventing the occurrence of rabies, to spread the knowledge of such means among the public, and to undertake research work on rabies or any other disease in so far as the funds of the Association permit and the staff of the Institute is qualified to undertake such investigations.

The Institute is situated at Coonoor in the Nilgiri District of the Madras State and since its inception in 1907, it has served the needs of Madras and the other States of South India, all of which are represented on the Central Committee. In recent years the Association has gradually undertaken more and more work of general laboratory nature in response to the demands for the service of a first class general medical laboratory in this part of India. The enormous number of patients who have been treated with vaccine prepared at this Institute and the numerous papers of scientific interest and importance which have been published during the past forty-five years indicate the important part which the Institute has played in medical and health work in South India.

The Pasteur Institute at Coonoor was for many years the only place where patients might receive antirabic treatment. In 1922, a few Subsidiary Treatment Centres were opened as an experiment on the decentralisation of antirabic treatment. This step was made possible owing to improved means of preparing and preserving the vaccine, and the results obtained were so successful that a policy of further decentralisation has been pursued with caution up to the present time. Large numbers of hospitals, dispensaries and registered medical practitioners now receive their supplies of antirabic vaccine from this Institute.

In addition to the routine and research activities which have been carried out under the auspices of the Association, the Institute has provided facilities for researches financed from other sources. Some of these have been temporary while others have become more or less permanent. An independent organisation financed by the Indian Council of Medical Research, now known as the Nutrition Research Laboratories, has had its headquarters at the Institute almost continuously since 1918. The Southern India Branch of the Research Section of the Malaria Institute of India continued to work at this Institute during the year 1951 under the Director, Malaria Institute of India, Delhi.

II. ROUTINE WORK

1. STAFF OF THE INSTITUTE

DIRECTOR

DR. N. VEERARAGHAVAN, M.B., B.S., D.Sc.
(On deputation abroad from 27-1-1951 to 25-11-1951)

DR. I. G. K. MENON, M.B., B.S.
(Offg. from 27-1-1951 to 25-11-1951)

Assistant Director

DR. I. G. K. MENON, M.B., B.S.
(1-1-1951 to 26-1-1951 and 26-11-1951 to 31-12-1951)

CAPT. P. V. KURIAN, M.B., B.S., D.T.M.
(Offg. from 27-1-1951 to 25-11-1951)

Medical Officers

CAPT. P. V. KURIAN, M.B., B.S., D.T.M.
(1-1-1951 to 26-1-1951 and 26-11-1951 to 31-12-1951)

CAPT. A. BALASUBRAMANIAN, M.B., B.S.

Head Clerk and Accountant

MR. R. SUBRAMANIAN, B.A., B.COM.

Dr. N. Veeraraghavan, who was sent on deputation, spent five months in the pathology department of the Institute of Neurology, London, specialising in the pathology of the nervous system and about two months at the Lister Institute, London, studying bio-physical techniques like electrophoresis, ultra-centrifugation, etc. He visited various laboratories in the United Kingdom and the Continent and attended the Second International Poliomyelitis Conference held at Copenhagen in September. He rejoined duty on 26th November 1951.

2. ANTIRABIC TREATMENT

(i) Antirabic Treatment for Human Patients

The antirabic vaccine employed for the treatment of human patients was a 5 per cent suspension of sheep brain (Paris strain of fixed virus) in carbolsaline prepared by Semple's method. A total of 2,751,544 c.c. was manufactured during the year.

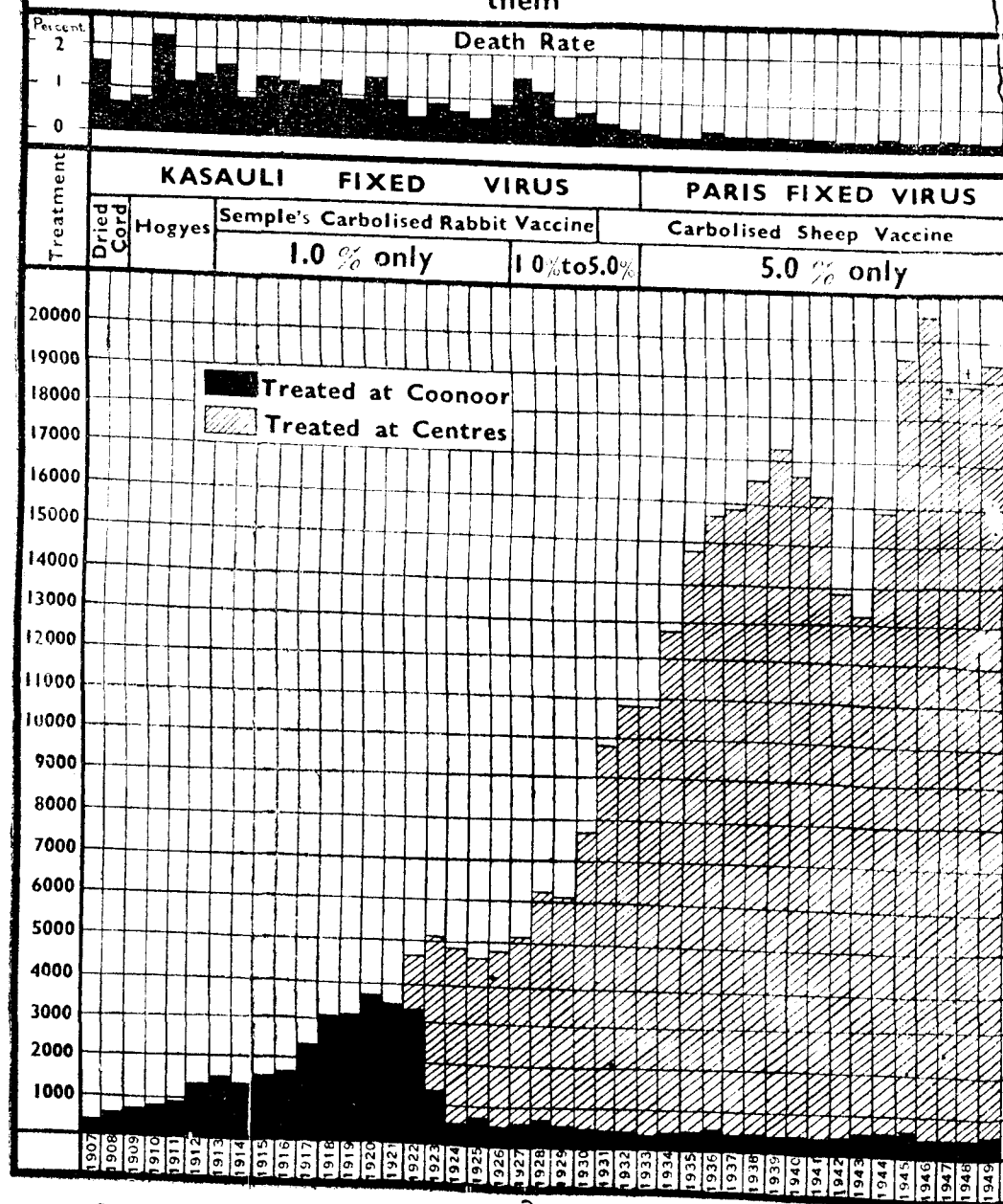
During the year under review 21,745 courses of antirabic vaccine were issued under the revised system of treatment. Details of the revised system of treatment are given below :

	Class	Adult dosage	Child dosage	Number of days
I	...	2 c.c.	2 c.c.	7
II	...	5 c.c.	5 c.c.	14
III	...	10 c.c.	5 c.c.	14

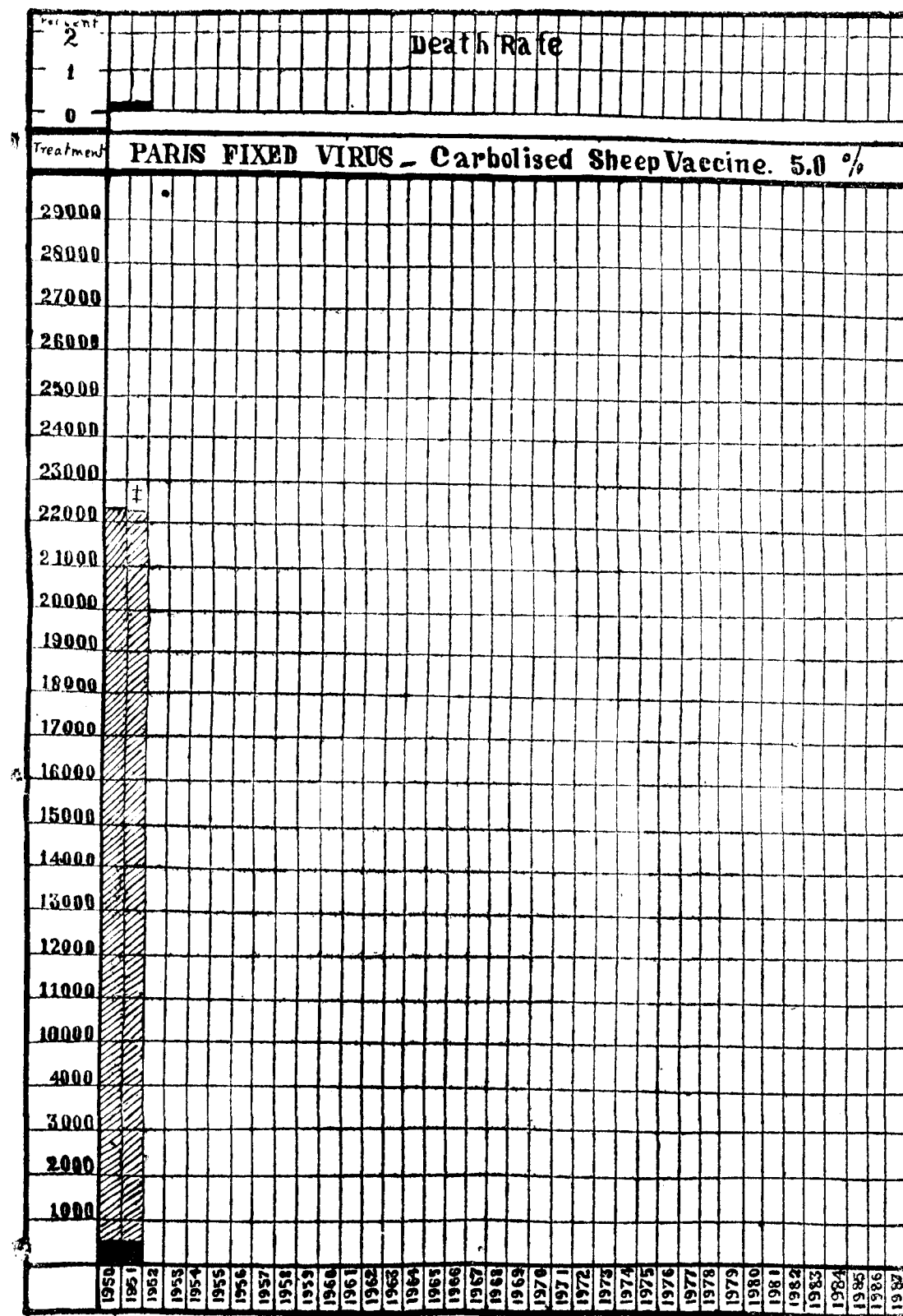
Of the 22,165 patients treated at the Institute and Subsidiary Treatment Centres during the year, case cards were returned for 14,651 patients. Of

PASTEUR INSTITUTE OF SOUTHERN INDIA, COONOR

Total number of Patients treated at Coonor and
Subsidiary Centres since 1907 and the death-rate among
them



In addition,
* 331,020 c.c. of antirabic vaccine was supplied to the Governments of Uttar Pradesh and
Pakistan,
† 146,466 c.c. of antirabic vaccine was supplied to the Government of Uttar Pradesh.



† 187,166 c.c. of antirabic vaccine was supplied to the Central Research Institute, Kasauli,
and the Government of Uttar Pradesh.

these 8,914 have been subjected to statistical analysis details of which are given in Tables I to VI.

This Institute also supplied 187,166 c.c. of antirabic vaccine to the Central Research Institute, Kasauli, and the Government of Uttar Pradesh.

(a) *Patients treated at the Pasteur Institute :*

During the year under review 242 Asiatic patients received a complete course of antirabic treatment at the Institute. Incomplete courses of treatment were also given to 178 patients, of whom 36 were absolved from further treatment after the possibility of rabies in the biting animals had been excluded. The remainder absconded.

The subsequent history of treated patients was ascertained six months after the completion of treatment in 75.48 per cent cases.

One death was recorded among the 384 patients who received complete or incomplete courses of treatment giving a mortality rate of 0.26 per cent. The death occurred in an Asiatic patient.

Advice, but no treatment, was given to 283 cases.

During the 45 year period from 1907 to 1951, the total number of patients treated at the Institute was 42,317, among whom 411 subsequently died of rabies giving a mortality rate of 0.97 per cent.

(b) *Patients treated at Subsidiary Centres:*

The treatment given at the various Subsidiary Centres was similar to that administered at the Pasteur Institute, Coonoor.

The various centres returned 14,231 case cards for patients treated during the year under review. Of these 8,672 received a complete course of treatment and 5,205 were incompletely treated. 35 patients were absolved from further treatment as the possibility of rabies in the biting animals was excluded. The remaining 319 were not taken into account for statistical purposes for want of sufficient details in the case cards.

The occurrence of deaths among patients who received various classes of treatment is given below :

Class of treatment	Completely treated			Incompletely treated		
	Number treated	Number of deaths	Mortality rate	Number treated	Number of deaths	Mortality rate
I	665	...	...	67	...	...
II	4,462	4	0.09	2,241	...	...
III	3,545	6	0.17	2,897	8	0.28
Total	8,672	10	0.12	5,205	8	0.15

18 deaths were recorded among the 13,877 patients who received complete or incomplete courses of treatment giving a mortality rate of 0.13 per cent.

The total number of patients treated at the Subsidiary Centres during the 30 year period from 1922 to 1951 was 276,837 among whom 818 deaths were reported giving a mortality rate of 0.30 per cent.

All the 18 deaths reported during the year occurred among Asiatic patients. 15 deaths followed dog bites, 2 jackal bite and 1 unknown animal bite.

One case of post-treatment paralysis ('Paralytic accident') was reported during the year.

(ii) **Antirabic Treatment for Animals**

Antirabic treatment was also made available for the prophylactic treatment of animals. While it is advocated that dogs should be protected before they are exposed to infection, it is found in practice that treatment is comparatively seldom given until the animal is at risk. During the year 242,907 c.c. of 5 per cent carbolised sheep-brain vaccine were issued for the treatment of animals, chiefly to Veterinary Officers of the Madras State and the neighbouring States. The number of animals treated during the year was 1,816 of which 1,038 were dogs.

During the 29-year period from 1923 to 1951, 19,292 animals have received antirabic treatment, among which 230 deaths have been reported giving a mortality rate of 1.19 per cent.

3. GENERAL LABORATORY WORK

Routine laboratory examinations were carried out on a large scale for the benefit of hospitals, dispensaries and practitioners. The total number of examinations carried out during the year was 5,193. Most of this was done free of charge, but fees were recovered at scheduled rates from patients who were in a position to pay, except in the case of Government servants.

Details of these examinations are given in Table X.

This Institute also continued to receive and report upon brains from suspected rabid animals. During 1951, 200 such specimens were received, details of which are given in Table V. No charge was made for this service and where necessary, the results were communicated by telegram free of charge.

4. BLOOD BANK

The Blood Bank work at the Institute was continued. During the year 11,550 c.c. of plasma were prepared. Since the inception of the Blood Bank in 1942, a total of 179,105 c.c. of plasma has been prepared and issued to various civil, military and mission hospitals.

5. DISTINGUISHED VISITORS

Distinguished visitors to the Institute included :

Dr. W. B. Roantree, F.R.C.S., Kolar Gold Field.
 Sir Edward Mellanby, Central Drug Research Institute, Lucknow.
 Lady May Mellanby, Central Drug Research Institute, Lucknow.
 Sir Edward Russell, Woodstock, United Kingdom.
 Lady Russell, Woodstock, United Kingdom.
 Mr. N. Rama Rao, Vice-Chairman, Central Silk Board of India.
 Dr. A. M. Boyce, California Citrus Expt. Station, U.S.A.
 Dr. Norman D. Waters, Berkeley, California.
 Dr. Guy Beevor, State Department of Agriculture, California, U.S.A.
 Miss Ollie Jena Olsen, Abilene, Texas, U.S.A.
 Lady Lokasundari Raman, "Panchavati", Bangalore.
 Col. T. B. Pahaljani, A.D.M.S., Madras Area.
 The Hon'ble Mr. Justice N. C. Lokur, Adyar House, Madras.
 Mr. M. Seshadri, Home Minister, Hyderabad.
 The Hon'ble Mr. Justice K. Subbarao, Corner House, Marshall's Road, Madras.
 Dr. P. Ratnasamy, Medical College, Madras.
 The Hon'ble Sri K. Madhava Menon, Minister, Madras.
 Mrs. Kuttimalu Amma, M.L.A., Malabar.

III. ADDITIONS AND IMPROVEMENTS

The animal houses at the Institute which were in a bad state of repair were attended to during the year.

2. ROADS

3. EQUIPMENT

Some of the valuable items of equipment purchased during the year included the equipment for microphotography and phase contrast microscopy.

The World Health Organization presented the Centre with equipment worth \$4,500 during the year. These consisted of an International portable refrigerated centrifuge, an Edwards' freeze drying apparatus, a 15 cubic feet capacity deep freeze cabinet and an all electric egg incubator.

During the year 83 books and 71 bound volumes have been added to the Library. The number of journals subscribed for increased from 68 to 75. The total number of volumes at the end of the year was 6,222.

The activities of the Institute were filmed in colour by Dr. Damodara Das, Madras.

A canteen was started during the year. This serves mid-day meal to the members of the staff and is very popular. This is proving to be of very great benefit to the lower income groups particularly those not residing within the compound.

TABLE I.
A general statement regarding patients treated at the Institute and its Centres from 1907-1951.

	EUROPEANS.				ASIATICS.				EUROPEANS AND ASIATICS COMBINED.			
	Total treated.	Total deaths.	Total death-rate per cent.	Advice cases.	Total treated.	Total deaths.	Total death-rate per cent.	Advice cases.	Total treated.	Total deaths.	Total death-rate per cent.	Advice cases.
Institute 1907-08	61	1	1.64	...	121	2	1.65	...	182	3	1.64	16
Institute 1908-09	89	...	...	...	251	2	0.79	...	340	2	0.59	38
Institute 1909-10	175	...	...	...	483	4	0.83	...	658	4	0.61	71
Institute 1910-11	221	1	0.45	...	606	16	2.64	...	827	17	2.05	74
Institute 1911-12	130	...	...	...	810	9	1.11	...	940	9	0.96	128
Institute 1912-13	150	...	...	...	1,090	14	1.23	...	1,240	14	1.12	210
Institute 1913-14	152	...	...	...	1,141	20	1.75	...	1,293	20	1.54	227
Institute 1914-15	167	...	...	...	1,043	21	2.01	...	1,210	21	1.73	135
Institute 1915-16	111	...	...	...	1,379	14	1.02	...	1,490	14	0.94	142
Institute 1916-17	161	...	...	...	1,546	24	1.55	...	1,707	24	1.40	217
Institute 1917-18	262	...	...	...	2,134	31	1.45	...	2,396	31	1.29	223
Institute 1918-19	150	1	0.66	...	2,825	32	1.13	...	2,975	33	1.11	260
Institute 1919-20	176	1	0.56	...	2,996	40	1.34	...	3,172	41	1.26	233
Institute 1920-21	177	...	...	...	3,446	32	0.92	...	3,623	32	0.88	145
Institute 1921-22	221	2	0.90	...	3,250	41	1.25	...	3,471	43	1.24	211
Institute 1922-23	178	...	...	...	3,197	29	0.91	...	3,375	29	0.80	171
Centres " "	...	...	...	...	...	...	...	...	1,248	12	0.96	...
Combined " "	...	...	...	...	...	...	...	...	4,623	41	0.89	171
Institute 1923-24	67	...	...	...	1,287	4	0.51	...	1,354	4	0.29	160
Centres " "	...	...	...	...	...	...	...	...	3,692	22	0.59	...
Combined " "	...	...	...	...	...	...	...	...	5,046	26	0.51	160
Institute 1924-25	16	...	...	...	473	7	1.45	...	489	7	1.43	109
Centres " "	...	...	...	...	...	...	...	...	4,402	39	0.88	...
Combined " "	...	...	...	...	...	...	...	...	4,891	46	0.91	109
Institute 1925-26	28	1	3.57	...	544	6	1.10	...	572	7	1.22	155
Centres " "	...	...	...	...	...	...	...	...	4,072	29	0.71	...
Combined " "	...	...	...	...	...	...	...	...	4,644	36	0.77	155
Institute 1926-27	39	...	...	...	376	4	1.05	...	415	4	0.96	124
Centres " "	...	...	...	...	...	...	...	...	4,373	27	0.61	...
Combined " "	...	...	...	...	...	...	...	...	4,788	31	0.64	124
Institute 1927-28	30	...	...	...	364	4	1.09	...	394	4	1.01	165
Centres " "	...	...	...	...	...	...	...	...	4,788	45	0.94	...
Combined " "	...	...	...	...	...	...	...	...	5,182	49	0.94	165
Carried over	2,761	7	...	...	29,362	356	...	...	54,698	537	...	3,214

TABLE I—(continued)

A general statement regarding patients treated at the Institute and its Centres from 1907-1951 (continued).

	EUROPEANS.				ASIATICS.				EUROPEANS AND ASIATICS COMBINED.			
	Total treated.	Total deaths.	Total death-rate per cent.	Advice cases.	Total treated.	Total deaths.	Total death-rate per cent.	Advice cases.	Total treated.	Total deaths.	Total death-rate per cent.	Advice cases.
Brought forward	2,761	7	...	...	29,362	355	...	...	54,688	537	...	3,214
Institute 1928-29	41	1	2.44	...	424	5	1.17	...	465	6	1.29	155
Centres " "	216	1	0.46	...	4,470	64	1.43	...	4,686	65	1.38	...
Combined " "	257	2	0.77	...	4,894	69	1.40	...	5,151	71	1.37	155
Institute 1929	88	...	...	...	519	5	0.96	...	607	5	0.82	138
Centres " "	174	...	...	...	4,434	52	1.17	...	4,608	52	1.12	...
Combined " "	262	...	...	...	4,953	57	1.15	...	5,215	57	1.09	138
Institute 1930	36	...	...	21	505	5	0.99	160	541	5	0.92	181
Centres " "	286	1	0.35	...	5,813	35	0.60	...	6,099	36	0.59	...
Combined " "	322	1	0.31	21	6,318	40	0.63	160	6,640	41	0.62	181
Institute 1931	14	...	...	20	501	7	1.39	129	545	7	1.28	149
Centres " "	298	2	0.75	...	7,968	59	0.74	...	8,236	61	0.74	...
Combined " "	312	2	0.64	20	8,469	66	0.78	129	8,781	68	0.78	149
Institute 1932	42	...	...	15	524	5	0.76	176	566	4	0.70	191
Centres " "	385	1	0.26	...	8,819	35	0.38	...	9,204	36	0.39	...
Combined " "	427	1	0.23	15	9,343	38	0.41	176	9,770	40	0.40	191
Institute 1933	18	...	...	3	399	...	...	196	417	...	...	189
Centres " "	265	...	...	...	8,875	33	0.37	...	9,140	33	0.36	...
Combined " "	283	...	...	3	9,274	33	0.36	196	9,557	33	0.35	186
Institute 1934	34	...	...	8	380	...	...	203	414	...	...	211
Centres " "	297	...	...	...	10,492	26	0.25	...	10,789	26	0.24	...
Combined " "	331	...	...	8	10,872	26	0.24	203	11,203	26	0.23	198
Institute 1935	18	...	...	2	415	...	...	196	433	...	...	...
Centres " "	338	...	...	...	12,291	20	0.16	...	12,624	20	0.16	...
Combined " "	356	...	...	2	12,706	20	0.16	196	13,062	20	0.15	...
Institute 1936	32	...	...	4	461	...	...	219	493	...	...	...
Centres " "	328	...	...	...	12,184	20	0.16	...	12,512	20	0.16	...
Combined " "	360	...	...	4	12,645	20	0.16	219	13,005	20	0.15	...
Institute 1937	33	...	...	...	393	2	0.51	161	426	2	0.47	161
Centres " "	318	1	0.31	...	11,590	20	0.17	...	11,908	21	0.18	...
Combined " "	351	1	0.29	...	11,983	22	0.18	161	12,334	23	0.19	161
Institute 1938	36	...	...	5	370	1	0.27	172	406	1	0.25	177
Centres " "	287	...	...	...	11,703	20	0.17	...	11,990	20	0.17	...
Combined " "	323	...	...	5	12,073	21	0.17	172	12,386	21	0.17	177
Institute 1939	27	...	...	4	398	...	...	164	425	...	...	168
Centres " "	171	...	...	...	7,850	21	0.27	...	8,021	21	0.26	...
Combined " "	198	...	...	4	8,248	21	0.25	164	8,446	21	0.25	...

Institute 1940	9	...	...	7	346	2	0.58	168	355	2	0.56	175
Centres " "	259	...	...	...	11,156	31	0.28	...	11,415	31	0.27	...
Combined " "	268	...	...	7	11,502	33	0.29	168	11,770	33	0.28	...
Institute 1941	11	...	...	4	238	...	...	162	249	...	...	166
Centres " "	332	...	...	...	10,011	16	0.16	...	10,343	16	0.15	...
Combined " "	343	...	...	...	10,249	16	0.15	162	10,592	16	0.15	...
Institute 1942	38	...	...	11	243	...	...	183	281	...	...	166
Centres " "	310	...	...	...	8,133	17	0.21	...	8,443	17	0.20	...
Combined " "	348	...	...	11	8,376	17	0.20	183	8,724	17	0.19	194
Institute 1943	24	...	...	3	306	2	0.65	134	330	2	0.60	137
Centres " "	324	...	...	...	8,162	16	0.20	...	8,486	16	0.19	...
Combined " "	348	...	...	3	8,468	18	0.21	...	8,816	18	0.20	...
Institute 1944	26	...	...	5	384	1	0.26	174	410	1	0.24	137
Centres " "	338	...	...	...	9,435	19	0.20	...	9,473	19	0.20	179
Combined " "	364	...	...	5	9,819	20	0.20	174	10,183	20	0.19	...
Institute 1945	14	...	...	1	469	2	0.46	219	483	2	0.41	179
Centres " "	391	...	...	...	13,482	21	0.16	...	13,873	21	0.15	220
Combined " "	405	...	...	1	13,951	23	0.17	...	14,356	23	0.16	...
Institute 1946	4	...	...	1	366	2	0.55	209	370	2	0.54	210
Centres " "	215	...	...	...	10,062	11	0.11	...	10,277	11	0.11	...
Combined " "	219	...	...	1	10,428	13	0.13	209	10,647	13	0.12	210
Institute 1947	9	...	...	1	314	1	0.32	207	323	1	0.31	208
Centres " "	161	...	...	...	8,638	11	0.13	...	8,798	11	0.13	...
Combined " "	170	...	...	1	8,952	12	0.13	207	9,122	12	0.13	...
Institute 1948	4	...	...	1	279	4	1.43	212	283	4	1.41	213
Centres " "	128	...	1.56	...	8,857	20	0.23	...	9,085	22	0.24	...
Combined " "	132	2	1.52	...	9,136	24	0.26	212	9,268	26	0.28	213
Institute 1949	2	...	...	...	273	1	0.37	219	275	1	0.36	219
Centres " "	33	...	...	...	7,822	15	0.19	...	7,855	31*	0.26	...
Combined " "	35	...	...	...	8,095	16	0.20	219	8,150	32*	0.26	219
Institute 1950	7	...	...	...	299	2	0.67	216	306	2	0.65	216
Centres " "	137	...	...	...	8,134	12	0.15	...	8,271	20*	0.24	...
Combined " "	144	...	...	...	8,433	14	0.17	216	8,577	22*	0.26	...
Institute 1951	...	...	...	...	242	1	0.41	283	242	1	0.41	283
Centres " "	53	...	...	...	8,619	10	0.12	...	8,672	18*	0.21	...
Combined " "	53	...	...	...	8,861	11	0.12	283	8,914	19*	0.21	283
Grand Total	9,372	16	0.17	116	257,410	1,007	0.39	4,162	289,357	1,229*	0.42	7,785--

*These include deaths in cases incompletely treated also and the death rate percent is calculated on all the cards returned.

From 1922-28, details as to classification of patients at out-centres under Europeans and Asiatics are not available, but the total number of treated patients is shown in the 'Europeans and Asiatics Combined' column. These figures serve to show that the results of treatment at the centres compare favourably with those obtained at the Institute.

TABLE II.

A general classification of patients attending the Coonor Institute and its Subsidiary Centres during 1951.

	EUROPEANS.				ASIATICS.			
	Class of cases treated.				Class of cases treated.			
	I	II	III	Total.	I	II	III	Total.
Number fully treated	16	19	18	53	658	4,528	3,675	8,861
Percentage to total	30.19	35.86	33.95	...	7.43	51.10	41.47	...
Total deaths	...	...	...	...	...	4	7	11
Death-rate percent (to number fully treated)	...	...	...	...	...	0.09	0.19	...
Number not fully treated (presumably at risk)	1	8	14	23	66	2,307	3,022	5,395
Deaths	...	...	...	...	...	...	8	8
Death-rate percent (to number not fully treated)	...	...	...	...	...	...	0.26	0.15
Advice cases	...	...	...	...	...	...	...	283*
Cases excluded from statistical tables for other reasons	...	...	...	...	6	186	127	319
Total	17	27	32	76	730	7,021	6,824	14,558

*These figures represent 'Advice cases' at the Institute. Similar figures for Subsidiary Centres are not available.

TABLE III.

Deaths from hydrophobia amongst persons treated—Institute and Centres—Europeans only.

Serial No.	Case No.	Sex.	Age in years.	Biting animal.	Interval between bite and commencement of treatment.	Class of cases.	Duration of treatment in days.	Number of days from commencement of treatment to onset of symptoms.	Duration of illness.	Interval between bite and death in days.
...	...	...	...	...	...	...	...	...	...	...

TABLE III-A.

Deaths from hydrophobia amongst persons treated—Institute and Centres—Asiatics only.

Serial No.	Case No.	Sex.	Age in years.	Biting animal.	Interval between bite and commencement of treatment.	Class of cases.	Duration of treatment in days.	Number of days from commencement of treatment to onset of symptoms.	Duration of illness.	Interval between bite and death in days.
1	25	M	30	Dog	11	III	14	38	2	50
2	748	F	40	Dog	45	II*	14	44	1	90
3	176	M	6	Jackal	2	III	11	12	2	15
4	5/51	M	9	Dog	11	III	14	36	3	49
5	6/51	M	7	Unknown	7	II	14	33	1	40
6	49/51	M	5	Dog	6	I*	7	14	2	21
7	36/51	M	42	Dog	2	II	14	46	3	50
8	38/51	M	12	Dog	2	II	14	98	2	101
9	654	M	25	Dog	2	II	14	115	3	119
10	4	M	10	Dog	9	III	14	37	3	48
11	8	M	12	Dog	7	III	11	10	1	17
12	27	M	45	Dog	3	III	5	54	1	57
13	64	M	4½	Dog	2	III	1	62	1	64
14	278	M	6	Dog	2	III	...	19	2	21
15	4	M	...	Dog	2	III	14	22	2	25
16	9/51	M	50	Dog	2	III	14	38	3	42
17	7	M	4	Dog	1	III	14	15	1	16
18	16	M	52	Jackal	11	III	8	8	...	18
19	311	M	5	Dog	21	INSTITUTE. III	14	15	2	37

*Correct classification of these cases are Class III adult and Class III child respectively. These are included among incompletely treated cases in the analysis.

TABLE IV.

Classification by the animal which bit, scratched or licked the patient,

INSTITUTE AND CENTRES.

Numerators—Deaths in completely treated cases. Denominators—Cases completely treated.

ANIMAL.	Number treated.			Percentage to total.			Death rate percent.		
	Europeans.	Asiatics.	Combined.	Europeans.	Asiatics.	Combined.	Europeans.	Asiatics.	Combined.
1 Dog	53	10/8,333	10/8,386	100.00	94.04	94.08	...	0.12	0.12
2 Jackal	...	227	227	...	2.56	2.56	...	...	...
3 Wolf	...	...	...	...	...	...	...	...	...
4 Hyena	...	...	...	...	...	...	...	...	...
5 Fox	...	3	3	...	0.03	0.03	...	...	...
6 Wild dog	...	...	...	...	...	...	...	...	...
7 Man	...	39	39	...	0.44	0.44	...	...	...
8 Monkey	...	12	12	...	0.14	0.13	...	...	...
9 Cat	...	34	34	...	0.38	0.38	...	...	...
10 Leopard	...	...	...	...	...	...	...	...	...
11 Panther	...	...	...	...	...	...	...	...	...
12 Wild cat	...	...	...	...	...	...	...	...	...
13 Tiger	...	...	...	...	...	...	...	...	...
14 Cow	...	4	4	...	0.04	0.04	...	...	...
15 Buffalo	...	75	75	...	0.85	0.84	...	...	...
16 Horse	...	1	1	...	0.01	0.01	...	...	...
17 Mule	...	2	2	...	0.02	0.02	...	...	...
18 Donkey	...	...	...	...	...	...	...	...	...
19 Camel	...	15	15	...	0.17	0.17	...	...	...
20 Sheep	...	...	...	...	...	...	...	...	...
21 Goat	...	...	...	...	...	...	...	...	...
22 Pig	...	6	6	...	0.07	0.07	...	...	...
23 Rabbit	...	1	1	...	0.01	0.0	...	...	...
24 Guinea-pig	...	...	...	...	...	...	...	...	...
25 Mongoose	...	...	...	...	...	...	...	...	...
26 Badger	...	...	...	...	...	...	...	...	...
27 Squirrel	...	...	...	...	...	...	...	...	...
28 Rat	...	...	...	...	...	...	...	...	...
29 Bear	...	1	1	...	0.01	0.01	...	...	...
30 Deer	...	...	...	...	...	...	...	...	...
31 Elephant	...	...	...	...	...	...	...	...	...
32 Fowl	...	...	...	...	...	...	...	...	...
33 Cheetah	...	...	...	...	...	...	...	...	...
34 Lion	...	2	2	...	0.02	0.02	...	...	...
35 Bullock	...	...	...	...	...	...	...	...	...
36 Calf	...	5	5	...	0.06	0.06	...	...	...
37 Laboratory infection	...	8	8	...	0.08	0.08	...	...	...
38 Unknown	...	2	2	...	0.02	0.02	...	...	...
39 Contact cases	...	1/78	1/78	...	1.88	0.87	...	1.28	1.28
	...	13	13	...	0.15	0.15	...	...	...
Total	53	11/8,861	11/8,914	0.59	99.41	...	...	0.12	0.12

TABLE V.
Statement showing brains submitted and examined for rabies, 1951.

Animal.	Number of brains received.	Positive.	Inconclusive.	Unfit for examination.
Dog	175	112	41	22
Goat	3	3	...	...
Cow, Calf, Bull	10	8	1	1
Cat	4	1	1	...
Buffalo	6	4	1	...
Jackal	1	1	...	...
Human	1	1	...	...
Total	200	130	44	26

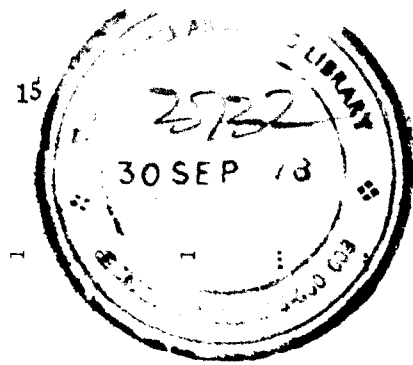


TABLE VI.

Classification by the animals which bit, scratched or licked the patient
from 1908 to date.

Animals.	Number completely treated.	Percentage to total.	Deaths in completely treated cases.	Percentage death rate.
1 Dog	275,266	95.13	1,083	0.39
2 Jackal	6,767	2.33	89	1.23
3 Wolf	11	...	...	...
4 Hyena	10	...	...	...
5 Fox	737	0.25	10	1.36
6 Wild dog	13	...	3	23.08
7 Man	1,218	0.42	...	...
8 Monkey	1,123	0.39	...	...
9 Cat	1,594	0.55	1	0.07
10 Leopard	51	0.02	3	5.88
11 Panther	20	...	...	...
12 Wild cat	20	...	...	...
13 Tiger	13	...	...	...
14 Cow	980	0.34	...	...
15 Buffalo	76	0.03	...	...
16 Horse	134	0.05	...	...
17 Mule	9	...	...	...
18 Donkey	239	0.08	...	...
19 Camel	1	...	...	...
20 Sheep	31	0.01	1	3.23
21 Goat	448	0.15	...	...
22 Pig	52	0.02	...	...
23 Rabbit	10	...	...	...
24 Guinea-pig	10	...	...	...
25 Mongoose	20	...	...	...
26 Badger	...	...	...	...
27 Squirrel	...	...	...	...
28 Rat	89	0.03	...	...
29 Bear	20	...	...	...
30 Deer	6	...	...	...
31 Elephant	4	...	...	...
32 Fowl	12	...	...	...
33 Cheetah	12	...	...	...
34 Lion	1	...	...	...
35 Bullock	14	...	...	...
36 Calf	33	...	...	...
37 Laboratory infection	37	0.01	...	...
38 Unknown	263	0.09	1	0.38
39 Contact cases	13	...	...	...
Total	289,357	...	1,191	0.41

TABLE VII.

Deaths from hydrophobia in the Madras State during 1913-1951.

Year.	Towns.	Rural area.	Total.
1913	38	102	140
1915	26	48	74
1914	19	46	65
1916	17	9	26
1917	26	11	37
1918	30	44	74
1919	34	28	62
1920	47	50	97
1921	41	48	89
1922	62	158	220
1923	31	251	282
1924	85	279	364
1925	64	421	485
1926	100	388	488
1927	76	560	636
1928	71	493	564
1929	76	343	419
1930	100	356	456
1931	128	533	661
1932	115	423	538
1933	109	355	464
1934	110	302	412
1935	112	434	546
1936	115	551	666
1937	98	728	826
1938	149	960	1,109
1939	242	1,064	1,306
1940	145	1,134	1,279
1941	186	1,289	1,475
1942	145	1,273	1,418
1943	130	1,115	1,245
1944	170	906	1,076
1945	120	511	631
1946	118	321	439
1947	109	279	388
1948	108	215	323
1949	134	283	417
1950	131	271	402
1951	137	142	279
Total	3,754	16,724	20,478

TABLE VIII.

Deaths from hydrophobia after antirabic treatment during 1913-1951 in the Madras State.

Year.	Number treated.	Deaths.
1913	724	15
1914	593	15
1915	880	7
1916	785	14
1917	1,213	19
1918	1,681	25
1919	2,196	36
1920	2,497	23
1921	2,396	33
1922	3,305	31
1923	3,574	19
1924	3,500	32
1925	3,366	28
1926	3,306	20
1927	3,932	35
1928	4,529	54
1929	4,443	50
1930	4,747	37
1931	5,573	40
1932	6,029	25
1933	6,177	21
1934	7,436	20
1935	8,521	15
1936	8,273	15
1937	8,666	14
1938	9,266	14
1939	6,083	17
1940	9,613	31
1941	8,716	12
1942	7,128	16
1943	7,232	18
1944	9,068	20
1945	12,406	23
1946	9,569	13
1947	11,079	12
1948	12,842	21
1949	9,049	28
1950	9,438	12
1951	12,080	16
Total ...	2,31,911	896

TABLE IX.
Statement showing animals treated with antirabic vaccine from 1923 to 1951.

SPECIES OF ANIMALS.	YEARS.					Number of fatal cases from rabies.			Percentage of failures.	Percentage of mortality.
	1923 to 1930.	1930 to 1940.	1941 to 1950.	1951.	Total.	Died during treatment.	Died less than 15 days after treatment.	Died more than 15 days after treatment.		
Dog	1,052	3,554	8,125	1,038	13,769	31	67	35	0.25	0.97
Cow	20	147	1,105	166	1,438	4	9	2	0.14	1.04
Bullock	12	126	1,099	229	1,466	7	28	10	0.63	3.07
Calf	21	107	661	118	907	2	5	2	0.22	0.99
Milch Buffalo	3	34	590	136	763	1	3	4	0.52	0.92
Goat	2	10	361	97	470	1	1	1	0.21	0.64
Sheep	11	34	8	5	9	2	3	1	0.93	5.56
Horse	...	...	58	...	108	...	...	...	...	...
Colt	...	41	2	...	41	...	...	...	...	...
Mule	...	28	...	15	168	...	...	...	...	...
Pony	12	7	113	...	13	2	3	2	1.19	4.17
Elephant	2	3	5	...	14	...	...	...	7.14	7.14
Monkey	2	1	14	...	19	...	1	...	...	5.26
Spotted Deer	1	7	...	...	2	...	...	...	...	...
Deer	...	...	12	...	19	...	...	...	...	...
Kid	1	13	13	6	20	...	3	...	...	6.52
Cat	...	...	30	3	46	...	...	...	...	...
Pig	...	...	16	...	16	...	...	...	...	...
Duck	...	...	1	...	1	...	...	...	...	...
Goose	...	...	1	...	1	...	...	...	...	...
Cattle	...	...	6	...	6	...	...	...	...	...
Donkey	...	...	4	2	6	...	...	...	...	...
Hen	...	...	...	1	1	...	...	...	...	...
Total ...	1,139	4,113	12,224	1,816	19,292	49	123	58	0.30	1.19

TABLE X.

Detailed Statement of General Laboratory Examinations carried out during the year 1951.

	Total.	Positive.
I. ANIMAL INOCULATION TEST :—		
(a) For tuberculosis ...	4	
(b) „ diphtheria ...	5	1
II. AUTOGENOUS VACCINES ...	63	
III. BLOOD :—		
(a) Agglutination tests :—		
With enteric group of organisms ...	267	
„ proteus group of organisms ...	2	
„ Brucella ...	2	
(b) Biochemical tests :—		
Complete glucose tolerance test ...	12	
Blood urea ...	12	
„ non-protein nitrogen ...	2	
„ calcium estimation ...	1	
„ Van den Bergh reaction ...	3	
Fibrinogen ...	3	
(c) Complete examination of blood :—		
Colour index ...	29	
Differential W.B.C. count ...	174	
Blood picture ...	64	
Haemoglobin percentage ...	62	
Total R.B.C. count ...	42	
„ W.B.C. count ...	110	
(d) Cultures for enteric group ...	111	
„ for <i>B. typhosus</i> ...		
(e) Packed cell volume ...	2	
(f) Bleeding time ...	10	
(g) Coagulation time ...	9	
(h) Grouping ...	3	
(i) Sedimentation rate ...	56	
(j) Film for Malarial parasites ...	103	
<i>P. falciparum</i> ...		
<i>P. vivax</i> ...		
(k) Film for microfilaria ...	2	
(l) „ for <i>Spirillum minus</i> ...	4	
(m) Serological test :—		
Kahn test ...	1,221	
Wassermann Reaction ...	1,231	
IV. FRACTIONAL GASTRIC ANALYSIS ...	28	
V. CEREBRO-SPINAL FLUID :—		
(a) Cell count ...	4	
(b) Microscopic examination ...	2	
(c) Chlorides, estimation of ...	6	
(d) Sugar ...	3	
Carried over ...	3,652	

Brought forward ... 3,652
CEREBRO-SPINAL FLUID—(Continued)

(e) Proteins „ ...	3	
(f) Culture (<i>M. tuberculosis</i>) ...	7	4
„ (for other organisms) ...	10	1
(g) Kahn test ...	3	
(h) Wasserman Reaction ...	4	

VI. FAECES :—

(a) Microscopic ...	572	
<i>E. histolytica</i> vegetative forms ...		17
„ „ cystic forms ...		15
<i>E. coli</i> cystic forms ...		64
<i>Giardia intestinalis</i> vegetative forms ...		16
„ „ cystic forms ...		33
Ova of <i>H. nana</i> ...		4
„ whip worm ...		58
„ hook worm ...		45
„ round worm ...		122
Occult blood test ...	4	
(b) Cultures ...	187	
<i>B. dysenteriae</i> , Flexner ...		18
„ Sonne type ...		1
„ Schmitz type ...		2
„ Shiga ...		4
<i>V. cholerae</i> ...		2

VII. MISCELLANEOUS MICROSCOPIC EXAMINATIONS :—

(a) Smears for <i>N. gonorrhoeae</i> ...	13	
(b) „ „ <i>P. pestis</i> ...	9	
(c) „ „ <i>Spirochaetes</i> ...	5	4
(d) „ „ <i>M. leprae</i> ...	11	1
(e) „ „ other organisms ...	5	
(f) „ „ <i>M. tuberculosis</i> ...	3	2

VIII. MISCELLANEOUS CULTURAL EXAMINATIONS :—

(a) From boils, pustules and vesicles ...	24	
(b) „ gums ...	7	
(c) „ pleural fluid (for other organisms) ...	4	
(d) „ „ „ (for <i>M. tuberculosis</i>) ...	6	2
(e) „ other organs ...	2	
(f) „ gastric contents (for <i>M. tuberculosis</i>) ...	1	

IX. NASAL SWABS :—

Culture examination ...	33	
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X. PATHOLOGICAL SPECIMENS :—

Sections ...	13	
--------------	----	--

Carried over ... 4,578

Brought forward ...					4,578	
XI. SPUTUM :—						
(a) Microscopic examination :—						
for <i>M. tuberculosis</i>	...	...	79	18		
(b) Cultural examination :—						
for <i>M. tuberculosis</i>	...	...	42	5		
„ other organisms	...	...	24			
XII. THROAT SWABS :—						
(a) Microscopic examination :—						
for <i>C. diphtheriae</i>	...	...	53	7		
„ Vincent's organisms	...	...	5	1		
(b) Cultural examination :—						
for <i>C. diphtheriae</i>	...	...	64	20		
„ other organisms	...	...	47			
XIII. URINE :—						
(a) Cultural examination :—						
for <i>M. tuberculosis</i>	...	...	5			
„ other organisms	...	...	89			
(b) Friedman's test	...	...	11	3		
(c) Qualitative	...	...	192			
(d) Quantitative	...	...	4			
Total	...		5,193			

V. RAINFALL IN INCHES IN COONOOR.

Average for forty- three years • (1908-1950 inclusive).				Maximum	Minimum	1951
				During the 43 years.		
January	...	...	5.16	18.34	...	1.75
February	...	...	2.87	7.88	...	...
March	...	...	2.45	11.54	0.01	7.62
April	...	...	4.19	11.71	0.21	12.80
May	...	...	3.67	8.24	1.29	5.02
June	...	...	3.02	7.27	0.66	0.75
July	...	...	3.26	9.64	0.70	3.58
August	...	...	3.92	11.25	0.84	2.08
September	...	...	4.15	18.57	0.12	8.25
October	...	...	12.73	29.74	3.12	3.12
November	...	...	11.99	34.95	0.32	17.9
December	...	...	5.53	19.50	0.02	1.3
Total			62.94	...	...	64.2

Maximum Fall ... 86.34 inches in 1944

Minimum Fall ... 45.08 inches in 1908

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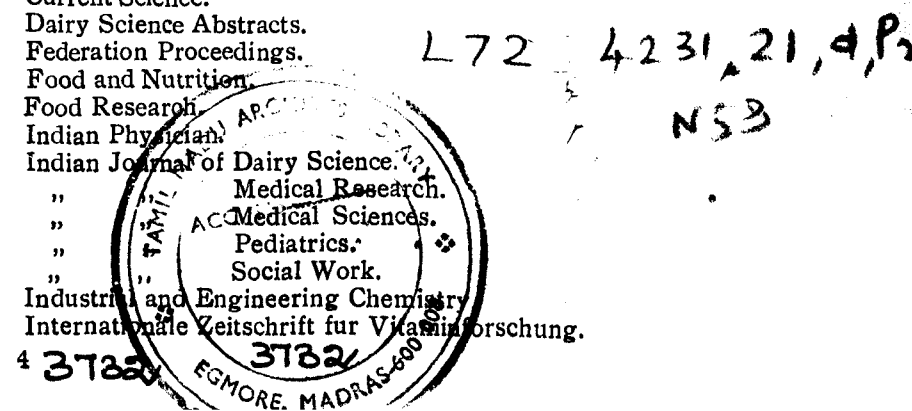
I. Pasteur Institute

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12. Annals of Tropical Medicine and Parasitology.
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17. Biological Abstracts.
18. Blood (Journal of Haematology).
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48. " " the Indian Medical Association.
49. " " Infectious Diseases.
50. " " Laboratory and Clinical Medicine.
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52. " " the Royal Army Medical Corps.
53. " " Scientific and Industrial Research.
54. " " Tropical Medicine and Hygiene.

55. Lancet.
56. Medical Journal of Australia.
57. Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service.
58. Nature.
59. New England Journal of Medicine.
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II. Nutrition Research Laboratories

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86. Archives Des Sciences Physiologiques.
87. Archives of Diseases of Childhood.
88. British Abstracts—A III Physiology, Biochemistry and Anatomy.
89. " " —C Analysis and Apparatus.
90. British Journal of Nutrition.
91. Bulletin of the World Health Organization.
92. Chemical Abstracts.
93. Chronicle of the World Health Organization.
94. Current Science.
95. Dairy Science Abstracts.
96. Federation Proceedings.
97. Food and Nutrition.
98. Food Research.
99. Indian Physician.
100. Indian Journal of Dairy Science.
101. " " Medical Research.
102. " " Medical Sciences.
103. " " Pediatrics.
104. " " Social Work.
105. Industrial and Engineering Chemistry.
106. Internationale Zeitschrift fur Vitaminforschung.



107. Journal of Applied Physiology.
108. Journal of General Physiology.
109. Journal of Nutrition.
110. Journal of Science of Food and Agriculture.
111. Journal of Scientific and Industrial Research.
112. Monthly Bulletin of the Ministry of Health and the Public Health Laboratory Service.
113. Nutrition Abstracts and Reviews.
114. Nutrition Bulletin.
115. Nutrition Reviews.
116. Proceedings of the Society for Experimental Biology and Medicine.
117. Science and Culture.
118. Tropical Diseases Bulletin.

SECTION B

THE FORTY-FIFTH ANNUAL REPORT OF THE CENTRAL "COMMITTEE OF THE PASTEUR INSTITUTE OF SOUTHERN INDIA, COONOR.

During the year under report the Office of the President of the Association was held by Dr. J. C. David, M.B., B.S., Ph.D. (Edin.), from 1-4-1951 to 27-4-1951, by Dr. K. Vasudeva Rao, M.D., F.R.C.P. (Edin.), T.D.D. (Wales), from 28-4-1951 to 10-11-1951 and by Dr. P. Arunachalam, M.D., M.R.C.P. (Lond.), T.D.D. (Wales), D.M.R. (Lond.), from 11-11-1951 to 31-3-1952.

In the absence of Dr. N. Veeraraghavan, M.B., B.S., D.Sc., on deputation abroad, Dr. I. G. K. Menon, M.B., B.S., continued to officiate as Honorary Secretary and Treasurer till 25-11-1951. Dr. N. Veeraraghavan, M.B., B.S., D.Sc., resumed charge of his duties as Honorary Secretary and Treasurer on 26-11-1951 and held the post till the end of the year.

The ordinary business of the Association for the year was despatched in four meetings :

June 25th 1951, at Coonoor,
September 22nd 1951, at Coonoor,
January 30th 1952, at Madras,
April 12th 1952, at Madras.

The Forty-fourth Annual General Meeting of the Members of the Association was held at Madras on 30th January 1952 at which the following Committee for the year 1951-'52 was formed.

List of Ex-officio Members of the Central Committee

1. The General Officer Commanding, Madras Area, Madras 4.
2. The Collector of the Nilgiris.
3. The District Medical Officer of the Nilgiris.
4. The Director of Medical Services, Madras.
5. Dean, Government General Hospital and Madras Medical College, Madras.
6. The Director, King Institute, Guindy, Madras.
7. The Officer Commanding, Military Hospital, Wellington.
8. The Chairman, Municipal Council, Coonoor.
9. The Director, Pasteur Institute, Coonoor.
10. The Hon'ble Chief Minister of Mysore State.
11. The Hon'ble Minister for Health, Travancore-Cochin State, Trivandram.
12. The Hon'ble the Chief Minister, Government of Hyderabad.
13. The Director of Public Health, Madras.
14. The Superintending Engineer, Coimbatore Circle, Coimbatore.
15. The Assistant Director of Medical Services, H.Q. Madras Area, St. Thomas Mount, Madras 16.
16. The Surgeon to His Excellency the Governor of Madras.
17. The Deputy Director of Medical Services, Madras.
18. The Officer Commanding, Military Hospital, Avadi, Madras.
19. The Chief Medical Officer, Southern Railway, Madras.
20. The Assistant Director, Pasteur Institute, Coonoor.
21. The Collector of Madras, Madras.

22. The Commissioner of the Corporation of Madras, Madras.
23. The Director of Animal Husbandry, Madras.

List of Elected Members of the Central Committee for the year 1951-'52.

1. Sri S. M. Patel, I, Big Street, Triplicane, Madras.
2. Sri P. R. Nammalwar, Councillor, Corporation of Madras, 'Sukavati', 148, Poonamallee High Road, Kilpauk, Madras.
3. Rao Bahadur Dr. T. S. Tirumurti, B.A., M.B. & C.M., D.T.M. & H., Retd. Civil Surgeon & Retd. Principal, Stanley Medical College, 'Sewagram' No. 1, Krishnamachari Road, Nungambakkam, Madras 6.
4. The Hon'ble Justice N. Mack, I.C.S., Judge, Madras High Court, 'The Lee', Sterling Road, Madras.
5. E. F. G. Hunter, Esq., C/o M/s Binny & Co., Madras.
6. Sri V. L. Ethiraj, Bar-at-Law, Public Prosecutor's Chambers, High Court, Madras.
7. Sri Rao Bahadur V. T. Rangaswami Aiyangar, Advocate, 'Surabhi', Balaji Nagar, Royapettah, Madras.
8. Col. A. J. D'Souza, M.C., I.M.S. (Retd.), 'Bramley Lodge', Ootacamund. (The Nilgiris).
9. Sir M. Balasundaram Naidu, Kt., C.I.E., Landlord, Madras.
10. Sri V. Emberumanar Chetty, Senior Partner, M/S Hoe & Co., Madras.
11. Sri S. Venkatesa Iyengar, B.A., B.L., Advocate, 'Seshadri Vilas', Mowbray's Road, Mylapore, Madras.
12. Sri Rai Bahadur C. Balchand, Banker, Mount Road, Coonoor.
13. Lieut.-Col. J. C. Bharucha, I.M.S. (Retd.), 'Bideford', Ootacamund.
14. Sri A. Varadappa Chetty, Honorary Presidency Magistrate, 26, South Mada Street, Mylapore, Madras.
15. Sri Rao Bahadur T. S. Kachapikasa Mudaliyar, B.A., Dubash, the South Indian Export Co., 145, Poonamallee High Road, 'Ajmer', Kilpauk, Madras.
16. Major P. F. Fanaken, I.M.S./I.A.M.C. (Retd.), 'Banksia', Coonoor.
17. Sri Jagannathadas Govindas, B.A., B.L., A.R.P.S., Advocate, 459, Mint Street, Park Town P.O., Madras.
18. Rao Bahadur Dr. M. R. Guruswami Mudaliyar, B.A., M.D., Hony. Consulting Physician, Government General Hospital, Madras, and Retd. Civil Surgeon, 'Gurubavan', Kilpauk, Madras.
19. Mrs. M. N. Clubwala, Honorary Presidency Magistrate, 'Philroy', Nungambakkam High Road, Cathedral P.O., Madras.
20. Dr. P. V. Cherian, Retd. Surgeon-General with the Government of Madras, 5, Victoria Crescent, Egmore, Madras.
21. C. F. Gilbert, Esq., Retired Engineer, 'The Lodge', Coonoor.
22. Dr. H. C. Berlie, 'Longleat', Coonoor.
23. Dr. R. B. Watson, M.D., 'The Rockefeller Foundation, No. 6, Infantry Road, P.O. Box No. 8, Bangalore 1.
24. Sri C. M. Kothari, Stock and Share Broker, Oriental Buildings, Armenian Street, George Town, Madras.
25. Janab Khan Sahib Siddick Ismail Sait Bahadur, Planter and Landlord, 'Stanley Villa', Coonoor.
26. Janab Khan Bahadur Muhammed Musa Sait Bahadur, Merchant, 12, Graeme's Road, Cathedral Post, Madras.
27. Sri G. Janakiram Chetty, Landlord, 'Gopathy Nivas', Thyagarayanagar, Madras.
28. J. Milton, Esq., President, Coonoor Co-operative Urban Bank Ltd., 'Llanelly', Coonoor.
29. L. Gonsalves, Esq., B.A., B.L., Advocate, 'Romana', Ootacamund.
30. Sri Rao Bahadur B. Samanna Naidu, Municipal Councillor, Mount Road, Coonoor.

The following members retired from the Central Committee during the year under Rule 7 of the Rules of the Pasteur Institute Association.

1. Sri C. M. Kothari, Madras.
2. Janab Khan Sahib Siddick Ismail Sait Bahadur, Coonoor.
3. Janab Khan Bahadur Muhammad Musa Sait Bahadur, Madras.
4. Sri Janakiram Chetty, Madras.
5. J. Milton, Esq., Coonoor.
6. L. Gonsalves, Esq., Ootacamund.
7. Sri Rao Bahadur B. Samanna Naidu, Coonoor.

All the retiring members were re-elected to the Central Committee.

Life Members of the Association.

1. Messrs. John Taylor & Sons, Oorgaum.
2. Messrs. Spencer & Co., Ltd.
3. The Raja of Pudukkottai.
4. The United Planters Association of Southern India, Coonoor.
5. Sir John Hall.

Honorary Life Members of the Association.

Lieut.-Col. T. H. Gloster, I.M.S. (Retd.).

List of Members of the Association.

1. Mr. Ramsay Unger.
2. The Treasurer, U.L.C. Mission, Guntur.
3. M/s Stanes & Co., Ltd., Coimbatore.
4. The Chief Medical Officer, Kolar Gold Fields.
5. Mr. G. Chooet-Smith, Madura.
6. Col. A. C. Ellery.
7. Mrs. Ellery.
8. Miss Gilbert.
9. Mr. J. R. N. Pryde.
10. Mrs. J. R. N. Pryde.
11. Miss G. Pakenham Walsh.
12. Sri P. Venugopal Pillay.
13. Dr. C. A. Martin.
14. Lieut.-Col. H. S. D'Arcy Mc'Arthy.
15. Captain J. S. Barnard.
16. Mrs. G. E. Berlie.
17. Major T. D. Jeevarathnam.
18. Mr. C. Rivaz.
19. Mrs. Mack.
20. Lieut.-Col. C. H. P. Allen.
21. Sri K. N. Nambudripad.
22. The Hon'ble Chief Justice Mr. P. V. Rajamannar.
23. Sri S. V. Ramanjam Chetty.

Contributions were received during the year from

Local Government.

Government of French India	...	RS. A. P.	RS. A. P.
			200 0 0

Other States.

	RS.	A.	P.	RS.	A.	P.
1. Mysore State (due Rs. 1,750)						
2. Travancore-Cochin State ...	2,000	0	0	2,000	0	0

Railways.

Southern Railway ...	100	0	0
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District Boards in Madras State.

1. District Board of Madurai (due Rs. 50)						
2. " " Chittoor ...	100	0	0			
3. " " Tirunelveli ...	200	0	0			
4. " " Salem (due Rs 200) ...	100	0	0			
5. " " Bellary ...	166	0	0			
6. " " Tanjore ...	300	0	0			
7. " " Kurnool ...	100	0	0			
8. " " Visakhapatnam (due Rs. 934)						
9. " " Tiruchirapalli ...	200	0	0			
10. " " Coimbatore ...	150	0	0			
11. " " Malabar ...	100	0	0			
12. " " Nilgiris ...	25	0	0			
				1,441	0	0

Municipalities in Madras State.

1. Chingleput Municipal Council ...	27	0	0			
2. Erode " " ...	20	0	0			
3. Karur " " ...	22	0	0			
4. Guntur " " ...	100	0	0			
5. Cochin " " ...	10	0	0			
6. Ootacamund " " ...	200	0	0			
7. Kumbakonam " " ...	25	0	0			
8. Palghat " " ...	35	0	0			
9. Masulipatam " " ...	105	0	0			
10. Coonoor " " ...	25	0	0			
11. Gudiatam " " ...	10	0	0			
12. Mercara " " ...	25	0	0			
13. Coimbatore " " ...	50	0	0			
14. Chittoor " " ...	37	0	0			
15. Cuddalore " " ...	30	0	0			
16. Secunderabad " " ...	100	0	0			
				821	0	0

Donations from patients and others.

His Highness the Maharajah Jam Sahib of Nawanagar ...	1,000	0	0			
				1,000	0	0
				5,562	0	0

The following Government Order was recorded :—

G. O. No. 525, Health, dated 18th February 1952 of the Government of Madras accepting enhancement of the price of antirabic vaccine from Rs. 6 to Rs. 7 per course.

During the year a total of 22,339 courses of antirabic vaccine equal to 1,922,123 c.c. of 5 per cent sheep brain vaccine was issued to civil and military hospitals. Besides, 137,166 c.c. of antirabic vaccine were supplied to various hospitals in Uttar Pradesh at the instance of the Director, Central Research Institute, Kasauli.

As a result of the increase in sale price of antirabic vaccine from Rs. 6 to Rs. 7 per course the financial position of the Institute has eased to an extent. On the other hand there has been a steady fall in the income from contributions particularly from local bodies and a decline in the income from interest on investments. Another disquieting feature has been the marked depreciation in the value of our investments on account of the fall in the price of Government securities. In these circumstances the scope for the expansion of the research activities which the Association is anxious to promote is limited. The Institute has been recognised by the Central Government as a Charitable Institution under the Indian Income-Tax Act and as such any contributions made are exempt from the levy of income-tax. Liberal contributions from the Central and State Governments, local bodies and others interested in the growth of science would greatly help in the expansion of the activities of the Institute.

Routine diagnostic work including general bacteriological and serological examination of pathological material from Government hospitals, private practitioners, etc., continued to be heavy during the year. A considerable amount of work has been done by the Biochemical section during the period under review. It is found that large number of patients from the Nilgiris and the surrounding districts are availing themselves of the diagnostic facilities.

The Institute has been a centre of reference in regard to medical and public health problems. Assistance was rendered to research workers in India and abroad by exchange of information and supply of material for study.

A considerable amount of research work on various subjects has been carried out during the year.

Dr. M. Kumara Menon, M.B., B.S., Assistant to the Director, Malaria Institute of India, Delhi, was given a short period of training at the Virus Laboratory of the Institute at the instance of the Director, Malaria Institute of India, Delhi.

Kumari I. Nalini, B.Sc., B.Ph.Sc., Government of India Industrial trainee is undergoing training in the various sections of the Institute from 1st October 1951.

During the year the World Health Organisation, Geneva, invited Dr. I. G. K. Menon, M.B., B.S., Assistant Director, to serve as a member of the Expert Advisory Panel on Influenza.

APPENDIX

Statement of Receipts and Disbursements of the Pasteur Institute of

RECEIPTS.	Amount.	Total. \$
	RS A P	RS A P
Opening balance with the Imperial Bank of India, Ootacamund, on 1-4-'51 ...	8,332 6 6	
" " in the Coonoor Sub-Treasury on 1-4-51 ...	7,579 1 8	
" " on hand on 1-4-51 ...	500 0 0	
		16,411 8 2
SUBSCRIPTIONS—		
Members of the Association ...	185 0 0	
Members of the Committee ...	125 0 0	
CONTRIBUTIONS—		
Madras District Boards ...	1,441 0 0	
Madras Municipalities ...	821 0 0	
Government of French India ...	200 0 0	
States ...	2,000 0 0	
Railways ...	100 0 0	
Donations from patients and others ...	1,000 0 0	
Interest on investments ...	27,691 2 0	5,872 0 0
Less collection charges ...	773 0 0	
Bacteriological fees ...		26,918 2 0
Sale of antirabic vaccine ...		5,676 2 0
Miscellaneous ...		1,55,308 0 2
Sales tax recoveries ...		2,607 0 9
Electric current recoveries ...		1,961 7 4
Recoveries by sale of animals ...		438 15 0
Refund of advances ...		39 8 0
Accommodation and Amenities ...		378 1 0
Nutrition Research for gas, etc. ...		6,900 0 0
Earnest money deposits ...		2,066 6 1
		200 0 0
Total ...		2,24,777 2 6

PASTEUR INSTITUTE,
COONOOR, 25-5-1952.

I.

Southern India, Coonoor, for the year 1951-52.

DISBURSEMENTS.	Amount.	Total.
	RS A P	RS A P
Salary of the Director ...	14,447 8 0	
Salary of other establishment ...	61,744 4 0	76,191 12 0
Contribution to Provident Fund ...		5,188 13 4
Travelling allowance ...	2,014 14 0	
Servants' clothing ...	181 5 0	2,196 3 0
Apparatus ...	9,974 3 0	
Chemicals ...	6,309 12 7	16,283 15 7
Materials for media room and other laboratories ...	965 2 5	
Ampoules, packing materials, etc. ...	17,409 7 9	
Purchase and upkeep of animals ...	39,088 8 7	57,463 2 9
Postage and Telegrams ...	10,194 13 0	
Telephone rent ...	603 5 0	
Insurance ...	803 2 0	
Discount and Bank charges ...	63 4 6	11,664 8 6
Manufacture of gas ...	2,519 13 6	
Electric light, power and cold storage ...	11,479 9 2	
Water, scavenging, etc. ...	157 14 0	
Audit fees ...	649 14 6	14,807 3 2
Maintenance, replacements and improvements to Buildings ...	13,776 9 0	
Furniture, fixtures and fittings ...	801 1 0	
Properties and other taxes ...	907 7 0	15,485 1 0
Purchase of books and periodicals ...	4,884 6 9	
Stationery and printing including bulletins, reprints, posters, etc. ...	2,163 14 9	7,048 5 6
Miscellaneous ...		281 1 6
Sales Tax ...		1,912 9 2
Advances to patients ...		319 8 0
Earnest money deposits ...		175 0 0
Closing Balance with the Imperial Bank of India, Ootacamund on 31-3-'52 ...	5,278 14 9	
" in the Coonoor Sub-Treasury on 31-3-52 ...	9,981 0 3	
" on hand on 31-3-52 ...	500 0 0	15,759 15 0
Total ...		2,24,777 2 6

(Sd.) N. VEERARAGHAVAN,
Director.

APPENDIX

Dr. Manufacturing and Trading Account of the Pasteur Institute, Coonoor,

PARTICULARS.	Amount.			Total.		
	RS	A	P	RS	A	P
To Stock on 1-4-1951				24,605	14	10
„ Establishment charges :—						
Paid during the year	76,191	12	0			
Add amount pending payment on 31-3-1952	15,660	0	0			
	91,851	12	0			
Less amount provided last year	15,709	10	0			
„ Contribution to Provident Fund				76,142	2	0
„ Travelling allowance				5,188	13	4
				2,014	14	0
„ Purchases :—						
Ampoules	17,409	7	9			
Chemicals	6,309	12	7			
Materials for media room and other laboratories	965	2	5			
Animals and their upkeep	39,049	0	7			
	63,733	7	4			
Add credit purchases outstanding on 31-3-1952	836	10	0			
	64,570	1	4			
Less outstanding bills of previous year	3,494	15	9			
				61,075	1	7
„ Postage and Telegrams	10,373	14	0			
„ Maintenance replacements and improvements to buildings	13,341	9	0			
„ Manufacture of gas	1,483	7	3			
„ Electric light, power and cold storage	1,705	13	0			
„ Water, scavenging, etc.	144	6	0			
„ Servants clothing	181	5	0			
„ Telephone rents	608	7	0			
„ Insurance	803	2	0			
„ Discount and Bank charges	63	4	6			
„ Property and other taxes	1,118	6	0			
„ Stationery and Printing	2,142	14	9			
„ Miscellaneous	281	1	6			
				32,247	10	0
„ Depreciation :—						
Buildings—5%	8,949	3	2			
Working plant—15%	2,007	1	8			
Furniture—10%	2,055	6	2			
Books—15%	3,541	4	5			
Apparatus—20%	9,192	3	1			
				25,745	2	6
Total				2,27,019	10	3

PASTEUR INSTITUTE,
Coonoor, May 25, 1952.

II.

for the year ending 31st March 1952.

Cr.

PARTICULARS.	Amount.			Total.		
	RS	A	P	RS	A	P
By Sale of antirabic vaccine				1,60,074	10	6
„ Bacteriological fees recovered				5,676	2	0
„ Stock on 31-3-1952 :—						
Antirabic vaccine . 4,54,489 c.c.						
Live-stock	2,223	12	9			
Chemicals	13,701	7	0			
Packing materials	1,574	10	5			
Kerosene, etc.	51	3	0			
Animal food	2,617	15	0			
Building materials	1,497	9	1			
Miscellaneous	127	7	4			
Ampoules	6,319	11	10			
				28,113	12	5
„ Balance—Gross loss carried to Profit and Loss Account				33,155	1	4
Total				2,27,019	10	3

(Sd.) N. VEERARAGHAVAN,
Director

APPENDIX

Balance Sheet of the Pasteur Institute,

CAPITAL AND LIABILITIES.	Amount.	Total.
	RS A P	RS A P
General Purposes Fund—		
As per last Balance Sheet	6,15,513 14 9	
Less Net loss carried from Profit and Loss Account	27,184 8 8	
		5,88,329 6 1
Endowment and Development Fund—		
As per last Balance Sheet		4,41,885 9 0
Special Building Grant—		60,000 0 0
Earnest money Deposits—		65 0 0
Sundry Creditors—		
Salary of Director and Staff for March 1952 ...	6,160 0 0	
Leave and Pension Contribution due to Lt.-Col. M. L. Ahuja	9,500 0 0	
Bills outstanding	1,217 8 9	
Sales tax pending payment	217 2 0	
Excess collection due to Nilgiris District Board ...	0 8 0	
Advance collection of subscription	5 0 0	
Excess collection for vaccine supplied	6 0 0	
		17,105 2 9
Carried over ...	...	11,07,386 1 10

III.

of Southern India, Coonoor, as on 31st March 1952.

ASSETS.	Amount.	Total.
	RS A P	RS A P
Block Account :—		
Land—12.53 acres		37,255 7 0
Buildings :—		
As per last Balance Sheet	1,78,983 13 5	
Less depreciation (5%)	8,949 3 2	
		1,70,034 10 3
Working Plant (Gas, Electric and Cold Storage)—		
As per last Balance Sheet	13,380 11 2	
Additions during the year	9,365 6 9	
	22,746 1 11	
Less depreciation (15%)	2,007 1 8	
		20,739 0 3
Furniture, Fixtures and Fittings :—		
As per last Balance Sheet	20,553 13 7	
Additions during the year	801 1 0	
	21,354 14 7	
Less depreciation (10%)	2,055 6 2	
		19,299 8 5
Books :—		
As per last Balance Sheet	23,608 8 1	
Additions during the year	4,884 6 9	
	28,492 14 10	
Less depreciation (15%)	3,541 4 5	
		24,951 10 5
Apparatus :—		
As per last Balance Sheet	45,960 15 4	
Additions during the year	5,433 13 3	
	51,394 12 7	
Less depreciation (20%)	9,192 3 1	
		42,202 9 6
Stock-in-Trade :—		
Antirabic Vaccine—4,54,489 c.c.	2,223 12 9	
Livestock	6,319 11 10	
Amponles	13,701 7 0	
Chemicals	1,574 10 5	
Packing materials	51 3 0	
Kerosene, etc.	2,617 15 0	
Animal food	1,497 9 1	
Building materials	127 7 4	
Miscellaneous		
		28,113 12 5
Carried over ...	...	3,42,596 10 3

APPENDIX IV.

Profit and Loss Account of the Pasteur Institute, Coonoor, for the year ended 31st March 1952.

Dr.

PARTICULARS	Amount		Total	Amount		Total
	RS	A P	RS	A P	RS	A P
To Balance from the Manufacturing and Trading Account			33,155	1 4	7,304	0 0
" Audit Fees			349	14 6	215	0 0
" Loss due to depreciation in the market value of securities			35,507	5 7		
Total			69,012	5 5		
					7,089	0 0
					7,200	0 0
					2,589	5 1
					23,878	14 0
					773	0 0
					23,105	14 0
					1,843	9 8
					27,184	8 8
					69,012	5 5

APPENDIX V.

Contribution D.C.B. statement of the Pasteur Institute, Conoor, for the year 1951-'52.

PARTICULARS	Advance Collection.			Arrears.			Current.			Total.			Amount collected.			Amount written off.			Balance on 31-3-'52.			Advance Collection.		
	RS	A	P	RS	A	P	RS	A	P	RS	A	P	RS	A	P	RS	A	P	RS	A	P	RS	A	P
Members of the Association	5	0	0	70	0	0	209	0	0	265	0	0	185	0	0	15	0	0	70	0	0	5	0	0
Members of the Committee	5	0	0	90	0	0	150	0	0	235	0	0	125	0	0				110	0	0			
Madras District Boards				642	0	0	1,983	0	0	2,625	0	0	1,441	0	0				1,184	0	0			
Madras Municipalities							821	0	0	821	0	0	821	0	0									
Government of French India							200	0	0	200	0	0	200	0	0									
States				1,000	0	0	2,750	0	0	3,750	0	0	2,000	0	0				1,750	0	0			
Railways				100	0	0	2,900	0	0	360	0	0	100	0	0				200	0	0			
Donations from patients and others							1,000	0	0	1,000	0	0	1,000	0	0									
Total	10	0	0	1,902	0	0	7,304	0	0	9,196	0	0	5,872	0	0	215	0	0	3,114	0	0	5	0	0

(Sd.) N. VEERARAGHAVAN,
Director.

PASTEUR INSTITUTE, COONOR,
May 25 1952.

APPENDIX VI.

Provident Fund Account of the Pasteur Institute, Coonoor, for the year 1951-'52.

Sources of Receipts.	Amount.			Total.	How Invested.			Amount.			Total.
	RS	A	P		RS	A	P	RS	A	P	
Cash on hand on 1-4-1951											
Opening Balance in Subscription Account on 1-4-1951	32,734	3	10	0			Loans to members from Subscription Account				
Subscription from members of staff	3,917	3	0				Subscription and Bonus refunded with interest to:				
Compulsory Savings	2,204	12	0				Mr. Samuel	1,155	0	0	
Advances recovered	987	0	0				Sri Moses	54	15	3	
Interest on Subscription Account	821	2	8				Sri N. Radhakrishnan	196	12	6	
				40,664	5	6	Closing Balance on 31-3-52				1,406
Opening Balance in Bonus Account on 1-4-1951	31,215	14	11				In Fixed Deposits with the Imperial Bank of India, Ootacamund	11,025	3	0	
Bonus paid from Institute funds	3,917	3	0				In National Savings Certificates (12 year series)	41,155	0	0	
Interest on Bonus Account	776	9	3				In 3½% 10 year Treasury Savings Deposit Certificates	5,000	0	0	
				35,909	11	2	In Savings Bank Account with the Coonoor Post Office	16,617	12	0	
Miscellaneous				0	10	8	Cash on hand	0	0	5	
							Total				73,797
Total				76,574	11	7					76,574

APPENDIX VII.

APPENDIX VII.

(Sd.) N. VEERARAGHAVAN, *Director.*

Endowment.	Amount.		Total.		How invested.	Amount.		Total.	
	RS	A	RS	A		RS	A	RS	A
Opening Balance on 1-4-1951	...		4,41,885	9 0	In Government securities with the Treasurer of Charitable Endowment, Madras	RS		4,41,885	9 0
Total	...		4,41,885	9 0	Total	...		4,41,885	9 0

PASTEUR INSTITUTE, COONOR,
May 25, 1952.

(Sd.) N. VEERARAGHAVAN,
Director.

SECTION C

SCIENTIFIC REPORT

I. RABIES

A. The Value of 5% Semple's Antirabic Vaccine in Human Treatment

(N. VEERARAGHAVAN)

Introduction

It is now recognised that the only reliable way of assessing the value of antirabic treatment in human beings is to study the fate of a number of similar groups of persons bitten by rabid animals, the infectivity of each animal at the time of biting being proved by subsequent death from hydrophobia of at least one of the persons bitten by them. An evaluation of the mortality rate among the treated and untreated in these groups would then give an accurate index of the value of treatment. A less accurate but still useful way of arriving at a valuation of antirabic treatment is to take only those instances in which a presumably rabid dog has bitten several persons, of whom some accept treatment and some refuse. If both groups are observed for several months it should be possible to assess the value of treatment.

An enquiry on these lines has been in progress at the Institute since 1946. The main objects of the enquiry are to determine (i) whether the 5 per cent Semple's vaccine manufactured by this Institute has any protective value under circumstances in which adequate control untreated groups have been observed and (ii) whether there is any variation in the mortality rate as a result of treatment with 5 per cent Semple's vaccine instead of the 1 per cent vaccine used by Col. Cornwall at this Institute during the years 1912-'24 for which he has collected similar data.

Materials

In this investigation every attempt has been made to obtain all particulars regarding the biting animals as well as the persons and animals bitten by them. The fate of the treated and untreated has been ascertained in most cases one year after bite. In some instances where a rabid dog or jackal has bitten several persons, one of the staff has visited the village on more than one occasion and checked up the fate of the treated and untreated persons. The data given below pertain to all persons regarding whom particulars are available without any selection.

During the years 1946-'51 a total of 1,451 persons bitten by proved or presumably rabid animals has been observed. These can be classified into three groups as shown below:

(a) Persons bitten by animals whose infectivity has been proved by the death from rabies of one of the persons or animals bitten by them. All instances where only one person bitten by a rabid animal has died of hydrophobia with or without treatment have been excluded.

(b) Persons bitten by animals proved rabid by laboratory examination or certified clinically rabid.

(c) Persons bitten by presumably rabid animals which were killed after they had bitten two or more persons. In this group are also included all persons bitten by jackals and foxes. This has been done as some consider that all wolves, jackals and foxes which attack persons need not necessarily be rabid.

All the relevant data regarding the various groups studied are given in Tables 1 to 3. Table 4 summarizes all the findings presented in Tables 1 to 3.

The total number of animals involved in this investigation was 568. They are grouped as follows:

Dogs	...	...	418	(73.6%)
Jackals	...	...	112	(19.7%)
Foxes	...	...	9	(1.6%)
Other animals	...	...	29	(5.1%)

Comments

In table 1 are given all the particulars regarding the various episodes where the infectivity of the biting animal has been proved by one of the bitten persons dying of rabies. The results can be summarized as follows:

Number of persons bitten	...	186	
Number completely treated	...	120	
Deaths from rabies among the completely treated	...	10	(8.33%)
Number untreated, incompletely treated or died during treatment	...	66	
Deaths from rabies among the untreated, incompletely treated and those who died during treatment	...	31	(47%)

The treated patients in episodes 4, 28, 29 and 33 in Table 1 developed signs of hydrophobia 6, 12, 4 and 12 days respectively after the completion of treatment. If the view is taken that deaths within 15 days after the completion of treatment should not be considered treatment failures the mortality rate among the treated would be only 6 out of 116 i.e., 5.1 per cent.

In four instances persons started treatment 42 to 46 days after bite. Col. Cornwall in his study considered that all persons coming for treatment 35 days or more after bite had already traversed the period of greatest risk that most of them would survive even without treatment. In the present study the longest incubation period is 203 days while the shortest is 20 days. In one instance the incubation period among persons bitten by the same jackal varied from 26 to 180 days. In these circumstances it was considered inadvisable to fix an arbitrary limit of 35 days beyond which the chances of the treatment being of any value should be considered doubtful.

The incubation period among those who died after treatment is given below:

Incubation period in days.	Number of persons.
20	1
21	1
29	1
33	2
37	1
42	1
47	1
59	1
203	1

TABLE I

Group (x)

(Numerator : Deaths) Persons bitten by proved infective rabid animals. (Denominator : No. of persons involved)

Serial No.	Biting animal	Total No. of persons bitten	Deaths among completely treated			Deaths among incompletely treated			Deaths during treatment			Deaths among untreated			Deaths among animals bitten	Remarks
			Classification			Classification			Classification			Classification				
			II	III		II	III		II	III		II	III	Unknown		
1	Jackal	4	...	1/4	...	...	...	...	...	...	...	...	...	...	Treated patient died 33 days after bite.	
2	"	16	...	0/8	...	...	...	...	...	...	...	...	...	...	...	
3	"	35	...	0/12	...	...	...	...	...	...	...	...	...	...	Incubation periods (I P) among untreated were 26, 39, 46, 150 and 180 days. Treated patients started treatment within 6 days after bite.	
4	"	12	...	1/5	...	...	...	...	...	...	...	...	...	4/4	I P in the treated patient was 20 days. Treatment was started one day after bite. Three dogs and one cow bitten by the jackal died of rabies.	
5	Dog	2	...	0/1	...	...	...	...	...	...	...	...	...	...	...	
6	"	3	...	0/1	...	...	...	...	1/1	...	...	...	...	1/1	Dog died 3 days after biting. The untreated patient died of rabies 40 days after bite. The other patients reported for treatment 42 days after bite.	
7	"	3	...	0/1	...	...	...	...	...	...	...	...	...	0/2	One calf bitten by the dog died of rabies.	
8	"	2	...	0/1	...	...	...	...	...	...	...	...	...	1/1	I P in the untreated case was 91 days. Treated patients started treatment 22 days after bite.	
9	"	4	...	0/2	...	...	...	...	1/1	...	...	...	...	1/1	Dog died 3 days after biting. I P in the untreated patient not known. I P in the patient who died during treatment was 46 days.	
10	"	3	0/1	0/1	...	...	...	...	1/1	...	...	...	...	...	I P in patients who died during treatment was 26 days. Treatment started 12th day after bite.	
11	"	7	...	0/6	...	...	...	...	...	...	...	...	...	1/1	I P in the untreated case was 40 days. Treated patients started treatment 42 days after bite.	
12	"	23	...	0/19	...	...	...	...	2/2	...	...	...	...	...	I P in the untreated case was 46 days. I P in patients who died during treatment were 57 and 58 days. Treatment for all others was started on the 46th day after the death of the first untreated case.	
13	"	3	...	1/3	...	...	...	...	...	...	...	...	...	...	I P in the treated case was 47 days. Treatment was started on the date of bite.	
14	"	3	...	0/3	...	...	...	...	...	...	...	...	...	1/2	One animal bitten by the dog died of rabies 20 days after bite.	
15	"	2	0/1	...	...	...	...	...	...	...	...	...	...	...	I P in untreated case was 30 days.	

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16	"	3	0/1	...	...	...	...	...	...	...	...	...	...	...	2/2	I P in untreated cases were 30 and 120 days. The treated patient started treatment 45 days after bite.
17	"	5	0/2	...	...	...	...	...	...	...	...	...	...	...	...	...
18	"	2	...	1/1	...	...	...	...	...	...	...	...	...	...	...	I P in the incompletely treated case was 25 days. Treatment was started on the 6th day after bite and 9 injections were given.
19	"	3	...	...	...	...	...	...	1/1	...	...	...	...	...	...	I P in the case which died during treatment was 16 days. Showed signs of rabies 3 days after starting treatment.
20	"	2	1/2	...	...	...	...	...	...	...	...	...	...	...	...	I P in the treated patient was 59 days. Treatment was started 15 days after bite.
21	"	5	...	1/5	...	...	...	...	...	...	...	...	...	...	...	I P in the treated case was 42 days. Treatment started 2 days after bite.
22	"	2	...	1/1	...	...	...	...	...	...	...	...	...	...	3/4	I P in the treated case was 203 days. The untreated patient is said to have been scratched only. Three dogs bitten died of rabies.
23	"	2	...	0/1	...	...	...	...	1/1	...	...	...	...	...	...	I P in the case which died during treatment was 34 days. Showed signs of rabies 4 days after starting treatment.
24	"	4	0/1	0/2	...	...	...	...	...	...	...	...	...	...	...	I P in the incompletely treated case was 69 days. Treatment was started 29 days after bite and 3 injections were given.
25	"	3	...	0/2	...	...	...	...	1/1	...	...	...	...	...	...	I P in the case which died during treatment was 32 days. Showed signs of rabies on the 3rd day after starting treatment. Treatment for all patients commenced 30 days after bite.
26	"	2	...	0/1	...	...	...	...	1/1	...	...	...	...	...	...	I P in the case which died during treatment was 21 days. Treatment started 10 days after bite. Patient showed signs of rabies on the 11th day after starting treatment. Treatment for the other case was started 15 days after bite.
27	"	2	...	1/2	...	...	...	...	...	...	...	...	...	...	...	I P in the case which died was 37 days. Treatment was started 3 days after bite. In the case which survived treatment was started 5 days after bite.
28	"	2	...	1/2	...	...	...	...	...	...	...	...	...	...	...	I P in the case which died was 29 days. Both patients reported for treatment 3 days after bite.
29	"	5	0/1	1/4	...	...	...	...	...	...	...	...	...	...	...	I P in the case which died was 21 days. Treatment was started 2 days after bite.
30	"	3	0/1	0/2	...	...	...	...	...	...	...	...	...	...	1/1	One dog bitten by the rabid animal died of rabies.
31	"	3	...	0/3	...	...	...	...	...	...	...	...	...	...	1/1	One calf bitten on the muzzle died 21 days after bite.
32	"	2	...	0/2	...	...	...	...	...	...	...	...	...	...	1/2	One buffalo calf bitten died of rabies.
33	"	14	1/5	0/9	...	...	...	...	...	...	...	...	...	...	...	I P in the calf which died was 33 days. Treatment was started 7 days after bite.
Total	...	186	2/14	8/106	1/1	2/12	...	9/9	...	10/31	9/13	14/18				

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Group (ii)

Persons bitten by proved rabid animals

Bitten in groups of	Total No. of persons bitten	Completely treated						Incompletely treated						Untreated						Biting animals							
		Classification						Classification						Classification						Dog	Calf	Goat	Cat	Buffalo	Human		
		Total						Total						Total													
		I	II	III	Un- known			I	II	III	Un- known			I	II	III	Un- known										
1	109	9	32	67	...	108	...	...	...	...	...	...	...	...	...	...	...	...	...	93	5	2	1	1	5		
2	54	9	21	21	3	54	...	...	...	...	...	...	...	...	...	...	...	...	...	22	1	...	2	...	1	1	
3	30	11	8	8	3	30	...	...	...	...	...	...	...	...	...	...	...	...	...	9	1	...	...	...	...	...	
4	20	3	5	12	...	20	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	1	
5	20	9	8	3	...	20	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...	
6	18	12	1	...	2	15	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	
7	21	16	4	...	...	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	2	
9	18	9	9	...	...	18	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	
12	12	12	...	...	...	12	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	
Total ...	302	90	83	111	8	297	...	...	...	...	...	...	...	...	...	...	...	...	...	5	138	7	2	5	1	2	9

TABLE 3

Group (iii)

Persons bitten by presumably rabid animals

Bitten in groups of	Total No. of persons bitten	Completely treated						Incompletely treated						Untreated						Biting animals					
		Classification					Total	Classification					Total	Classification					Total	Dog	Jackal	Fox	Cat	Donkey	Cow
		Classification						Classification						Classification											
		I	II	III	Un- known	Total		I	II	III	Un- known	Total		I	II	III	Un- known	Total							
1	72	...	2	70	...	72	...	...	...	...	...	...	...	...	...	...	...	67	5	...	...	...	...	...	...
2	336	14	133	172	3	322	...	...	3	...	...	...	...	...	...	...	...	138	24	4	1	...	...	...	...
3	198	1	61	103	15	180	...	...	...	...	...	...	...	...	...	...	...	55	11	...	...	...	...	...	...
4	132	10	32	71	7	120	...	...	1	...	...	...	...	...	...	...	...	24	...	...	...	...	...	...	1
5	75	...	10	44	9	63	...	...	...	...	...	...	...	...	...	...	...	13	2	...	...	...	...	...	...
6	60	...	8	47	...	55	...	...	...	...	...	...	...	...	...	...	...	10	...	...	...	...	...	...	...
7	28	4	13	11	...	28	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
8	32	1	12	19	...	32	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...
9	9	...	6	3	...	9	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
10	20	...	8	12	...	20	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...
11	11	...	...	1	10	11	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Total ...	973	30	285	553	44	912	...	...	4	...	...	...	...	...	...	...	...	248	108	9	1	1	1	1	1

TABLE 4

Combined Statement of Tables 1, 2 and 3

PERSONS BITTEN BY INFECTIVE, PROVED AND PRESUMABLY RABID ANIMALS

Numerator: Deaths.

Denominator: No. of persons involved.

Group	Total No. bitten. persons	Deaths among completely treated					Deaths among incompletely treated					Deaths during treatment					Deaths among untreated					Biting animals											
		Classification					Classification					Classification					Classification																
		Total					Total					Total					Total																
		I	II	III	Unknown		I	II	III	Unknown		I	II	III	Unknown		I	II	III	Unknown		Dog	Jackal	Fox	Cat	Donkey	Cow	Calf	Buffalo	Goat	Human		
I	186	...	2/14	8/106	...	15/109	...	1/1	2/12	...	3/13	...	...	9/9	...	10/20	...	...	10/31	9/13	19/44	32	4	...	...	...	...	...	...	...	...	...	
II	302	0/90	0/88	0/111	0/8	0/297	...	...	...	...	...	...	...	...	...	0/10/1	...	0/3	0/5	138	...	...	...	1	...	7	2	2	5	9	...		
III	973	0/30	0/285	0/553	0/44	0/912	...	0/4	...	...	0/4	...	...	...	...	0/20/4	0/2	0/49	0/57	248	108	9	1	1	1	...	...	...	...	...	...		
Total	1461	0/120	2/387	8/770	0/52	15/1318	...	1/5	2/12	...	3/17	...	...	9/9	...	10/20	...	0/30/5	10/33	9/65	19/106	418	112	9	2	1	8	2	2	5	9	...	

In Table 4 are given the data concerning the persons observed in all the groups. All these persons have been bitten by proved or presumably rabid animals. The findings presented in the Table can be summarized as follows:

Number of persons observed	...	1,461
Treated	...	1,329
Deaths among treated	...	10 (0.75%)
Untreated or incompletely treated	...	132
Deaths among untreated or incompletely treated	...	31 (25.5%)

Conclusions

It will be seen from the above figures that 8.33 per cent of persons bitten by proved infective animals develop the disease in spite of having a complete course of treatment while the mortality rate is 47 per cent in the same group of persons when they are not treated or undergo an incomplete course of treatment. Thus it would appear that the treatment given by the Pasteur Institute, Coonoor, saves nine out of every eleven persons who would otherwise have developed rabies and died.

If on the other hand, we take into consideration all persons bitten by proved or presumably rabid animals the mortality rate in the treated group is found to be 0.75 per cent. This figure is 2.3 times the over-all mortality rate of 0.33 per cent among the treated arrived at by McKendrick as a result of analysis of the data for over 12 years. It is, however, worth pointing out that it is nearly one-third of the mortality rate of 2.5 per cent reported by Col. Cornwall in his study. These figures would appear to indicate that the results of treatment with the 5 per cent Semple's vaccine now prepared at this Institute are superior to those obtained with the 1 per cent vaccine used in the treatment of patients during the years 1912-'24.

B. Studies on the Cultivation of Rabies Virus *in vitro* (N. VEERARAGHAVAN)

It has been reported earlier that with the newer samples of glycine (B.D.H.) it is not possible to obtain any evidence of multiplication of rabies virus *in vitro* compared with the concentration of 2,500 to 5,000 million m.l.d. of virus previously obtained. All the available evidence suggests that the good results obtained were not due to glycine *per se* but to some impurity or impurities present in it. This view is strengthened by the finding that an analysis of the old sample of glycine shows that it contains 3 to 4 per cent impurities.

Studies have been in progress to determine the nature of the impurity. The problem is really complex as glycine was produced by three different methods by the manufacturers during the years 1938-1939.

The results of these investigations are summarized below.

1. The following compounds added to the standard culture medium in concentrations mentioned per 100 ml. were found to have no beneficial effect on the multiplication of the virus *in vitro*:

Proteoses		
Proteose-peptone (Armour)	...	250 mg. per 100 ml.
" " (Difco)	...	250
Peptones		
Bacto-Peptide (1941)	...	150
" " (1942)	...	"
" " (1947)	...	"
" " (1949)	...	"
Peptone (Gurr)	...	"
" Raptokos Brett)	...	"

Polypeptides

Glycyl-glycine	...	...	200 mg. per 100 ml.
Leucyl-glycine	...	...	"
Partial hydrolysate of casein obtained by re-fluxing for 6 hours 20 g. of casein with 200 ml. of 0.5 N HCl (= g. casein)	...	...	2 ml.

Amino acids

dl-alanine	...	...	25—250 mg.
l-arginine hydrochloride	...	...	5—20
dl-aspartic acid	...	...	10
l-cystine	...	...	2.5—20
l-glutamic acid	...	...	5—20
l-histidine monohydrochloride	...	...	2.5—20
l-hydroxyproline	...	...	25—50
isoleucine	...	...	20
l-leucine	...	...	2—50
l-lysine	...	...	25
dl-methionine	...	...	2—20
dl-phenylalanine	...	...	5—50
l-proline	...	...	20—50
dl-serine	...	...	20
dl-threonine	...	...	2.5—20
dl-valine	...	...	2.5—50

Factors

d-Biotin (Ashe)	...	...	0.2—20 ug.
" (Roche)	...	...	20
" (Merck)	...	...	20
+ Biotin (Roche)	...	...	20
Biotin Concentrate from liver-acid hydrolysis papain	...	...	...
Biotin Concentrate from egg yolk	...	...	...
Choline chloride	...	...	1—200 mg.
Cobione (Vitamin B ₁₂ , Merck)	...	...	1 ug.
Folic acid	...	...	1—200 "
Hepatex-T (Evans)	...	...	0.2 ml.
Liver Infusion (McLeod)	...	...	10 ml.
p-aminobenzoic acid	...	...	500 ug.
Vitamin A (Glaxo- water soluble)	...	...	50 IU
" C (Ascorbic acid, B.D.H.)	...	...	10—20 mg.
" D (Calciferol, in 0.1 ml. alcohol)	...	...	400 IU
" E (in 0.1 ml. alcohol)	...	...	1 mg.

Trace Minerals

Cobalt chloride	...	...	6 ug.
Copper sulphate	...	...	25—1,000
Ferric chloride	...	...	125
Ferrous sulphate	...	...	250
Iodine+	...	...	330
Potassium iodide	...	...	660
Manganese tetrachloride	...	...	6
Zinc sulphate	...	...	6

Salts

Ammonium acetate (Merck)	...	...	400 mg.
" carbonate	...	...	25
" phosphate (monobasic, Merck)	...	...	400
" phosphate (dibasic, Merck)	...	...	300

Ammonium sulphate (Merck)	...	...	300
Calcium chloride	...	...	100
" lactate	...	...	10
Magnesium sulphate (Merck)	...	...	25—50
Methylene-aminoacetonitrile	...	...	50
Methylene glycine	...	...	80
Potassium chloride	...	...	480
" nitrate (Merck)	...	...	1,000
Sodium acetate (Merck)	...	...	10
Sodium carbonate	...	...	200—800
" chloride (Merck)	...	...	100
" citrate	...	...	100
" nitrite (Merck)	...	...	100
Sodium salicylate	...	...	100
" sulphite	...	...	50

Other substances

Ammonium sulphocyanide	...	...	10 mg.
Asparagine	...	...	100
BAL	...	...	25
Betain HCl	...	...	200
Clarified steamed tomato juice	...	...	1 ml.
Creatine	...	...	25 mg.
Creatinine	...	...	25 mg.
Ethylene diaminetetraacetic acid	...	...	50—200 mg.
Glucose (Merck)	...	...	500
Glycollic acid	...	...	100—200
Glyoxylic acid (B.D.H.)	...	...	1—2 ml.
Hydroxylamine	...	...	100 mg.
Pyruvic acid	...	...	100
Sarcosine	...	...	200
Sodium azide	...	...	8
Sodium cyanide	...	...	0.1—0.4
Sodium fluoride	...	...	0.01
Sodium hippurate	...	...	100
Sodium sulphocyanide	...	...	10
Urea	...	...	100
Uric acid	...	...	10
Yeast nucleic acid (Merck)	...	...	10

2. The addition of the following substances to the medium occasionally gave good concentrations of the virus in cultures. But the results could not be repeated regularly.

Ammonium bicarbonate (Baker)	...	...	370 mg.
" chloride (Analar)	...	...	50—250
" nitrate (Merck)	...	...	200—370
Carbon-dioxide gas (a small quantity bubbled into the medium taking care to see that the pH is not altered much before inoculating the virus)	...	...	...
Dimethyl glycine	...	...	50—200
dl-Cysteine hydrochloride	...	...	25—50 mg.
Glycine anhydride	...	...	100—200
Glutathione (B.D.H.)	...	...	5 "
Marmite Paste (5%)	...	...	5 ml.

Throughout these investigations care was taken to see that pH of the cultures before incubation was 6.8.

These studies are being continued.

C. Action of Receptor-Destroying Enzyme of *V. Cholerae* in Rabies (N. VEERARAGHAVAN, A. BALASUBRAMANIAN AND T. P. SUBARAMANIAN)

It has been reported by Stone (1948) that infections of influenza virus of embryonated hens' eggs after allantoic inoculation and of mouse lungs after intranasal instillation, could be prevented by pretreatment of the exposed cells with the receptor-destroying enzyme (RDE) of *Vibrio cholerae*. Cairns (1951) showed that the death of mice from infection by a neurotropic variant of influenza virus can be similarly prevented by pretreatment of the mice with an intracerebral injection of the receptor-destroying enzyme.

Experiments were undertaken to determine whether the receptor-destroying enzyme administered intravenously, intraperitoneally or subcutaneously, had any value in preventing the onset of rabies in animals given the virus intracerebrally or subcutaneously.

The medium used for the preparation of cholera vibrio filtrate consisted of one per cent proteose-peptone (Armour) and 0.5 per cent sodium chloride added to beef heart infusion and steamed for 20 minutes to dissolve the peptone. The mixture was filtered, pH adjusted to 7.4 and sterilised by autoclaving.

Cholera vibrio filtrate was prepared by inoculating the above medium with about 10,000 million organisms per 100 ml. A 20 hour culture of the strain of *V. cholerae* on nutrient agar was used. The cultures were incubated at 37° C. At the end of 20 hours it was filtered through a Sterimat GS pad. The filtrate was tested for sterility and used for the determination of the RDE content.

The method employed for the purification of RDE was similar to that described by Burnet and Joyce (1947). 0.5 ml. of packed guinea-pig cells is added to each 10 ml. of crude filtrate in centrifuge tubes, all reagents and tubes being chilled to 0°C. As soon as the red cells have been thoroughly dispersed and have been in contact with the fluid for 2 minutes the tubes are rapidly centrifuged and the supernatant fluid removed. The cells are resuspended in one-fourth the volume of normal saline, incubated at 37°C for half an hour, centrifuged and the supernatant removed. This served as the purified RDE.

Guinea-pig red cells obtained under sterile conditions were washed four times in normal saline and used.

The method of determining the RDE content was similar to that described by Burnet, McCrea and Stone (1946). Serial dilutions of filtrate were made in calcium saline in 0.25 ml. amounts giving a range of doubling dilutions from 1 to 512. To each tube 0.25 ml. of a 10 per cent washed guinea-pig cells were added, shaken well and incubated at 37°C for 2½ hours. The tubes were then centrifuged and the supernatant fluid discarded. The cells were made up to a 0.5 per cent suspension by the addition of citrate saline. 0.25 ml. of each suspension was put into a standard haemagglutination tube and 0.25 ml. of influenza virus (PR 8 strain) containing 5 haemagglutinating doses added. Results were read at the end of two hours.

The results of the experiments are summarized below:

Results

Experiment 1.

Twenty rabbits (average weight 1660 gm.) were given 5 ml. of the crude cholera filtrate (RDE titre: 128) intravenously for five consecutive days. Nine of the rabbits died of protein shock during treatment.

Eleven of the treated rabbits and five controls were challenged with 0.3 ml. of 1 in 1,000 dilution of the Paris strain of rabies fixed virus subdurally on the third day of treatment.

Seven out of 11 (64%) of the treated animals and 3 out of 5 (60%) of the untreated controls died of rabies.

Experiment 2.

In this experiment the challenge virus was given subcutaneously immediately after the administration of the first dose of the crude cholera filtrate.

Fifteen rabbits in group I were given the filtrate subcutaneously, 15 in group II intravenously and 10 in group III intraperitoneally. The treatment consisted of 5 ml. of the filtrate daily for 5 days. Ten animals in group IV were not treated and served as controls.

All the animals were challenged with 0.75 ml. of the supernatant from a 20% suspension of sheep fixed virus brain given subcutaneously immediately after the administration of the first dose of the filtrate.

The results of the experiment are given below:

TABLE 5.

Group	Mode of administration cholera filtrate	Number of rabbits used	Number died of other causes	Number died of rabies	Mortality per cent due to rabies	Average incubation period in days
I	Subcutaneous ...	15	0	12	80	14
II	Intravenous ...	15	5	5	50	11
III	Intraperitoneal ...	10	1	6	66	13
IV	Untreated ...	10	0	9	90	10

As the intravenous administration of crude cholera filtrate appeared to be of some value the experiment was repeated using purified RDE.

Experiment 3.

25 rabbits were given 4 ml. of a purified preparation of RDE (titre: 256) for 5 days intravenously. These were challenged with 0.75 ml. of the supernatant from a 20% suspension of sheep fixed virus brain given subcutaneously immediately after giving the first dose of RDE, along with 20 rabbits which were untreated and served as controls. The results of the experiment are given below:

TABLE 6

Group	Mode of administration of purified RDE	Number of rabbits used	Number died of other causes	Number died of rabies	Mortality per cent due to rabies	Average incubation period in days
I	Intravenous ...	25	3	12	55	16
II	Untreated ...	20	0	13	65	17

These results would indicate that the receptor-destroying enzyme of *V. cholerae* given subcutaneously, intraperitoneally or intravenously is of no value in preventing the onset of rabies in animals challenged with the virus intracerebrally or subcutaneously.

The value of receptor-destroying enzyme administered intracerebrally is under investigation.

II. Q FEVER

(N. VEERARAGHAVAN AND P. K. SUKUMARAN)

At the instance of the World Health Organization a survey of the prevalence of Q fever in the Nilgiris and surrounding districts of the Madras State was undertaken.

The division of Epidemiological Services, W. H. O. kindly supplied the Institute with Q fever antigen and positive guinea-pig sera.

The screening was done with a 1 in 16 dilution of the sera. The procedure adopted for the complement-fixation test was that recommended by the World Health Organization. 0.25 ml. of a 1 in 16 dilution of the serum, 0.25 ml. containing 2 units of antigen and 0.5 ml. containing 2 units of complement were incubated overnight at +4° C. 0.25 ml. containing 2 units of haemolysin and 0.25 ml. of a 2 per cent suspension of sheep cells were then added, the mixture incubated for 30 minutes at 37° C and the results read.

The sera of 46 persons, 80 cows, 12 bullocks, 6 buffaloes and 44 sheep have so far been studied. The results are summarized in the following table:

TABLE 7

	Number of sera tested	Number positive in screening test	Number of sera positive in the highest dilution			
			16	32	64	128
Human	46	7	3	3	1	0
Cow	80	14	12	1	1	0
Bullock	12	0	0	0	0	0
Buffalo	6	0	0	0	0	0
Sheep	44	2	2	0	0	0
Total	188	23	15	6	2	0

The above findings would indicate that Q fever is prevalent in the Nilgiris. It is interesting to note that 2 out of 3 human sera positive in each of the dilutions 16 and 32 and one positive in a dilution of 64 were obtained from the Todas, a pastoral people, living in the Nilgiri hills. One of the sera positive in a dilution of 16 was from a sheep dealer while the other positive in a dilution of 32 was from a patient who had continuous fever with a negative Widal reaction.

These studies are being continued. It is proposed to extend these investigations to the surrounding districts during the next year.

III. CLINICAL TRIAL OF HETRAZAN AS AN ASCARICIDE IN CHILDREN

(P. V. KURIAN)

In the treatment of infestation with ascaris, it is claimed that 'Hetrazan' (Diethylcarbamazine) has some advantages over the common anthelmintics used in general practice. Lederle Laboratories Ltd., India, very kindly made supplies of Hetrazan available for clinical trials at this Institute.

Three series of children showing ova of ascaris in their faeces were treated with Hetrazan on three different dosage schedules. Fourteen days after completion of treatment a specimen of faeces was collected. If a smear of faeces did not show ascaris ova on microscopic examination, the examination was repeated on the same specimen after concentrating the eggs by flotation using concentrated salt solution. All the children were treated as out door patients.

In the first series the child's weight was taken and the dose was calculated at 1 mg./lb of body weight to the nearest quarter tablet. This dose was given to the child three times daily for five days, at 8.30 a.m., 12.30 p.m., and 4.30 p.m.

Every morning the child or its attendant was questioned about the number of worms passed during the previous 24 hours and a note was made of it. Fourteen days after completion of treatment a clearance test was carried out. In this series no toxic reactions were noticed and only one child gave a negative faeces report.

The second series was on the same lines except that the dosage was doubled (2 mg./lb of body weight) and continued for 7 days. In this series one child of 2½ years complained of abdominal pain and treatment had to be stopped at the end of 5 days. One out of six gave a negative stool report after 14 days.

The third series consisted of a course of 3 days only, all the tablets being given in a single dose after breakfast. It was not easy to administer large number of tablets to children of 2 to 6 years. The results appeared to be just as good as the dosage schedule in second series as 3 children out of 17 gave negative stool reports after 14 days.

A fourth series consisting of ten children were treated with oil of chenopodium (Dose: 2 minims for every year of age, with an ounce of castor oil.) Nine out of ten of these children gave negative stool reports 14 days after treatment.

TABLE 8

Series	No. of children treated	Ages. (years)	Weights (lbs)	Dosage schedule	Total dose mg./lb.	Toxic Reaction	Worms passed	No. Negative 14 days after
I	13	2-10		1 mg./lb thrice daily for 5 days.	15 mg./lb	Nil	All children	1
II	6	2-11	28-60	2 mg./lb thrice daily for 7 days.	42 mg./lb	1 child 2½ years	All children	1
III	17	2-7	17-43	5 mg./lb on 1st day single dose — 9 mg./lb 2nd & 3rd days single dose.	23 mg./lb	2 children nausea 2 abd. pain	All children	3
IV	10	2-10		2 minims for every year of age.		1 patient had transient jaundice.	All children	9

Conclusions

1. From the limited number of patients studied, it appears that oil of chenopodium is more efficient than Hetrazan under the conditions described.
2. No serious toxic manifestations were observed in the 36 children treated with Hetrazan.
3. Hetrazan has the advantage that starvation and purgation are unnecessary.

IV. INFLUENZA

A. Epidemiology

(I. G. K. MENON, *World Health Organization Influenza Centre*)

The collection of statistical information regarding the incidence of clinical influenza was continued during the year. The data for the Nilgiri District for 1951 and 1952 are given in Tables 9 to 12. In addition to the four clinics in the Nilgiri District, information was also obtained from the following areas:

Coimbatore and Madura Districts,
Madhya Pradesh,
Eastern States,
Jorhat and
Shirpur

The scope of the study was extended this year with the kind co-operation of the authorities of the following teaching hospitals, viz.

Irwin Hospital, New Delhi,
Lady Hardinge Medical College Hospital, New Delhi,
Sawai Man Singh Hospital, Jaipur,
School of Tropical Medicine, Calcutta,
J. J. Hospital, Bombay,
B. J. Hospital for Children, Bombay,
V. J. Hospital, Amritsar,
Sassoon Hospitals, Poona,
K. R. Hospital, Mysore,
Victoria Hospital, Bangalore,
Krishnarajendra Hospital, Mysore,
Civil Hospital, Ahmedabad.

The figures for the year 1952 do not reveal an epidemic incidence of influenza in the Nilgiri District till the end of August, though there was a slight increase in the number of cases in Lawley Hospital for the months of May and June. The figures from Wellington and Ootacamund areas show a gradual increase from September onwards. However, after the rains at the end of November there has been a sharp increase in the number of cases in Coonoor and virus has been isolated from one case recently. The outbreak is continuing.

A study of the incidence of influenza in the district shows that, while an outbreak started in July and August in 1950, in 1951 it started late in August and in 1952, much later still, at the end of November. The outbreaks appear to be related to the onset of the monsoons. The South-West monsoon, however, is associated with only a moderate increase in the number of cases in April-May, while the autumn outbreak following the North-East monsoon is more widespread. It is essential to collect data over much longer periods and larger areas before the general applicability of the finding can be accepted.

A sharply localised outbreak of influenza was reported in March, 1952, from a military unit in the Bangalore area. It started on the 9th of March and was responsible for 112 admissions in 8 days, out of a total personnel of 812 at risk.

The distribution of admissions is shown below:

1952 March,	9th	10th	11th	12th	13th	14th	15th	16th	= 8 days
Number of cases	1	13	46	17	9	12	12	2	= 112.

The onset of the disease was sudden. Almost all the cases showed fever, dry cough, congested throat, headache and slight bodyache. The temperatures ranged from 100° to 101° and came down to normal within three or four days. Some unusual features were observed in a few cases, e.g., enlargement of the cervical glands in 12, enlargement of the liver in 5, small pin point rash in 3 and mucous membrane haemorrhage and vomiting respectively in 2 cases. No antibiotics were used in view of the mildness of the disease.

Six specimens of throat gargles and ten specimens of paired sera were sent for examination. The throat gargles, despite the usual treatment with penicillin and streptomycin, were found to cause death in the inoculated eggs and a Gram-negative bacillus was isolated from the eggs. However, examination of the sera revealed that the outbreak was due to influenza virus type A. This was confirmed by the isolation of an A prime virus from the throat gargling of one of the patients by Lt.-Col. S. L. Kalra of the Armed Forces Medical College, Poona. The origin of the outbreak was not clear, as there were no cases among

the surrounding civilian population or in adjacent military units either before or following this.

Another sharply localised outbreak has been reported from Borstal School, Palamcottah, Tirunelveli District. It started on the 17th of November and was responsible for 175 admissions over 18 days, out of a total personnel of 637 at risk. The distribution of admission is shown below:

November, 1952												
17th	18th	19th & 20th	21st	22nd	23rd	24th	25th	26th	27th	28th	29th	30th
1	3	Nil	4	3	11	29	29	23	26	17	6	3

December, 1952			
1st	2nd	3rd	4th
11	5	2	2

There was no unusual increase of cases among the civilian population around. It is interesting to note that there was a similar epidemic in the Institution this time last year and that the same weather conditions, namely overclouded sky with drizzling for several days, prevailed on both occasions. Paired sera from patients from this institution revealed on examination that influenza virus type B was responsible for this year's outbreak while in 1951 it was due to type A virus.

From the information available from the World Influenza Centre, London, the behaviour of Influenza in other countries has been similar in 1952, as there have been very few outbreaks due to the A prime viruses. Several countries, however, reported the isolation of type B virus from cases. In India also type B virus has been isolated in March, 1952, by Dr. D. W. Soman, Haffkine Institute, Bombay.

An interesting report was received in February, 1952, from Dr. P. S. Clarke of Deohall Tea Estate, Hoogrija P. O., Assam. According to him in February, 1950, there was an outbreak of an influenza like condition in this estate lasting over a month and causing five deaths in hundred cases. The mortality rate among untreated cases was estimated by him at about 30 per cent. Subsequently chloromycetin was found to be very effective in treatment. Similar outbreaks occurred in 1951 and 1952 at about the same time. The chief features of the disease were, fever, lasting up to 14 days and going up to 103 or 104° maximum, severe cough, headache, chest pain and extreme prostration. Patches of consolidation were noticed in the lungs as also soft splenic enlargement in 50 per cent of the cases. Myocarditis and fall of blood pressure were frequently noticed. The Widal reaction was negative. The Weil Felix reaction was found to be negative against O.X.2, O.X.19 and O.X.K. Specimens of paired sera from three cases from the 1952 outbreak were kindly forwarded to me by Dr. Clarke, Chief Medical Officer, Tingri Medical Association, Hoogrija. Examination of the sera showed clearly that the disease was not caused by the influenza viruses.

Several cases were observed at Coonoor during the months of April and May resembling the above condition clinically. Two of the cases were studied in detail. The first case started on 23rd April with low temperature, fine erythematous rash and harassing cough. The temperature slowly increased to 102° on the 5th day without in any way being affected by the usual chemotherapeutic drugs, sulphadiazine, penicillin, etc. On the sixth day aureomycin was administered in 250 mg. doses, three times a day. The condition responded dramatically, the temperature coming to normal after the fourth kapseal. The second case occurred in the same household, 16 days after the onset of the first case. The temperature on onset was slightly higher being 100.4°, the pulse rate was in proportion. Sulphadiazine tablets were tried for two days with no improvement. Aureomycin, however, produced the same dramatic response as in the first case. Culture of the throat swabs in both cases revealed only the usual organisms. There was no leukocytosis in either case. Albuminuria was noticed in the first and severe backache in the second

case. Throat gargles were collected from both patients and after the usual treatment with penicillin and streptomycin inoculated into eggs of varying incubation periods, namely, sixth day, tenth day, and thirteenth day by different routes, namely, yolk sac, allantoic and amniotic fluids. The harvested fluids did not give any haemagglutination and no definite pathological lesions were noticed in the eggs. The serum collected from some other cases were put up for complement fixation tests with the antigens of lymphogranuloma venereum group and Q fever (Henzerling strain), in addition to the tests against various influenza virus types. The results were all negative.

Reports were also received of similar outbreaks from Coimbatore, Madras and other towns during the same period. This interesting condition requires further study for the elucidation of its aetiology.

B. Laboratory Studies

(I. G. K. MENON, M. S. NARASIMHAMURTHY AND KUMARI I. NALINI.)

1. Isolation of virus

A haemagglutinating virus has been isolated recently by Kumari I. Nalini from the throat gargling of a patient from Coonoor. Studies on the nature of the virus are in progress.

2. Serological Examination

Nineteen specimens of sera were examined. Of these, the sera from Assam gave negative results with both the haemagglutination-inhibition and complement fixation tests for influenza. Among the 10 specimens of sera from the Bangalore outbreak in March, 6 showed a four-fold or greater increase in antibody titre against an A prime influenza virus antigen, while the remaining four showed a similar decrease. It was clear that the outbreak was due to influenza virus type A, as was confirmed by the isolation of the virus from later cases in the outbreak by Lt.-Col. Kalra.

Out of the six pairs of sera from the Borstal School, Palamcottah, four showed an eight-fold or greater increase in antibody titer against influenza virus type B, Lee antigen and all six against the Crawley antigen. The outbreak is thus due to type B virus. It is interesting to note that there was an epidemic last year at this time in this Institution due to type A virus.

3. Antigenic studies on the Indian strains of influenza virus

Isaacs, Gledhill and Andrewes from their studies on the 1950-'51 epidemics of influenza in various countries of the world have pointed out that the L subtype of influenza A prime virus was first isolated by Burnet in Australia in June, 1950, and that simultaneously the S subtype was also found there. In August, 1950, the L subtype was isolated in India at Coonoor and it was found that all the isolations made during this epidemic belonged to this type only. It would appear that this new subtype had its origin either in the Southern Hemisphere or in the East. Though all the strains isolated at Coonoor in 1950-'51 have been found to belong to this subtype, certain differences have been noticed between the 1950 and '51 strains in this laboratory. Studies on the antigenic analysis of these strains have, therefore, been initiated under the auspices of the Indian Council of Medical

Research. The Enquiry started functioning in May, 1952. The Indian strains available for analysis are the following:

Name of strain	When isolated	Locality	Worker
1. A/India/1/50	August, 1950	Coonoor	Menon
2. " 2/50	"	"	"
3. " 3/50	"	"	"
4. " 1/51	March, 1951	"	"
5. " 2/51	"	Bombay	Swaminathan
6. " 3/51	November, 1951	Coonoor	Menon
7. " 4/51	"	"	"
8. " 5/51	"	"	"
9. " 1/52	March, 1952	Bangalore	Kalra

Freeze dried material was obtained from the World Influenza Centre, London, and passed allantoically for antigens for the following foreign strains:

PR8	(1934)
FM1	(1947)
Lepine	(1948)
Sweden	(1950) and
Liverpool	(1951)

Experiments are in progress for deciding the best routes and schedules of immunization for obtaining anti-sera against the various strains. Preliminary studies have shown satisfactory results.

V. STUDIES ON HAEMAGGLUTINATION

(I. G. K. MENON)

Studies on the haemagglutination of certain sensitive fowl cells by egg material inoculated with bacteria were continued. The simultaneous lysis of the red cells produced by *Staphylococcus aureus* interfered with observations on haemagglutination. Some throat gargles collected during the autumn epidemic in 1951 were found to cause death in the eggs despite the use of penicillin and streptomycin. The responsible organism was isolated and found to be a Gram-negative bacillus. Throat gargles from the Bangalore epidemic also yielded a similar organism. Both these groups gave identical biochemical reactions. It has been found that the amniotic fluids from 13-day-eggs inoculated with cultures of this organism gave very high haemagglutination titres, e.g. >2048, not only with cells from sensitive fowls but also with the red cells of the guinea-pig, the rabbit and the rat. Normal allantoic, amniotic and yolk fluids and embryonic tissues were separately collected. They were inoculated with the bacterial cultures and incubated at 37° C for several days. It was found that infected embryo tissue suspensions showed from 48 hours onwards gradually increasing haemagglutinating titres. This seems to indicate that the phenomenon is essentially due to the metabolic products formed during the growth of the organism on embryonic tissue. Certain lipoid substances that haemagglutinated sensitive fowl cells were found to have no actions on the cells from the guinea-pig and the rabbit. The red cells of the pigeon and turkey were, however, haemagglutinated by the lipoids, but not by the bacterial products. Detailed studies on the phenomena of lipoid, bacterial and viral haemagglutination on various types of red cells are in progress.

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TABLE No. 9
Influenza in the Nilgiris 1951

Month	WELLINGTON			COONOOR			OOTACAMUND		
	Cantonment Hospital			Nutrition Clinic			Lawley Hospital		
	1	2	3	1	2	3	1	2	3
January	1081	166	15.3	239	40	16.2	2622	412	15.7
February	995	162	16.3	184	29	15.8	2451	248	10.1
March	1130	183	16.2	108	17	15.7	2812	418	14.9
April	1358	189	13.9	270	22	8.1	2950	450	15.3
May	1234	152	12.3	363	21	6.1	3240	442	13.6
June	926	134	14.5	252	10	4.0	2998	450	15.0
July	844	133	15.8	215	15	7.0	3015	499	16.6
August	1633	231	22.4	232	14	5.0	3253	396	12.1
September	1198	328	27.4	239	25	10.5	2990	672	22.5
October	1171	286	24.4	269	53	19.7	2995	598	20.0
November	1012	240	23.7	271	43	15.9	2723	587	21.6
December	1069	240	23.8	221	26	11.8	2663	573	21.5

1. Total out-patient admissions.

2. Influenza cases.

3. Percentage.

TABLE No. 10
Influenza in the Nilgiris 1952

Month	WELLINGTON			COONOOR			OOTACAMUND		
	Cantonment Hospital			Nutrition Clinic			Lawley Hospital		
	1	2	3	1	2	3	1	2	3
January	903	170	18.8	196	19	9.7	2022	303	11.6
February	906	162	17.9	131	6	3.7	2432	415	17.1
March	1036	184	17.8	154	26	9.8	2970	475	16.0
April	1226	210	17.1	312	17	5.4	3070	405	13.2
May	1392	240	17.2	402	22	5.5	3439	573	16.7
June	1058	149	14.1	286	12	4.2	2741	433	18.0
July	976	170	17.4	382	25	6.5	3253	393	6.3
August	1170	242	20.7	350	32	9.2	2892	356	12.0
September	1328	360	27.1	376	23	6.1	3005	130	11.0
October	1171	290	24.8	330	23	7.0	2983	528	11.0
November	1263	373	29.5	351	36	10.3	2498	349	28.3
December	...	...	...	...	...	...	...	...	...

1. Total out-patient admissions.

2. Influenza cases.

3. Percentage.

TABLE No. 11
(Coonoor—1952)

Month	No. of cases of Influenza		Rainfall in inches	Temperature		Variation	Relative Humidity	
	L. H.	N. C.		Max.	Min.		Max. %	Min. %
January	...	303	19	2.29	74	32	42	78
February	...	415	6	8.67	73	40	33	70
March	...	475	26	0.36	78	42	36	71
April	...	405	17	4.25	84	50	34	75
May	...	573	22	0.60	87	51	36	82
June	...	493	12	2.83	78	54	24	76
July	...	393	25	1.31	72	56	16	76
August	...	336	32	2.27	74	54	29	79
September	...	330	23	0.96	76	49	27	78
October	...	328	23	3.54	74	48	26	78
November	...	849	36	1.75	70	38	32	77
December	...							70

L. H. = Lawley Hospital.

N.C. = Nutrition Clinic.

TABLE No. 12
(Ootacamund—1952)

Month	No. of cases of Influenza				Rainfall in inches		Temperature		Variation
	S.	H.	H.	D.			Max.	Min.	
January	...	106			0.94		82	29	53
February	...	101			1.80		87	33	54
March	...	104			0.23		82	30	52
April	...	108			0.55		84	43	11
May	...	172			1.39		83	41	42
June	...	168			1.87		80	40	40
July	...	152			2.66		72	48	24
August	...	178			2.06		75	40	35
September	...	243			3.99		78	43	35
October	...	368			5.98		76	39	37
November	...	413			0.51		85	31	54
December	...								

S.H.H.D. = Stone House Hill Dispensary.

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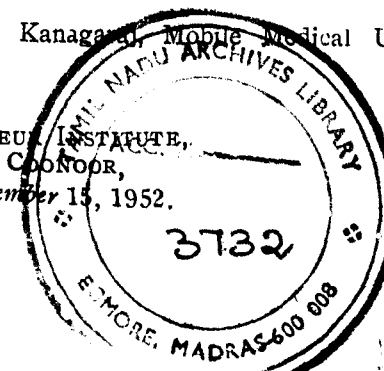
For kindly making available sera from animals used in Q fever survey.

Dr. K. S. Nair, Veterinary Hospital, Coonoor.
Veterinary Officer, Military Farm, Wellington.

Dr. A. Kanagavel, Mobile Medical Unit, Nilgiris.

For kindly making available blood from Todas.

PASTEUR INSTITUTE,
COONOR,
December 15, 1952.



N. VEERARAGHAVAN,
Director.

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