



**REPORT OF THE KING INSTITUTE OF
PREVENTIVE MEDICINE, GUINDY**

**FOR THE PERIOD FROM 1ST APRIL 1950
TO 31ST MARCH 1951**

BY

DR. Y. S. NARAYANA RAO, M.B.B.S., D.T.M. (Cal.), D.B. (Lond.),
Director, King Institute, Guindy

AND

**REPORT OF THE GOVERNMENT
ANALYST, MADRAS**

BY

SRI S. NARAYANA AYYAR, M.A., A.I.I.S.C., F.R.I.C.,
Government Analyst, King Institute, Guindy

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REPORT OF THE KING INSTITUTE OF PREVENTIVE MEDICINE, GUINDY, FOR THE PERIOD FROM 1ST APRIL 1950 TO 31ST MARCH 1951

STAFF.

GAZETTED OFFICERS.

Director.

Dr. Y. S. Narayana Rao, M.B.B.S., D.T.M. (Cal.), D.B. (Lond.).

Assistant Directors.

Dr. M. K. Krishna Menon, M.B.B.S.

Dr. M. Narayana Pai, M.B.B.S. (also officer-in-charge of Biologicals Control).

Dr. N. R. Ratnakannan, M.B.B.S.

Dr. C. Sriramachandra Rao, M.B.B.S., D.P.H.

Dr. C. Venkateswara Rao, M.B.B.S., L.O.

Dr. M. W. Williams, M.B.B.S. Deputed for higher studies on 2nd September 1949, a.n.

Dr. K. S. Ranganathan, M.B.C.S. (Eng.), L.B.C.P. (Lond.), services placed at the disposal of the Government of India from 8th April 1948.

Civil Assistant Surgeons, Class I.

Dr. B. A. Srinivasan, M.B.B.S. Relieved on 30th August 1950, a.n.

Dr. Dinker Babu Rao, M.B.B.S.

Dr. P. F. Verghese, M.B.B.S., up to 23rd January 1951.

Dr. C. W. Chacko, M.B.B.S., study leave for two years with effect from 5th October 1950, a.n.

Dr. H. Doraiswami, M.B.B.S., up to 21st January 1951.

Dr. A. Ramamohan Rao, M.B.B.S., up to 14th April 1950.

Dr. S. Vaidyanathan, B.Sc., M.B.B.S., up to 5th January 1950, a.n.

Dr. J. Pakkiam, M.B.B.S., up to 4th January 1951, a.n.

Dr. V. Krishnamurthy, M.B.B.S.

Dr. C. S. Balasubramaniam, M.B.B.S.

Dr. K. Dattatreyalu, M.B.B.S.

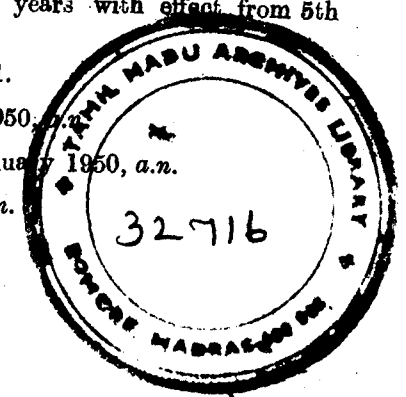
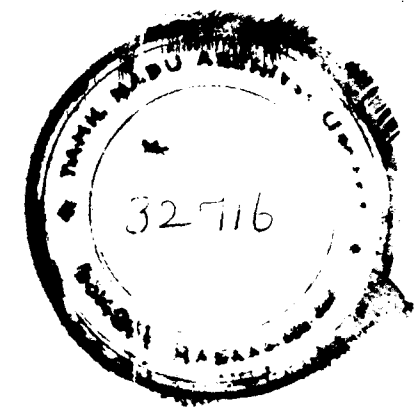
Dr. N. Sundararajan, M.B.B.S.

Dr. R. Venkateswara Rao, M.B.B.S., up to 6th October 1950, f.n.

Dr. S. Ranganathan, M.B.B.S., up to 24th October 1950, f.n.

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Dr. O. M. Satyendran, M.B.B.S., till 15th November 1950, *a.n.*
 Dr. Md. Jaffar Khan, M.B.B.S.
 Dr. K. Appu Kurup, L.M.P., L.O., from 4th May 1950.
 Dr. K. J. Verghese, M.B.B.S., from 6th October 1950, *f.n.*
 Dr. S. Francis Xavier, M.B.B.S., from 19th October 1950, *f.n.*
 Dr. S. R. A. Babu, M.B.B.S., from 23rd November 1950.
 Dr. B. M. Venugopal Chetty, M.B.B.S., from 27th December 1950 to 27th March 1951.
 Dr. M. R. Natarajan, M.D., from 14th December 1950.
 Dr. D. M. Lingayya, M.B.B.S., from 23rd June 1951.

Civil Assistant Surgeons, Class II.

Dr. (Mrs.) H. R. Williams, L.M.P., till 15th August 1950.
 Dr. N. V. Gangadharan, L.M.P.
 Dr. P. Ramaswamy, L.M.P., from 29th September 1950, *a.n.*

Department of Water Analysis.

Chief Water Analyst Sri P. V. Seetharama Ayyar, M.A.
 Assistant Analyst (Water Bacteriology and Chemistry) .. N. Swaminathan, B.Sc., A.I.I.Sc.
 Do. .. K. R. Ramaswamy, B.Sc. (from 1st April to 25th July 1950).
 Assistant Analyst (Water Biology) .. K. G. Veeraraghavan, M.Sc.

Bio-Chemist, Department of Anti-toxins.

Dr. P. Seshagiri Rao, D.Sc.

Drugs Chemical Assistant.

Kumari R. J. Irani, B.Sc. (Hons.), M.Sc., M.S. (Lis.), from 12th September 1949.

GOVERNMENT ANALYST SECTION.

Government Analyst Sri S. Narayana Ayyar, M.A., A.I.I.Sc., F.R.I.C.
 Deputy Government Analyst K. R. Srinivasan, M.A., A.B.I.C., till 19th June 1950, *a.n.*
 Do. Y. G. Doraiswamy, M.Sc., A.B.I.C., from 19th June 1950, *a.n.*

Senior Assistants to Government Analyst.

Sri Y. G. Doraiswami, M.Sc., A.B.I.C., till 19th June 1950, *a.n.*
 „ K. R. Srinivasan, M.A., A.B.I.C., from 19th June 1950, *a.n.*
 „ P. S. Nataraja Sarma, M.A., from 22nd August to 19th November 1950.
 „ K. Narayanaswamy, M.A., A.B.I.C.
 „ M. Krishnamoorthy, M.Sc.

Senior Assistant, Sterile Solution Section.

Sri V. R. Srinivasan, M.A. from 22nd November 1950.

Office establishments, (Gazetted).

Sri V. Srinivasan, B.A., Lay Secretary and Treasurer.

Senior Assistant to Vaccine Lymph Section.

Dr. K. S. Balasubramaniam, L.M.P.

Junior Assistant to Vaccine Lymph Section.

Dr. T. S. Kasturi, L.M.P., from 29th September 1950, *f.n.*
 Sri P. M. Munuswamy Raju, acting temporarily.

NON-GAZETTED OFFICERS.

Veterinary Assistant Surgeons.

Sri E. R. Nagarajan.
 Sri S. Jayaraman.

Junior Assistants.

Department of Water Analysis .. Sri K. R. Ramaswamy, B.Sc.
 „ K. Venkataraman.
 „ S. Venkataraman.
 Kumari S. Chellam.
 Sri A. S. Hariharan, B.Sc.
 „ K. Sambandan.

Government Analysts Section .. Sri G. Balasubramanian, B.Sc. (Hons.).
 „ M. V. Narayanan, B.Sc. (Hons.).
 „ C. S. Raghunathan, B.Sc. (Hons.).
 „ K. Kuppuswamy, M.Sc.
 „ V. Seshagiri Rao, B.Sc. (Hons.).

Government Analysts Section—cont. Sri P. S. Nataraja Sarma, M.Sc.

„ K. Balasubramaniam, B.Sc. (Hons.).

„ K. Ramachandran, M.A.

„ N. Srinivasan, M.A.

„ S. A. Subramanian, M.Sc.

Solution Section (Department of Anti-toxin). „ V. V. Krishna Rao.

Junior Chemical Assistant „ S. Srinivasa Raghavan, B.Sc.

Additional Chemical Assistant „ M. Govinda Rao.

OFFICE.

NON-GAZETTED OFFICERS.

Manager Sri R. Kalyanasundaram.

Librarian Sri V. Srinivasa Ayyangar.

Permanent Accountant 1; Clerks, Upper Division, 3; Clerks, Lower Division, 9; Typists 3; Stenographer 1; Telephone attendants 2; Attenders 2; and Peons 9.

Temporary Cashier 1; Clerk, Upper Division, 1; Clerks, Lower Division, 9; Typists 2; Steno-typist 1; Attender 1; and Peon 1.

LABORATORY STAFF.

Permanent Sample-takers 4; Technicians 7; Laboratory Attendants, I grade, 14; Laboratory Attendants, II grade, 33; Compounder 1; and Peons 35.

Temporary Technical Assistants 2; Sample-taker 1; Technicians 11; Laboratory Attendants, I grade, 19; Laboratory Attendants, II grade, 20; Algae collector 1; and Peons 34.

Miscellaneous staff Photo Artist 1; Overseer 1; Assistant Overseers 4; Mechanic 1; Deputy Overseer 1 (temporary); Electrician 1 (temporary).

Experimental Filter Station Technical Assistant 1; Mechanic and Filter Operator 1; Turn Cock 1; Assistant Mechanic 1 (temporary). (Staff transferred under the charge of Sanitary Engineer with effect from 1st January 1951.)

STAFF OF THE ASSOCIATED ENQUIRIES UNDER THE INDIAN COUNCIL OF MEDICAL RESEARCH.

(1) Filterable Viruses Enquiry.

Chemist Sri K. N. Gopalan, B.Sc.

Laboratory Assistant 1 Laboratory Attendant 1

Peons 2

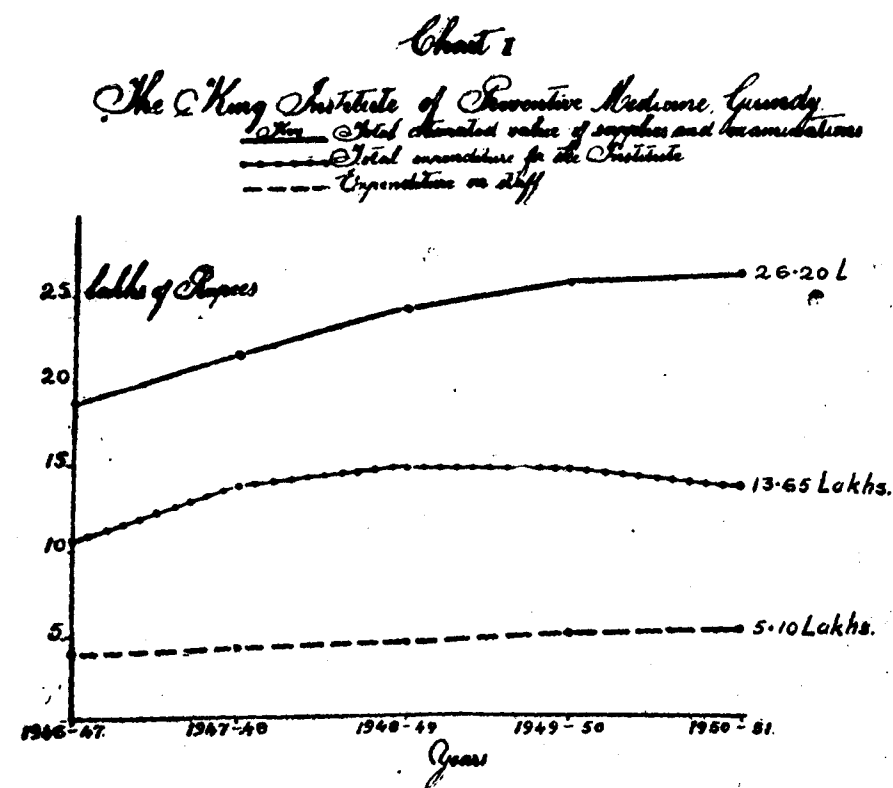
GENERAL REVIEW.

The following graph clearly shows how gradually the work of this institute is increasing. It also shows that.—

(1) there has been an increase in the gross profits of Rs. 57,884 this year over that of last year;

(2) at the same time the total expenditure of the institute shows a decrease of Rs. 1,03,306 this year over that of last year;

(3) thus the net profit to the State Government shows an increase of Rs. 1,61,200 this year over that of last year:



Finance.—The total expenditure for the year amounted to Rs. 13,65,453 (see Table I) including the amounts borne by other departments on Institute accounts. The total cash receipts by way of sale-proceeds of sera and vaccines and collection of payments for services rendered amounted to Rs. 2,90,438. The difference, i.e., Rs. 10,75,015 represents the net cost of the Institute debitable to Provincial Revenues. It has been pointed out, however, that most of the biologicals manufactured in the Institute such as Vaccine Lymph, Bacterial Vaccines, Anti-Tetanic serum, Sterile solutions, etc., and Anti-toxins purchased from foreign firms are issued free to Government Institutions in the State. Vaccine Lymph and Prophylactic Cholera Vaccines are issued free of cost to the local bodies. Similarly services are also rendered free of charge to these Government departments and local bodies. If the above supplies and services rendered by the Institute were to be charged for according to the rates approved by Government, the total anticipated receipts as shown in the Statement No. 3 of Table I would amount to Rs. 26,14,851. The difference between these estimated receipts and the estimated expenditure, i.e., Rs. 12,49,398 represents the net profit to Government.

Improvements.—We are glad to state—

I. That the following new constructions have been completed this year :—

- (a) Sterility room in the Anaerobic Section.
- (b) Temporary calf sheds in the Nawab Gardens.
- (c) Draught-free room in the Vaccine Lymph Section.
- (d) Covered stand for cycles of the staff.

II. That the following additional staff have been sanctioned :—

- (a) Sterile Solution Section .. One Senior Chemical Assistant (Gazetted Rank).
- (b) Department of Anti-toxins. One Junior Chemical Assistant.
- (c) Mechanic Section One Refrigerator Mechanic.

III. That the emoluments of the retired army officers (Assistant Overseers) have been revised and are now on a par with those of the non-military Assistant Overseers.

It has been found that the scales of pay of some officers in this Institute are much less than that of officers with similar qualifications in other departments of the State Government. Therefore, proposals have been put up for the removal of this anomaly and the revision of the scales of pay of Junior Assistants, Sample Takers and the Librarian, and I hope the Government will approve the proposals.

Library.—The library has continued to be used by the members of the Institute staff, Research Officers of the Indian Council of Medical Research, Officers of the B.C.G. Vaccine Laboratory and a few members of the Public Health and Medical departments stationed in the City. During the period under report 61 volumes of books and 100 volumes of bound journals were added to the stock bringing the total to about 10,560 volumes. The Institute is indebted to the Secretary, Department of State, U.S.A. for a free gift of recent editions of 30 books on medicine and allied subjects forwarded through the Director-General of Health Services, New Delhi.

The extremely limited accommodation available for the Library is quite inadequate for the use of a section which is growing with the increased activities of the Institute. Arrangements should be made very early to revive the original scheme sanctioned in 1939 for the construction of a new library block. Further housing of the almyras would be seriously handicapped if this question is not taken up immediately. The Government have since been pleased to sanction for two years to start with from the official year 1951 the scheme for the reorganization of the medical libraries attached to the Institute and the Medical Colleges in the State to meet the heavy demands for the technical books from students and staff.

II. *Staff meeting.*—The weekly meetings of the Scientific staff were held regularly. Besides the usual reviews of articles from journals, special talks were given as follows :—

- (1) Dr. M. K. K. Menon—5th May 1950. A talk on the production of Diphtheria Anti-toxin.
- (2) Dr. M. Narayana Pai—26th May 1950. A demonstration on the assay of Penicillin and Penicillin drugs.
- (3) Dr. M. Narayana Pai—25th August 1950. Second demonstration on Biological assay of Penicillin.
- (4) Dr. M. K. K. Menon—15th September 1950. Standardization of Anti-toxin.
- (5) Dr. M. K. K. Menon—29th September 1950. Horse Immunization.
- (6) Dr. P. Seshagiri Rao—6th October 1950. Serum Concentration.
- (7) Sri P. V. Sitarama Iyer—13th October 1950. Survey of work done in the Department of Water Analysis of the Institute with special reference to the Bacteriological Analysis of water.

(8) Sri N. Swaminathan—27th October 1950. Survey of work done in the above department with reference to Chemical Aspects of water.

(9) Sri K. G. Veeraraghavan—3rd November 1950. Survey of work done in the above department with reference to Microbiology of water supplies.

(10) Sri S. Narayana Iyer—A talk at the All India Radio, Madras Station, on "Food Analysis Research" on 7th February 1951.

Educational facilities.—The courses of training for laboratory attendants and laboratory technicians were continued. During the year under report, 22 candidates in both of the two courses attended the training course. Twenty-one candidates received their certificate on satisfactorily completing the training.

The following candidates were given practical training in one or other branches of work of this institute :—

- (1) Sri R. Rama Rao, B.Sc. (Hons.), L.T., No. 5, Rangachari Street, Madras-17, for 3 months from 17th April 1950 to 16th July 1950.
- (2) Miss I. Nalini, Government of India Scholar, Maharaja's College, Ernakulam, for one year from 1st May 1950 to 30th April 1951.
- (3) Sri M. Thillai Govindarajan, B.Sc., No. 233, Third Main Street, Gandhi-nagar, Adyar, for three months from 5th June to 4th September 1950.
- (4) Mr. C. S. Ebenezer, Meston Villa, Tambaram, for three months from 8th June to 7th September 1950.
- (5) Sri M. Subramaniam, Laboratory Assistant of the Department of Medical and Sanitary Services, Ceylon, for about a month from 1st September 1950.
- (6) Mr. P. S. Meerasa, 39, Malayaperumal Street, China Bazaar, Madras, for three months from 25th July to 24th October 1950.
- (7) Dr. Ramcharan Das, Assistant Surgeon, Public Health Department, Assam, for two months from 11th September to 10th November 1950 (Training in Vaccine Lymph Manufacture, etc.).
- (8) Mr. S. K. Sahu, Lakshminarayan Institute of Technology, Nagpur, for three months from 16th October 1950 to 15th January 1951.
- (9) Sri B. V. Shenoi, Kolar Gold Field Hospital, Champion Reef, for three months from 2nd January to 1st April 1951.
- (10) Messrs. P. R. J. Gangadharan, M. Logiah, G. Jagan Mohan Rao, Ch. Gopalakrishnamurthy, Pharmacy Students of the Andhra University, Waltair, for one month from 26th March to 25th April 1951.

Researches.—An account of the Researches undertaken in this Institute during the year will be found in Part II of this report.

List of distinguished visitors.—The Institute was honoured during the year by the visit of—

- Dr. M. J. Miller, McGill University, Montreal, Canada.
 Major-General A. N. Rudra, General Officer Commanding, Madras Area, Madras.
 Dr. Ernest Muir, Consulting Leprologist.
 Major-General A. N. Sharma, Director of Medical Services, Army Headquarters, Delhi.
 Dr. Victor W. Taikoqua, University of Melbourne.
 Dr. Guthe, M.D., M.P.H., Chief Venereal Diseases Division, World Health Organization, Geneva.
 Dr. N. Jungalwalla, World Health Organization, New Delhi.
 Dr. R. L. Gauld } American Medical Experts on Cholera.
 Dr. R. P. Mason }
 Dr. A. T. Wilson }
 Dr. C. G. Pandit, Secretary, Indian Council of Medical Research, New Delhi.
 Col. R. D. Khurana, Army Headquarters, New Delhi.

PART I—ROUTINE WORK.

VACCINE LYMPH SECTION.

Charge: Dr. N. R. Ratnakannan, M.B.B.S.

1. *Manufacture and issue of vaccine lymph.*—The stock of vaccine lymph at the commencement of the year under report was only 79,785 ml. of 1 in 7 dilution and used to be about 200,000 ml. This low stock position was due to the interruption in the manufacture of vaccine lymph due to the prevalence of foot and mouth disease and also an increased demand in the State during the previous year. Hence during this year as much of production as possible was carried out with the existing facilities and 244,338 ml. of 1 in 7 dilution vaccine was manufactured. The average yield per calf was 30.2 gms. as compared with 31.9 gms. of last year.

But in spite of a satisfactory production, the stock position at times was far from satisfactory as there has been a very heavy demand from the entire State. So there had been a necessity to augment the stock by a purchase of 20,000 ml. of vaccine from the Vaccine Institute, Belgaum, and 7,500 ml. from the Vaccine Institute, Bangalore. In addition to these, about 4,920 ml. of reconstituted dry vaccine was also used.

A total quantity of 309,014 ml. of vaccine was issued during the year and this figure is the highest encountered during recent years, the average supply being about 200,000 ml. per year. This heavy supply has in its turn affected the closing balance at the end of the year and the amount of vaccine held at the closing of the year was only 47,529 ml.

The usual tests, in conformity with the standards prescribed in the Madras Drug Rules, for purity, toxicity and potency were done on all batches of vaccine lymph, and issue to the field made only after the requisite standards were satisfied. The method of purifying the vaccine by bubbling chloroform vapour had to be resorted to for all batches, as the stock position did not permit any prolonged storage in cold for purification.

2. *Potency of vaccine lymph.*—The potency of all batches of vaccine were satisfactory at the time of issue both by laboratory tests on calves and by results of primary vaccinations of children in the test range. The continuance of the post of vaccination with test-lymph, proved very helpful. In all 2,447 primary vaccinations were verified with a case success rate of 96.9 per cent and an insertion success rate of 93.9 per cent.

On the recommendation of the Expert Committee on Biological Standardization of the World Health Organization that the "Seed Vaccinia Virus" used in the preparation of smallpox vaccine, be tested for its immunising potency against freshly isolated human variola virus, and under instructions from the Director-General, Health Services, India, the seed vaccine, used in this Institute was sent to the Assistant Director of Public Health, in charge of the Vaccine Institute, Belgaum for the tests. He had reported that the experiments on monkeys showed that vaccination with 0.025 ml. of 1 in 5 dilution of the seed, protected against an inoculum of 0.1 cc. of 1 in 2 dilution of virulent variola virus freshly isolated from confluent cases of smallpox.

Similar experiments were conducted in this Institute also, the details of which are given under the head—researches.

3. *Analysis of result statements received from the districts, municipalities, Corporation of Madras, etc.*—It was felt that the returns of vaccinations for the official year (1st April to 31st March), usually published in the Institute Annual Report is not strictly comparable with the figures received by that department for the calendar year and this could probably account for such a high percentage of lymph unaccounted for. So, it was decided, from this year, to take into

consideration, for this analysis, the result statements for vaccine supplied during the calendar year. As this is the first year of this changeover, returns received for vaccine supplied from 1st April to 31st December 1950 only were taken up for compilation and presented below:—

(a) *Total vaccinations and types (Table II).*—Result statements were received for 5,353,854 vaccinations performed in the State. Of this 17 per cent were primary, 1.1 per cent secondary and 81.9 per cent revaccinations.

(b) *Primary vaccinations (Tables II and III).*—A total number of 716,027 primary vaccinations were verified with the following results:—

			Cases success rate.	Insertion success rate.
			PER CENT.	PER CENT.
Corporation of Madras	..	..	99.8	90.3
Municipalities	..	..	96.8	85.8
Districts	..	..	80.6	59.8
State as a whole	..	..	83.8	64.0

The case and insertion success rates for vaccinations performed in the districts continue to be much lower than that of Corporation of Madras and the Municipalities, and especially this year, the difference is much more marked. The low figures obtained in general this year is probably due to the fact that the results of vaccinations performed during the cooler months of January to March have not been included in the compilation.

The possibility of improving the results of vaccination in rural areas by the use of a more concentrated vaccine lymph was tried last year. But the results showed there is practically no improvement in the success rate. So the other probable factors, viz., (a) minimizing the number of days of exposure of the despatched vaccine to atmospheric temperature, and (b) improving the technique of vaccination in rural areas and proper check on the vaccinator's work has to be stressed upon.

(c) *Re-vaccinations.*—Returns were received for 2,805,623 re-vaccinations which were verified and the success rate was 10.1 per cent as compared with 11.0 per cent of the previous year. The success rate in the Madras Corporation, municipalities and districts were 8.1 per cent, 12.4 per cent and 9.4 per cent respectively.

4. *Lymph unaccounted for.*—The change over of the taking up the returns for the vaccine supplied during the calendar year, for compilation and analysis, also does not appear to have improved the figure under this head. The percentage of lymph for which the returns are yet due from the field for this period (1st April to 31st December 1950) is 38.2 per cent. Though this is a low figure as compared with that of last year (56.4 per cent), it discloses that no returns have been received for about two million doses of vaccine issued.

DIAGNOSTIC DEPARTMENT.

Charge: Dr. C. Venkateswara Rao, M.B.B.S., L.O.

During the year, 13,459 specimens were received for bacteriological examination in this department which represents the largest number ever examined during the previous years. The increase this year is due to the large number of specimens of faeces received for the diagnosis of V. Cholera, as a result of the epidemic of cholera in this State. The number of blood specimens examined for cultural and agglutination tests this year had also increased over the previous years. Nearly a lakh of blood specimens were received for Wasserman and Kahn tests this year and reported. This department had also manufactured the reagents required for these tests and supplied them to other laboratories. The details pertaining to these examinations, the amount of reagents supplied and the analysis of the sources from which the specimens for serological tests were received are shown in Tables IV and IV(a).

There was a heavy demand for Media this year both for the Institute needs and for the various other laboratories in this State. The staff of the section had to work extra hours to cope up with the demand and if such heavy demands continue it may not be possible to meet them in full until the increased accommodation, equipment and staff are provided. The statement showing the supplies of Media made to other laboratories is shown in Table V.

PROPHYLACTIC AND THERAPEUTIC VACCINE SECTIONS.

Charge.—Dr. C. Venkateswara Rao, M.B.B.S., L.O.

Due to an epidemic of cholera in this State, this year, there was a very heavy demand for Anti-Cholera Vaccine and about 10.5 million doses of Anti-Cholera vaccine were supplied this year including the 3.5 lakhs doses sold to the Hyderabad State. This section had also manufactured 1.73 lakhs doses supplied and 1.97 lakhs doses of T.A.B. Vaccine. About 2.9 lakhs doses of Plague Vaccine were obtained from Haffkine Institute, Bombay and distributed to the Public Health Staff of this State.

The demand for Therapeutic Vaccines was also more this year in spite of the various Anti-Biotics now available nearly 76,000 doses were supplied this year as compared to 58,348 doses supplied last year. The increase is more marked in the supply of whooping cough and Strepto Filial Vaccine which are very popular. This section had also manufactured and supplied Bacterial Suspensions, High titre sera and live cultures to various other laboratories in this State and in other States. The detailed statement of supplies made are shown in Table V.

The demand for Dysentery Bacteriophage continued to be heavy and about 1,600 bulbs were issued this year.

STERILE SOLUTION SECTION.

This section had manufactured and supplied the various sterile solutions to Government Hospitals, Local Fund, Municipal and Missionary Medical Institutions in this State. The demand for these sterile solutions continue to be on the increase, particularly the glucose ampoules. Special solutions like Ringer Lactate, Molar Lactate, etc., as required by the Hospitals were also manufactured and supplied. Recently several institutions had asked for a variety of solutions like 25 per cent glycerine, 25 per cent Magsulph, etc., and if their requirements are to be met in full more accommodation and augmentation of the staff is necessary. The statement showing the supply of sterile solutions made this year is shown in Table V Page 41.

DEPARTMENT OF ANTI-TOXINS.

Charge: Dr. M. K. Krishna Menon, M.B.B.S.

A. VETERINARY SECTION.

The total number of horses maintained in this institute for production of Therapeutic Sera at the beginning of the year was 46. Of these two died and one was added in the course of the year; thus making a total number of 45 at the end of this year. The horses are accommodated in the Veterinary College and the adjacent S.P.C.A. premises and the Transport lines, Fort St. George. The number of horses under immunization and bleeding and the quantity of blood drawn are shown in detail in Tables I and II.

TABLE I.				
Name of toxins.				
		Number of horses under immunization and bleeding.	Number under immunisation but not bled.	Total.
Tetanus	..	30	12	42
Perfringens	..	2	..	2
Scorpion toxin	..	..	1	1
Total ..				45

TABLE II.

Name of anti-toxin.				Quantity of blood drawn in litres.
Tetanus	..	..	..	2,578.50
Perfringens	..	..	..	191.25
Scorpion anti-toxin	..	..	..	..
Total ..				2,769.75

B. Anaerobic Section.

Toxigenic strains of *Clostridium tetani*, *Clostridium perfringens*, *Vibrio septique* and *Clostridium oedematiens* are maintained both in the dry state as well as in the semi-solid medium. Toxicity and purity of the cultures are tested every six months. Particular care is taken to maintain Hæmolytic strains of *Vibrio septique* cultures.

The following amounts of toxins were manufactured during the year under report:—

	LITRES.
Tetanus toxin	700
Gas-gangrene toxin (perfringens)	70

Biological Standardization.

Three hundred and thirty samples of tetanus anti-toxin and 39 samples of gas-gangrene (perfringens) anti-toxin were standardized during the year in the laboratory. These include tests on sera purchased from outside.

Extra Departmental Services.

The following samples were received from the undermentioned hospitals for investigation of contamination with *Clostridium tetani*:—

	Samples.	Results.
(a) Medical Officer, Rajahmundry ..	Cotton and Gauze	No <i>Clostridium tetani</i> isolated.
(b) Superintendent, Kasturba Gandhi Hospital for Women and Children, Madras.	Gauze, Cotton, Catgut and Fishing gut.	Do.
(c) Superintendent, Raja Mirasdar Government Headquarter Hospital, Tanjore.	Swab from Septic wound ..	Do.
(d) Superintendent, Government Royapettah Hospital, Madras.	A case of Post-operative Tetanus-samples of Catgut, Gauze, Cotton, Nupercain. Dust scraped from theatre and Patient's motion.	Do.
(e) Raja Mirasdar Government Headquarters Hospital, Tanjore.	Muscle piece from a patient for clostridial infection.	<i>Clostridium welchii</i> was isolated.

Manufacture of Tetanus Toxoid for human use.

In addition to Tetanus Toxoid manufactured for injection of horses a batch of Tetanus Toxoid for human use has also been prepared after several experiments in this direction. Several batches had to be rejected before accepting this batch as conforming to the various requirements prescribed for this Biological Product. The product is now undergoing the final tests.

Special work.—A series of experiments on the nutritional requirements of *Clostridium tetani* and *Clostridium welchii* were undertaken. Experiments were conducted to determine the toxigenicity of different strains of *Clostridium tetani* on the usual Beef-Peptic digest medium and as a result, the most toxigenic strain was chosen for routine toxin production. The effect of varying Hydrogen-ion concentration of the medium and also the addition of extra nutritional requirements were studied. Experiments to grow *Clostridium tetani* on a Hog Stomach

autolysate enriched by the addition of Beef Heart infusion were conducted. The growth and toxin production of *Clostridium tetani* on media containing different protein levels (measured in terms of total Nitrogen) were studied. The effect of varying the iron content of the medium was studied with a view to determine the optimum Fe. favourable to the production of high titre-toxin. As a result of these studies, it has been possible to produce tetanus toxin of high potency, the minimum lethal dose for white mice being as low as 0.000003 c.c.

For the production of gas-gangrene anti-toxin the toxin employed for the immunization of horses is manufactured from type-A strain of *Clostridium welchii* maintained in the laboratory.

C. Serum Concentration Section.

During the year efforts were made to process larger quantities of anti-toxic plasma and as a result there has been an increase in the quantity of processed anti-toxic plasma by 571 litres as compared to that processed last year. Total quantity of plasma processed during the year under review amounts to 2,236 litres (i.e., approximately 497 gallons). This comprises two types of anti-toxic plasma (Tetanus and Gas-gangrene) and as usual tetanus anti-toxic plasma constitutes the major part. Thus a steady increase in the production level has been maintained.

Type of anti-toxic plasma.	Volume processed. LITRES.
1 Tetanus	2,121
2 Gas-gangrene (perfringens)	115

Apart from the usual routine work, some preliminary investigations on a laboratory scale have been carried out to see if the Modern Enzymatic method of serum refining could be adopted for processing anti-toxic plasma by employing proteolytic enzymes like pepsin. But the results are not very encouraging from the economic point of view as heavy losses are encountered during the process.

From time to time, modifications in the existing methods of processing immune plasma are being made consistent with the advances made in recent years regarding the processing of the therapeutic sera in general.

D. Serum Filling Section.

Ampouling and labelling of sera in accordance with the regulations prescribed in the Madras Drug Rules are carried out in this section before they are issued for use. The demand for Tetanus anti-toxin both curative and prophylactic continued to be on the increase. The following Tables show the various Therapeutic Sera stocked and issued during 1950-51.

(a) Statement showing Tetanus Anti-toxin purchased in bulk and bulbed during 1950-51.

Serial number and name of sera.	Number of bulbs bulbed.
1 Tetanus Anti-toxin 3,000 I.U. (1928)	1,107
2 Tetanus Anti-toxin 20,000 I.U. (1928)	3,087

(b) Statement showing K.I.P.M. Product bulbed during 1950-51 (from 1st April 1950 to 31st March 1951).

Serial number and name of sera.	Number of bulbs bulbed.
1 Tetanus Anti-toxin 3,000 I.U. (1928)	53,893
2 Tetanus Anti-toxin 20,000 I.U. (1928)	12,242
3 Tetanus Anti-toxin 50,000 I.U. (1928)	2,235
4 Anti-Gas-Gangrene 4,000 I.U.	3,047

(c) A statement of Therapeutic Sera Stocked and issued to the various medical institutions of the state is shown in Table VI.

The institute is not yet self-sufficient in the matter of Tetanus Anti-toxin. As more horses are acquired and as additional stable accommodation is made available, it is expected to step up the serum production to self sufficiency.

BLOOD BANK SECTION.

Staff—

Dr. C. S. Ramachandra Rao, M.B.B.S., D.P.H., Assistant Director (Blood Transfusion).

Assisted by—

Dr. N. Sundararajan, M.B.B.S., Civil Assistant Surgeon, Class I.

Dr. J. Pakiam, M.B.B.S., Civil Assistant Surgeon, Class I.

Dr. V. Shetty, M.B.B.S., Civil Assistant Surgeon, Class I.

There are 17 blood banks all over the province including City State Hospitals. The activities of these blood banks are rapidly expanding and are becoming more popular. Training was given to 23 medical officers in Blood Transfusion and Resuscitation work.

The mobile blood bank unit was sent to accept blood donations from the inmates of jails at Vellore, Rajahmundry, Cannanore, Tiruchirappalli and Madras.

The blood bank took part in exhibitions in different districts in the province for popularizing blood donations and to stimulate the medical profession and the public to take interest in blood transfusion work. Blood was taken at the exhibition stalls from voluntary donors to convince the visitors of the simplicity and harmlessness of blood donation. Blood Pressure of the visitors was taken at the exhibition stall and immediately informed them, but the results of blood tests were communicated to them later on. Instructive charts and models were displayed at the blood bank stalls to educate the public.

Central Supply scheme which was started from 1st April 1950 as a feeder for essential blood bank equipment for the medical institutions in the province, has been supplying the hospitals with their requirements in blood transfusion service articles.

The work done by blood bank section during the year 1st April 1950 to 31st March 1951 is given below :—

I. Blood—

(1) Number of blood bottles received	3,195 bottles.
(2) Amount of blood used for processing	399 litres.
(3) Amount of blood issued	3 "

II. Plasma—

(1) Balance of plasma from previous year	46.5 litres.
(2) Amount of plasma processed	398.5 "
(3) Amount of plasma in litres issued	347.5 "

III. High titre-blood grouping sera—

A	2,774 c.c.
B	2,811 c.c.
O	2,529 c.c.

IV. Donors received by the bank—

Voluntary blood donors unpaid	22
Voluntary blood donors paid	904

V. Exhibitions—

Number of exhibitions taken part	5
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DEPARTMENT OF BIOLOGICAL CONTROL.

Dr. M. Narayana Pai was in charge of the department during the whole of the year. He was assisted by Dr. K. Dattatreyalu (Pharmacologist), Dr. V. Krishnamurthi (Bacteriologist), and Miss R. J. Irani (Chemical Assistant). The total number of tests performed in this department during the year 1950-51 was 5,384 as against 1,562, tests done during the year 1949-50.

The work of the department consisted of (1) The examination of all batches of biological products manufactured at the King Institute, Guindy, for sterility, pyrogen, toxicity, potency, identity and chemical assay, etc., before being issued to the various hospitals, public health bodies and private practitioners. (2) the examination of samples of biological products—Some manufactured by local, mofussil or other private firms in India while some others were of foreign manufacture sent by city and mofussil hospitals, for sterility, pyrogen, toxicity, potency, chemical analysis and suitability for therapeutic use (3) the examination on the above lines of specimen of biological products manufactured by local or mofussil manufacturing concerns who contact us directly (4) the similar examination of specimen of biological products seized and sent to us by the Inspector of manufacturing concerns in Drugs, and (5) Research: During the year, experiments were done on local species of frogs for the diagnosis of early cases of pregnancy, as a substitute for the Friedman's tests where rabbits are employed. Fifty-four tests were conducted on different specimen of urine from suspected and known early pregnancy cases from the Government Hospital for women and Children, Egmore and the Kasturba Gandhi Hospital, Madras.

As during the previous year this department has been considerably handicapped owing to lack of suitable equipment and proper accommodation due to financial and other reasons. Despite the lack of facilities the work of the Department has increased four-fold as compared with the previous year, as will be evidenced by a reference to paragraph I of this report.

A few specimen of interest tested in this department are given below:—

(1) A specimen of Vitamin C Tablets manufactured by a Bombay manufacturing concern and labelled as 100 mgs. of Ascorbic Acid for each tablet was sent here for analysis by their local agents in Madras. These were supplied to a Government Hospital and were found not to be effective therapeutically. The Hospital referred this to the firm and so the firm sent it to us for assay. On assaying we found that it contained only 35.5 mgs. ascorbic acid instead of the 100 mgs. of ascorbic acid claimed on the label by the manufacturers.

(2) A specimen of Calcium Gluconate 10 per cent 10 c.c. in ampoules prepared by a Calcutta firm and supplied to a Government Hospital in Madras was sent to us for analysis "as to the fitness for further use" as it was found to produce reactions on administration to patients. On examination we found it to be sterile but pyrogenic and the same was reported to the hospital authorities.

It is of interest to state at this stage that other batches of ampoules made by the same concern and sent to us from the same hospital were found to be pyrogen free and hence suitable for use.

(3) A specimen of Tinct. Digitalis was sent to us by a manufacturing concern in Bangalore stating that this batch was manufactured from Digitalis Leaves from Nepal and that they believed it to be "more potent than that of B.P. 1948" and that they wanted the true potency to enable them to complete the manufacture of that batch. On assaying both by the Biological (Frog) method and chemical method we found it did not contain any Digitalis Glucosides and the same was reported. Now the same firm has requested us to examine the powdered leaves and report to them.

(4) A specimen of Niamine (25 per cent aqueous solution of Nikethamide in ampoules of 2 c.c.) manufactured by a Calcutta concern was sent to us by a Local Firm as to its fitness for sale in the open market. We found it on analysis to be

non-toxic to white mice but on chemical analysis the batch contained only 18.2 per cent as against 25 per cent claimed on the label. Further, the reducing substances exceeded the B.P. Limit. Hence this was reported to be not of standard quality. Subsequently the firm sent us another batch of the same product which was found to be of standard quality.

(5) A specimen of eye ointment stated to contain 50 units of Penicillin and 5 per cent sulphadiazine, manufactured by a South Indian Private Laboratory was sent to us by the Inspector of Manufacturing concerns in Drugs. It was found on analysis to contain Penicillin in conformation to the specification on the label while the Sulphadiazine was only 4.3 per cent as against 5 per cent claimed.

(6) A sulphur preparation claimed to be a cure for Leprosy was sent to us for test by a private practitioner. It was found to be sterile but locally toxic on subcutaneous injection whereas it was non-toxic to white rats on intravenous injection.

(7) This Department has been helping the Allergic Asthma Enquiry conducted under the auspices of the Indian Council of Medical Research at the University Bio-Chemistry Laboratory by doing the sterility tests on 28 samples of allergens prepared during the course of the research.

(8) This Department has also undertaken work on the nature of determining the penicillin and streptomycin sensitivity of organisms isolated in cultures from specimen received in this Institute both from City Hospitals and private medical practitioners.

REPORT OF THE

DEPARTMENT OF BIOLOGICAL CONTROL.

Table A.

Showing the nature of the tests carried out in the Department of Biological Control during the year 1950-51, the value of the tests if charged for at the scheduled rates and the amount actually collected from private firms for the various tests done on samples sent by them.

Serial number and nature of the specimen.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Specimen received from various departments of Institute.	Specimen received from hospitals.	Specimen received from private firms.	Specimen received from Inspector (Drugs).	Specimen received from other Laboratories.	Total.	Number of specimens unsuitable.	Value of tests if charged at the scheduled rates.	Amount realized in 1950-51 as fee for examination of private specimens.
1 Pyrogen tests	..	..	18	2	8	NH	319	4	15,950	..
2 Sterility tests	..	..	46	9	12	28	2,086	11	24,432	..
3 Toxicity tests	..	..	4	6	2	NH	1,086	2	54,198	..
4 Chemical assays. Tr. Strophanthus, Tr. Digitalis. Digitoxin, Pituitrin.	..	..	21	10	11	NH	232	14	8,460	..
5 Bio-assays	..	..	1	4	NH	NH	54	2	1,296	..
6 Potency tests for cholera, T.A.B. and Yellow Fever Vaccines.	..	..	NH	NH	NH	NH	6	..	300	..
7 Mice, virulence tests on V. Cholera and B. Typhosus strains.	..	..	NH	NH	NH	NH	21	..	1,050	..
8 Anti-toxin potency tests	..	..	NH	4	NH	NH	25	..	1,875	..
9 Penicillin and Streptomycin Sensitivity tests	..	..	NH	4	NH	NH	11	..	275	..
10 Penicillin assays	..	..	NH	4	2	NH	12	..	300	..
11 Prophylactic vaccines, tests of Opacity, Identity and serological tests with H.T.S.	..	..	NH	NH	NH	NH	1,234	..	30,850	..
2 Vaccine lymph, bacterial content, colony count and safety tests.	..	..	NH	NH	NH	NH	146	..	3,650	..
3 Miscellaneous tests—										
Catgut absorbability	..	..	..	..	..	..	..	..	..	..
Blood sugar	..	..	..	..	..	..	..	..	..	..
Betel leaf Ext.	..	..	..	..	..	..	..	..	..	..
Widal	..	..	..	..	..	..	..	..	..	..
Male frog test	..	..	..	..	..	..	..	..	..	..
Total number of specimen tested	..	..	..	..	..	..	5,348	..	1,43,376	826

DEPARTMENT OF WATER ANALYSIS AND ALGAE CONTROL.

Charge : Sri P. V. Seetharama Iyer, M.A. Chief Water Analyst.

The functions and scope of the Department of Water Analysis and Algæ Control have been described in full in the report for the year 1949-50.

The year under report marks the fourth of a series of drought years in most parts of the State. This has naturally led to the continuation of the quest for new and additional sources of water for both drinking and industrial purposes. Consequently, the marked increase that was recorded during the previous year in the number of water samples received at these laboratories for analysis to assess their suitability for various uses including human consumption has been maintained during the year under report also. The total number of water samples analysed during the year under report was 8,306 as compared with 8,391 in the previous year and 6,794 in 1948-49. These figures do not include samples tested in connection with the Research work on Water Purification carried out at the Government Experimental Filter Station, Kilpauk, or samples tested during field investigations.

The year began with 162 protected drinking water supplies in the State listed for periodical examination. The water-supplies to Melapalayam municipality, Arantangi Panchayat Board, Central Jail, Pudukottah, Kaggalu Jail Labour camp, Bellary, Sri Sadana and Government Vigilance Home, Madras and Bhavanisagar Project camp were added to the list during the year while the examination of the supply to Lawrence Memorial School, Lovedale, was discontinued, thus bringing the total number to 168 at the close of the year. Table VIII gives the number of 'protected' water-supplies which are now under periodical examination with details regarding the number and the nature of sources, method of filtration and chlorination adopted, etc. Samples for analysis were collected from these water supplies thrice during the year. Reports drawn on the results of each examination together with suggestions for improvements wherever necessary, were sent to the concerned local authority, the Sanitary Engineer to Government, the Director of Public Health and since January 1950 also to the Executive Engineer (Public Health) of the region in which the particular water-supply is situated. The recommendations made in the reports have received prompt and suitable action from the concerned Sanitary Engineering and Public Health personnel.

The number of samples of water which were taken during the year from the protected water-supplies in the State and tested to determine their bacteriological, physical and chemical characteristics was 4,559. The number tested during the previous year was 4,456. In addition, 103 samples of water were analysed in connection with investigation on new urban and rural water-supply projects undertaken by the State Government.

Seven hundred and eighteen samples of water and specimens of biological growths were assayed in the Laboratory and in the field for the estimation and identification of algal and other organisms in connection with the application of algal control measures.

In connection with the research work on water purification carried out at the Experimental Station, Kilpauk, 2,159 samples of water were analysed bacteriologically and chemically. Besides, the examination of 61 samples of sand, alum, bleaching powder, microscopical organic growths, etc., was also made.

The Water Analysis Department of the Institute offers the only well equipped and competent laboratory and advisory service in the State for the analysis of waters required for industrial use, and for the determination of suitable methods of treatment of water to render them fit for use in specific industrial and manufacturing processes. The number of samples of industrial waters analysed during the year under report was 135 as compared with 62 during the previous year. Twenty-five samples of sewage and trade wastes were also analysed during the year.

The analytical work relating to the examination of samples of water, etc., collected from the protected water-supplies in the State is carried out free of charge. No fee is levied for examinations made of samples received for test in connection with water-supply investigation schemes conducted by governmental agencies. All other examinations of water samples, both for drinking and industrial purposes as well as other analytical examination (Disinfectants, salt samples, aerated waters, etc.) are all charged for on the basis of a schedule of fees approved by Government.

The number of tests on disinfectants carried out during the year was 69 while the number tested in the previous year was 120. Nearly 80 per cent of the samples received for test yielded a Rideal Walker co-efficient value of five and above.

The Government Experimental Filter station which was under the administrative control of the Director, King Institute since 1940, was transferred to the administrative control of the Sanitary Engineer from 1st January 1951. This transfer of control of the station was recommended by the Water and Sewage Purification Committee and approved by Government in the Order Ms. No. 153, Health, dated 24th September 1950. The experiments at the filter station, Kilpauk, will be planned by the Water and Sewage Purification Committee as before, the engineering aspect of the working will be attended to by the Sanitary Engineering Department and the experimental and the analytical work will be carried out by the King Institute, Guindy.

In addition to the analysis of water samples, the analysis of chemicals and other materials used in water purification processes and the bacteriological examination of milk, food products, aerated waters, etc., were also carried out. Samples of milk were collected at fortnightly intervals from the Government Milk Factory, Teynampet, and tested bacteriologically. The total number of such samples tested during the year was 127, of which 120 comprise samples of milk drawn from the Milk Factory.

The analysis of the samples of salt, started in the previous year at the request of the Deputy Salt Controller of the Ministry of Industry and Supply, Government of India, was continued for a further period of one year. In order to facilitate undertaking this additional work, an extra Junior Assistant was appointed temporarily in the department. A total of 56 samples of salt was tested during the year under report.

As in previous years, this department continued to manufacture and supply pancreatic extract for use in the preparation of media. The quantity of the extract prepared during the year was 333.5 litres while the quantity supplied during the previous year was 158 litres. Standardized reagents and stains amounting to over 54,600 ccs were prepared and supplied for use in other departments of the institute.

Want of sufficient laboratory accommodation has again handicapped the work in this department throughout the year under report. Plans and estimates have been recently approved for enclosing the verandas on two sides of the present building and converting them into laboratory rooms. It is expected that when these constructions are carried out, the pressure for space would be relieved to some extent.

The Government in their Memorandum No. 49457-Q/49-11, Health, dated 30th October 1950, decided that a Conference of Officers, who are carrying on research on the subject of Fluorosis at the different Research institutions in the State should be convened to determine the future lines of research work on the problem and co-ordinate the effort of the different institutions. Accordingly a Conference was held on 20th January 1951, at the King Institute, Dr. J. C. David, M.B.B.S., PH.D., Surgeon-General with the Government of Madras, presided and the following officers attended the Conference. Dr. P. Arunachalam, M.D., M.B.C.P., T.D.D., D.M.B., Superintendent, Stanley Hospital, Dr. K. V. Giri, D.Sc., F.A.Sc., F.R.I.C.,

Professor of Bio-Chemistry, Indian Institute of Science, Bangalore, Dr. T. Lakshminarayana, D.P.H. (Lond.), Director of Public Health, Madras, Dr. Y. S. Narayana Rao, M.B.B.S., D.T.M. (Cal.), D.B. (Lond.), Director, King Institute, Guindy, Dr. V. N. Patwardhan, M.Sc., Ph.D., A.I.I.S.C., Director, Nutrition Research Laboratories, Coonoor, Dr. A. S. Ramachandran, M.B.B.S., M.Sc., Professor of Bio-Chemistry, Madras Medical College, Madras, Sri P. V. Seetherama Iyer, M.A., Chief Water Analyst, King Institute, Guindy, Dr. D. Subba Rao, M.B.B.S., B.S.Sc., M.P.H. (Harvard), Nutrition Officer, Public Health Department, Madras; and Sri K. Venkataraman, M.Sc., A.R.I.C., Brackish Water Enquiry, Indian Institute of Science, Bangalore and Dr. H. A. Shaw, D.Sc., of the National Chemical Laboratory of India, Poona, was also present by invitation.

The discussion covered in detail the whole field of research carried out in the State on various aspects of the problem of Fluorosis, and measures required for its amelioration. Schemes for further research which would throw more light on important problems relating to fluorosis and plans for extended study of the problem of removing fluorine from drinking-water were drawn up in their order of priority at the Conference. These are:—

(1) The establishment and working of a semi-large-scale pilot plant at Guntakal for removing fluorides from drinking-water by the use of alkali digested alum impregnated paddy husk carbon (King Institute, Guindy).*

(2) A survey of the fluorine content of all sources of drinking-water in the areas of the Nellore district where fluorosis is prevalent in chronic endemic form (King Institute).

(3) A diet and Nutrition survey of the population of the chronic fluorosis endemic areas (Director of Public Health, Madras and Nutrition Research Laboratories, Coonoor).

(4) Clinical, Bio-chemical and X-ray studies of patients suffering from fluorine poisoning after hospitalisation (Department of Public Health, Superintendent, Stanley Hospital and Professor of Bio-Chemistry, Stanley Medical College.)

(5) X-ray and clinical field investigations to evolve diagnostic data to discover early cases of fluorine poisoning (Department of Public Health).

(6) Studies on the bio-chemical aspects of fluorine poisoning in animals (Professor of Bio-chemistry, Indian Institute of Science, Bangalore).

It was estimated that the entire scheme would cost approximately Rs. 50,946 in the first year. The research schemes with details have been submitted to Government for their approval and necessary financial grants.

Section of water Bacteriology and Chemistry.—Five thousand one hundred and thirty three samples of water, food, milk, etc., were analysed bacteriologically of which 753 were water samples tested in connexion with research experiments carried out at the Kilpauk Research Station and the application of algicides to Red Hills lake water.

The finding of lactose fermenting organisms in some samples of water which showed the presence of residual chlorine has already been referred to in the report for the year 1949-50. Investigations were, therefore, undertaken during the year under report to determine the resistance, if any, of different types of coliform organisms to various concentrations of chlorine and ammonia-chlorine compounds. The organisms selected for study are those found normally occurring in samples of drinking-water and in sewage. The applicability of the recently introduced ferrous ammonium sulphate method for the detection and estimation of residuals of free chlorine and the different ammonia-chlorine compounds is also being studied. The work is in progress.

An investigation into the present status of hygienic conditions in Hotels and Restaurants with special reference to the bacteriological cleanliness of the utensils used in these has been undertaken at the instance of the Hotel Sanitation Committee. This investigation which is in progress has, as its object, the

* The Institution or the Agency through which the scheme would be implemented is given within brackets.

determination of standards of bacteriological cleanliness that could be prescribed for hotel utensils. The existing facilities for washing and cleaning utensils at certain selected restaurants and the bacteriological condition of the vessels at different stages of washing are being studied as well as the nature and degree of improvement that could be effected through the use of quaternary ammonium compounds (Roccol) for washing the vessels and rinsing them subsequently in hot water (about 80°C).

The total number of samples of water analysed chemically during the year was 2,409 while 2,243 samples were tested for their physical qualities such as odour, colour and turbidity. Fifty-nine samples of bleaching powder, alum, sand, lime, etc., and 25 samples of sewage were also analysed. Details regarding the various sources from which these samples were received for analysis are given in Table VII Part (1), (a), (b) and (c).

A few interesting and unusual observations made in the course of the chemical analysis of water samples are worth recording. Samples received from Venkata-puram, Hampidevanahalli taluk in the Tungabhadra Project canal area showed the presence of excessive amounts of alkali salts (sodium bicarbonate and sodium sulphate) in solution while their chloride content and hardness were very low. These samples also contained over 2.0 parts per million of Fluorine. While such waters may have some medicinal value, they would however prove unsuitable for regular use for drinking, owing to the presence of a high Fluoride content.

It is rare to find waters containing iron in solution in the Ferric state. Three samples of water, however collected from Kottayur, Rajahmundry and Vijayavada showed the presence of ferric carbonate in solution (0.1 to 0.2 part per million).

A sample of water was received from a Medical Practitioner in Bhadrachalam taluk, for analysis as it was suspected to cause gastro-intestinal troubles and also made persons drinking the water regularly "black in colour". Detailed analysis of the water showed the presence of high amounts of calcium and magnesium bicarbonates with a low chloride content. Trace elements like lead, tin, selenium, manganese, chromium, cerium, zinc, mercury, titanium, etc., were all absent. The chemical features did not throw any light on the alleged troubles caused by drinking this water.

A marked increase was recorded in the number of samples of water received for analysis for industrial and other non-domestic uses. As in previous years, boiler feed waters formed a large percentage of such samples. In addition, many samples were submitted for test to determine their suitability for use in building construction as the normal supplies had failed or were found inadequate. Water of correct quality is essential for use as a boiler feed to prevent economic loss due to corrosion of boiler plates and personal risk due to accidents. Salts which impart hardness to water like the bicarbonates and sulphates of calcium and magnesium, when present in excessive amounts in a boiler feed water tend to form scales inside the boiler. As a result of the formation of scales, the flow of heat from the boiler metal to the water becomes greatly reduced. When silica is also present in the water, the scales tend to be very hard. A relatively small amount of magnesium chloride in water may cause active corrosion due to decomposition and the production of free acid at high temperatures. Carbon dioxide either in the free state or in combination as bicarbonates produces acidic conditions under the working temperature in boilers. This acts detrimentally and causes corrosion of boiler plates. Another constituent in water which is important in the case of boiler feed waters is the oxygen in solution. The dissolved oxygen in water plays a prominent role in electrolytic corrosion of iron. The concentration of dissolved oxygen in water, however, requires to be estimated at the spot on samples collected under certain special conditions.

Only two out of the 26 samples of boiler feed waters received for analysis appeared suitable for use without treatment while one sample was found totally unfit for use by any practicable method of correction. Recommendations made

for boiler feed treatment included (1) acidification to correct excessive content of sodium bicarbonate, (2) Addition of calcium carbonate or soda ash to overcome deleterious action of high carbon dioxide content, (3) Treatment with sodium aluminate to prevent silica scales, (4) Lime treatment, alone or with soda to correct waters containing excessive amounts of carbonate hardness or carbonate and non-carbonate hardness respectively and (5) Addition of 'calgon' as a stabilizer to prevent after precipitation. These recommendations were made based on laboratory trials with the samples sent for analysis. It is, however, regrettable to have to state that no information is available regarding the adoption of the suggested measures by the concerned parties, and the results as judged by periodical inspection of the boilers by State inspecting agencies.

Section of water biology.—Samples of water collected on a routine basis from the protected water supplies in the State which are derived from reservoirs, tanks and wells were examined microscopically to determine the nature and composition of the biological growths present in them. The purpose and aim of such examination has been given in detail in the report for the year 1949-50. The total number of specimens examined microscopically during the year was 783 out of which over 50 samples were taken from Red Hills Lake in connection with the algicidal treatment to the lake water.

A programme of algal control measures is now adopted on a regular routine basis at 16 water supplies in the State with beneficial results. The aesthetic quality of these water supplies has improved and the interference of organic growths with the filtration processes has been minimised.

A survey of the algal flora of the drinking-water reservoir, Southern Railway, Perambur, was carried out in August 1950 at the request of the railway authorities. The reservoir was infested with aquatic weeds belonging to the genus *Najas* and the water supported an algal plankton composed mainly of species of *Euglena*, *Oscillatoria*, *Anabaena*, *Merismopedia*, *Scenedesmus*, *Pediastrum* and *Diatoms*. Recommendations were made regarding measures for restricting the development of plankton algae and the higher vegetation in the tank water.

As in the previous year, technical assistance was rendered to the Madras Corporation authorities in carrying out algicidal treatment to the Red Hills Lake. Copper sulphate was used as the algicide of choice in this case and the treatment was restricted to the harbour around the Jones Tower. The lake water was treated with copper sulphate three times during the year under report. Systematic algicidal application, started since September 1948, has proved useful in keeping the total organic matter content of the lake water under control. The organic matter content of the lake water which ranged from 0.27 to 0.350 parts per 100,000 during March to October 1948 before copper sulphate treatment was adopted on a regular basis, was subsequently reduced to 0.150 to 0.260 per 100,000 during corresponding periods in 1949 and 1950. Algicidal treatment has brought about a significant reduction in the concentration of the planktonic organisms like *Microcystis*, *Anabaenopsis*, *Oscillatoria*, *Caelosphaerium*, *Oocystis*, *Pediastrum* and *Peridinium* in the lake water. In consequence, filter runs have shown improvement and the production of H₂S in the Kilpauk sand filters has been greatly reduced.

Protected water-supplies in the State.—It is customary to group the drinking-water-supplies in the State as (1) Municipal and Panchayat Board water-supplies, (2) Railway station water-supplies, (3) Jails and Certified school water-supplies, (4) Institutional water supplies and (5) Rural water-supplies. Of these, all but the last have been brought under periodical analytical control.

(1) *Municipal and Panchayat Board water supplies.*—The water supplies to 59 municipalities and 17 panchayat Boards were examined three times during the year. Seventeen municipalities and 2 panchayats purify their water-supply by filtration and chlorination. These purification works comprise 8 slow sand filters and 11 mechanical (rapid sand) filters (gravity and pressure types). The drinking-water supplies to 32 municipalities and 12 panchayat boards are purified by chlorination alone, while 13 municipalities and panchayat boards are supplied drinking-water without any form of treatment.

The slow sand filters at Kurnool, Kakinada and Eluru continued to work efficiently during the year while those at Adoni showed improvement. Troublesome microscopic plant growths occurred in the sand filters at Periakulam. The sand filters at Salem yielded a filtrate, which showed only slight improvement over the raw water. The operation and maintenance of the filters at this water works require rigid control by an adequately trained operator. The slow sand filters at Madras continued to function as in previous years, *more as coarse strainers*. After the introduction of periodical algicidal treatment to Red Hills Lake, the production of sulphuretted hydrogen in the filters was much reduced and the average length of filter runs extended. The lake water is also chlorinated before filtration. The slow sand filter at Ramachandrapuram Panchayat Board yielded a filtrate which was poor in quality.

The gravity mechanical filters at Rajahmundry, Erode, Bodinayakanur and Mettupalayam yielded satisfactory results. The pressure filters at Pudukottai functioned efficiently while improvement in working was recorded in the case of the pressure filters at Chidambaram and Masulipatam. The filter plant at Palacole (pressure filter) yielded rather inconsistent results.

The drinking-water supplied to consumers in 63 Municipalities and panchayat Boards in the State is chlorinated as a safeguard against water borne diseases. This is done with the aid of automatic apparatus using liquid chlorine in 18 water works and manually controlled or mechanical drip-feed equipment using bleaching powder solution at 45 places. During the year under report, 714 samples of water were collected from the service taps in the municipalities and panchayats and tested for their hygienic quality. The following statement shows the number of samples which were found unsatisfactory in each group of supply divided according to the type of treatment adopted.

(1) *Municipal water-supplies.*

Type of supply.	Number of supplies.	Number of samples tested from service taps.	Number of samples unsatisfactory.	Percentage unsatisfactory.	
				1950-51.	1949-50.
(1)	(2)	(3)	(4)	(5)	(6)
Untreated	11	89	32	35.9	47.3
Chlorinated only	32	339	110	32.1	37.9
Filtered and chlorinated	17	162	52	32.1	33.7
Total	60	590	194	32.8	32.8

(2) *Panchayat Board water-supplies.*

Type of supply.	Number of supplies.	Number of samples tested from service taps.	Number of samples unsatisfactory.	Percentage unsatisfactory.	
				1950-51.	1949-50.
(1)	(2)	(3)	(4)	(5)	(6)
Untreated	3	21	10	47.6	50.0
Chlorinated only	12	92	41	44.6	32.3
Filtered and chlorinated	2	11	1	9.0	39.0
Total	17	124	52	41.9	34.4

32.8 per cent or nearly a third of the samples were not quite satisfactory. The corresponding figure for the previous year was also 32.8 per cent. It would thus be seen that the general position as regards the hygienic quality of water as supplied for drinking continues unchanged. However, a marked fall in bacteriological quality is noticed in the case of those Municipal water supplies which are subjected to filtration and chlorination. In the year under report, 32.1 per cent of the samples drawn from the consumer taps in these Municipal water undertakings fell below standards of bacteriological purity while the corresponding figure for the previous year was 13.7 per cent. This matter would therefore seem to require critical examination with the object of upgrading these supplies and of ensuring uniformly good quality at all times. The fall in quality would appear

chiefly to be due to deterioration in the distribution pipe-lines and in subsidiary storage reservoirs. Regulated and systematic scouring of the pipes and the maintenance of clean conditions in storage reservoirs would assist greatly in overcoming this trouble. Another factor which also requires urgent consideration is the speedy replacement of the manually operated chlorinating equipment now used at most water works with a more reliable and automatic apparatus using liquid chlorine. Then both correctness in dosage and uniformity of treatment could be secured. Appropriate remedial measures for improving the Bacterial quality of the supplies not conforming to standards have been recommended for adoption to the local authorities. The Sanitary Engineer and the Director of Public Health are also taking suitable action to see that the suggestions made are duly carried out.

(2) *Railway station water-supplies.*—In all, 54 Railway station water-supplies on the Southern Railway and Bengal Nagpur Railway systems are under periodical examination at the King Institute. The hygienic quality of the drinking-water supplied on the platforms of the stations on the former Madras and Southern Maharatta Railway system has shown a great improvement as judged by the results of tests on samples collected during the year under report. This improvement is due to the stricter supervision and control over chlorination procedures adopted at these railway stations by the concerned authorities. Except in five stations, where liquid chlorine is used, the water is generally chlorinated with the aid of a McLeod's box, using bleaching-powder solution. When operated with care, this apparatus yields very satisfactory results.

A similar improvement however is not noticed in the case of the water-supplies to the stations on the former South Indian Railway. Here, except at Villupuram, Tanjore, Tiruchirappalli, Tirunelveli, Mayuram and Erode, chlorination of the drinking-water supplied to the platforms has been generally defective, since no standard procedure is adopted in the matter of chlorination carried out at present with bleaching-powder solution. It may be possible to effect much improvement in the quality of the water-supplies to the stations on this system also if some automatic apparatus using liquid chlorine or McLeod's boxes are installed to sterilise the supply.

(3) *Jails and Certified Schools.*—The water-supplies to 25 jails, certified schools and Vigilance Home were tested three times during the year under report. The water-supply to most of these institutions continued to be of satisfactory quality, as judged by the results of the examinations carried out during the year. Recommendations for improvement wherever necessary, made in reports of analysis, were adopted by the concerned authorities.

(4) *Other Institutions.*—The water-supplies to twelve Government Institutions, Colleges and camps are examined periodically at the Institute (Table VIII).

The drinking water-supplies to the Medical College, Vellore, Kasturba Gandhi Memorial Hospital, Madras, Engineering College, Guindy, Government Houses at Guindy and Ootacamund were all of good quality.

The Annamalai University water-supply, which is derived from an earthen storage tank and is filtered through a pressure filter, was throughout unsatisfactory in quality. No attempt has been made by the University authorities to implement the recommendations for improving the quality of the supply made in the analytical and special reports. Also in the case of the Glen Morgan-Singara camp water-supply, no action has been taken by the authorities to put into effect suggestions made to introduce proper methods of chlorinating the supply to the various camps and to put the existing filters in good working order.

The water-supply to Papanasam Hydro-Electric camps was in fair order as judged by the results of tests done during the year under report. The water-supply to Tungabhadra Project camp is drawn from a canal. The water is purified by aeration, alum sedimentation, mechanical filtration and chlorination. The supply was of satisfactory quality. In the Bhavani Project camp, where mechanical filters have been constructed, suitable arrangements for alum treatment and settlement are lacking. The filtered water therefore tends to be discoloured and turbid and bacteriologically unsatisfactory.

(5) *Rural Water-supplies.*—Thirty-seven samples of water were analysed in connection with schemes for providing drinking-water-supplies to rural areas. The Rural water-supply scheme is executed through the Revenue Department. Samples of water for analysis to determine potability are collected from the sources under investigation by the Health Inspector or the Minor Irrigation Overseer of the region at the request of the revenue authorities and sent to the Institute for analysis. The districts from which these samples were taken are South Arcot, North Arcot, Anantapur, Nellore, Cuddapah, Tiruchirappalli, East Godavari, Coimbatore, Nilgiris (12 samples) Tirunelveli and Poonamallee Health Unit. To facilitate preliminary selection of suitable sources for further detailed examination, the Minor Irrigation Overseer from Tiruppur was trained at the Institute in the methods of testing water samples to determine their salinity and hardness. Out of the 37 samples analysed at the Institute, 26 were passed as fit for drinking, while the rest were not found suitable for the purpose owing to the presence of undesirably large amounts of dissolved salts.

Besides these, 40 samples of water collected from Darsi, Podili and Kanigiri taluks in Nellore district where fluorosis is prevalent were received for the determination of their fluorine and chloride contents.

Water and Sewage Purification Committee.—There were three meetings of the water and Sewage Purification Committee during the year under report on 24th May 1950, 4th August 1950 and 1st February 1951.

The Committee discussed the proposal of the Chief Engineer (P.W.D.) for carrying out experiments on the use of "Micro mesh" pre-filters for the purification of the Madras City Water-supply. The Committee resolved that while experiments should be conducted to assess the usefulness of the method, the advisability of providing rapid sand (mechanical) filters for any immediate expansion of the City water-supply should not be delayed. The necessity of reconditioning the existing distribution system so that the filtered water may not suffer any deterioration in transit through the pipe lines was also stressed. It is understood that Government have since approved the installation of mechanical filters to augment the supply by an additional ten million gallons.

Another important subject considered by the Committee related to the permissible safe distance between filter trenches dealing with septic tank effluents and drinking water sources. Specifications now laid down in P.H.B.D. No. A/43 provide for a minimum distance of 100 feet. It is however often found difficult to satisfy this condition especially in built-up areas and insistence on this provision would result in depriving many owners of big buildings of this sanitary convenience. Since these trenches do not ordinarily reach directly to the ground water level, it was considered that percolation through natural soil would afford the desired measure of protection to the ground water from contamination. It was resolved that P.H.B.D. No. A/43 may be modified to provide that in built-up areas, such filter trenches may be located at a distance of not less than 25 feet from the nearest source of drinking-water provided, however, that the filter trench is enveloped all round with a layer of sand to a depth of at least one foot.

At its meeting held on 1st February 1951, the Committee considered the permissible limit of fluorine concentration in drinking-water. It was resolved that waters containing up to 1.5 parts per million of fluorine may normally be used for drinking purposes. The use of waters containing fluorine in excess of 1.5 parts per million for drinking purposes should not be permitted, unless it is based on a survey carried out by the Public Health Department regarding prevalence of dental fluorosis among the vulnerable section of the population in the area.

Experimental Filter Station, Kilpauk.—The administrative control of the Government Experimental Filter Station was transferred to the Sanitary Engineer with effect from 1st January 1951.

The main research work carried out at the station during the year under report related to the application of the Break Point Method of chlorination to the Red

Hills Lake water prior to sand filtration. This experiment was originally designed to test the hypothesis that loss of dissolved oxygen from the feed water during passage through a sand filter occurs as a result of bacterial decomposition of organic matter. Chlorination of the feed water by the break point method and super-chlorination of the sand filter before it is placed in service ensured bacterial sterility of both the water and the filter bed. In the break point method of chlorination, sufficient chlorine is added to the water so that a residual of "free available chlorine" remains in the treated water after a definite contact period (2 hours in the experiment).

The experiment was started in the middle of May 1950. A sand filter fed with unchlorinated water and worked at the same rate as the experimental filter (8 inches vertical per hour) was run concurrently as a control.

The results of the analysis of samples of the feed water and the filtered water from the experimental and control filters show—

(1) That pre-chlorination to the break point increases the filter run by nearly 80 to 100 per cent as compared with the control filter.

(2) The filtered water from the break point chlorinated filter is always free from coliform organisms and has a very low total colony count. The filtered water from the control sand filter shows the presence of coliform organisms, the number varying from 5 to 80 per 100 ml. The filtrate from the break point filter showed the presence of small amounts of residual "combined chlorine" (0.05 to 0.1 part per million).

(3) There is considerable loss of dissolved oxygen from the water during passage through either filter. However, while the control sand filter yields over a greater part of each run a filtrate which is totally devoid of dissolved oxygen, the break point filter yields a filtrate which contains small traces of dissolved oxygen (0.05 to 0.2 part per million) even at the close of each run. The causes for the loss of dissolved oxygen from water during slow sand filtration remain obscure.

(4) The filtrate from the break point filter does not contain sulphuretted hydrogen. The control sand filter produced sulphuretted hydrogen towards the close of its run during the months of August to December and within a short period of starting from January to March.

(5) Practically no organic film developed on the surface of the break point filter while a thick mat of slimy organic growths comprising blue-green algae; *Protoeoccales*, *Desmids*, *Diatoms* and Ciliate Protozoans developed on the surface of the control sand filter.

(6) The silt adhering to the sand grains in the break point filter was easily cleaned and removed. A greater degree of washing was required to clean the fine sand scraped from the control sand filter.

The experiment is being continued to cover the different seasonal conditions of the raw water. It is further proposed to continue the experiments so that full data may be gathered during a normal year. The year during which the experiment has so far been carried out was characterized by unusual drought conditions.

In order to test the performance of a sand filter when fed with Red Hills Lake water from which all suspended organic impurities and silt have been removed, Red Hills Lake water was treated with slum, clarified in settlement tanks, and filtered through a mechanical filter. The clear filtrate from the mechanical filter was then passed through a sand bed containing 18 inches of fine sand and worked at 8 inches vertical per hour. This experiment, it was expected, would provide useful reference data relevant to the trials using micro mesh prefilters that may be made later. The experiments had to be suspended however to carry out repairs to the mechanical filter and the construction of a perforated concrete collecting system for the same filter.

The analytical and other experimental work relating to the researches at the Filter Station was carried out by Sri K. G. Veeraraghavan, M.Sc., Assistant Analyst (Water Biology), during the year under report.

Field investigations—(1) Sterilization of water mains—Arantangi Water-supply.—The Arantangi Water-supply Scheme provides a supply of five gallons per head per day with about eight hours of pumping per day. The supply is derived from an infiltration well sunk in the bed of the Vellar River. The well is connected to a combined suction and pump well located in the Padugai to the east of the infiltration well. Water is pumped from the suction well through a 6 inch C.I. main 7,600 feet long to a service reservoir located in the Fort area of the town. The service reservoir is built of cement concrete and consists of two concentric compartments, each with a capacity of 7,000 gallons. Drinking water is distributed to the town from the service reservoir through 25 street fountains. The total length of the distribution system is about 20,842 feet.

The pumping main and the distribution system were sterilized with chlorine between 16th May 1950 and 18th May 1950 before the water-supply to Arantangi was put into commission. The pipe lines were thoroughly flushed out before they were sterilized. The pipes were then filled with heavily chlorinated water (15 parts per million of chlorine), which was retained in them for over 12 hours.

After the contact period, the scours were opened and the pipes emptied of all superchlorinated water. A chlorine residual of 5.0 parts per million was found in samples of the chlorinated water drawn from taps in different parts of the town and from scours on the pumping main before they were emptied. Fresh water was then pumped through. Samples of water were collected from the suction well and from the street fountains after sterilization and tested bacteriologically in the field laboratory. It was found that the water did not suffer any deterioration in bacteriological quality during passage through the pumping main, storage reservoir and the distribution pipe lines, indicating that these had been sterilized adequately. The supply was then brought into regular use.

The sterilization of the main and the distribution pipe lines at Arantangi was carried out under the guidance of Sri P. V. Seetharama Iyer, Chief Water Analyst.

(2) Tuberculation of mild steel pipes—Papanasam Hydro-Electric Project.—Blister-like growths on the inside surface of the low pressure pipes at Papanasam Hydro-Electric Station were first noticed in 1943, shortly after the pipe were placed in service. Pitting of the pipe wall underneath the blister-like growths had also occurred and periodical inspection showed that the depth of these pits tended to increase gradually. On the request of the Chief Operation Engineer, Madras Electricity System, a field investigation was carried out in September 1950 to study the nature and composition of the tuberculations, the factors responsible for their development and to evolve methods to prevent their formation.

In the course of the investigation, numerous samples of tubercles were collected from the interior of the high velocity discharge pipe at Papanasam Upper Camp, and from the surface of the scour pipe below the surge tanks.

Samples of water and the contained planktonic organisms were also collected from the Tambaraparani Reservoir, the diversion weir, the surge tanks and the discharge end at the power-house. The water samples were analysed in the field to estimate their dissolved oxygen and carbon-dioxide content, pH and corrosivity. It was found that the chemical characteristics of the reservoir water rendered it corrosive to iron structures, which are not properly protected against its deleterious attack.

The tubercles were found adhering firmly to the surface of the pipe in the form of barnacle-like nodules. Beneath each tubercle, a circular depression was noticed in the metallic wall, the surface of which appeared bright and shining. The tubercle was composed of concentric black and brownish layers of iron compounds which were cemented together firmly. Bacterial organisms belonging to the group "Iron Bacteria" were isolated from samples of the tubercles after

cultivation in special culture solutions in the laboratory. Similar bacterial organisms were also found to occur in the water samples collected during the investigation. It would appear that the tubercles are formed as a result of the growth and development of the bacterial organisms at the spots where the defects in the pipe coatings expose the metal to the corrosive action. The organisms which tend to get lodged in the spongy corroded spots multiply rapidly and appear to yield a hard cementing material which binds the products of corrosion and forms nodular protuberances. Corrosion of the metal would appear to continue actively underneath the tubercle.

It was not considered practical to treat the water chemically and render it innocuous to mild steel and other iron structures. Therefore, protection of the pipe surface by the application of suitable coatings was recommended as a measure for the prevention of corrosion. It was also recommended that the most suitable pipe coating may be selected after carrying out detailed field experiments to determine the properties of the different paints available for use. The data that would be gathered from such experiments would prove valuable not only in finding a solution to the problem of tuberculation at Papanasam but also in the prevention of such troubles at other installations where the water is ascertained to be similarly corrosive.

This investigation was carried out by Sri K. G. Veeraraghavan, Assistant Analyst (Water Biology), and Sri A. S. Hariharan, Junior Water Analyst.

(3) Mineral Waters Survey.—The investigation on the mineral waters in the State started in the year 1949 was continued during the year under report.

(a) Skandapushkarani and Nazhi wells, Tiruchendur.—A detailed chemical and biological study was made of the Skandapushkarani and Nazhi well waters, to ascertain whether these waters possess any medicinal value and to find out the causes for the presence in the well water of sulphuretted hydrogen. In the course of a detailed field investigation, samples of the water flowing from springs into Skandapushkarani and from Nazhi well were collected and tested in the field. The area in which these wells were situated was surveyed and samples of water collected from representative wells in the area were also analysed. A study of the data collected during the investigation shows that these well waters are not specially medicinal in nature; the Skandapushkarani water having a small amount of hydrogen sulphide in solution, may have some beneficial effect on certain skin affections. This hydrogen sulphide was produced by the action of bacterial organisms in the water, which are capable of reducing sulphates to sulphides during their metabolic activity.

The Nazhi well is practically set within the Skandapushkarani well. Yet the two waters showed a remarkable difference in their chemical features; the former had a fairly low saline content while the latter was highly brackish with a salinity, resembling dilute sea water. It would seem probable that these two wells, though situated so closely are fed by different springs. A report on the findings of the investigations was sent to Government.

(b) Gundala, Badrachalam taluk.—This is a thermal sulphurous spring in the bed of the Godavari river at Gundala (Lat. 17°39, Long. 81°0) a village in Bhadrachalam taluk, four miles from Bhadrachalam on the Kunnawaram Road. The Godavari at this place is usually dry between February and June. During the rest of the months, there is flow of water in the river. It would appear that when there is surface flow in the river over the area where the thermal spring is situated, steam could be seen issuing from the spring. The most important festival during the year is Sri Rama Navami (March) when a large number of pilgrims visit this place and get a potful of water on payment of a small fee. The spring water has a temperature of 150°F and contains marked amounts of sulphuretted hydrogen, together with appreciable amounts of sodium sulphate and sodium chloride. The water may have some therapeutic value in the treatment of certain skin diseases, gout, rheumatism, etc., and act as an intestinal antiseptic when used for drinking.

(c) *Artesian wells, Vriddhachalam taluk.*—A preliminary field survey of eleven artesian wells in South Arcot district was made during February-March 1951 to ascertain the chemical characteristics of the waters with special reference to corrosivity and medicinal property. It was found that the artesian wells yielded a water rich in dissolved carbon dioxide content while some contained also small amounts of sulphuretted hydrogen in solution. They were acidic in reaction and held iron in a dissolved state. The iron was thrown out of solution as a precipitate of iron oxide when the water was exposed to the atmosphere. Much of the iron in solution was probably derived from the mild steel lining pipes as the waters are corrosive owing to the presence of large amounts of carbon dioxide in solution. A report based on the findings of the preliminary survey with recommendations regarding measures that may be adopted to protect the lining pipes from corrosion has been sent to the Board of Revenue and other Engineering and Public Health authorities.

The Field investigations on mineral waters in the State were carried out by Sri P. V. Seetharama Ayayr, Chief Water Analyst, Sri N. Swaminathan, Assistant Analyst (Water Bacteriology and Chemistry) and Sri A. S. Hariharan, Junior Water Analyst.

PART II—RESEARCHES.

FILTERABLE VIRUSES ENQUIRY UNDER THE DIRECTOR.

(Financed by the Indian Council of Medical Research.)

(Dr. Y. S. Narayana Rao and Sri K. N. Gopalan.)

A. Influenza.

Studies on the haemagglutination by influenza "A" and "B" viruses.—From the report of F. Lanni, Y. T. Lanni and Beard (1949) on the inhibitory effect of cow's milk on virus haemagglutination, it will be seen that inhibitors of haemagglutination are found in various mammalian and avian fluids. Such an inhibitor is present in human milk also to some extent. From the experiments conducted in this laboratory, it has been found that some samples of human milk exert a high inhibitory effect on the haemagglutination by Influenza A and B viruses with fowl cells, following the technique of Lanni, Sharp and others (1949).

Throughout the experiment, infected allantoic fluid of "PR8" A strain heated to 56°C. for half an hour, and Influenza B antigen were used.

Milk samples from the city hospitals were received in sterile containers and kept in the frigidaire till taken for use. In view of the suspected relationship between this inhibitor and the inhibitor present in serum, sera were received along with the milk from the same patients.

Milk samples were centrifuged to remove the fat, then one portion of the milk was inactivated at 56°C. for half an hour along with the serum.

Inhibition titrations were performed with the active and inactivated milk samples and the serum of the same patient by the constant virus, varying inhibitor technique, employing four haemagglutinating units of the virus.

The virus was first incubated at 20°C. with the inhibitor dilutions for half an hour, then the red cells were added and readings taken after an additional hour at 20°C. The inhibition titre is expressed as the reciprocal of the final dilution of the fluid in the reaction mixture composed of 0.25 ml. of the inhibitor dilution, 0.25 ml. of the virus suspensions and 0.5 ml. of one per cent chicken red cells giving a doubtful haemagglutination end point.

About 100 samples were received and tested thus for the inhibitory effect. In 62 of the samples tested for A virus and in 72 of the ones tested for B virus, the inhibitory effect of the active milk was either greater than that of the inactivated one or equal to that and it was either equal to that of the serum or a little less. The results are shown in Table I.

TABLE I.

Haemagglutination inhibition titre of human milk and sera with influenza "A" and "B" viruses.

Antigen used.	Inhibitor.	Below 64.	64	128	256	512	1,024	Above 1,024.	Total.
PR8 A Virus.	Active milk ..	13	9	9	19	6	3	3	62
	Inactivated milk ..	17	10	8	19	5	1	2	62
	Sera (inactivated) of the same patient.	1	2	7	9	16	15	12	62
	* Total sera ..	3	5	13	14	23	20	14	92
B Antigen.	Active milk ..	6	9	11	21	8	8	9	72
	Inactivated milk ..	10	6	16	17	9	9	5	72
	Sera (inactivated) of the same patient.	1	1	..	7	13	21	29	72
	* Total sera ..	1	1	2	8	19	27	35	93

In about a dozen cases, an interference phenomenon was observed which masked the inhibition zone. This could not be removed completely even by inactivation and centrifugation, while in a few cases it was possible.

In the above experiment, controls with serum, virus, milk and saline were put up for each sample.

From the above results it will be seen that inhibitor which is present in human milk is perhaps a non-specific inhibitor only, when compared with the specific inhibitor present in serum. However, attempts are now in progress to isolate the inhibitor and to study the nature of the inhibitor by methods similar to that of Lanni in order to find out whether it is really a component of human milk or a specific antibody produced in response to causal antigenic stimulation.

Diagnosis of influenza.—The virus inhibition titre of the 100 samples of sera received along with the milk samples are given in Table I itself in the column "Total sera". As shown above, the technique has been slightly modified to conform to the technique adopted for milk.

From the above readings, it is seen that the average normal range of the antibody content of normal sera tested this year has shifted to higher dilutions, namely between 256 and 1,024 in A virus and to 512 and above 1,024 in B virus, when compared with the results of previous years. This may be attributed to the slight modification in the technique.

B. (i) *Vaccinia and Variola.*—Two strains of smallpox cultivated on the chorio-allantoic membrane of the developing chick are in their 28th and 6th passages. The three vaccinia strains are in their 184th, 84th and 20th passages.

(ii) *Cross immunity experiments.*—Five batches of seed lymph used for the routine manufacture of vaccine lymph and one sample of dry lymph from Paris were tested for the protection they afford against smallpox in monkeys. All of them were found to give complete protection against a membrane strain of variola.

(iii) *Assessment of the development and duration of immunity against smallpox in monkeys after vaccination.*—Vaccinated monkeys were challenged with a membrane strain of smallpox at varying intervals to assess the development and duration of immunity against smallpox in monkeys. The results are given in Table II.

* This column indicates the total number of sera tested with the respective A and B viruses for some of which the corresponding milk samples were not obtained.

TABLE II.

Development and duration of immunity against smallpox in monkeys after vaccination.

Serial number and interval after which immunity was challenged with membrane smallpox (Days).	Number of vaccinated monkeys tested.	Reaction.	Remarks.
(1)	(2)	(3)	(4)
1 4	1	Modified take.	Partially immune.
2 6	1	No take.	Immune.
3 8	1	No take.	Immune.
4 10	1	No take.	Immune.
5 17	2	No take.	Immune.
6 31	1	No take.	Immune.
7 44	2	No take.	Immune.

(iv) *Assessment of the development and duration of immunity against vaccinia in monkeys after variolation.*—Monkeys variolated with a membrane strain of smallpox were challenged with seed vaccine lymph at varying intervals to study the development and duration of immunity against vaccinia. The results are given in Table III.

TABLE III.

Development and duration of immunity against vaccinia after variolation.

Serial number and interval after which immunity was challenged with seed vaccine lymph (Days).	Number of variolated monkeys tested.	Reaction.	Remarks.
(1)	(2)	(3)	(4)
1 4	1	Good take.	No immunity.
2 7	2	No take.	Immune.
3 7	2	Modified take.	Partially immune.
4 8	2	No take.	Immune.
5 10	2	No take.	Immune.
6 90	1	No take.	Immune.

It is interesting to note that two of the monkeys variolated had generalized eruption about the 10th day and died.

(v) *Comparison of the protective value of different types of vaccine lymph and variola virus against smallpox.*—In a pilot experiment, batches of four monkeys have been protected with (1) seed vaccine lymph, (2) dry vaccine lymph, (3) membrane vaccine lymph and (4) membrane variola, and the immunity developed is to be assessed by challenging with a membrane strain of variola virus at varying intervals.

The importance of assessing the level of immunity developed after vaccination at varying intervals in the same animal and the correlation of the antibody content of the serum with the resistance to infection was realised and attempts were made to develop a suitable technique for the complement-fixation with vaccinia. The results so far obtained are inconclusive. Further work in this direction is in progress.

VACCINE LYMPH SECTION.

(Dr. Y. S. Narayana Rao, Dr. N. R. Ratnakannan and

Dr. K. S. Balasubramaniam.)

1. *Use of sheep as vaccinifiers in the production of vaccine lymph*—Sometimes a lot of difficulty is experienced in the procurement of calves either on account of high prices prevailing or due to the prevalence of any cattle disease in the area of procurement. Hence the question of using other susceptible animals like the sheep was thought of and experiments were conducted during the year under report on these lines. Subsequently there was also a reference on this subject from the D.G.H.S., India, for comments.

Only one side of the sheep was used for vaccination by the scarification method. The vaccination was performed using (a) the usual seed lymph and (b) the sheep material passed through the seed cycle of rabbit and buffalo calves. The vesiculation in the sheep and the yield of crude pulp was quite satisfactory and was comparable with that of the calf. The sheep pulp was divided into two halves and one half was treated with phenol to give a final concentration of 4 per cent and the other half was glycerinated in the usual way. Tests were put up for purity and safety and after both the samples have satisfied the standards prescribed, field trials were undertaken. Vaccinations were performed in the test range and the results have been encouraging.

2. *Further trials using the dried vaccine lymph.*—As was reported last year, a supply of 300,000 doses of dried vaccine lymph was received from the Vaccine Institute, Paris, and the different batches tested for purity, safety and potency. The following experiments were conducted in the test range using the dried lymph.

(a) *Exposure to room temperature for a period of about a week, the maximum time sometimes taken for the vaccine to reach a vaccinator in the remotest village.*—The ampoules of dried vaccine were exposed to room temperature for a period ranging from 5 to 7 days in the institute and then reconstituted and used. The results have been quite good proving that the dried vaccine would be the ideal one for places where the prevailing atmospheric temperature is fairly high, as it is the high temperature during transit that is to a large extent responsible for the relatively low case success rates obtained in the districts. The following are the results:—

Period of exposure to room temperature.	Date of reconstitution.	Date of vaccination.	Date of verification.	Number of cases.	Case success.	Insertion success.
					PER CENT.	PER CENT.
5 days	21 May 1950.	22 May 1950.	1 June 1950.	27	100	100
		23 May 1950.	2 June 1950.	10	100	100
		24 May 1950.	3 June 1950.	12	100	100

(b) *The effect of a higher dilution of the vaccine than that recommended by the suppliers.*—It was found that the reactions were severe with the dilution of 1.5 c.c. of 50 per cent glycerine water per ampoule of the dried vaccine as recommended by the manufacturers and hence it was decided to dilute the vaccine further and accordingly 3.5 c.c. of 50 per cent glycerine water was used per ampoule and the following are the results. Even with the increased dilution, the vaccine was found to be quite potent.

Period of exposure to room temperature.	Date of reconstitution.	Date of vaccination.	Date of verification.	Number of cases.	Case success.	Insertion success.
					PER CENT.	PER CENT.
5 days	21 June 1950.	22 June 1950.	3 July 1950.	24	100	100
		23 June 1950.	Do.	13	100	100
		24 June 1950.	Do.	25	100	100
11 days	27 May 1950.	28 May 1950.	6 June 1950.	17	94.1	84.8
		29 May 1950.	7 June 1950.	24	100	95.7
		31 May 1950.	10 June 1950.	18	100	88.9

(c) *A general field trial* was made during the month of June when the temperature was fairly high. The dried vaccine was supplied to many of the districts and the higher dilution of 3.5 c.c. of glycerine was recommended. Two insertions were made in one arm with the dried vaccine and as a control two insertions in the other arm were made with the routine glycerinated lymph. The results were of a striking contrast, the dried vaccine being far higher in potency than the usual vaccine. But the comparatively low figures with the usual vaccine could be explained as due to the higher atmospheric temperature in the month in which the trial was undertaken. Usually no vaccinations are done in May and June. The high case success and insertion success rates obtained with the dried vaccine even under

such adverse conditions once again emphasises the necessity for the manufacture of the dried vaccine in India.

The following are the results :—

	Primary.			Re vaccinations.	
	Number of cases.	Case success, PER CENT.	Insertion success, PER CENT.	Number.	Case success, PERCENT.
Dried vaccine	2,316	98.8	95.6	2,313	24.9
Control vaccine	1,366	70.0	58.0	1,251	10.1

3. *Role of streptomycin in the purification of vaccine lymph.*—A number of advantages were claimed by Dr. Krishnamurthy, Superintendent, Vaccine Institute, Bangalore, regarding the use of streptomycin in the purification of vaccine lymph and a reference on this subject for remarks was communicated to us by the D.G.H.S., India. Accordingly experiments were conducted to assess the relative superiority of the streptomycin over the chloroforming process now employed in the institute.

Eleven cups were taken for the tests and the effects of chloroform and streptomycin were compared. Each cup was divided into two halves, one half of which was treated with 5 m.g. streptomycin per c.c. and stored in cold at -5°C for 36 hours at the end of which purity tests were put up. The other half was treated with chloroform vapour in the usual way and purity tests put up. As a control a sample of each cup without any purification was also tested. The following are the results :—

TABLE IV.

Cup number.	Method of purification.	Total colony.	Test for pathogens.	Potency titre on calves.
1	Untreated	20,000	Absent.	1 in 1,500
	Chloroformed	100	Do.	
	Streptomycin	400	Do.	
2	Do	10,000	Present.	Do.
		100	Absent.	Do.
		3,300	Do.	Do.
3	Do.	20,000	Absent.	Do.
		500	Do.	Do.
		500	Do.	Do.
4	Do.	30,000	Present.	Do.
		100	Absent.	Do.
		1,700	Do.	Do.
5	Do.	90,000	Present.	Do.
		100	Absent.	Do.
		37,200	Do.	Do.
6	Do.	1,50,000	Present.	Do.
		100	Absent.	Do.
		Numerous.	Do.	Do.
7	Do.	25,900	Present.	Do.
		300	Absent.	Do.
		7,200	Do.	Do.
	Do.	Numerous.	Present.	Do.
		1,900	Do.	Do.
		500	Absent.	Do.
	Do.	Numerous.	Present.	Do.
		300	Do.	Do.
		2,300	Do.	Do.
Do.	Do.	Numerous.	Culture over-grown with contaminants.	Do.
		800	Present.	Do.
		11,500	Absent.	Do.
	Do.	Numerous.	Present.	Do.
		1,600	Do.	Do.
		15,500	Do.	Do.

It could be seen from the above table that in most of the samples, the total colony count is lowest in the chloroformed samples but the figure is within limits even in the case of streptomycin samples. As for the individual pathogenic organisms, the results seem to be slightly better in the streptomycin treated samples. As regards the potency the titre on calf has been the same but the vesiculation is a shade poorer with streptomycin treated samples.

The streptomycin treated vaccine was tested by way of primary vaccinations in the test range also and a case success of 100 per cent and an insertion success of 97.4 per cent were obtained which is comparable to the results obtained by the usual chloroformed vaccine.

The following conclusions were arrived at regarding the use of streptomycin in purification of vaccine lymph :—

(1) No great advantage could be claimed by the addition of streptomycin in concentration of 5 mg. per c.c. to the vaccine lymph, as equally good results are obtained by the chloroforming method.

(2) Streptomycin does not affect the potency to any appreciable extent.

(3) The reactions in vaccinations in the field has been the same as the chloroformed lymph.

(4) The cost of production is definitely higher in the case of streptomycin treated lymph.

Cost of chloroforming for 1,000 c.c., Rs. 8.

Cost of streptomycin for 1,000 c.c., Rs. 25.

4. *A case report of small-pox in a child aged 7 days.*—It was reported by Dr. Masilamani, Health Officer, Madras Corporation Infectious Diseases Hospital, Tondiarpet, Madras, that a child aged 7 days was admitted into the hospital with symptoms of small-pox. In view of the fact that such incidence of small-pox in a new-born child, so early in life, is very very rare, laboratory investigations for confirmation of the clinical diagnosis was sought for. The scabs from the case were collected and laboratory investigations by way of experiments on monkeys, egg passage, Paul's test, inoculation into calves and complement fixation tests were performed. The clinical diagnosis of small-pox was confirmed on the basis of the experiments conducted. A detailed report of the case and a discussion on the subject is under preparation for publication.

LIST OF PAPERS CONTRIBUTED BY THE MEMBERS OF THE STAFF AND ATTACHED ENQUIRIES UNDER INDIAN COUNCIL OF MEDICAL RESEARCH PUBLISHED IN JOURNALS DURING THE PERIOD FROM 1ST APRIL 1950 TO 31ST MARCH 1951.

(1) Narayana Ayyar, S.—The estimation of coconut oil in the presence of mineral oils and other vegetable oils (Journal of Scientific and Industrial Research, Volume 9-B, April 1950, pages 93-95).

(2) Narayana Pai, M. and Irani R. J. (Miss).—The anti-bacterial principle of the betel leaf, a preliminary report (Indian Medical Gazette, Volume 85, No. 7 of July 1950, pages 302-304).

(3) Ramanujam, K. and Smith Michael.—Haemolytic Anaemia during treatment of leprosy with Diaminodiphenylsulphone by mouth, report of a case (Lancet, Volume I, No. 6645, dated 6th January 1951, pages 21 and 22).

THE KING INSTITUTE, GUINDY, MADRAS,
16th February 1952.

Y. S. NARAYANA RAO,
Director.

TABLE I.

(For the year 1st April 1950 to 31st March 1951.)

Statement No. 1—Expenditure (actuals).

King Institute, Guindy—				RS.	A.	P.
1	Pay of officers	..	..	1,23,876	0	0
2	Pay of establishments	..	..	1,78,502	0	0
3	Dearness allowance	..	..	1,10,838	0	0
4	Pay of menials	..	..	3,561	0	0
5	Travelling and other compensatory allowances	..	..	63,811	0	0
6	Telephone charges	..	..	1,492	0	0
7	Books and periodicals	..	..	3,824	0	0
8	Service postage and telegram charges	..	..	48,060	0	0
9	Cleaning charges and office expenses	..	..	6,485	0	0
10	Rates and taxes	..	..	7,205	0	0
11	Purchase of serum	..	..	1,94,493	0	0
12	Instruments and chemicals	..	..	2,74,905	0	0
13	Purchase and feed of calves and other animals	..	..	1,21,154	0	0
14	Motor car maintenance charges	..	..	7,158	0	0
15	Electric current charges	..	..	11,352	0	0
16	Customs duty	..	..	21,608	0	0
17	Other contingencies	..	..	43,104	0	0
18	Dearness allowance to menials	..	..	6,820	0	0
Total ..				12,28,189	0	0
(b) Administration of Drugs Act, 1940—						
1	Pay of officers	..	..	20,811	0	0
2	Pay of establishment	..	..	3,696	0	0
3	Travelling allowance	..	..	5,092	0	0
4	Dearness allowance	..	..	4,576	0	0
5	Other compensatory allowance	..	..	21,979	0	0
6	Other charges	..	..			
Total ..				56,154	0	0
(c) Account borne by other budget on Institute account—						
Proportionate cost of management and supervision by the Surgeon-General and his staff.				3,030	0	0
Cost of audit on construction and repair of buildings and electrical installations.				402	0	0
Maintenance charges of buildings and electrical installations.				40,241	0	0
Depreciation and interest charged on—						
(a) Buildings				29,199	0	0
(b) Electric current and machinery				4,397	0	0
Cost of stationery, clothing and printing				3,224	0	0
Superannuation allowance and pension				617	0	0
Total ..				81,110	0	0
Grand total ..				13,65,453	0	0
Deduct—Net receipts (actual)				2,90,438	0	0
Net cost to State funds ..				10,75,015	0	0

Statement No. 2—Actual Receipts.

				RS.	A.	P.
1	Sale-proceeds of sera and vaccine	..	..	1,50,360	0	0
2	Contribution	..	..			
3	Recoveries of overpayments—Bacteriological laboratories.	..	..	6,158	0	0
4	Collection of payments for services rendered	..	..	1,11,445	0	0
5	Miscellaneous	..	..	23,539	0	0
Deduct—Refunds—Bacteriological laboratories				1,064	0	0
Net actual receipts ..				2,90,438	0	0

TABLE I—cont.

Statement No. 3—Estimated cost of supplies and services made.

Particulars.				RS.	A.	P.
1	Bacteriological and chemical examinations	..	..	5,57,077	8	0
2	Bacteriological vaccine supplies	..	..	11,24,162	0	0
3	Value of cultures, antigens, etc.	..	..	1,14,108	11	6
4	Vaccine lymph	..	..	3,20,389	0	0
5	Sera bought and sold to Government hospitals, private bodies, etc.	..	..	1,94,493	0	0
6	Value of examinations done under the Drugs Act	..	..	1,43,376	0	0
Total ..				24,53,604	3	6

Government Analyst Section.

				RS.	A.	P.
Food—						
1	Contribution from local bodies working the M.P.A. Act.	..	..	94,355	0	0
2	Value for analysis done for Government institutions	..	..	58,980	0	0
3	Fees received from unofficial sources for analysis of food samples.	..	..	1,990	0	0
Drugs—						
4	Value for drug samples analysed for hospital's samples and under the Madras Drug Rules.	..	..	5,190	0	0
5	Fees received from unofficial sources for analysis of drug samples.	..	..	732	0	0
Total ..				1,61,247	0	0
Grand total value of receipts ..				26,14,851	0	0
Deduct Expenditure ..				13,65,453	0	0
Net value of Profits ..				12,49,398	0	0

TABLE II.

Type of vaccination (1st April to 30th December 1950).

Serial number and type.		Total number of cases verified.	Total number of cases not verified.	Total	Percentage of each type to the total cases done.
1	Primary	716,027	195,713	911,740	17.1
2	Secondary	61,558	..	61,558	1.1
3	Re-vaccination	2,805,623	1,574,933	4,380,556	81.8
Total ..		3,583,208	1,770,646	5,353,854	
				Cases.	Percentage of each type to the total quantity issued.
A. Total quantity of vaccine lymph issued at four insertions rate.				5,126,220	..
B. Total quantity of vaccine lymph used for vaccinating cases in 1, 2 and 3 calculation at four insertions per case				3,163,576	61.8
C. Total vaccine lymph unaccounted for				1,962,644	38.2

TABLE III.

Primary, secondary and re-vaccination results for 1950-51
(1st April to 31st December 1950).

(The districts are in order of case success rate in primary vaccinations.)

Success rate in primary vaccinations.)									
Serial number and district.	Primary vaccinations.				Re-vaccinations.				Percentage of lymph unaccounted for.
	Case success.		Insertion success.		Total cases.		Total number not verified (unknown).		
	Total cases.	Percentage of case success.	Total number of insertions verified.	Percentage of insertion success.	Total cases.	Percentage of case success.	Total number not verified (unknown).	Total vaccinations.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1 Nilgiris ..	3,884	98.9	15,538	77.3	9,971	9.1	4,605	18,480	37.5
2 Chittoor ..	31,097	90.1	139,381	76.7	113,428	13.6	62,514	212,039	36.3
3 Malabar ..	36,984	87.7	138,949	80.8	96,955	10.8	87,132	221,071	49.3
4 South Kanara ..	29,371	86.2	120,313	66.0	135,779	9.9	80,423	245,573	30.6
5 Tanjore ..	3,815	85.9	35,406	63.0	13,763	13.6	11,762	34,340	82.8
6 Madurai ..	24,425	85.7	100,301	64.1	77,954	11.7	92,472	194,851	23.1
7 Ramanathapuram ..	23,231	85.7	91,300	63.7	60,652	8.5	95,553	179,480	43.8
8 Chingleput ..	14,093	84.7	55,851	62.7	59,043	9.3	91,040	164,176	12.3
9 North Arcot ..	43,291	83.9	166,020	65.1	214,260	7.3	124,676	364,997	21.3
10 Tiruchirappalli ..	25,965	82.7	101,789	59.9	42,558	9.6	78,559	144,908	34.0
11 Krishna ..	17,811	81.4	69,395	60.6	49,124	11.8	36,819	103,754	42.3
12 West Godavari ..	18,698	82.3	73,718	58.7	51,124	9.0	29,690	99,512	29.8
13 Coimbatore ..	17,594	81.2	71,374	59.1	60,323	11.2	55,470	123,892	58.7
14 Bellary ..	19,759	81.1	78,333	53.5	101,634	8.1	79,335	200,726	5.4
15 Tirunelveli ..	15,574	80.3	61,179	57.1	47,674	11.1	46,357	109,605	41.7
16 South Arcot ..	31,538	80.1	135,250	55.4	114,581	11.2	140,338	289,088	39.9
17 Salem ..	9,713	79.5	37,870	53.8	91,954	8.5	25,732	74,282	33.0
18 Guntur ..	24,950	77.1	89,103	56.0	68,020	12.0	88,774	205,673	45.6
19 Anantapur ..	15,405	76.8	56,108	55.7	60,145	8.8	62,531	145,968	48.3
20 Cuddapah ..	17,751	76.5	71,734	55.7	75,679	7.0	32,801	110,697	35.2
21 Kurnool ..	21,213	74.5	80,550	46.5	112,987	8.1	55,960	182,852	9.3
22 Visakhapatnam ..	61,530	72.9	216,058	48.7	97,427	8.8	105,118	279,635	18.2
23 East Godavari ..	31,596	72.8	126,221	45.3	79,744	6.4	69,910	193,933	20.3
24 Nellore ..	29,514	69.7	114,717	45.3	79,744	6.4	59,946	169,204	19.0
District total ..	578,850	80.6	2,246,858	59.8	1,870,321	9.4	1,618,988	4,068,150	37.7
25 Municipalities ..	108,949	96.8	399,098	85.8	759,701	12.4	115,855	979,505	30.6
26 Madras Corporation ..	33,052	99.8	136,438	90.3	173,102	8.1	97,188	333,352	25.7
27 Other bodies ..	176	94.8	832	80.6	2,499	16.0	163	2,338	99.2
Grand total ..	716,027	83.8	2,782,326	64.0	2,805,623	10.1	1,832,204	5,353,354	33.2

TABLE IV.

Statement showing the pathological specimens examined in the laboratories of the State—public, local fund, private, aided hospitals and dispensaries, in the Madras State during the year from 1st April 1950 to 31st March 1951.

Number.	Part.	Description.	Number examined.	Number positive.	Details regarding positive.	Total number of column 6.
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Part I.—Microscopical and bacteriological tests.

1	A	Blood films..	75	..	Malaria Microfilaria Relapsing fever Spirochaetes Leishmania Donovani Other organisms .. ..	.. .. .. .. .. ..
Total ..		..	..	..	..	..

TABLE IV—cont

Statement showing the pathological specimens examined in the laboratories of the State—public, local fund, private aided hospitals and dispensaries in the Madras State during the year from 1st April 1950 to 31st March 1951—cont.

Number.	Part.	Description.	Number examined.	Number positive.	Details regarding positives.	Total number of column 6.
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Part I.—Microscopical and bacteriological tests—cont.

2	..	Blood red cells	..	..	..	..
	..	Blood white cells	287	..	..	..
3	..	Blood for total count—Red cells ..	3	..	..	..
	..	White cells	9	..	..	..
4	..	Blood for Haemoglobin	1	..	..	..
5	..	Blood for grouping	913	..	Group A Do. B Do. A & B Do. G	216 294 49 354
5 (a)	..	Rh. Test	8	5	Enteric group— Salm. typhi Salm. paratyphi A Do. B Do. C More than one organisms	1,754 50 21 1 210
5 (b)	..	Cold agglutination	34	11	Dysentery group— S. shiga S. flexner Well felix reaction— O X 2 O X 19 O X K More than one organisms	 5 .. 1 24
6	..	Blood for agglutination tests. ..	4,357	2,069	Malta fever— Br. melitensis Br. abortus Other organisms	.. 3 ..
Total ..		..	..	..	..	2,069
7	..	Blood for Aldehyde test	19	6	..	..
	..	Blood for Antimony test	15	7	..	..
8	A	Blood for culture	999	75	Salm. typhi Salm. paratyphi A Do. B Do. C Other organisms	72 3
Part A, total ..		..	6,726	2,173	Total ..	75
9	B	Cerebro-spinal fluid for— Cell count	25	..	..	..
	..	Mic examination	15	2	N. intracellularis D. pneumoniae	1 1
	..	Cultural examination	106	3	D. pneumoniae Other organisms	1 2
Part B, total ..		..	146	5	Total ..	5

TABLE IV—cont.

Statement showing the pathological specimens examined in the laboratories of the State-public, local fund, private aided hospitals and dispensaries in the Madras State during the year from 1st April 1950 to 31st March 1951—cont.

Number. (1)	Part. (2)	Description. (3)	Number examined. (4)	Number positive. (5)	Details regarding positives. (6)	Total number of column 6. (7)
Part I.—Microscopical and bacteriological tests—cont.						
10	C	Urine for—				
		Quantitative test	14	4	Sugar	2
					Albumin	1
					Bile salt	1
		Microscopical examination.	25	16	Pus cells	10
					Epithelial cells ..	3
					Granular cast ..	1
					Amorphous Phosphate	1
		Cultural examination ..	332	142	R.B.C.	1
					B. coli	81
					Enteric group ..	1
					Other organisms ..	60
		Part C, total ..	371	162	Total	162
11	D	Faeces for microscopical examination	58	26	H. N. cystis	4
					Ova	2
					Cellular exudate ..	18
					Others	2
		Cultural examination ..	5,900	2,056	V. cholera	2,037
					Dysentery group ..	10
					Enteric group ..	4
					Other organisms ..	5
		Part D, total ..	5,958	2,082	Total	2,082
12	E	Specimen of pathological fluids for microscopical examination.	531	38	M. tuberculosis ..	21
					N. leprae	1
					N. gonorrhoea ..	1
					P. pestis	7
					C. diphtheria ..	8
					Other organisms ..	1
		Cultural examination ..	536	215	M. tuberculosis ..	9
					C. diphtheria ..	21
					Other organisms ..	185
		Part E, total ..	1,067	253	Total	253
13	F	Tests on animals with speci- mens or pathological fluids, etc.	152	21	M. tuberculosis ..	2
					C. diphtheria ..	1
					Other organisms ..	1
					Friedman's test for pregnancy	19
		Part F, total ..	152	21	Total	21
		Part I, grand total ..	14,414	4,696		

Part II.—Pathological examination.

Specimens for histo-patho- logical examination ..	90
Specimen for research ..	12
Part II, grand total ..	102

Statement showing the total number of serological tests from 1st April 1950 to 31st March 1951.

Name of the tests.	Number examined.	Number of positive.
Number of bloods for Kahn tests ..	63,849	15,070
Number of bloods for Wassermann tests ..	31,694	12,111
Number of cerebro-spinal fluid for Wassermann tests	1,968	221
Number of cerebro-spinal fluid for Langer's tests ..	1,046	110
Total number of serological tests ..	98,552	27,512
Total number of bloods received lysed or broken ..	2,540	

TABLE IV-A.

Statement showing an analysis of the sources from which specimens received for serological tests—1950-51.

Serial number and name of institution.	Khan test.			Wassermann test.			Cerebro-spinal fluid for Wassermann test.			Cerebro-spinal fluid for Langer's test.			Total		
	Number examined.	Negative.	Positive.	Number examined.	Negative.	Positive.	Number examined.	Negative.	Positive.	Number examined.	Negative.	Positive.	Number examined.	Negative.	Positive.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 General Hospital (Venereal Department), Madras.	17,435	11,186	6,299	16,846	10,949	5,897	304	265	30	241	231	20	3	..	849
2 Stanley Hospital, Madras	4,305	2,317	1,488	1,325	341	984	255	213	42	33	69	13	..	..	8
3 Blood Bank, General Hospital, Stanley Hospital, King Institute.	7,388	6,257	1,001	6,355	5,207	1,148	..	..	..	..	..	..	..	..	403
4 Ophthalmic Hospital ..	2,840	2,392	448	470	136	344	..	..	..	..	..	..	..	..	10
5 Indian Medicine Hospital, Madras.	731	630	101	105	31	74	1	1	..	1	1	..	..	..	3
6 Women and Children Hospital, Madras.	5,146	5,004	402	413	143	270	12	8	4	8	6	..	..	..	9
7 Mental Hospital, Madras	975	855	120	106	25	81	428	390	38	384	342	42	..	..	2
8 Kasturba Gandhi Hospital, Madras.	4,487	4,078	409	515	149	866	15	13	2	3	5	..	..	..	13
9 Government Royapet Hos- pital, Madras.	324	283	41	38	8	30	4	4	..	2	2	..	..	..	4
10 Other hospitals in Madras City.	5,102	4,244	858	1,100	530	570	507	448	59	268	243	25	..	..	16
11 Refusal hospitals (town) ..	13,454	9,770	3,684	2,793	804	1,910	391	365	26	48	42	6	..	..	68
12 Local Fund Dispensaries and Rural Dispensaries ..	655	554	101	99	41	58	1	..	..	1	..	..	..	..	..
13 Primary Public Health Centres.	38	27	6	8	5	3	..	..	..	..	..	..	..	..	1
14 Private Practitioners ..	754	642	112	1,521	1,233	287	45	34	11	10	6	4	..	..	13
Grand total ..	63,849	48,779	15,070	31,694	19,583	12,111	1,963	1,742	211	1,046	936	110	3	2	1,402

TABLE V.

Bacterial vaccines and other supplies.

Serial number and name of organisms.	Stock doses.	Antigenous doses.
<i>A. Prophylactic vaccines.</i>		
1 Cholera Vaccine	10,490,147 c.c.	..
2 T.A.B. Vaccine	196,797 c.c.	..
Plague vaccine stocked from Haffkine Institute, Bombay, and issued to P.H. bodies of the State	232,840 c.c.	..
<i>B. Therapeutic vaccines.</i>		
<i>Respiratory group.</i>		
3 Streptococcus	..	24
4 Strepto + N. catarrhalis	..	24
5 Strepto + Pneumococcus	..	18
6 Strepto + B. freedlander	..	6
7 Strepto + Staphylococcus	..	24
8 Strepto + C. N. Bacillus	..	6
9 Strepto + N. Cat + G. N. Bacillus	..	12
10 Strepto + N. Cat + B. diphtheroids	..	6
11 Strepto + Pneumo + N. catarrhalis	2,954	18
12 Strepto + Pneumo + N. Cat. + Staphylo	..	24
13 Strepto + Pneumo + H. influenzae	..	6
14 Strepto + N. Cat + B. freedlander	..	6
15 Strepto + N. Cat + H. influenzae	..	34
16 Strepto + Pneumo + N. Cat + H. influenzae	30	12
17 Strepto + Staphylo + G. N. Bacillus	..	6
18 Pneumo + B. freedlander	..	6
19 Pneumo + N. catarrhalis	..	6
20 Pneumo + N. Cat. + M. tetragenis	..	6
21 Pneumo + B. diphtheroids	..	6
22 Pneumo + N. Cat. + H. influenzae	..	6
23 Staphylo + B. diphtheroid + B freedlander	..	6
24 Staphylococcus	..	6
25 Staphylo + H. influenzae + N. Catarrhalis	..	6
26 Strepto + Pneumo + N. Cat + B. freedlander	..	12
27 Staphylo + B. diphtheroid	..	6
28 B. diphtheroid + N. Cat + H. Influenzae	..	6
29 G. N. Bacillus	..	12
30 B. Pyocyaneus	..	6
31 Whooping Cough vaccine (curative)	5,181	..
32 Whooping Cough vaccine (Prophylactic)	1,611	..
<i>Pyogenic group.</i>		
33 Streptococcus vaccine	1,442	6
34 Strepto + Staphylococcus	11,150	30
35 Strepto + N. catarrhalis	..	12
36 Strepto + Pneumo + N. catarrhalis	..	12
37 Strepto + Staphylo + B. asiaticus	..	6
38 Staphylococcus	8,065	60
39 Staphylococcus + Enterococcus	..	6
40 Staphylococcus + B.F.A.	..	6
41 Staphylococcus + B. diphtheroids	..	6
42 B. Pyocyaneus + B. diphtheroids	..	6
43 B. morgani	..	22
44 Streptococcus (Pyorrhoea)	1,631	..
45 Streptococcus (Filarial)	14,384	..
46 B. acne Vaccine	406	..
47 B. acne + Staphylococcus Vaccine	66	..
<i>Genito Urinary group.</i>		
48 B.F.A. + Staphylo + B. diphtheroid	..	6
49 B. Coli	1,041	24
50 B. Coli + Staphylo	..	18
51 B. Coli + Enterococcus	..	18
52 B. Coli + Staphylo + B. diphtheroids	..	6
53 B. Coli + B. pyocyaneus + N.L.F.	..	6

TABLE V—cont.

Bacterial vaccines and other supplies—cont.

Serial number and name of organisms.	Stock doses.	Antigenous doses.
<i>B. Therapeutic vaccines—cont.</i>		
<i>Genito Urinary group—cont.</i>		
54 Coliform Organism	..	6
55 B. pyocyaneus + Staphylo	..	6
56 G.N. Bacillus + N.L.F.	..	6
57 Strepto + Staphylococcus	..	6
58 Strepto + Staphylo + B. diphtheroids	..	6
59 Staphylo + Enterococcus + B.F.A.	..	6
60 Staphylo + G.N.C.	..	6
61 Staphylo Enterococcus	12,525	..
62 Gonococcus vaccine	1,883	..
63 Gono + Staphylococcus	711	..
64 D. Coli + Strepto (puerperal)	396	..
65 Streptococcus (puerperal)	..	..
<i>Intestinal group.</i>		
66 T.A.B. vaccine (1 in 4 dilution) for P.S.T.	2,511	..
67 T.A.B. vaccine (curative)	6,033	..
68 Typhoid vaccine (curative)	152	..
69 Enterococcus	..	6
70 B. Coli + Enterococcus vaccine	..	..
<i>Miscellaneous.</i>		
71 Strepto + Pneumo + Staphylo	..	6
72 N. Catarrhalis + B. diphtheroid + Staphylo + B. pyocyaneus	..	12
73 Old Tuberculin for V.P. test	1,277	..
74 Old Tuberculin for Mantoux test	1,968	..
75 Old Tuberculin Undiluted	14	..
76 Various live cultures	248	..
77 Bacterial suspensions	55,010 c.c.	..
78 High Titre Sera	569 c.c.	..
79 Reports on Kala-azar	4	..
80 Reports on Auto-vaccine	34	..
81 Dysentery Bacterio Phage	1,588	..
82 Kahn Antigen	3,691	..
83 Bullock-heart extract for Wassermann test	225	..
84 1 per cent Cholesterol solution for Wassermann test	25	..
85 Anti-sheep Amboceptor for Wassermann test	5	..
86 Distilled water, sterilized	30 lb.	..
87 Distilled, water, unsterilized	13 "	..
88 Wassermann capsules 5 c.c.	101,213	..
89 Various Media	98,762 tubes	30,200 c.c.
90 Various sterile materials for obtaining cultures	2,454	147 sets
91 Peptone water tubes	9,775 tubes.	207 bottles.
92 Normal saline sterilized	2,454	207 sets.
93 Various sterile solutions—	..	..
25 per cent glucose 20 c.c.	175,941 ampoules	..
Do. 10 c.c.	5,213 do.	..
5 per cent Calcium Gluconate 5 c.c.	21,941 do.	..
10 per cent Calcium Chloride 10 c.c.	3,844 do.	..
Pyrogen-free distilled water 20 c.c.	28,798 do.	..
Normal Saline 20 c.c.	19,716 do.	..
Miscellaneous ampoules	3,699 do.	..
Glucose—Saline, Ringer, Lactate, etc.	539 pint bottles	..

TABLE VI.

Statement of Therapeutic sera Stocked and issued (1950-51).

Serial number and name of sera.	Stock on Receipts from		Issued from	Balance on
	1st April 1950.	1st April 1950 to 31st March 1951.	1st April 1950 to 31st March 1951.	31st March 1951.
(1)	(2)	(3)	(4)	(5)
1 Anti-Anthrax, 10 c.c.	30	12	10	32
2 Anti-Gas Gangrene, 4,000 units	Nil.	2,027	2,027	Nil.
3 Do. 10,000 units	4,871	6,000	3,000	7,671
4 Anti-scorpion, 1 c.c.	274	3,166	3,336	104
5 Anti-streptococcus, 5 c.c.	1,866	18	1,163	721
6 Anti-Venene, 10 c.c.	698	403	1,066	35
7 Diphtheria-antitoxin, 1,000 units	921	180	928	173
8 Do. 2,000 units	286	Nil.	286	Nil.
9 Do. 10,000 units	5,666	7,248	7,963	4,931
10 Diphtheria Prophylactic T.A.F., 1 c.c. ..	428	564	466	526
11 Do. T.A.F., 10 c.c.	70	30	33	67
12 Do. A.P.T., 0.5 c.c.	94	170	121	143
13 Do. A.P.T., 3 c.c.	25	Nil.	25	Nil.
14 Do. A.P.T., 5 c.c.	161	80	48	193
15 Haemostatic and Neo Haemoplastin, 2 c.c. ..	4,137	5,120	6,201	3,056
16 Tetanus-antitoxin, 3,000 units	652	258,253	204,504	54,401
17 Do. 20,000 units	268	16,674	16,835	107
18 Do. 36,500 units	Nil.	14,400	7,155	7,245
19 Do. 38,000 units				
20 Do. 50,000 units				
21 Tetanus Toxoid, 5 c.c.	17	Nil.	1	16
	20,264	314,345	255,188	79,421

TABLE VII.

Department of water analysis.

PART I.

WATER SAMPLES.

Serial number and description.

Number examined.

(a) Domestic purposes.

1 Bacteriological examination of water samples	1,895
2 Chemical examination of water samples from the protected water-supplies.	1,352
3 Samples for bacteriological examination from investigation sources ..	15
4 Samples for chemical examination from investigation sources	48
5 Samples for bacteriological examination from private bodies and Government institutions.	203
6 Samples for chemical examination from private bodies and Government institutions.	141
7 Water samples, bacteriological examination for suitability for ice, ice-candy and aerated water manufacture.	10
8 Water samples for fluoride estimation	40
9 Water samples for vibrio tests	2,120
10 Water samples for physical tests, like turbidity, odour, colour, etc. ..	1,540
11 Field investigation by the staff of water analysis department	25

(b) Government Experimental Filter Station, Kilpauk, Madras.

1 Water samples for bacteriological examination	753
2 Water samples for chemical analysis	703
3 Water samples for physical tests (odour, colour and turbidity)	703
4 Tests for the estimation of dissolved oxygen in water samples	492
5 Tests for the estimation of dissolved H ₂ S in water samples	288
6 Determination of dose of chlorine for Break Point chlorination	46
7 Determination of residual chlorine content of water samples	1,332
8 Samples of sand for analysis	13
9 Samples of bleaching powder for analysis	6
10 Estimation of biological growths in water samples and sand samples ..	42

TABLE VII—cont.

Department of water analysis—cont.

PART I—cont.

WATER SAMPLES—cont.

Serial number and description.

Number examined.

(c) Non-domestic purposes.

1 Water samples for use in boilers	26
2 Water samples for suitability for ice, ice candy, fruit caning, etc. ..	6
3 Do. for gardening and agricultural purposes.	5
4 Do. for cleaning, laundry, etc.	5
5 Do. for industrial purposes	3
6 Do. for building construction	7
7 Do. for soap manufacture	1
8 Do. for film washing and developing	1
9 Water samples examined for pathogens	4
10 Do. for hardness test only	4
11 Do. for corrosion of pipe lines	17
12 Do. from swimming pools	1
13 Do. for corrosivity test	1
14 Do. for alkalinity test	1
15 Water samples for suitability for textile purpose	2
16 Do. for engine cooling	5
17 Do. for washing dairy utensils	2
18 Do. for preservation of pickles	1
19 Leakage water from Mettur Dam	25
20 Water samples from mineral water investigation	13
	135

(d) Algological studies.

1 Microscopical examination of samples of water	593
2 Microscopical examination of organic growths in filter sand, settlement basins, etc.	125
3 Test for the determination of algicides	144
4 Test for residual copper sulphate and chlorine	130
5 Field tests for estimating dissolved gases in water samples	90
6 Field tests for estimating pH. of water samples	46
7 Field tests for estimating turbidity, odour and colour, of water samples. ..	210
8 Field tests for estimating organic matter in water samples	203

PART II.

MISCELLANEOUS SAMPLES.

Serial number and description.

Number examined.

1 Bleaching powder for available chlorine	46
2 Alum for analysis	5
3 Specimens for pH. estimation	2
4 Urine for analysis	2
5 Estimation and adjustment of pH.	40
6 Testing of glassware for neutrality	1
7 Sand for analysis	2
8 Sodium sulphite for analysis	1
9 Analysis of rock chips	1
10 Analysis of salt samples from private parties	2
11 Analysis of salt samples from Government of India	56
12 Milk samples for bacteriological examination	130
13 Milk powder for bacteriological examination	4
14 Evaporated milk for bacteriological examination	1
15 Soda water for bacteriological examination	1
16 Biscuit for bacteriological examination	1
17 R.W. co-efficient tests on disinfectants	69
18 Identification of sandflies	15
19 Sewage samples and industrial wastes	25

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TABLE VII—cont.

PART III.

SOLUTIONS SUPPLIED.

Serial number and description.	Quantity supplied in c.c.
1 Normal Sodium hydroxide	18,100
2 N/10 Hydrochloric Acid	180
3 25 per cent Sulphuric Acid	120
4 33 per cent Acetic Acid	50
5 Phenolphthalein Solution	30
6 0.01 per cent Phenol red	300
7 Benedict's Solution (quantitative)	2,070
8 Fehling's Solution A and B	720
9 Zenkers Fluid	9,600
10 Pancreatic extract	337,500
11 Buffer Salt Solution pH. 9.2	1,000
12 Oxalated tube to the Surgeon to H.E. the Governor of Madras	36
13 Wet stains supplied	23,100

TABLE VIII.

Protected water-supplies examined at the King Institute, Guindy, with details regarding source, method of filtration, chlorination, etc.

Protected water-supplies.	Total number of.		Source.				Infiltration gallery or well.	
	Places.	Sources.	Impounded reservoirs.	River or stream.	Tank.	Well.	Bed of river.	Bank of river.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Municipalities	59	82	10	14	7	13	25	18
Panchayat boards	17	24	..	10	3	8	3	2
Jails, Borstal and Certified schools and Vigilance Homes.	25	3	2	1	1	16	11	2
Railway stations	54	64	1	3	..	54	5	1
Swimming pools	1	1	1	..	..	..	..	..
Other institutions	12	18	4	7	..	6	1	..
Total	168	223	18	35	11	96	45	18

	Filtration.				Chlorination.			
	Slow-sand filter.	Mechanical filter. Pressure.	Mechanical filter. Gravity.	Infiltration gallery or well.	Not filtered.	Automatic liquid chlorine.	Mechanical.	Hand controlled bleaching powder.
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Municipalities	7	5	5	38	27	17	3	40
Panchayat boards	1	..	1	5	17	1	..	20
Jails, Borstal and Certified schools and Vigilance Homes.	2	1	..	18	17	6	..	22
Railway stations	..	1	4	6	53	17	22	22
Swimming pools	..	1	..	..	..	1	..	..
Other institutions	1	3	3	1	10	3	2	9
Total	11	11	13	68	124	45	27	113

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REPORT OF THE GOVERNMENT ANALYST, MADRAS, FOR THE YEAR 1ST APRIL 1950 TO 31ST MARCH 1951

(Called for by G.Os. No. 142, P.H., dated 22nd January 1930, Ms. No. 2516, P.H., dated 8th October 1930 and No. Ms. 2129, P.H., dated 16th July 1946.)

I. STAFF.

Government Analyst	Sri S. Narayana Ayyar, M.A., A.I.I.S.C., F.B.I.C.
Deputy Government Analyst	Sri K. R. Srinivasan, M.A., A.B.I.C., from 1st April to 18th June 1950. ,, Y. G. Doraisami, M.Sc., A.B.I.C., from 19th June 1950 to 31st March 1951.
Senior Assistants to Government Analyst.	Sri Y. G. Doraiswami, M.Sc., A.B.I.C., from 1st April to 18th June 1950. ,, K. R. Srinivasan, M.A., A.B.I.C., from 19th June 1950. ,, K. Narayanaswami, M.A., A.B.I.C. ,, M. Krishnamurthi, M.Sc.
Junior Assistants to Government Analyst.	Sri P. S. Nataraja Sarma, M.A. ,, K. Balasubramanian, B.Sc. (Hons.). ,, K. Ramachandran, M.A. ,, N. Srinivasan, M.A. ,, M. V. Narayanan, B.Sc. (Hons.). ,, C. S. Raghunathan, B.Sc. (Hons.). ,, G. Balasubrahmanian, B.Sc. (Hons.). ,, S. A. Subramanyam, M.Sc. ,, K. Kuppuswami, M.Sc. ,, V. Seshagiri Rao, B.Sc. (Hons.).

The laboratory staff includes one technical assistant, three first-grade attendants, two second-grade attendants and seven peons. The office staff consisted of one steno-typist, three typists and three clerks.

Sri K. R. Srinivasan, Senior Assistant was on earned leave for 90 days from 22nd August to 19th November 1950 and Sri P. S. Nataraja Sarma, Junior Assistant, was promoted to act as Senior Assistant in the vacancy. Sri Nataraja Sarma, after reversion as Junior Assistant availed himself of earned leave for 47 days from 19th January 1951. Other Junior Assistants who were on earned leave during the period were—

Sri K. Ramachandran for 12 days from 10th to 21st April 1950.

Sri N. Srinivasan for 22 days from 21st August to 11th September 1950.

Sri M. V. Narayanan for 60 days from 20th November 1950 to 18th January 1951.

Sri S. A. Subramanian for 13 days from 11th to 23rd July 1950.

Sri T. Santhanagopalan, B.Sc. (Hons.), Sri P. Athmaraman, B.Sc. (Hons.), and Sri M. R. Gopalan, B.Sc. (Hons.), acted as Junior Assistants during leave vacancies.

II. INTRODUCTION.

The work in the Government Analyst's laboratory chiefly consisted as usual of the statutory analysis of food samples received under the Madras Prevention of Adulteration Act, 1918 from 238 local bodies in the Madras State and drug samples received from the Drug Controller through the Inspector of Manufacturing concerns under the Drugs Act, 1940 and the Madras Drug Rules, 1945. Diet articles and drugs including stock mixtures were analysed for Government Hospitals with a view to check the purity and quality of the articles supplied by contractors and the strength of compounded drugs. Other Government departments such as the Board of Revenue (Civil Supplies) Rationing Officers and others also sent food samples for identification or detection of food products sold or stocked in violation of rationing regulations, or for assessment of quality. Requests from private persons and firms to have their products for example oils, curry powder, etc. analysed were complied with, as far as possible, especially from exporters who wanted their products to be certified by the Government Analyst as regards purity so as to help them in earning foreign currency and from importers who chiefly wanted to test the extent and nature of damage of the goods which occurred in transit. The number of samples analysed under each category is given below :—

TABLE I.

Number and categories of samples analysed from different sources in the Government Analyst Laboratory.

	1950-51.		1949-50.	
	Total number of samples.	Samples reported as adulterated or unsatisfactory.	Total number of samples.	Samples reported as adulterated or unsatisfactory.
(1)	(2)	(3)	(4)	(5)
Food samples under the Madras Prevention of Adulteration Act.	18,651	8,814	18,524	8,637
Food samples analysed for Government hospitals.	4,945	858	4,471	828
Food samples analysed from Government departments.	547	101	643	162
Miscellaneous samples from unofficial sources.	71	8	89	23
Total (Foods) ..	24,214	9,781	23,727	9,648
Drugs analysed under the Madras Drug Rules.	79	42	68	31
Number of drugs analysed for Government hospitals.	99	38	66	29
Miscellaneous drug samples from unofficial sources.	24	8	19	6
Total (Drugs) ..	202	88	153	66

Though further extension of the Madras Prevention of Adulteration Act to new panchayats has been stopped for the present the total number of foods analysed during the year is 24,214 as against 23,727 for the previous year, thus showing a small increase, which is due to more samples having been received from Government hospitals. The number of drugs analysed during the year is 202 as against 153 in the previous year. There is no restriction on the number of samples of foods and drugs sent by Government hospitals and other Government institutions. Further though the space and facilities available in the Government Analyst's Laboratory are limited, many inquiries and requests for analysis of samples are received from various Government departments. This laboratory being the only Government Laboratory in the Madras State equipped for the

analysis of foods and drugs, such requests have necessarily to be complied with. The volume and variety of work have increased and it is hoped that Government would sanction the construction of a separate Central Laboratory for the Government Analyst at Guindy and at least two Regional Laboratories, for which detailed plans and estimates have been submitted to Government. Provision of adequate laboratory facilities, in addition to bringing more revenue to Government would also enable this laboratory to be of greater service to the public.

The existing Madras Prevention of Adulteration Act has been found to have many defects and a new Prevention of Adulteration Bill embodying some urgent amendments has been under the consideration of Government for many years. But since food adulteration is a concurrent subject now, the Government of India have taken the initiative and circulated a Prevention of Food Adulteration Bill to elicit public opinion and the Madras Government probably are awaiting legislation by the Government of India before taking further action.

During the year Government passed a rule in G.O. No. 3082, dated 1st September 1950, prohibiting the sale or possession for sale of Kesari Dhall or flour in admixture with any other dhal or flour.

III. FINANCE.

The total receipts amounted to Rs. 1,61,247 and the estimated expenditure is Rs. 1,19,564 showing a profit of Rs. 41,683. Besides this, an amount of Rs. 1,45,144 has accrued to Government and credited to the Judicial Budget being Government's share of fines realized for offences under the Madras Prevention of Adulteration Act.

TABLE II.

Financial statement of the Government Analyst's Department for 1950-51.

ESTIMATED RECEIPTS.

Food.		RS.
1 Contribution from local bodies working the Madras Prevention of Adulteration Act..	.. .. .	94,355
2 Value for analysis done for Government institutions ..	.. .. .	58,980
3 Fees received from unofficial sources for analysis of food samples .. .. .	.. .. .	1,990
Drugs.		
4 Value for drug samples analysed for hospital samples and under the Madras Drug Rules .. .. .	.. .. .	5,190
5 Fees received from unofficial sources for analysis of drug samples .. .. .	.. .. .	732
Total Receipts ..	.. .. .	1,61,247

ESTIMATED EXPENDITURE.

		RS.
1 Salaries and allowances of the staff of the Government Analyst .. .. .	.. .. .	62,291
2 Superannuation allowance and pension on above ..	.. .. .	1,038
3 Proportionate cost of certain common staff of the King Institute, Guindy .. .. .	.. .. .	1,338
4 Proportionate cost of management and supervision by the Director of Medical Services and Director, King Institute, Guindy .. .. .	.. .. .	926

ESTIMATED EXPENDITURE—cont.

5 Stores, instruments and chemicals, including gas and water charges	Rs. 27,490
6 Customs duty	2,161
7 Contingencies	11,006
8 Electric current	1,136
9 Cost of stationery, clothing and printing	322
10 Rates and taxes	721
11 Proportionate charges on cost of audit, maintenance, interest and depreciation on buildings, electric installation and other plants	11,136
Total, Expenditure ..	1,19,564

Share of the fines accruing to Government on account of the working of the Madras Prevention of Adulteration Act (10 per cent of total fines plus half the excess over the contribution of the local body to Government towards fee for analysis)

1,45,144

IV. WORKING OF MADRAS PREVENTION OF ADULTERATION ACT.

The Madras Prevention of Adulteration Act, 1918, started working in Madras City and 16 other local bodies in 1931 and after being extended to all the 95 municipalities and 144 panchayat boards it is now in force in 239 local bodies in the Madras State, including the Panchayats of Sriperumbudur and Kanniseri. The Act is applicable to Sriperumbudur for the festival season only and to Kanniseri during the Cattle Fair. Efficient working of the Act brings revenue to Government and the local bodies. As mentioned in the last year's report the saturation capacity of the laboratory has been reached and though many new panchayats are eager to work the Act and many wish to send increased quota of samples, their requests had to be turned down owing to lack of laboratory accommodation and other facilities. The number of samples received during the year under the Act was 23,712 of which 11,201 or 47.2 per cent were adulterated. This includes 5,061 samples received and analysed by the Madras Corporation Analyst in the Corporation Laboratory.

It is a strange coincidence that during the year the percentage of adulterated samples has reached the same record figure of 47.2 per cent both in the Madras City and the remaining areas of Madras State working the Act. As observed in the report for last year, the chief factors which have contributed to increase in adulteration are the inadequacy of the number of samples taken and the imposition of low fines by Magistrates in food adulteration cases. The dishonest vendor readily pays off the small fine imposed on him which is only an insignificant fraction of his profit. Some Magistrates impose even trivial fines of Rs. 2 or Rs. 3 which does not even cover the cost of purchasing and sending the sample and the fee for analysis incurred by the local body. Unless the Magistrates take food adulteration cases as a serious offence and impose deterrent fines adulteration of food is not likely to diminish to any extent.

In this connection it would be interesting to trace the effect of working the Act for two decades in the 18 local bodies which were the pioneers working the Act. Some distinct improvement was noticeable at the end of the first decade but in the second decade, which coincided with the period of World War II and the following years there has been a steady increase in adulteration in most of the municipalities as shown in the following table. The increase is due to scarcity of food and the enormous increase in the price of food articles in the post-war period.

TABLE III.

Percentage of adulterated samples in 18 local bodies in the last 20 years, reviewed at intervals of 5 years.

	1932-33.	1937-38.	1942-43.	1947-48.	1950-51.
Madras City	43.4	32.4	22.7	40.3	47.2
Kozhikode	10.7	18.1	37.5	46.5	53.1
Coimbatore	39.1	52.1	67.1	64.5	68.2
Guntur	32.9	37.3	39.5	44.3	42.1
Karaikudi	25.0	20.8	78.4	33.3	34.3
Kumbakonam	24.4	42.3	41.6	43.7	45.7
Madurai	23.2	28.7	27.6	23.4	28.0
Mangalore	68.5	25.9	55.1	62.1	68.8
Mettupalayam	57.0	83.3	75.0	58.4	89.6
Nellore	23.8	38.6	42.9	54.0	43.0
Ootacamund	48.0	45.9	32.4	4.5	50.9
Proddatur	6.3	50.0	20.8	22.2	27.1
Rajahmundry	43.6	41.0	66.1	66.9	77.9
Salem	44.5	32.0	35.8	63.1	53.9
Tellicherry	21.7	26.3	54.0	40.0	63.8
Tiruchirappalli	12.6	27.3	51.9	52.2	46.1
Virudhunagar	2.9	11.5	43.5		27.9
Visakhapatnam	47.2	42.1	61.1		

Table IV gives particulars of total number of samples sent by 239 local bodies (including Madras City), the number adulterated and percentage of adulterated samples. The figures for 1949-50 have also been included for comparison. Charts I and II illustrate the total number of samples analysed and the percentage of adulterated samples in the last twenty years.

TABLE IV.

Number of samples analysed and number adulterated

1950-51.			1949-50.				
	Number of samples taken.	Number adulterated.	Per centage adulterated.		Number of samples taken.	Number adulterated.	Per centage adulterated.
<i>Municipalities.</i>				<i>Municipalities.</i>			
28 Class A	6,978	3,590	51.5	28 Class A	7,289	3,683	50.5
24 Class B	2,376	1,155	48.6	24 Class B	2,311	1,107	47.8
43 Class C	2,367	1,153	48.7	42 Class C	2,352	1,127	47.9
<i>Panchayat Boards.</i>				<i>Panchayat Boards.</i>			
143 Class C	6,980	2,918	42.1	142 Class C	6,572	2,720	41.4
Total for 236 local bodies analysed in Government Analyst's labora- tory.				Total for 236 local bodies, analysed in Government Analyst's labora- tory			
18,651				18,524			
8,814				8,637			
47.2				46.6			
<i>Corporation.</i>				<i>Corporation.</i>			
† Madras City ..	5,061	2,387	47.2	Madras City ..	4,810	1,918	39.9
Total for 236 local bodies.				Total for 237 local bodies.			
23,712				23,334			
11,201				10,555			
47.2				45.2			

* One Panchayat Board, Salur, got the status of municipality during the year.

† The figures for Madras City are for the calendar years 1950 and 1949.

The number of extra samples sent by the local bodies has increased from 998 in 1949-50 to 1,024 during the year under report. The details are given in Table V.

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Total number of samples.

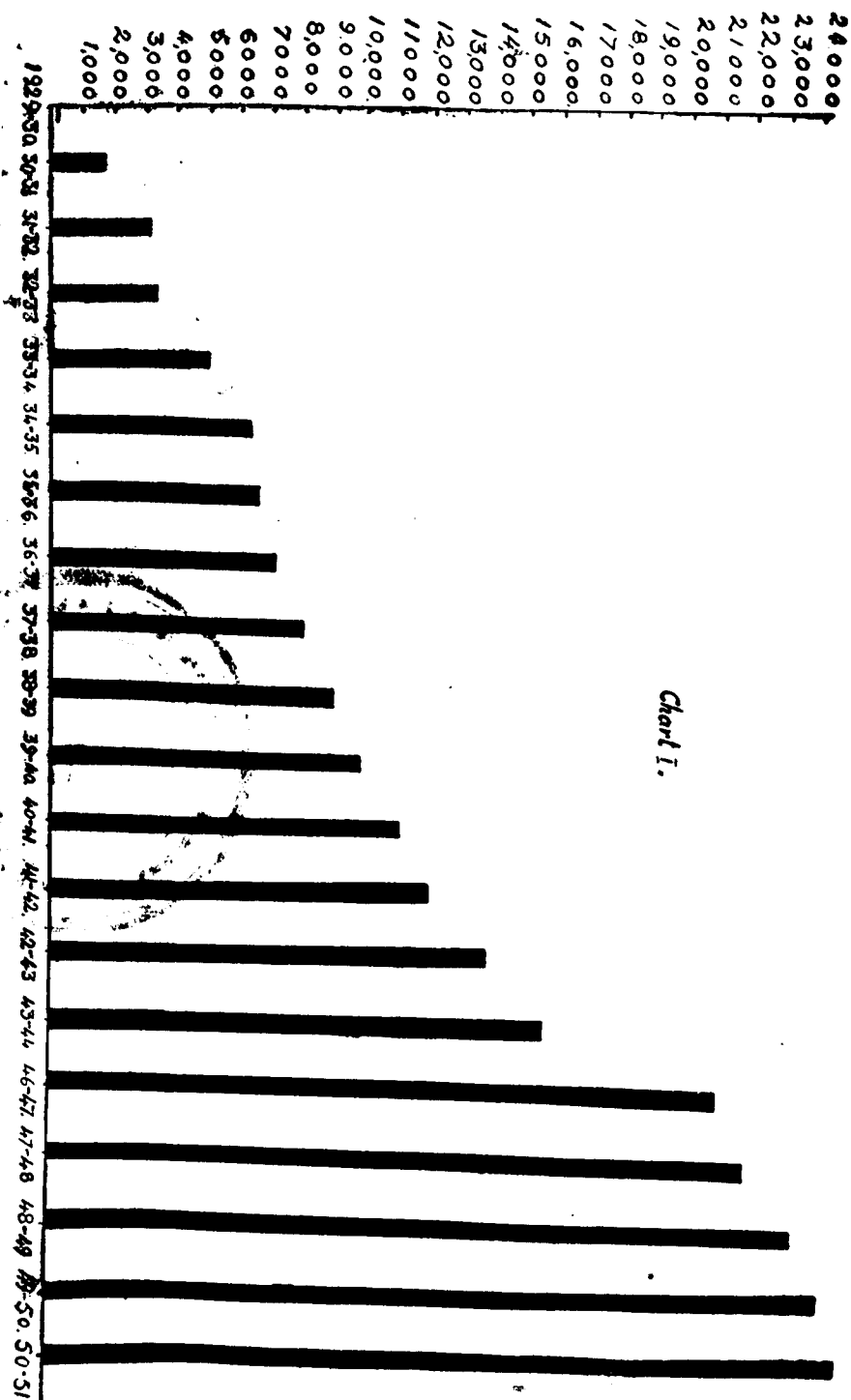
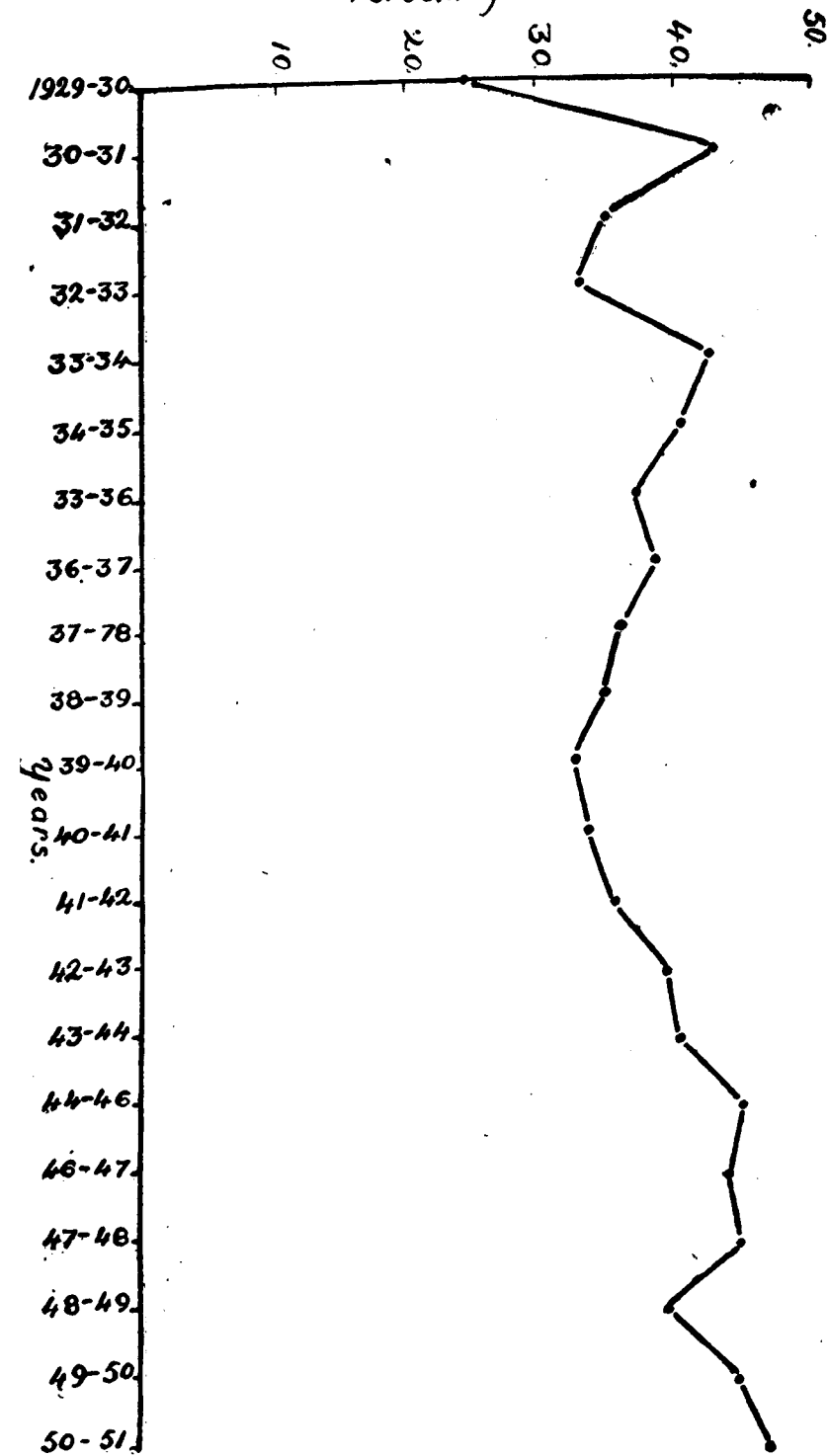


Chart I.

Percentage adulterated.



Chapter II.

TABLE V.

Number of extra samples sent by local bodies during 1950-51.

Name.	Number of extra samples.	Name.	Number of extra samples.
MUNICIPALITIES.			
<i>Class "A"</i>		<i>Class "B"—cont.</i>	
1 Madurai	3	29 Tiruppur	29
2 Kozhikode	33	30 Villupuram	5
3 Coimbatore	2	31 Virudunagar	11
4 Guntur	19		
5 Salem	95		
6 Ootacamund	20		
7 Rajahmundry	20		
8 Mangalore	9		
9 Tirunelveli	70		
10 Kancheeppuram	48		
11 Cuddalore	2		
12 Kumbakonam	19		
13 Masulipatnam	1		
14 Nagapattinam	12		
15 Palghat	29		
16 Tuticorin	198		
17 Vellore	3		
18 Pollachi	22		
Total	605		
<i>Class "B"</i>		<i>Class "C"</i>	
19 Amalapuram	1	32 Anantapur	8
20 Dindigul	3	33 Hindupur	2
21 Erode	2	34 Nandyal	1
22 Hospet	2	35 Peddapuram	1
23 Kurnool	8	36 Rajapalayam	6
24 Karur	2	37 Srivilliputtur	1
25 Ongole	2	38 Ambur	1
26 Palni	1	39 Aruppukkottai	2
27 Pudukkottai	1	40 Bhimavaram	8
28 Tenali	1	41 Dharapuram	5
		42 Guntakkal	2
		43 Kodaikanal	12
		44 Gudiyattam	3
		45 Narasaraopet	2
		46 Palacole	1
		47 Periyakulam	1
		48 Rasipuram	3
		49 Sriakulam	1
		50 Tadpatri	1
		51 Tindivanam	3
		52 Tiruvallur	2
		53 Udipi	1
		Total	67

PANCHAYATS.

Anantapur district—		Chittoor district—	
54 Gooty	10	69 Kuppam	6
55 Penukonda	6	70 Puttur	6
56 Uravakonda	2	71 Tungunur	6
		72 Madanapalle Sanatorium	1
North Arcot district—		Cuddapah district—	
57 Arcot	2	73 Rajampet	4
South Arcot district—		East Godavari district—	
58 Bhuvanagiri	4	74 Tuni	1
59 Kallakurichi	51		
60 Tirukoilur	3	West Godavari district—	
61 Vriddhachalam	5	75 Tanuku	4
Bellary district—		Guntur district—	
62 Harpanahalli	19	76 Mangalagiri	4
63 Rayadurg	1	77 Nidubrolu	2
64 Yemmiganur	2		
Coimbatore district—		Kurnool district—	
65 Avanashi	14	78 Markapur	1
66 Kurichi	2	Madurai district—	
67 Satyamangalam	2	79 Allinagar	2
		80 Batlagundu	1
		81 Chinnamannur	1
Chingleput district—		82 Cumbum	8
68 Madurantakam	1	83 Melur	2

TABLE V—cont.

Number of extra samples sent by local bodies during 1950-51—cont.

Name.	Number of extra samples.	Name.	Number of extra samples.
PANCHAYATS—cont.			
Nellore district—		Tirunelveli district—	
84 Venkatagiri	1	98 Courtallam	2
Ramanathapuram district—		99 Ettayapuram	2
85 Paramakudi	3	100 Kadayanallur	2
86 Rameswaram	1	101 Kallidaikurichi	1
87 Sattur	2	102 Puliyangudi	5
88 Tirupattur	3	103 Sankarankoil	4
Salem district—		104 Srivaikuntam	1
89 Shevaroyas	2	105 Tenkasi	2
90 Tiruchengode	2	106 Tiruchendur	6
Tanjore district—		107 Vickramasingapuram	13
91 Papanasam	1	Visakhapatnam district—	
92 Tirutturaippundi	6	108 Yellamanchilli	34
93 Tiruvadamardur	4		
Tiruchirappalli district—			
94 Ariyalur	2		
95 Kulittalai	5		
96 Musiri	1		
97 Turaiyur	3		
		Total	1,024

It may also be noted that the local bodies which send mostly milk samples show a relatively higher percentage of adulterated samples. For example, in the following local bodies given in Table VI, milk samples constitute more than 75 per cent of their quotas and they show a higher percentage of adulterated samples. Breeding of more cattle and milk distribution exclusively by Co-operative Milk Societies alone can eradicate the evil of milk adulteration.

TABLE VI.

Local bodies which have taken more than 75 per cent milk samples of their quota.

Name of local body.	Total number of samples.	Number of milk samples.	Name of local body.	Total number of samples.	Number of milk samples.
(1)	(2)	(3)	(1)	(2)	(3)
Anantapur district—			Coimbatore district—		
Tadpatri Municipality	44	35	Coimbatore Municipality	239	215
North Arcot district—			Udamalpet Municipality	96	71
Vellore Municipality	147	103	Mettupalayam Municipality	48	46
Tiruvannamalai Municipality	72	58	Gobichettipalayam Municipality	48	41
North Arcot district—			Avanashi Panchayat	62	55
Tirupattur Municipality	48	38	Bhavani Panchayat	39	28
Ambur Municipality	49	39	Satyamangalam Panchayat	50	39
Arcot Panchayat	50	37			
Arni Panchayat	46	34	Chingleput district—		
Rasipur Panchayat	48	42	Tiruvallur Municipality	50	36
			Alandoor Panchayat	44	31
South Arcot district—			Chittoor district—		
Cuddalore Municipality	145	108	Chittoor Municipality	48	37
Tindivanam	51	43	Kuppam Panchayat	54	41
Bhuvanagiri Panchayat	48	37	Madanapalle Panchayat	45	39
Kallakurichi Panchayat	99	92	Madanapalle Sanatorium	49	46
Nellikuppam	48	37	Tiruttani Panchayat	43	33

TABLE VI—cont.

Local bodies which have taken more than 75 per cent milk samples of their quota—cont.

Name of local body.	Total number of samples.	Number of milk samples.	Name of local body.	Total number of samples.	Number of milk samples.
(1)	(2)	(3)	(1)	(2)	(3)
Cuddapah district—			Salem district—		
Cuddapah Municipality ..	96	84	Salem Municipality ..	384	359
East Godavari district—			Rasipuram Municipality ..	49	49
Kakinada Municipality ..	287	201	Idappadi Panchayat ..	48	45
Rajahmundry Municipality ..	235	207	Namakkal Panchayat ..	48	44
Samalkot Panchayat ..	35	30	Shevaroy's Panchayat ..	50	44
West Godavari district—			Tiruchengode ..	49	44
Eluru ..	144	115	Tanjore district—		
South Kanara district—			Kumbakona Municipality ..	164	126
Mangalore Municipality ..	225	143	Mannargudi Municipality ..	48	40
Udipi Municipality ..	49	42	Nannilam Panchayat ..	48	39
Kasargod Panchayat ..	48	40	Papanasam Panchayat ..	49	42
Krishna district—			Tirutturaippundi Panchayat ..	52	44
Nuzvid Panchayat ..	44	34	Tiruchirappalli district—		
Kurnool district—			Tiruchirappalli Municipality ..	334	266
Dhone Panchayat ..	48	42	Ariyalur Panchayat ..	50	39
Madurai district—			Kulittalai Panchayat ..	48	44
Palni Municipality ..	97	88	Lalgudi Panchayat ..	43	35
Bodinayakanur Municipality ..	72	61	Jayankondan Panchayat ..	48	43
Kodaikanal ..	60	56	Musiri Panchayat ..	49	39
Allinagaram Panchayat ..	48	39	Mannaparai Panchayat ..	48	39
Melur Panchayat ..	50	46	Tirunelveli district—		
Malabar district—			Courtallam Panchayat ..	51	44
Palghat Municipality ..	173	158	Kadayanallur Panchayat ..	53	50
Nilgiri district—			Puliyangudi Panchayat ..	48	42
Ootacamund Municipality ..	236	173	Srivaikuntam Panchayat ..	48	40
Coonoor Municipality ..	145	124	Visakhapatnam district—		
Kotagiri Panchayat ..	48	45	Visakhapatnam Municipality ..	288	265
Ramanathapuram district—			Vizianagaram Municipality ..	95	84
Pallattur Panchayat ..	42	41	Bheemunipatnam Municipality ..	48	41
Rameswaram Panchayat ..	49	42	Srikakulam ..	49	39
Sattur Panchayat ..	50	45			
Tiruppattur Panchayat ..	50	41			

A difficulty pointed out by many sampling officials is the difficulty to trace the milk vendors who come from surrounding villages and hawk milk in the towns. Since very often these outlying areas lie outside the jurisdiction of the municipal or panchayat limit and sampling officials cannot take samples at the source, it would be desirable to institute a system of compulsory licensing. This would also eliminate the common plea put forward by milk vendors that they are acting only as carriers of milk and are not professional vendors.

In view of the enormous consumption of milk in hotels and restaurants, many sampling officials have stated that there is no check on the quality of milk used for preparing coffee and have suggested that a limit of, say, not more than 25 per cent added water should be present in milk intended for the preparation of beverages like coffee, tea, etc. In these days of milk scarcity, the question of prohibiting the use of milk in hotels as is being done in the City of Bombay may be seriously considered by Government so that genuine milk will be made available for children and invalids for whom milk is an indispensable article of food.

Table VII gives particulars about the nature of food article, total number and number reported as adulterated during the year under report and during the previous year.

TABLE VII.

Nature of samples taken in 238 local bodies (including Madras City) working the Act in the Madras State.

Nature of sample.	1950-51.			1949-50.		
	Total.	Number adulterated.	Percentage adulterated.	Total.	Number adulterated.	Percentage adulterated.
Milk	15,119	9,253	61.3	14,634	8,452	59.8
Ghee	1,783	395	22.1	1,887	544	28.4
Butter	869	280	32.2	782	239	30.1
Gingelly oil	1,786	280	15.7	1,904	238	13.0
Coconut oil	1,431	166	11.6	1,486	233	18.9
Groundnut Oil	476	34	7.1	512	41	8.2
Kusuma oil	21	2	9.5	29	9	31.1
Mineral oil	10	3	30.0	31	12	39.0
Coffee	965	180	18.7	1,064	257	24.5
Sweets and other preparations made in ghee.	102	67	65.7	141	102	72.4
Honey	63	9	14.3	80	9	12.2
Dhalls and flours	621	385	62.0	323	234	72.4
Turneric	192	57	29.7	159	66	42.0
Tea	167	42	25.2	192	20	10.0
Vegetable oil products	30	9	30.0	46	17	37.0
Other unclassified samples	77	39	50.7	64	32	50.0
Total ..	23,712	11,201	47.2	23,334	10,555	45.2

The above table shows that the percentage of adulterated samples for the Madras State taken, as a whole, is 47.2 per cent which is the highest figure ever recorded since the working of the Madras Prevention of Adulteration Act began in 1929.

Adulteration in milk, butter, gingelly oil, shows a small rise from that recorded for the previous year, the respective figures for the year under report and the previous year being 61.2 and 59.8 for milk, 32.3 and 30.1 for butter and 15.8 and 13.0 for gingelly oil. It is noteworthy that tea adulteration shows a sharp increase to 25.2 per cent as compared with 10.0 per cent for the previous year. Adulteration of coconut oil records a further decrease to 11.6 per cent as compared to 18.9 per cent and 27.5 per cent for the previous two years and this improvement is probably due to the control exercised in the trading of mineral oil and the quick action taken to seize and destroy stocks of coconut oil adulterated with mineral oil.

The percentages of adulterated samples in the various districts of the Madras State and Madras City are given in Table VIII along with their rank in adulteration for the previous year.

TABLE VIII.

Districts arranged according to increasing order of adulterated samples.

Name of district.	Rank for the year 1950-51	Percentage of adulterated samples in the year.	Rank for the year 1949-50.	Percentage of adulterated samples in 1949-50.
Cuddapah ..	1	34.4	2	32.6
Madurai ..	2	34.5	1	32.1
South Arcot ..	3	34.9	4	38.3
Ramanathapuram ..	4	36.7	3	34.0
Nellore ..	5	39.6	7	40.3
Tanjore ..	6	39.7	8	40.4
Chittoor ..	7	41.2	10	44.1
Guntur ..	8	43.3	9	43.6
Kurnool ..	9	44.6	11	46.5
North Arcot ..	10	44.7	5	39.7
Krishna ..	11	45.1	19	53.0
Nilgiris ..	12	45.4	14	47.6
Madras City ..	13	47.2	6	39.9
Tiruchirappalli ..	14	48.8	18	50.6
Anantapur ..	15	50.7	16	49.3

TABLE VIII—cont.

Districts arranged according to increasing order of adulterated samples—cont.

Name of district.	Rank for the year 1950-51.	Percentage of adulterated samples in the year.	Rank for the year 1949-50.	Percentage of adulterated samples in 1949-50.
Tirunelveli ..	16	51.0	17	49.7
Malabar ..	17	51.8	12	46.7
Bellary ..	18	52.4	22	56.9
Visakhapatnam.	19	53.8	21	55.4
Chingleput ..	20	54.8	13	47.1
Salem ..	21	57.1	20	55.0
East Godavari ..	22	59.5	25	64.0
West Godavari ..	23	60.9	15	49.2
Coimbatore ..	24	63.3	23	61.2
South Kanara ..	25	67.1	24	62.2

Madurai district which showed the lowest percentage of adulterated samples in the last two years gets only the second rank during the year giving the first place to Cuddapah district. Other districts which show deterioration are West Godavari district where the percentage of adulterated samples has risen from 49.2 per cent to 60.9 per cent, Chingleput district from 47.1 per cent to 54.8 per cent; North Arcot from 39.7 per cent to 44.7 per cent; Malabar district from 46.7 per cent to 51.8 and Madras City where the percentage of adulterated samples has risen from 39.9 per cent to 47.2 per cent. A few districts, viz., Chittoor, Bellary and East Godavari show a small improvement, but there has been a striking improvement in Krishna district where the percentage has fallen from 53.0 per cent to 45.1 per cent.

Generally speaking there has been a distinct increase in adulteration obviously due to the mounting rise in prices and the large margin of profit arising from adulterating with cheaper foodstuffs. Further, the fines imposed are relatively trivial and the dishonest vendor readily pays off the fines rather than adopt honest trade practice.

It will also be observed that the districts which show a high percentage of adulterated samples include places which send mostly milk samples.

Table IX gives particulars of samples taken in Madras City in the Calendar year 1950.

The total number of samples analysed by the Madras Corporation Analyst was 5,061 of which 2,387 (47.2 per cent) were adulterated while the total for the previous year was 4,810 of which 1,918 (39.9) per cent were adulterated. The striking increase in adulteration shows that the penalty imposed for food adulteration offences is not having any deterrent effect.

TABLE IX.

Nature of samples taken in Madras City in the calendar year 1950.

Nature of samples.	Number of samples taken.	Number adulterated.	Percentage adulterated.
Milk ..	2,880	2,075	72.0
Butter ..	475	118	24.8
Ghee ..	725	82	11.3
Gingelly oil ..	313	39	12.4
Groundnut oil ..	86	4	4.7
Coconut oil ..	286	33	11.5
Coffee powder ..	196	4	2.0
Tea ..	22	..	..
Ghee substitutes ..	19	5	26.3
Other articles ..	59	27	45.8
Total ..	5,061	2,387	47.2

Table X gives the nature of samples taken in 238 local bodies in the Madras State during the year 1950-51, excluding Madras City and analysed in the Government Analyst Laboratory.

TABLE X.

Nature of samples taken in 238 local bodies working the Act in the Madras State during the year 1950-51 and analysed in the Government Analyst's laboratory.

Nature of samples.	1950-51.			1949-50.		
	Total No. of samples taken.	Number adulterated.	Percentage adulterated.	Total No. of samples taken.	Number adulterated.	Percentage adulterated.
Milk ..	12,239	7,178	58.7	12,005	6,816	56.8
Ghee ..	1,058	313	29.6	1,199	469	39.1
Butter ..	394	162	41.1	301	134	44.5
Gingelly oil ..	1,473	241	16.4	1,495	183	12.2
Coconut oil ..	1,145	133	11.6	1,291	277	21.5
Groundnut oil ..	390	30	7.7	412	36	8.7
Kusumba oil ..	21	2	9.5	29	9	31.0
Mineral oil ..	10	3	30.0	31	12	38.7
Coffee ..	769	176	22.9	842	248	29.4
Sweets and other preparations made in ghee.	102	67	65.6	141	102	72.3
Honey ..	63	9	14.3	80	9	11.2
Dhalls and flours ..	621	385	62.0	323	234	72.4
Turmeric ..	192	57	29.7	159	66	41.5
Tea ..	145	42	29.0	162	20	12.3
Vegetable oils and hydrogenated vegetable oil.	11	4	36.3	32	12	37.5
Other unclassified samples.	18	12	65.7	22	10	45.4
Total ..	18,651	8,814	47.2	18,524	8,637	46.6

V. NOTES ON ADULTERATION.

Milk.—As usual milk is the most commonly adulterated food. Out of 12,239 milk samples analysed in the year 7,178 (58.7 per cent) were adulterated as against a total of 12,005 and 6,816 (56.8 per cent) adulterated samples for the year 1949-50. The average composition of genuine and adulterated milk analysed in this Laboratory during the year is given below, the figures in brackets being the corresponding figures for the year 1949-50 :—

					Fat.	Solids not fat.
					PER CENT.	PER CENT.
Cow's milk ..	Genuine ..	..	..	..	4.45 (4.7)	9.2 (9.3)
					3.5 (3.8)	6.5 (6.2)
Buffalo milk ..	Genuine ..	..	..	..	6.6 (6.9)	9.7 (9.7)
					4.8 (4.5)	6.7 (6.8)
Mixed milk ..	Genuine ..	..	..	..	5.7 (6.2)	9.8 (9.5)
					4.1 (4.1)	6.6 (6.5)

The figures conclusively show that the statutory presumptive standards prescribed for cow's milk, viz., 3.0 per cent for fat and 8.5 per cent for solids-not-fat are much lower than the average figure of 4.45 per cent and 9.2 per cent given by the samples received in the year; likewise the standards for buffalo milk, viz., 4.5 per cent for fat and 9.0 per cent for solids-not-fat are lower than the average figures of 6.6 per cent and 9.7 per cent obtained in the year. There is thus a strong argument to justify raising the statutory standards. In this connection it may be stated that the legal limits in the corresponding Bombay Act for buffalo milk are 7.0 per cent for fat and 9.0 per cent for solids-not-fat.

Butter and ghee.—During the year under report 394 samples of butter were analysed of which 162 (41.1 per cent) were adulterated. The corresponding figures for the previous year were 301 and 134 (44.5 per cent) respectively. Of the 162 adulterated samples 81 were certified as containing more than the permitted limit of 20 per cent moisture and 64 were reported as containing foreign fat while 17 were

reported as containing both excess moisture and foreign fat. Though there is a small decrease in the percentage of adulterated samples, it has been observed that hydrogenated vegetable fat is more widely used to adulterate butter contrary to the prevalent view that ghee alone is commonly adulterated with foreign fat and that purchasing butter and preparing ghee from it ensures unadulterated ghee.

Out of 1,058 ghee samples analysed during the year 313 (29.6 per cent) were adulterated as against 39.1 per cent adulterated samples for the previous year showing a slight improvement.

The average Reichert Value for genuine butter and ghee and adulterated butter and ghee are given below, the figures for the previous year being included in brackets for comparison.

		Reichert VALUE.	Moisture. PER CENT.
Butter	Genuine	27.7 (28.7)	18.6 (19.1)
	Adulterated	21.5 (17.8)	27.5 (25.8)
Ghee	Genuine	28.3 (28.8)	
	Adulterated	12.8 (13.1)	

Oils.—Of 1,473 gingelly oil samples received 241 (16.4 per cent) were adulterated, exclusively with groundnut oil as against 1,495 and 183 (12.2 per cent) for the previous year. There is a slight increase in adulteration when compared to the figures for last year. Of 1,145 Coconut Oil samples, 133 (11.8) per cent were adulterated 75 with mineral oil and 58 with arachis oil. Thus there has been a welcome decrease in the use of mineral oil as an adulterant, thanks to the prompt steps taken to seize and destroy stocks of adulterated oil. Fifteen tins of adulterated coconut oil forfeited to Palni Municipality were given to the temple for lighting purposes.

Coffee.—Out of 769 coffee samples, 176 (22.9 per cent) were found to be adulterated, the common adulterants being chicory and wild date. In some cases vendors declare the admixture with chicory at the time of sampling, orally, hoping to escape prosecution. But the rules require that even in the case of chicory, which alone is permitted as an adulterant of coffee, admixture with chicory and the percentage added should be declared by means of a printed label.

Tea.—Of 145 tea samples 42 (29.0 per cent) samples were adulterated. There is thus a considerable increase in adulteration of tea during the year. Ten years ago in the Annual Report of the Government Analyst for the year 1940-41 it was stated that adulteration in tea had practically stopped. The percentage of adulterated tea samples during the past few years is given below :—

Year.	Total number of tea samples.	Number adulterated.	Percentage adulterated.
1946-47	62	3	4.8
1947-48	173	8	4.6
1948-49	151	21	13.9
1949-50	162	20	12.3
1950-51	145	42	29.0

The figures show that there is an increasing tendency for adulterating tea.

Dhalls and flours.—Lak dhal and flours are still being used to adulterate other dhalls and flours though rule 28-E prohibits the use of Lak dhal. However, the percentage of adulterated samples has decreased from 72.4 per cent to 62.0 per cent probably due to intensive sampling and seizure of suspected stocks.

Vegetable oil products.—Nine out of 30 samples contained ghee in admixture and were reported as adulterated. Though these mixtures are sold by vendors to sampling inspectors as vegetable oils, under the impression that they would escape punishment, actually these mixtures are intended for sale to the public as ghee. Under the rules it is an offence to store or sell adulterated ghee under any description.

Turmeric.—Fifty-seven out 192 samples had excess lead or foreign starch as an adulterant. The maximum amount of lead found in turmeric samples was 220 parts per million. The foreign cereals and pulses detected in adulterated turmeric were rice, tapioca, maize, wheat, ragi, Bengalgram, redgram, green gram and pea.

Honey.—The adulterant commonly present was cane sugar in the form of jaggery solution, the proportion present ranging from 16 to 68 per cent.

VI. FINES.

The number of convictions, fines in analysis and non-analysis cases, maximum, minimum and average fine in each local body, are given in Appendix B.

The average fine for the whole State during the year was only Rs. 43. The average fines during the last four years are given below :—

	RS.		RS.
1947-48	49	1949-50	48
1948-49	50	1950-51	43

The average fine has been steadily falling year by year while one would expect the Magistrates to take into account the high prices of food stuffs and the premeditated nature of the fraud practised by the merchants and impose deterrent fines on them.

While many local bodies have recovered from fines five, six, seven and eight times their contribution last year, only in the single instance of Rajahmundry, the municipality has received five times its contribution to Government in the year under report.

The municipalities of Mangalore, Tanjore and Mayuram and the panchayat boards of Bobbili and Parvathipuram have recovered four times their contribution.

Thirty-three local bodies, comprising 19 municipalities and 14 panchayats have recovered *thrice their contribution*, as under :—

Municipalities.

Class A—

Coimbatore.
Eluru.
Kakinada.
Kumbakonam.
Pollachi.
Salem.
Visakhapatnam.

Class C—

Bhimavaram
Gobichettipalayam.
Guntakkal.
Mettupalayam.
Mannargudi.
Periyakulam.
Rasipuram.
Tiruvapur.
Vaniyambadi.

Class B—

Karur.
Palni.
Pudukottai.

Panchayats.

Anantapur district—
Kadiri.
North Arcot district—
Arkonam.
Coimbatore district—
Kurichi.
Satyamangalam,
East Godavari district—
Tuni.
West Godavari district—
Kovvur.
Nidadavole.

Salem district—
Dharmapuri.
Tiruchengode,
Tanjore district—
Ayyampet.
Nannilam.
Shirkali.
Tiruchirappalli district—
Musiri.
Tirunelveli district—
Sankarankoil.

It was already noted in the last year's annual report that there was a fall in the average fines in some local bodies from the figure for the year 1948-49. In some of these, there has been a further drop in the average fine for the year under report, as shown below:—

Name of local body.	Average fine in the years.		
	1948-49.	1949-50.	1950-51.
	RS.	RS.	RS.
<i>Municipalities.</i>			
Madurai	92	81	65
Kozhikode	50	40	33
Coonoor	90	52	30
Cuddalore	41	28	26
Masulipatnam	31	28	26
Nagapattinam	60	52	20
Nellore	56	36	28
Palghat	76	53	45
Cannanore	53	46	36
Chirala	49	27	23
Karaikudi	67	44	36
Tellicherry	72	51	36
Kodaikanal	57	26	26
Walajapet	69	34	9
<i>Panchayat boards.</i>			
Poonamallee (Chingleput district) ..	66	48	13
Tiruppattur (Ramanathapuram district).	65	42	29

In the following cases, Table XI, the fines were so low that even the contribution paid by the local body to Government as fee for analysis could not be recouped.

TABLE XI.			
Name of local body.	Contribution to Government.	Amount recovered as fine.	Average fine.
	RS.	RS.	RS.
<i>Municipalities.</i>			
Tadpatri (low adulteration)	245	749	33
Walajapet	240	76	10
<i>Panchayat boards.</i>			
Anantapur district—			
Uravakonda	250	198	10
South Arcot district—			
Bhuvanagiri	260	234	33
Panrutti (low adulteration)	240	166	26
Chingleput district—			
Alandoor	240	227	18
Poonamallee	240	235	17
East Godavari district—			
Samalkot (low adulteration)	240	200	24
Guntur district—			
Vetapalem (low adulteration)	240	132	20
Krishna district—			
Tiruvur	240	161	14

TABLE XI—cont.

Panchayat boards—cont.

Name of local body.	Contribution to Government.	Amount recovered as fine.	Average fine.
	RS.	RS.	RS.
<i>Madurai district—</i>			
Nilacoutai	240	216	24
Sholavandan	240	180	22
<i>Nellore district—</i>			
Kandukur (large number of cases pending).	240	191	26
Kavali (large number of cases pending).	240	217	20
<i>Ramanathapuram district—</i>			
Kilakarai	240	238	26
<i>Salem district—</i>			
Shevaroy	250	130	20
<i>Tirunelveli district—</i>			
Ettayapuram	250	99	27
<i>Visakhapatnam district—</i>			
Narasapatnam	240	219	18

In the case of the following local bodies, there has been a marked decrease in the average fines:—

TABLE XII.

Name of local body.	Average fine for the year.	
	1949-50.	1950-51.
	RS.	RS.
<i>Municipalities.</i>		
Madurai	81	65
Vijayavada	61	42
Salem	78	32
Ootacamund	43	40
Anakapalle	76	44
Bellary	56	34
Kancheepuram	49	35
Coonoor	52	30
Amalapuram	44	29
Cuddapah	71	25
Erode	77	40
Hospet	72	44
Devakottai	71	34
Peddapuram	63	43
Proddatur	41	20
Tellicherry	51	36
Udipi	50	27
Walajapet	48	9

TABLE XII—cont.

Name of local body.	Average fine for the year.	
	1949-50. RS.	1950-51. RS.
<i>Panchayat boards.</i>		
Anantapur district—		
Uravakonda	32	11
North Arcot district—		
Arni	50	38
Arcot	55	29
Ranipet	44	15
South Arcot district—		
Tirukkoilur	46	32
Coimbatore district—		
Avanashi	59	39
Bhavani	45	32
Kurichi	74	50
Chingleput district—		
Alandoor	78	18
Poonamallee	48	17
Chittoor district—		
Punganur	44	31
Tirumalai Hills	39	26
Tiruttani	44	22
Vayalpad	71	50
Cuddapah district—		
Badvel	102	27
Rajampet	46	30
West Godavari district—		
Tadepalligudem	68	43
Tanuku	46	36
Guntur district—		
Repalle	74	28
South Kanara district—		
Kasaragod	49	26
Krishna district—		
Jaggayapet	49	31
Tiruvur	36	13
Madurai district—		
Allinagaram	57	44
Chinnamannur	67	40
Cumbum	64	45
Melur	59	35
Nilakottai	39	24
Nellore district—		
Kandukur	40	25
Ramanathapuram district—		
Pallattur	43	27
Paramakudi	49	31
Sivaganga	57	36
Tiruppattur	42	29

TABLE XII—cont.

Name of local body.	Average fine for the year.	
	1949-50. RS.	1950-51. RS.
<i>Panchayat boards—cont.</i>		
Salem district—		
Namakkal	64	31
Shevaroy	42	22
Tanjore district—		
Pattukkottai	63	31
Tiruchirappalli district—		
Lalgudi	48	32
Jayankondan	33	19
Tirunelveli district—		
Sankarankoil	49	32
Tenkasi	46	33
Vickramasingapuram	46	32

During the year, the highest fine of Rs. 200 was imposed in nine municipalities and four panchayat boards whereas in the year 1949-50 fines of Rs. 200 and above were imposed in 31 local bodies. Fines of Rs. 100 and above but below Rs. 200 were imposed in only 74 local bodies as against 100 local bodies in the year 1949-50. It is most discouraging to note that trivial fines of below Rs. 5 were imposed in the following local bodies:—

the following local bodies:—				Minimum fine.			
				Rs.			
				Rs.			
<i>Municipalities.</i>							
Kozhikode	..	..	..	2	Vellore	..	2
Salem	..	..	..	3	Cuddaph	..	1
Coonoor	..	..	..	1	Walajapet	..	3
<i>Panchayat boards</i>							
Tiruvur (Krishna district)	..	..	..	2	Mudukulathur (Ramnathapuram).	..	2
Kandukur (Nellore)	..	..	..	2			

A minimum fine of Rs. 5 was imposed in the following twelve municipalities and fourteen Panchayat Boards:—

Ootacamund.	Virudunagar.
Kancheepuram.	Rajapalayam.
Cannanore.	Chittoor.
Erode.	Mettupalayam.
Palayamkottai.	Tindivanam.
Tiruppur.	

After all, the number of samples taken in each local body is restricted and if the fines imposed do not even come up to an amount which is incurred by the local body in collecting the sample and getting it analysed the merchants cannot be expected to improve their ways.

In non-analysis cases, 119 local bodies have taken action for offences under the following categories:—

- (i) Exposure of food to dust and flies and for keeping food in badly tinned or untinned vessels;
- (ii) interfering with seized stock—section 8; and
- (iii) preventing the sampling official from taking a sample—section 14 (3).

(1) *Government hospitals.*—The number of diet samples received during the year was 4,945 as against 4,471 samples for the previous year, thus recording an increase of 474 samples.

Bread.—Of 1,183 samples of bread, 110 were reported as unsatisfactory due to acidity in excess of the permitted limit and 35 for not having been properly baked.

Milk.—Nine hundred and sixty-two samples were received of which 132 were reported as adulterated. One hundred and twenty-three were adulterated with water, five were deficient in fat content, two were adulterated with water and were also deficient in fat even after allowing for adulteration, thereby showing that the sample had been machine-skimmed to remove the fat. Two adulterated milks contained cane sugar, presumably added to raise the lactometer reading and thus mask adulteration with water.

Butter.—Of 538 samples, 165 were reported as adulterated. Ninety-six contained water above the permitted limit of 20 per cent, 61 were adulterated with foreign fat and 8 contained both excess water and foreign fat.

Ghee.—Five hundred and ten samples were analysed of which 98 contained foreign fat and were certified as adulterated and 67 were reported as unsatisfactory for having a free fatty acid content in excess of the permitted limit of 2.5 per cent expressed as oleic acid.

Gingelly oil.—Five hundred and ninety-seven samples were dealt with, of which 13 consisted of groundnut oil only and one sample safflower oil only. Sixty-eight samples contained varying proportions of groundnut oil and one contained mineral oil.

Coffee powder.—The adulterants commonly used are chicory, exhausted coffee and preparation of wild date. Fourteen out of 174 samples were adulterated. Adulteration of coffee can be avoided if hospitals get their supply as coffee seeds instead of coffee powder.

Dhall.—Of 378 dhalls received, 46 samples were found to be artificially coloured, while three dhalls consisted of Lakdhall (*Lathyrus sativus*).

(2) *Civil Supplies department.*—As usual various fumigated foodgrains were tested for residual HCN and the stocks were released for consumption only after ensuring that all traces of HCN had been removed by aeration. Five flours were received for identification, one was identified to be Lak dhall—*Lathyrus sativus*, two as tapioca and two as Bengalgram flour.

(3) *Government Milk Factory.*—The Government Milk Factory in supplying reconstituted milk to the Government hospitals and the public has become a concern of great public utility and has justified its existence. Ever since its inception, it has been regulating the manufacture according to the advice of the Government Analyst. The starting materials used for the manufacture, viz., skimmed milk powder, carotene and coconut oil are tested for their quality and purity in the laboratory before they are used in the manufacture of reconstituted milk. Samples of reconstituted milk are periodically analysed to see whether their composition corresponds to that of cow's milk. The factory has also been advised to use tin free from lead for tinning the vessels.

During the year under report a total of 980 grms. of carotene and about 862 pounds of coconut oil were supplied by the factory. The carotene was dissolved in the oil and the solution re-issued periodically, in the form of carotenised oil for use in the manufacture of reconstituted milk. One hundred and forty samples of reconstituted milk were also analysed.

(4) *Rationing department.*—Doughs and cooked preparations like iddies, puri, dosai, briyani, etc., were sent by Rationing authorities to find out whether rice or wheat which are rationed articles, had been used in their preparation. One cake and one puri were found to have been prepared with wheat and in two doughs, four iddies, one dosai and one Briyani, rice was detected. Six flours were identified as Maida and five rusks were found to have been prepared from wheat flour.

(5) *Jails.*—Two samples of dhal were coloured with a coaltar dye. Four ghee samples had a free fatty acid content higher than the permitted limit of 2.5 per cent and four were adulterated with foreign fat. Of 31 gingelly oil samples 3 were adulterated with groundnut oil. Four of 27 milk samples were adulterated with water.

(6) *Industries and Commerce.*—As usual, samples of hydrogenated vegetable oil products were sent by the Director of Industries and Commerce to see whether they conform to the specifications prescribed by the Government of India. A sample of "Kamadhenu" Vanaspathi with high acidity and a sample of "Lion" brand vanaspathi with a melting point higher than the prescribed range were reported as unsatisfactory.

(7) *Magistrates and police.*—Two samples of margosa oil seized from a merchant by a police officer, alleged to contain mineral oil consisted of 24 per cent margosa oil and 76 per cent mineral oil. Four samples of flour were reported as self-raising flour.

(8) *Referee samples from Magistrates.*—Twenty-three samples were received from Magistrates for referee analysis.

(9) *Railways.*—A reference was received from the Chief Medical Officer, M.S.M. Railway, regarding the feasibility of fixing a standard for buttermilk. Though no standards have been laid down for the water content of buttermilk in England there are references in the literature of vendors having been convicted for selling buttermilk containing more than 30 per cent extraneous water and warned when the water content was between 25 and 30 per cent. The officer was informed that the quality of the buttermilk actually required should be fixed first. It is possible to prepare buttermilk practically free from water but usually a small amount of water is used to churn the curd to separate the butter. If the maximum permissible amount of added water is first fixed and a reasonably lower cost stipulated, the corresponding solids-not-fat may be fixed taking 8.5 per cent as the standard for genuine buttermilk.

Five samples of beans received from the M.S.M. Railway were certified as unfit for human consumption as four had been contaminated by sulphuric acid and one was damaged by weevils.

Two samples from flour bags detained in a Railway goods shed were received from the S.I.Ry. on suspicion that it might be Lak dhall flour. The samples were actually identified to be Lak dhall flour.

A powder sent by the S.I.Ry. was identified after analysis as silica.

(10) *Other Government bodies.*—Thirteen samples sold as bengalgram flour were sent by Health Inspectors from areas to which the Madras Prevention of Adulteration Act has not been extended. These were found to contain Lak dhall flour and the merchants were prosecuted under section 108 of Madras Public Health Act.

A sample of groundnut cake flour received from the Deputy Regional Food Commissioner, Government of India, was reported as unfit for human consumption as it had a bitter taste, and a high acidity and was infested with weevils.

Two samples of palmyra jaggery and date palm jaggery sent by the Principal, Central Palm Gur Training School, Cuddalore, contained 84.0 per cent and 75.0 per cent cane sugar respectively. A sample of coconut palm gur had a total sugar content of 85 per cent.

A sample of varagu seed containing a foreign seed in admixture suspected to be datura seed was sent by the District Health Officer, Tiruchirappalli. The identity of datura seed was confirmed by microscopic examination and the mydriatic action of the alkaloid prepared from the seed on the kitten's eye.

VIII. Food samples from unofficial sources are given in Table XV.

TABLE XV.

Statement showing samples received from unofficial sources during the year 1950-51.

	Number sent.	Number adulterated or unsatisfactory.		Number sent.	Number adulterated or unsatisfactory.
Biscuits	1	..	Wheat flour	1	..
Butter	2	2	Honey	1	..
Curry powder	6	..	Maida	2	..
Coffee powder	2	1	Milk	2	..
Cashew shell oil	1	..	Milk powder	6	..
Ghee	7	2	Tobacco seed oil	1	..
Agmark ghee for sterol	6	..	Salad oil	4	..
Gingelly oil	6	..	Tea dust	1	1
Groundnut oil	15	..	Vanaspathi	1	..
Groundnut oil cake	1	..	Chefarog and chefarox	2	..
Bengalgram flour	1	..			
Tapioca flour	1	..			
Pea flour	1	1	Total	71	7

Merchants from whom samples had been taken for analysis under the Madras Prevention of Adulteration Act sent their duplicate portions of samples. In this category two ghees and one gingelly oil and two butters were found to be adulterated. Two exporting firms sent for analysis salad oil and cashew shell oil, intended for export. One sample of Vanaspathi was sent by a manufacturing firm to find out whether the product complied with the specifications of the Vegetable Oil Product Control Order. Six samples of ghee were received from a few merchants in Bombay for the sterol Acetate test.

As usual, samples of groundnut oil were analysed for acidity.

Two powders having "Chefarox" and "Chefarog" as their trade names were sent for analysis by a local firm, to find out whether they contained any harmful substance and whether they could be used to bleach flours. Chefarox was identified to be a mixture of 20 per cent benzoyl peroxide and 80 per cent di-calcium phosphate and Chefarog consisted of 72 per cent ammonium per-sulphate and 28 per cent di-calcium phosphate.

IX. NEW RULE UNDER THE MADRAS PREVENTION OF ADULTERATION ACT.

In spite of the ban imposed by Press Note No. 200, dated 24th August 1948, on the stocking or sale of Kesari dhall, large scale sale of Kesari dhall and flour, by itself or mixed with other dhalls and flours continued and has necessitated the issue of rule 28-E in G.O. No. 3082, Health, dated 1st September 1950, prohibiting the sale or possession for the purpose of sale, under any description of Kesari dhall or flour by itself or in admixture with other dhalls and flours. Following the issue of this rule sampling Inspectors started a campaign of seizure of stocks, which has resulted in reducing the percentage of adulteration in dhalls and flours.

X. HIGH COURT RULINGS.

During the year two important judgments have been delivered by the High Court in appeals preferred to them.

Miscellaneous petition No. 1227 of 1950.—When a merchant at Kurnool, whose stock of Kesari dhall was forfeited by the local Sub-Magistrate, requested his stock to be permitted to be exported to Bombay, the High Court in Miscellaneous Petition No. 1227 of 1950 rejected his petition. The following is an extract from the judgement:—

"Petition praying that in the circumstances stated in the affidavit filed therewith the High Court will be pleased to return the M.Os. 1 to 9 in C.C. No. 497 of 1950 on the file of the Stationary Sub-Magistrate, Kurnool, to the petitioner to be

re-exported to Bombay on his undertaking and executing a bond to that effect to the satisfaction of the Stationary Sub-Magistrate, Kurnool, pending Crl. R.C. No. 855 of 1950 presented to the High Court to revise the order of the Court of the Subdivisional Magistrate, Kurnool, dated 12th May 1950, and made in Criminal Appeal No. 27 of 1950 (C.C. No. 497 of 1950, Stationary Sub-Magistrate's Court, Kurnool).

Order.—This petition coming on for hearing upon perusing the petition and the affidavit filed in support thereof and upon hearing the arguments of Mr. S. Krishnamurthy, advocate for the petitioners, and of the Assistant Public Prosecutor on behalf of the State, the Court made the following order:—

The Public Prosecutor opposes. I cannot allow suspected poisoned food-stuffs like these to be returned to the petitioner and sent to Bombay (where there is no ban) any more than I can allow seized spirits and alcohol to be returned to the accused to be sent to non-prohibition areas to work havoc there or persons accused of polygamy to migrate to centres where it is not a crime. The petition is dismissed."

Criminal Appeal No. 485 of 1950—Last date for filing of charge-sheet.—

In computing the period of limitation, for purposes of section 19 of the Act, the date of sampling is to be excluded. The following is an extract from judgment in Criminal Appeal No. 485 of 1950:—

"Appeal under section 417 of the Code of Criminal Procedure, 1898, against the acquittal of the aforesaid respondent (accused) by the Stationary Sub-Magistrate of Amalapuram in C.C. No. 22 of 1950 on his file.

This appeal coming on for hearing this day upon perusing the petition of appeal and the record of the evidence and proceedings before the Stationary Sub-Magistrate of Amalapuram and upon hearing the Public Prosecutor for the appellant and Mr. K. Rangachari, advocate for the respondent (accused), the Court passed the following:

Judgment.—This is an appeal against an acquittal. The offence complained of is under the Food Adulteration Act. The offence was committed on the 8th September 1949 but the complaint was filed on the 8th December 1949. The accused pleaded that the complaint was out of time by virtue of section 19 of the Act, and the lower Court agreed with this contention and acquitted the accused. The question for consideration is whether the day of the commission of the offence is to be excluded or included for purposes of calculating the period of three months indicated in section 19 of the Act. The words used are that no prosecution shall be launched after the expiry of three months after the commission of the offence. On proper construction of the wording of the section, I am of the opinion that the complaint is not out of time. The significance of the word 'after' occurring in the section could not be lost sight of when the section has to be construed. But I quite realize that it is a different matter to argue that since it is a criminal proceedings the benefit of a strict construction should be given to the accused. I have also been referred to a decision by my learned brother Somasundaram, J., where he has taken a strict view of the section and held that the three months' period would expire a day previous to the date of the actual commission. This decision would seem to overlook the effect of the words 'after' occurring in two places in section 19 of the Act. However, in the circumstances of the case, and at this late stage, I do not think there is any need for ordering a further trial of the accused. No useful purpose will be served either. While holding that the learned Magistrate was not right in his interpretation and while allowing the appeal for the reasons stated above, I think the accused need not be proceeded with further."

XI. ANALYSIS OF DRUGS.

The drugs analysed in the Government Analyst's Laboratory are received from three sources.

(i) Under the Drugs Act taken from manufacturing concerns—The drugs received under this category requiring chemical analysis alone are analysed by the Government Analyst while those under Schedules C and C₁ of the Madras Drug

Rules, 1945, requiring biological assay are dealt with by the Government Analyst (Drugs-special) of the King Institute;

- (ii) From Government Hospitals and other Government Institutions;
- (iii) From Private Individuals and Firms.

The number of drugs analysed from each of the sources during the year is given below in Table XVI along with the figures for the two previous years for comparison.

TABLE XVI.

Number and source of drugs analysed in Government Analyst Laboratory.

	1950-51.	1949-50.	1948-49.
Under the Drugs Act	79	68	52
From Government Hospitals and other Government Institutions	99	66	34
From Private Individuals and Firms	24	19	7
Total ..	202	153	93

The number of drugs analysed during the year is 202 as against 153 and 93 during the years 1949-50 and 1948-49 respectively. Although further extension to more local bodies of the Madras Prevention of Adulteration Act relating to Food has been suspended due to inadequate accommodation and facilities in the Government Analyst's Laboratory, the number of drug samples received is on the increase. Government have been requested to sanction additional staff for current work but considerable expansion of work in drug analysis under the Drugs Act or from other sources would be possible if Government sanction the construction of a separate laboratory at Guindy for which detailed plans and estimates have already been submitted.

Experience with the analysis of the limited number of drugs received shows that the manufacturers do not exercise the requisite care in preparing and labelling their proprietary products. But penal action has not been taken so far on the basis of my certificates. Nevertheless the firms are asked to withdraw the defective stocks from the market. They have begun to realize that their interests would suffer unless they rapidly adopt correct methods of manufacture. The declared ingredients are not present in their correct strength.

In the case of stock mixtures compounded in hospitals, the position is not at all satisfactory. It is very essential that sufficient laboratory facilities should be provided for the Government Analyst to analyse drug samples from all hospitals so as to have an effective check on the accuracy and potency of the prescribed mixtures and medicines intended for the patients.

Requests from many private individuals to have their drugs analysed had also to be refused for want of adequate staff and facilities.

Details about the number and nature of the drugs received during the year are given in Table XVII. Particulars of the 43 samples reported as unsatisfactory are given in Table XVIII.

TABLE XVII.

Drugs received under the Madras Drugs Rules.

	1950-51.				
	Total received.	Number not analysed.	Genuine.	Number below standard.	Percentage below standard.
Proprietary preparations	41	5	17	19	52.7
Pharmaceutical preparations	38	..	15	23	60.5
Total ..	79	5	32	42	53.1

TABLE XVIII.

Particulars of drugs reported unsatisfactory.

(A) Proprietary Drugs.

Serial number and name of the drug. (1)	Name of ingredients estimated. (2)	Strength as declared on label. (3)	Result of analysis. (4)
1 Sonal Ointment.	Sulphanilamide .. Hydrarg Ammon. NH ₂ Hgcl.	20 grs. 5 grs.	21.6 per cent deficiency.
2 Spiritus Ammoniac Aromaticus.	....	....	The sample has not been correctly labelled as it does not state to which Pharmacopeia it conforms; judging from B.P. standards. 46.4 per cent deficiency.
....	Free Ammonia ..	....	....
....	Ammonium Carbonate. Weight per ml. at 20° C.	....	21.7 per cent deficiency Found 0.875 as against 0.885.
3 Metavina-Metabalic Tonic.	Vitamin B ₂ ..	412.5 I.U. per oz. ..	56.2 per cent deficiency.
4 Syrup Cal-fer-Vit.	Ferri et Ammonium Citras. Calcium Glycero-phosphate.	15.0 grs. per oz. .. 2.5 grs. per oz. ..	23.3 per cent deficiency. 56.0 per cent excess.
5 Meelec Easton's Syrup.	....	....	The Pharmacopeia to the specifications of which the product has been manufactured has not been stated on the labels judging from B.P. Standards. 20.4 per cent deficiency.
..	Ferrous Phosphate Fe ₂ (Fe ₄) ₂ .	..	..
6 Anti Conjunctivitis (Eye Ointment).	Sulphanilamide .. Silver Nitrate ..	4.0 per cent 0.5 per cent	40 per cent deficiency.
7 Anti Scleritis ..	Sulphanilamide .. Yellow Oxide of Mercury.	6.0 per cent 2.0 per cent	16.6 per cent excess. 57.5 per cent deficiency.
8 Carmino ..	Pot. Bicarbonate .. Sod. Bicarbonate ..	0.3240 gr. per oz. .. 0.1620 gr. per oz. ..	Glycerine present as foreign ingredient.
9 Calcidex (Regd.)	Calcium Hypophosphite.	24.0 grs. per oz. ..	Coal tar dye present as foreign ingredient.
10 Bismosan ..	Liq. Bismuth et Ammonii Citras. Conc. Chloroform .. Hydrocyanic Acid dil.	4 fl. dr. per oz. Bismuth oxide 5 to 6 per cent w/v .. 4 mins. per oz. = 1.23 per cent w/v. 16 mins. per oz = 0.063 to 0.07 per cent w/v.	90.2 per cent deficiency. 95.7 per cent deficiency.
11 Stock's Whooping Cough Remedy.	Phosphoric Acid ..	30.0 mins. per oz. ..	30.3 per cent deficiency.
12 Blaud's Pills with Arsenet Strychn.	Pil. Ferri Carb B.P. Ferrous Carbonate. Arsenic Trioxide .. Strychnine Hydrochloride.	5.0 gr. (1 gr. FeCO ₃) 0.01 gr. .. 0.01 gr. ..	26 per cent deficiency.

TABLE XVIII—cont.

Particulars of drugs reported unsatisfactory—cont.

(A) Proprietary Drugs—cont.

Serial number and name of the drug.	Name of ingredients estimated.	Strength as declared on label.	Result of analysis.
(1)	(2)	(3)	(4)
13 Ring worm Ointment.	Total Ash Acid insoluble ash Phenol.	..	Labelling defective. The sample contains other phenolic compounds together with a zinc Compound as extraneous ingredients.
14 Bhavan Ring-worm Cure.	Salicylic Acid	10 per cent	(Methyl Alcohol and Ethyl Alcohol present as foreign ingredient). Conforms to I.P.L. 1946.
15 Yeast Tablets	Vitamin B ₁	..	..
16 Sreekaf (Patent) Cough Syrup.	Potassium Sulphoguaiacolate. Ammonium Chloride.	7.5 grs. per table spoonful. 2.5 grs. per table spoonful.	34 per cent deficiency.
17 Jupiter's Asthmosan.	Ephedrine Hydrochloride. Potassium Iodide Potassium Bromide Liquor Arsenicalis.	0.250 gr. per drachm. 0.75 gr. per drachm.. 1.50 gr. per drachm.. 0.148 mg. As 20.	(Coal tar dye present as foreign ingredient).
18 Pulmo-Fort (an ideal lung tonic).	Potassium Guaiacolate. Calcium Hypophosphite. Ammonium Chloride.	20.0 grs. per oz. 6.0 grs. per oz. 0.4 gr. per oz.	47.2 per cent deficiency.
19 Baby tone	Calcium Hypophosphite. Alcohol content (on the basis of the tinctures present).	0.50 per cent. 3.90 per cent v/v	(Coal tar dye and cane sugar present as foreign ingredients).

(B) B.P. Preparations.

20 Liq. Ammon. Acet. Fort B.P.	Ammonium Acetate.	5.0 to 60 per cent w/v.	Does not conform to B.P.
	Weight per ml. at 20°C.	About 1.094.	..
21 Syrupus Ipecacuanhae (B.P.C.)	Total Alkaloids calculated as Emetine.	0.0475 to 0.0525 per cent, w/v.	72.6 per cent deficiency.
	Alcohol	5.25 to 6.5 per cent w/v.	46.7 per cent deficiency.
22 Liquor Hydragryri Perchloride B.P.	Mercuric Chloride..	0.950 to 0.105 per cent w/v.	55.2 per cent excess.
23 Tinctura Ipecacuanhae (Vinum Ipecac) B.P.	Alcohol	20 to 24 per cent v/v.	26.0 per cent deficiency.
24 Tinctura Scilla B.P.	Extract	Approximately 10.0 per cent w/v of Squill.	25.9 per cent deficiency.
	Alcohol	52 to 57 per cent v/v.	..
25 Tinctura Scilla B.P. 1932.	Extract	Approximately 10.0 per cent w/v of Squill.	72.3 per cent deficiency.

TABLE XVIII—cont.

Particulars of drugs reported unsatisfactory—cont.

(B) B.P. Preparations—cont.

Serial number and name of drug.	Name of ingredients estimated.	Strength as declared on label.	Result of analysis.
(1)	(2)	(3)	(4)
26 Spiritus Aetheris Nitrosi B.P. 1932.	Ethyl nitrite	Not less than 1.25 per cent and not more than 2.5 per cent w/v.	..
	Alcohol	84 to 87 per cent v/v.	3.9 per cent deficiency.
	Weight per ml. at 20°C.	0.833 to 0.837	Found 0.8446.
27 Syrupus Codinae Phosphatis B.P.C.	Codeine Phosphate.	0.46 to 0.51 per cent w/v.	..
	Weight per ml. at 20°C.	1.312 to 1.322 g.	Found 1.297.
28 Tincture Pruni Virginiae B.P.C.	Cane Sugar	66.0 per cent w/w	32.4 per cent deficiency.
	Weight per ml. at 20°C.	0.960 g. to 0.985 g.	Found 0.948 g.
	Alcohol	43 to 48 per cent v/v.	14.6 per cent excess.
29 Mixtura Pepsin Bismuthi Co without Opium B.P.C.	Bismuth Oxide	5.0 to 6.0 per cent w/v.	..
	Chloroform	1.23 per cent w/v	93.5 per cent deficiency.
	Hydrocyanic acid dilute.	0.063 to 0.070 per cent w/v.	76.2 per cent deficiency. (Coal tar dye present as foreign ingredient).
30 Tinct. Hyoscyamus.	Alcohol	60 to 71 per cent v/v.	6.8 per cent deficiency.
31 Pot. Bicarbonate B.P.	Potassium Bicarbonate.	Not less than 99.0 per cent and not more than the equivalent of 105.0 per cent of KHCO ₃ .	2.9 per cent deficiency.
32 Tinctura Calumbae B.P. 1948.	Alcohol	57 to 60 per cent v/v.	60 per cent deficiency.
	Total solids	Not less than 1.2 per cent.	Found 0.48 per cent.
33 Potass. Nitras B.P.	Potassium nitrate	Not less than 99.0 per cent KNO ₃ .	Found 99.93 per cent.
	Copper and zinc	..	..
	Ammon. compounds.	..	..
	Sulphate	..	..
	Lead	..	..
	Chloride	..	Does not conform to B.P. in respect of limit for chloride.
34 Spt. Ammon. Aromaticus B.P.	Ammonium carbonate.	2.76 to 3.24 per cent w/v calculated as (NH ₄) ₂ CO ₃ .	..
	Free ammonia	1.12 to 1.25 per cent w/v calculated as NH ₃ .	40.2 per cent deficiency.
35 Tinct. Hyoscyamus B.P. (Poison).	Alcohol	66 to 71 per cent v/v	..
	Alkaloids of hyoscyamus.	0.0045 to 0.0055 per cent w/v calculated as Hyoscyamine.	77.8 per cent deficiency.
36 Tinct. saussureae I.P.L.	Alcohol	I.P.L. 85 to 90 per cent v/v.	11.5 per cent deficiency.
27 Ext. Belae Fructus Liq. I.P.L.	Total solids	15 to 20 per cent w/w.	47.3 per cent deficiency.
	Alcohol	21 to 24 per cent w/v.	23.8 per cent excess.

TABLE XVIII—cont.

Particulars of drugs reported unsatisfactory—cont.

(B) B.P. Preparations—cont.

Serial number and name of the drug.	Name of ingredients estimated.	Strength as declared on label.	Result of analysis.
(1)	(2)	(3)	(4)
38 Spiritus Coloniensis B.P.C.	Weight per ml. at 20° C.	0.823 to 0.833 g.	Found 0.874
	Alcohol ..	80 to 83 per cent v/v ..	9.0 per cent deficiency.
39 Tinctura Quinine Ammoniatæ B.P. 1932	Quinine sulphate ..	1.9 to 2.1 per cent w/v.	.....
	Ammonia ..	0.9 to 1.05 per cent w/v NH ₃.	.....
	Alcohol ..	52 to 54 per cent v/v ..	5.1 per cent deficiency.
40 Tr. Cardam Co. B.P. 1948	Alcohol ..	52 to 57 per cent v/v ..	(Coal tar dye present as foreign ingredient in the place of Cochineal).
41 Magnesium Sulphate B.P.	Magnesium sulphate Mg SO ₄ .7H ₂ O	99.5 to 102 per cent ..	The sample contains 107.8 per cent Magnesium Sulphate.
42 Tinctura Benzoini Composita B.P. 1948.	Total balsamic acids.	4.92 per cent w/v calculated with reference to the balsamic acid content of the ingredients benzoin, storax and balsam of tolu.	53.0 per cent deficiency.
	Alcohol ..	70—77 per cent v/v ..	

COMMENTS ARISING FROM THE ANALYSIS OF PROPRIETARY AND PHARMACOPOIAL PREPARATIONS RECEIVED UNDER THE DRUGS ACT.

Defective labelling has been noticed in a number of samples. In two cases "Spiritus Amm. Aromaticus" and "Meclec Easton's Syrup", the manufacturers have not mentioned the Pharmacopoeia to which their products conform. The quantity of ingredients present is omitted in "Anti-Conjunctivitis Ointment". In not a few cases the presence of foreign ingredient is not disclosed. "Carmino" is found to contain Glycerine, "Bhavan Ring-Worm Cure" Ethyl and Methyl alcohol, and "Caloidex" a coal tar dye; in all these cases there is no mention of these ingredients on the label. Further the preparation Caloidex is labelled as a marvellous cure for tuberculosis, a specific treatment for Tuberculosis and thereby contravenes rule 106 of the Madras Drug Rules, 1945. The sample, Ringworm ointment contains in addition to the declared ingredient of phenol other phenolic compounds and a zinc compound as extraneous ingredients. A sample of magnesium sulphate B.P. contained 107.3 per cent magnesium sulphate expressed as MgSO₄.7H₂O whereas the B.P. limits are 99.5 to 102 per cent. The sample was amorphous in appearance and probably had lost part of the water of crystallisation and gave thereby a higher magnesium sulphate content. Magnesium sulphate should be packed in air-tight containers so that the water of crystallisation is not lost on storage. The indiscriminate addition of coal tar dyes to medicinal preparations which has come to my notice from time to time is a practice which should not be permitted, as many of them are harmful to health. There is no question of aesthetic appeal in the case of drugs. Drugs are different from cosmetics.

Many samples show gross deficiency in constituents which are not liable to deterioration or loss during any stage of manufacture or storage. "Syrup Cal Fer Vit" contains 23.3 per cent less of Ferri Amm. Citras than the declared strength. (This sample incidentally contains a 56 per cent excess of Cal. Glycerophosphate). Meclec Easton's Syrup contains 20.4 per cent less of Ferrous phosphate, "Anti Conjunctivitis ointment 40 per cent less of silver nitrate" "Anti Scleritis", 57.5 per cent less of Yellow oxide of Mercury, "Stock's Whooping Cough

Remedy" 30.3 per cent less of phosphoric acid, and "Bland Pills with Arsenic and Strychnine" 26 per cent less of pil. Ferri Carb. There is no excuse for these deficiencies which reveal low technical standards or low ethical standards or both.

There is in the majority of compounded preparations a deficiency in important ingredients. It would appear from these departures from Pharmacopoeial standards that manufacturers are not following official directions properly.

Ninety-nine samples of drugs were received from Government hospitals and other Government institutions. Particulars of these are given in Table XIX.

TABLE XIX.

Serial number and name of drug.	Name of ingredients estimated.	Strength as per B.P.	Results of analysis.
(1)	(2)	(3)	(4)
Government General Hospital, Madras.			
1 Protasein ..	Proteins ..	.....	Contains 20.9 per cent proteins.
2 Liquor Hydrogen Peroxide.	Hydrogen Peroxide	Not less than 5.0 per cent w/v and not more than 7.0 per cent w/v hydrogen peroxide.	Not satisfactory.
3 Pulvis Sulphanilamide ..	Reaction with litmus, Iron content Ash ..	Neutral ..	Does not conform to B.P.
4 Catagin Tablets ..	Ascorbic acid ..	Not more than 0.1 per cent.	Does not conform to B.P.
5 Betagen ..	Thiamina Hydrochloride.	25 mgms. per c. c.	Conforms to B.P.
6 Mix. Quinine Sulphate ..	Quinine sulphate ..	10 grs. per oz. ..	82.8 per cent excess.
7 Mix. Soda Salicylas ..	Sodium salicylate ..	20 grs. per oz. ..	Satisfactory.
8 Nikethamidum No. T. 8055.	.....	Strength 25 per cent.	Do.
9 Nikethamidum No. T. 8707.	.....	Strength 25 per cent.	Correctly prepared.
10 Sulphanilamide Tablets B.P.	.....	.....	Do.
11 Vitamin C Tablets (Bita C)	Ascorbic acid ..	.....	Conforms to B. P.
	Soda Salicylate ..	.....	Contains 47.1 mg. ascorbic acid per tablet.
12 Soda Salicylas B.P.	Arsenic ..	.....	.....
	Lead ..	.....	.....
	Chloride ..	.....	.....
	Sulphate ..	.....	Conforms to B.P.
	Alkalinity ..	.....	.....
13 Soda Salicylas B.P.	Soda salicylate ..	.....	.....
	Arsenic ..	.....	.....
	Lead ..	.....	.....
	Sulphate ..	.....	.....
	Chloride ..	.....	Conforms to B.P.
	Alkalinity ..	.....	.....
Professor, Pathology Department, Medical College, Madras.			
14 Formaldehyde ..	Formaldehyde ..	.....	Contains sediment but the filtered solution contains 38.64 per cent w/v of Formaldehyde.

TABLE XIX—cont.

Serial number and name of drug. (1)	Name of ingredients estimated. (2)	Strength as per B.P. (3)	Results of analysis. (4)
<i>Government Royapettah Hospital, Madras.</i>			
15 Mist. Pot. Iodide ..	Pot. iodide ..	5 grs. per oz.	Correctly dispensed.
16 Mist. Pot. Bromide (Sheds)	Pot. bromide ..	5 grs. per oz.	224 per cent excess.
17 Mix. Asthmatica (B. Ward).	Pot. iodide ..	2 grs. per oz.	35.0 per cent deficiency.
18 Mix. Asthmatica (Dispensary).	Do. ..	Do.	20.0 per cent deficiency.
19 Mist. Quinine (Dispensary)	Quinine sulphate ..	10 grs. per oz.	14.0 per cent deficiency.
20 Mist. Quinine (G. Ward) ..	Do. ..	Do.	16.0 per cent deficiency.
21 Mist. Pot. Bromide (Dispensary).	Pot. bromide ..	Do.	Correctly dispensed.
22 Mist. Pot. Bromide (A Ward).	Do. ..	....	Found 15 grs. per oz.
23 Sodii Salicylas (A. Ward)	Soda salicyla ..	10 grs. per oz.	Correctly dispensed.
24 Sodii Salicylas (Dispensary).	Do. ..	Do.	Do.
<i>Government Mental Hospital, Madras.</i>			
25 Categen ..	Ascorbic acid ..	100 mg. ascorbic acid in 2 c.c.	Satisfactory.
26 Cetopil ..	Do. ..	Do.	Do.
27 Betopil ..	Vitamin B ₁ ..	Vitamin B ₁ 25 mg. in 1 c.c.	Do.
28 B-amp. ..	Do. ..	Do.	Do.
29 Betagen (1 c.c. ampoules)	Thiamine hydrochloride.	25 mgms. thiamine hydrochloride in 1 c.c.	Do.
30 Bistan (Vitamin B ₁) ..	Vitamin B ₁ ..	25 mg. Vitamin B ₁ in 1 c.c.	13.1 per cent deficiency.
31 Anuran (Thiamine Hydrochloride Vitamin B ₁).	Do. ..	100 mg. Vitamin B ₁ in 1 c.c.	12.7 per cent deficiency.
32 Civitan (Ascorbic Acid Vitamin C).	Vitamin C ..	100 mg. Vitamin C in 1 c.c.	Correct strength.
33 Anuran Vitamin B ₁ ..	Vitamin B ₁ ..	100 mgs. Vitamin B ₁ per c.c.	Satisfactory.
34 Sorvicin Vitamin C ..	Vitamin C ..	100 mgs. Vitamin C per c.c.	Do.
<i>Government Stanley Hospital, Madras.</i>			
35 Vitamin B ₁ ampoules ..	Vitamin B ₁ ..	25 mg. Vitamin B ₁ in 1 c.c.	44.4 per cent excess.
36 Vitamin C ampoules ..	Vitamin C ..	100 mg. per c.c.	66 per cent deficiency.
37 Vitamin C Tablets ..	Do. ..	....	Found 51.1 mg. per tablet.
38 Anaesthetic Ether B.P. ..	Boiling point ..	....	....
....	Acetone and aldehyde.	....	....
....	Foreign odour ..	....	....
....	Methyl alcohol ..	....	....
....	Peroxides ..	....	....
....	Sulphurous acid and other free acids.	....	....
....	Non-volatile matter.	....	....
....	Solubility ..	....	Conforms to B.P.
....	Weight per ml. at 20° C.	....	....
39 Mist. Bromide ..	Pot. bromide ..	10 grs. per oz.	109 per cent excess.
40 Mist. Diuretica ..	Pot. bicarbonate ..	5 grs. per oz.	46 per cent deficiency.
....	Pot. acetate ..	Do.	93 per cent deficiency.

TABLE XIX—cont.

Serial number and name of drug. (1)	Name of ingredients estimated. (2)	Strength as per B.P. (3)	Result of analysis. (4)
<i>Government Stanley Hospital, Madras—cont.</i>			
41 Vitamin C (ampoules) ..	Vitamin C ..	100 mg. in 2 c.c.	Satisfactory.
42 Mist. Quinine Sulphate ..	Quinine sulphate ..	5 grs. per oz.	18 per cent deficiency.
43 Mist. Ferri et Ammonium Citras.	Iron ammonium citras.	Do.	14 per cent deficiency.
<i>Government Rajah Sir Ramaswamy Mudaliar's Lying-in Hospital, Madras.</i>			
44 Mix. Quinine Sulph ..	Quinine sulph ..	20 grs. in 3 oz.	24.5 per cent excess.
45 Mix. Ferri et Ammonium Citras.	Iron ammonium citras.	10 grs. per oz.	Correct.
46 Morphia Sulphate (ampoules).	Morphia sulphate ..	1/2 grs. per c.c.	Do.
47 Quinine Mixture ..	Quinine sulphate ..	20 grs. in 3 oz.	39.5 per cent excess.
48 Mix. Ol. Morrhoea ..	Ol. morrhoea ..	1/2 dram per oz.	75 per cent deficiency.
49 Hydarg Cum Creta ..	Mercury ..	1/6 grain	50 per cent deficiency.
50 Mist. Alkaline Diuretica ..	Pot. bicarbonate ..	10 grs. per oz.	95 per cent deficiency.
....	Pot. acetate ..	Do.	69 per cent deficiency.
51 Tinctura Iodi—Mitis ..	Iodine ..	2.45 per cent to 2.55 per cent w/v.	Satisfactory.
52 Magnesium S. No. 1.	Sulphate Magnesium sulphate.	50 per cent	Do.
53 Magnesium S. No. 2.	Sulphate Do.	25 per cent	Do.
54 5 per cent Glucose Normal Saline.	Sodium chloride ..	....	Found 0.86 per cent w/v.
....	Glucose ..	....	Found 5.11 per cent w/v.
55 Glucose (Ampoules).	Solution Glucose ..	25 per cent	Satisfactory.
56 Glucose Saline ..	Sodium chloride ..	0.89 to 91 per cent w/v.	Do.
<i>Government Kasturba Gandhi Hospital for Women and Children, Madras.</i>			
57 Mix. Bismuth ..	Bismuth carb ..	20 grs. per oz.	Correct.
....	Sod. bicarbonate ..	Do.	53 per cent deficiency.
<i>Government Milk Factory, Teynampet, Madras.</i>			
58 Carotene Crystals ..	....	....	Satisfactory.
59 Do. ..	....	....	Do.
60 Do. ..	....	....	Do.
61 Do. ..	....	....	Do.
<i>Regional Commissioner of Disposals, Madras.</i>			
62 Standard First Aid envelope containing 7 1/2 grs. Insoluble Sulphacetamide (2 packet-).	Sulphacetamide ..	....	Found 98.7 per cent. The rubber gloves had perished and become unfit for use.
63 Aspirine Tablets ..	Aspirin ..	5 grs. per tablet	Contains salicylic acid in excess. Tablets unfit for use.
64 Morphine Hydrochloride 1/2 gr.	Morphine hydrochloride.	1/2 gr.	....

TABLE XIX—cont.

Serial number and name of drug. (1)	Name of ingredients estimated. (2)	Strength as per B.P. (3)	Result of analysis. (4)
<i>Regional Commissioner of Disposals, Madras—cont.</i>			
65 Pot. Permanganate $\frac{1}{2}$ oz.	Pot. permanganate ..	....	Found 94.2 per cent and suitable for the purposes stated on the label.
66 Sodium Chloride Tablets.	Sodium chloride ..	20 grs. per tablet ..	Satisfactory.
67 Quinine or Mepacrine Tablets.	Mepacrine ..	....	Contains 0.1 g. and fit for use.
<i>Inspector-General of Prisons, Madras.</i>			
68 Quinine Sulphate ..	Moisture ..	11 to 16 per cent ..	Satisfactory.
<i>King George Hospital, Visakhapatnam.</i>			
69 Mist. Quinine Sulph.	Quinine sulph.	1.5 grs. per oz. ..	Satisfactory.
70 Mist. Sedative Expect.	Pot. iodide ..	5 grs. per oz. ..	16 per cent deficiency.
	Pot. bicarbonate ..	15 grs. per oz. ..	42.7 per cent deficiency.
71 Mist. Pot. Iodide ..	Pot. iodide ..	10 grs. per oz. ..	Correct.
	Ammon. bicarbonate.	4 grs. per oz. ..	20 per cent deficiency.
72 Mist. Alba ..	Magnesium carbonate.	10 grs. per oz. ..	19 per cent excess.
	Mag. sulphate ..	2 drachms per oz.	Correct.
73 Mist. Quinine Sulph.	Quinine sulphas ..	7½ grs. per oz. ..	29.3 per cent deficiency.
74 Mist. Pot. Bromide ..	Pot. bromide ..	5 grs. per oz. ..	Correct.
	Ammon. bromide ..	Do. ..	Do.
75 Mist. Carminative ..	Soda bicarb ..	10 grs per oz. ..	Do.
76 Mist. Pot. Iodide ..	Pot. iodide ..	Do. ..	Do.
77 Mist. Sed. Expectorant ..	Do. ..	5 grs. per oz. ..	14 per cent deficiency.
	Sod. bicarbonate ..	15 grs. per oz. ..	Correct.
78 Mist. Quinine Sulphas ..	Quinine sulphas ..	7.5 grs. per oz. ..	Do.
79 Mist. Bismuth ..	Bismuth carb. ..	10 grs. per oz. ..	11 per cent deficiency.
	Soda. bicarbonate ..	5 grs. per oz. ..	28 per cent excess.
80 Mist. Bismuth ..	Bismuth carbonate.	10 grs. per oz. ..	30 per cent excess.
	Sod. bicarbonate ..	5 grs. per oz. ..	48 per cent excess.
81 Mixt. Mag. Sulphas ..	Mag. sulphas ..	4 drms. per oz. ..	Correct.
82 Mist. Asthmatica ..	Pot. bromide ..	10 grs. per oz. ..	Do.
	Pot. iodide ..	5 grs. per oz. ..	Do.
	Spiritus ammon aromaticus.	10 mm. per oz. ..	53 per cent deficiency.
83 Mist. Mag. Sulphas ..	Mag. sulphate ..	4 drams per oz. ..	Correct.
84 Mist. Quinine Sulphas ..	Quinine sulphate ..	7.5 grs. per oz. ..	Do.
85 Mist Soda Salicylas ..	Sodi salicylas ..	10 mins. per oz. ..	12 per cent deficiency.
	Soda bicarbonate ..	5 grs. per oz. ..	14 per cent deficiency.
86 Mist. Pot. Bromide ..	Pot. bromide ..	5 grs. per oz. ..	70 per cent excess.
	Ammon. bromide ..	Do. ..	26 per cent excess.
87 Mist. Sedative Expectorant.	Pot. iodide ..	Do. ..	10 per cent deficiency.
	Pot. bicarbonate ..	5 grs. per oz. ..	12.7 per cent deficiency.
88 Mist. Potassium Iodide ..	Pot. iodide ..	10 grs. per oz. ..	Correct.
	Ammon carbonate.	4 grs. per oz. ..	Do.

TABLE XIX—cont.

<i>King George Hospital, Visakhapatnam—cont.</i>			
Serial number and name of drug. (1)	Name of ingredient estimated. (2)	Strength as per B.P. or as declared on the label. (3)	Result of analysis. (4)
89 Mist. Soda Salicylas ..	Sodi salicylas ..	10 grs. per oz. ..	Correct.
	Soda bicarb. ..	5 grs. per oz. ..	Do.
90 Mist. Mag. Sulphas ..	Magnesium sulphate.	4 drams per oz. ..	Do.
91 Mist. Bismuth ..	Sod. bicarbonate ..	5 grs. per oz. ..	Do.
	Bismuth carbonate.	10 grs. per oz. ..	Do.
92 Mist. Quinine sulphas ..	Quinine sulphate ..	7½ grs. per oz. ..	13.3 per cent deficiency.
93 Mist. Sedative Expectorant.	Pot Iodide ..	5 grs. per oz. ..	Correct.
	Pot Bicarbonate ..	15 grs. per oz. ..	Do.
<i>District Medical Officer, Chittoor.</i>			
94 Mixture Quinine Sulph ..	Quinine sulphate ..	....	Found 2.4 grains.
95 Mixture Sodi Salicylas ..	Sodium salicylas ..	....	Found 2.1 grains.
<i>Special Agency Development Officer, Kakinada.</i>			
96 Multi Vitamin Tablets ..	Vitamin A ..	2,500 U.S.P. ..	400 U.S.P. units.
	Vitamin B-1 ..	1.0 mg. ..	0.2 mg.
	Vitamin B-2 ..	1.5 mg. ..	1.2 mg.
	Vitamin C ..	37.5 mg. ..	0.4 mg.
	Nicotinic acid ..	10.0 mg. ..	5.5 mg.
<i>District Medical Officer, Tirunelveli at Palaymkottai.</i>			
97 Potassium Iodide ..	....	....	Wrongly labelled.
Pot. Iodide.			Found 98.2 per cent pot bromide with a trace of iodide.

A few comments on the drugs analysed for hospitals may be of interest.

A sample of hydrogen peroxide received from the Government General Hospital, Madras, contained practically no hydrogen peroxide. A sample of mist. diuretica from the Government Stanley hospital, Madras, was 46 per cent deficient in pot. carbonate and 93 per cent deficient in pot. acetate. A Pharmacist of the Royapetta Hospital, Madras, dispensed 16.2 grains of pot. bromide instead of 5 grains, an instance of gross carelessness. Two expectorant mixtures received from the same hospital showed deficiencies in pot. iodide to the extent of 35 per cent and 20 per cent.

The Raja Sir Ramaswamy Mudaliyar Lying-in-Hospital, Madras, sent two mixtures containing quinine which were found to be incorrectly dispensed, one containing 24.5 per cent excess and the other 39.5 per cent excess of quinine. A sample of mist. oleum morrhuae from this hospital showed a deficiency of the oil to the extent of 75 per cent. Mist. Alkaline diuretica also from the same hospital, was deficient in pot. bicarbonate and pot. acetate to the extent of 95 and 69 per cent, respectively.

A sample of Mist. Bismuth from the Kasturba Gandhi Hospital for Women and Children, Madras, was 53 per cent deficient of the prescribed strength of sodium bicarbonate.

A large number of mixtures received from the King George Hospital, Visakhapatnam, were found to be inaccurately prepared. "Mist. Sedative Expectorant" was 16 per cent deficient in Pot. Iodide and 42.7 per cent deficient in pot. bicarbonate. "Mist. Alba" contained 19 per cent of mag. carbonate in excess. "Mist. quinine sulph" was 29.3 per cent deficient in quinine sulphate. There were two bismuth mixtures which were incorrectly dispensed, one showing a

deficiency of 11 per cent of bismuth carbonate and an excess of 28 per cent of sodium bicarbonate, and the other a 30 per cent excess of bismuth carbonate and a 48 per cent excess of sodium bicarbonate. Mist. pot. bromide was found to contain Pot bromide and ammonium bromide in considerable excess, viz., 70 per cent and 26 per cent, respectively. A sample labelled pot. iodide from District Medical Officer, Palayamkottai, was found to consist of 98.2 per cent pot. bromide with a trace of iodide only. Such wrong labelling may result in disastrous consequences.

The need for accurately dispensing all prescriptions cannot be too strongly stressed. Great care should be exercised in particular, in the preparation of mixtures containing sedatives like pot. bromide.

Particulars of twenty-three drugs analysed for private firms are given in Table XX.

TABLE XX.
Drugs from private firms.

Serial number and name of drug.	Name of ingredients estimated.	Strength as per B.P. or as declared on the label.	Result of analysis.
(1)	(2)	(3)	(4)
1 Ext. belladonnae radix.	....	....	Contained 2.5 per cent alkaloids calculated as hyoscyamine.
2 Sulphaguanidine ..	....	....	Conforms to B.P.
3 Kaolin B.P. ..	....	....	Not of standard quality.
4 Emetine hydrochloride (ampoules).	....	....	Contained 0.47 gr. Emetine hydrochloride in $\frac{1}{4}$ c.c. of sample.
5 Charma roga nivarini .. Alcohol ..	....	....	Alcohol absent.
6 Coliverol .. ..	....	....	Had developed high acidity and demulsified separating into the aqueous and oily layers and reported as unfit for human consumption.
7 Sulphadiazine tablets ..	....	....	Each tablet contained 7.7 grs. on an average of sulphadiazine.
8 Eucalyptus oil .. ..	....	....	Does not conform to I.P.L. 1946.
9 Multi-Vitamin (tablets) ..	Vitamin A ..	2,500 U.S.P. ..	97.2 per cent deficiency.
	Vitamin B-1 ..	3.0 mg. ..	64.7 per cent deficiency.
	Vitamin B-2 ..	1.5 mg. ..	....
	Vitamin C ..	25.0 mg. ..	97.5 per cent deficiency.
	Nicotonic acid ..	25.0 mg. ..	....
10 Calcium lactate ..	....	B.P. ..	Does not conform to B.P.
11 Syrup of tolu B.P. ..	....	....	Conforms to B.P.
12 Syrup of code in phosphate B.P.C.	....	....	Does not conform to B.P.C.
13 Sulfadimidine .. ..	....	....	Conforms to B.P.C.
14 25 c.c. 25 per cent glucose.	....	....	Correct strength.
15 25 c.c. 50 per cent glucose.	....	....	Do.
16 10 c.c. 10 per cent calcium gluconate.	....	....	Do.

TABLE XX—cont.
Drugs from private firms—cont.

Serial number and name of drug.	Name of ingredient estimated.	Strength as per B.P. or as declared on the label.	Result of analysis.
(1)	(2)	(3)	(4)
17 1 c.c. 100 mg. Vitamin C.			21.9 per cent deficient.
18 25 c.c. 3 per cent sodium citrate.			Correct strength.
19 12.5 per cent glucose solution.			Do.
20 Thiamine hydrochloride Vitamin B-2.			Genuine.
21 Ascorbic acid			Do.
22 60 c.c. glucose saline ..			Correct.
23 Chloroform		B.P. ..	Does not conform to B.P. and unfit for anaesthesia.

A sample of Coliverol which had separated into an oily layer and aqueous layer and had developed excessive acidity was reported as unfit for use.

A sample of Indian Eucalyptus oil received from a firm in Nilgiris did not conform to the Indian Pharmacopeial List, 1946. In this connection it may be stated that the Drug Committee has prescribed a minimum Cineole content of 55 per cent for Indian Eucalyptus Oil as against a minimum of 70 per cent Cineole prescribed in the British Pharmacopeia.

XII. MISCELLANEOUS.

The Government Analyst was appointed as a member of the Expert Committee constituted by the Government of India, to fix All-India and Regional Standards for Agmark ghee and standards for Agmark butter, and attended a meeting of the committee on 19th March 1951 at New Delhi.

The Government Analyst and Sri Y. G. Doraisami gave evidence in the Presidency Magistrate's Court, Madras, as Court witnesses in a case in which the accused was charged with importing and selling maida as self-raising flour.

The Government Analyst was appointed as a member of the Hotel Sanitation Committee constituted by Government to suggest ways and means of improving hygiene in hotels.

The Government Analyst gave a Radio talk on "Food Analysis—Research" from the Madras Station of All-India Radio.

Sri S. K. Sahu, who was deputed by the Lakshmi Narayana Institute of Technology, Nagpur, was trained in Food Analysis for a month from 16th December 1950 in the Government Analyst's Laboratory.

Sri M. B. Prabhakar, B.Sc., was, with the previous approval of Government, permitted to study the methods of estimating residual fumigants in foods for about a week in the Government Analyst's Laboratory.

THE KING INSTITUTE, GUINDY, MADRAS,
15th November 1951.

S. NARAYANA AYYAR,
Government Analyst.

APPENDIX

Number of samples received and found adulterated from municipalities during

Serial number and places.	(1)	Annual quota samples.	Grand total.		Percentage adulterated.	Milk.		Ghee.		Butter.	
			Total.	Adulterated.		Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1. Anantapur district.											
1 Anantapur .. M.	72	80	43	54.0	46	35	9	2	1	..	..
2 Hindupur .. M.	72	72	43	59.7	49	41	4	..	..	..	..
3 Guntakal .. M.	48	50	34	68.0	18	17	1	..	..	..	..
4 Tadipatri .. M.	48	44	8	15.9	35	7	1	..	..	..	..
5 Dharmavaram .. Pt.	48	48	23	47.9	16	12	2	1	..	..	..
6 Gooty .. Pt.	48	58	27	45.8	35	27	11	..	1	..	..
7 Kadiri .. Pt.	48	47	34	70.2	36	28	1	..	..	..	..
8 Penukonda .. Pt.	48	53	21	39.6	27	19	13	2	..	..	..
9 Uravakonda .. Pt.	48	49	21	42.9	13	13	1	..	..	..	..
Total ..	501	254	50.7	275	199	43	5	2	..	..	..

* Miscellaneous comprises—Tea 4 (0), Honey 3 (1), Kuruma oil 3 (0).

2. North Arcot district.

10 Vellore .. M.	144	147	51	34.7	103	42	10	5	2	1	..
11 Tiruvannamalai .. M.	72	72	31	43.1	58	29	3	2	..	..	..
12 Tirupattur .. M.	48	48	15	31.3	38	13	1	..	..	..	..
13 Gudiyattam .. M.	48	51	26	51.0	32	18	3	2	..	..	..
14 Vaniyambadi .. M.	48	48	33	68.8	33	30	3	2	..	..	..
15 Walajapet .. M.	48	48	8	16.7	3	1	..	..	..	..	..
16 Ambur .. M.	48	49	38	77.6	39	33	8	2	..	..	..
17 Arni .. Pt.	48	46	21	43.5	34	16	7	4	..	..	..
18 Arcot .. Pt.	48	50	19	38.0	37	17	2	..	2	2	..
19 Arkonam .. Pt.	48	48	30	62.5	28	24	5	3	..	..	..
20 Ranipet .. Pt.	48	48	21	43.8	42	19	1	..	..	..	..
Total ..	655	293	44.7	447	242	38	21	4	3	..	..

* Miscellaneous comprises—Sweets 1 (1), Tea 3 (2), Mineral oil 1 (1).

3. South Arcot district.

21 Cuddalore .. M.	144	145	67	46.2	108	63	7	..	..	..	..
22 Chidambaram .. M.	96	96	27	28.1	46	19	4	1	2	2	..
23 Villupuram .. M.	96	101	46	45.5	52	37	9	4	4	3	..
24 Tindivanam .. M.	48	51	21	41.2	43	18	3	2	..	..	..
25 Bhuvanagiri .. Pt.	48	48	10	20.8	37	10	..	..	..	..	..
26 Kallakuruchi .. Pt.	48	99	37	37.4	92	36	..	..	..	..	..
27 Nellikuppam .. Pt.	48	48	11	22.9	37	11	1	..	..	..	..
28 Panruti .. Pt.	48	47	8	17.0	31	7	1	1	..	..	..
29 Tirukkoyilur .. Pt.	48	49	12	24.5	19	8	3	1	..	..	..
30 Vriddhachalam .. Pt.	48	49	17	34.7	32	14	3	2	..	..	..
Total ..	733	256	34.9	497	223	31	11	6	5	..	..

* Miscellaneous comprises—Sweets 1 (1).

4. Bellary district.

31 Bellary .. M.	144	138	70	50.7	61	41	8	5	13	3	..
32 Adoni .. M.	96	96	60	62.5	61	45	5	2	10	3	..
33 Hospet .. M.	96	98	49	50.0	43	32	5	2	14	5	..
34 Harpanahalli .. Pt.	48	65	32	49.2	24	20	..	..	36	11	..
35 Rayadrug .. Pt.	48	49	19	38.8	31	15	5	3	..	..	..
36 Yammiganur .. Pt.	48	50	30	60.0	38	25	5	3	..	..	..
Total ..	496	260	52.4	258	178	28	15	73	22	..	..

* Miscellaneous comprises—Tea 1 (0), Honey 2 (0), Kuruma oil 10 (1).

PART A.

and panchayat boards working the Madras Prevention of Adulteration Act 1950-51.

Gingelly oil.		Coconut oil.		Groundnut oil.		Coffee.		Turmeric.		Dhalls and flours.		Miscellaneous.*	
Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
..	..	19	4	..	..	1	1	2	..	..	2	..	..
..	..	8	1	..	..	11	7	1	..	..	..	..	..
..	..	9	1	..	..	8	7	1	..	10	9	3	..
..	..	3	..	..	..	2	..	1	..	2	1	..	..
..	..	14	2	2	..	11	8	2	..	..	..	1	..
1	..	2	1	1	..	2	..	..	..	5	..	1	1
..	..	2	1	1	..	1	..	..	..	6	4	2	..
..	..	2	..	3	..	5	..	..	..	1	..	2	..
..	..	3	1	5	..	4	2	5	..	10	4	8	1
1	..	62	10	12	..	45	18	11	..	35	20	15	2

Mineral oil 4 (0), Dalda and vegetable oil 1 (1).

9	..	13	..	1	..	5	..	2	1	..	..	2	2
4	..	6	..	1	..	1	..	1	..	..	..	..	..
2	2	4	..	1	..	1	..	1	..	..	..	2	3
9	3	..	..	2	..	2	..	..	..	..	..	..	..
2	..	3	..	3	..	2	1	2	..	..	..	..	..
23	6	8	1	2	..	1	..	11	1	..	..	..	..
4	2	3	1	..	..	1	..	..	..	..	..	..	..
2	1	1	..	1	..	1	..	..	..	..	..	..	..
7	..	1	..	..	..	1	..	..	..	..	..	3	2
4	1	6	..	1	..	1	..	..	..	..	..	..	..
1	1	2	..	2	..	..	..	..	..	..	..	..	..
67	15	47	2	13	..	14	1	17	2	..	..	8	7

Dalda and Vegetable oil 1 (1), Chilly powder 2 (2).

22	4	5	..	..	..	2	..	1	..	..	..	..	..
33	5	4	..	..	..	7	..	..	..	..	..	..	..
15	1	10	..	5	..	3	..	..	..	..	..	..	..
2	1	3	..	..	..	..	..	..	..	..	..	..	..
5	..	3	..	1	..	1	..	..	..	..	..	..	..
1	..	1	..	3	..	1	..	..	..	..	..	..	..
5	..	2	..	1	..	2	..	..	..	..	..	..	..
8	..	5	..	1	..	1	..	..	..	..	..	..	..
15	2	8	..	2	1	2	..	..	..	..	..	..	..
7	1	2	..	..	..	5	..	..	..	..	..	..	..
113	14	43	..	13	1	24	..	2	..	..	..	4	2

Tea 2 (0), Chicory 1 (1).

1	1	18	4	7	1	3	2	3	..	16	12	8	1
1	1	9	3	1	..	1	1	1	1	3	3	4	1
1	..	16	3	3	1	10	5	3	..	1	1	2	..
..	..	2	..	..	..	3	..	..	..	..	..	..	..
..	..	6	1	..	..	5	..	..	..	2	..	..	..
..	..	5	2	..	..	1	..	..	..	..	..	1	..
3	2	56	13	11	2	23	9	7	1	22	16	15	2

Mineral oil 1 (1), Dalda and Vegetable oil 1 (0).

APPENDIX

8. Cuddapah district.								* Miscellaneous comprises—			
69 Cuddapah ..	M.	96	96	38	39.6	84	36	5	2	..	..
70 Proddatur ..	M.	72	70	19	27.1	38	16	8	..	..	..
71 Badvel ..	Pt.	48	44	12	27.3	9	7	6	1	..	..
72 Jammalamadugu.	Pt.	48	47	11	23.4	..	..	17	2	..	..
73 Pullivendla ..	Pt.	48	41	5	12.2	2	1	3	..	..	..
74 Rajampet ..	Pt.	48	52	23	44.2	32	19	2	..	..	..
75 Rayachoti ..	Pt.	48	43	27	62.8	14	13	8	4	..	..
Total ..		392	385	135	34.4	179	92	49	9	..	..

Sweets 3 (2), Tea 1 (0), Honey 2 (0), Kusuma oil 1 (0).

DIX A—cont.

and panchayat boards working the Madras Prevention of Adulteration Act 1950-51—cont.

Serial number and places.

Serial number and places.	Annual quota of samples.	Grand total.			Milk.		Ghee.		Butter.	
		Total.	Adulterated.	Percentage adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
5. Coimbatore district.										
37 Coimbatore .. M.	288	289	197	68.2	215	177	33	4	4	3
38 Erode .. M.	96	98	50	51.0	58	35	22	11	..	..
39 Pollachi .. M.	120	142	95	66.9	98	87	..	..	..	..
40 Tiruppur .. M.	96	125	83	66.4	88	69	..	..	..	..
41 Udumalpet .. M.	96	96	53	55.2	71	49	4	..	..	..
42 Dharapuram .. M.	48	51	25	49.0	34	22	1	..	..	..
43 Mettupalayam. M.	48	48	43	89.6	46	41	..	..	..	..
44 Gobichettipala- yam. M.	48	48	37	77.1	41	36	1	..	..	..
45 Avanaashi .. Pt.	48	62	33	53.2	55	30	3	..	..	..
46 Bhavani .. Pt.	48	39	15	38.4	28	15	..	..	..	..
47 Kurichi.. .. Pt.	48	55	33	60.0	35	28	..	..	..	..
48 Satyamangalam. Pt.	48	50	34	68.0	39	26	..	..	..	..
Total ..	1,103	698	63.3	808	615	64	15	4	3	

* Miscellaneous comprises—Sweets 14 (12). Tea 25 (13).

6. Chingleput district.

6. <i>Chingoleputam.</i>											
49	Kancheepuram.	M.	144	192	106	55.2	101	70	11	2	1
50	Chingoleput	M.	48	47	28	59.6	27	21	2	2	..
51	Tiravallur	M.	48	50	34	68.0	36	27	3	2	..
52	Alander	Pt.	48	44	23	52.3	31	21	..	..	..
53	Madurantakam.	Pt.	48	49	21	42.9	31	16	4	1	..
54	Poonamallee	Pt.	48	48	16	33.3	31	10	4	1	..
55	Tiruvottiyur	Pt.	48	48	27	56.3	11	6	4	..	1
56	†Sriperumbudur.	Pt.	..	35	26	74.3	24	19	5	1	1
Total			..	513	281	54.8	292	190	33	9	3

* Miscellaneous comprises—Tea 1 (0), Honey 1 (0),
for festival only.

7. *Chittoor district.*

57	Chittoor	..	M.	48	48	34	70.8	37	32	4	..	..	..
58	Tirupathi	..	M.	48	48	16	33.3	32	12	6	2	2	..
59	Kalahasti	..	Pt.	48	48	20	41.7	27	18	8	1	..	..
60	Kuppam	..	Pt.	48	54	19	35.2	41	16	3	2	..	..
61	Madanapalle	..	Pt.	48	45	28	62.2	39	25	2	2	1	..
62	Madanapalle Sanatorium.		Pt.	48	49	33	67.8	46	32	3	1	..	..
63	Palmaner	..	Pt.	48	47	15	31.9	37	12	3	1	..	..
64	Punganur	..	Pt.	48	47	18	38.3	27	14	1	..	..	..
65	Puttur	..	Pt.	48	54	15	27.8	43	14	..	..	..	..
66	Tirumalai Hills	..	Pt.	..	22	5	22.7	4	2	8	1	2	..
67	Tiruttani	..	Pt.	48	43	21	48.8	33	21	..	..	..	..
68	Vayalpad	..	Pt.	48	44	2	6.8	18	1	2	1	..	..
Total				..	549	226	41.2	384	199	40	11	8	..

- **Miscellaneous comprises:**

8. *Cuddapah district.*

8. Cuddalore District.		9. Karaikal District.		10. Pondicherry District.		11. Tanjore District.		12. Tiruchirappalli District.		13. Tirunelveli District.		14. Tutukudi District.	
Area in Acres.	Population.	Area in Acres.	Population.	Area in Acres.	Population.	Area in Acres.	Population.	Area in Acres.	Population.	Area in Acres.	Population.	Area in Acres.	Population.
69	Ouddapah .. M.	96	96	38	39.6	84	36	5	2	..	..	..	..
70	Proddatur .. M.	72	70	19	27.1	38	16	8	..	..	..	..	..
71	Badvel .. Pt.	48	44	12	27.3	9	7	6	1	..	..	..	..
72	Jammalamadugu. Pt.	48	47	11	23.4	..	..	17	2	..	..	..	..
73	Pullivendla .. Pt.	48	41	5	12.2	2	1	3	..	..	..	..	..
74	Rajampet .. Pt.	48	52	23	44.2	32	19	2	..	..	..	..	..
75	Rayachoti .. Pt.	48	43	27	62.8	14	13	8	4	..	..	..	..
Total ..		393	135	34.4	179	92	49	9	..	..	..	..	..

- Miscellaneous comprises—

1950-51—Cont.													
Gingelly oil.		Coconut oil.		Groundnut oil.		Coffee.		Turmeric.		Dhalls and flours.		Miscellaneous.*	
Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
26	8	1	..	2	..	2	..	..	..	..	..	6	5
6	2	4	..	..	..	6	1	1	..	..	..	1	1
6	..	16	1	1	..	11	2	..	..	..	..	10	5
10	2	2	1	3	..	13	4	1	..	7	7	1	..
2	..	3	..	4	..	7	..	..	..	..	..	5	4
4	..	5	1	1	..	3	1	1	..	..	..	..	..
..	..	2	2	..	..	..	..	..	..	..	..	2	1
..	..	..	..	1	..	4	1	..	..	..	..	1	..
1	1	..	..	..	..	2	1	..	..	..	..	1	1
3	..	..	..	1	..	3	..	..	..	..	..	4	..
8	2	4	..	2	..	5	2	..	..	..	..	1	1
2	..	..	..	..	..	..	..	..	..	..	..	9	8
68	15	37	5	15	..	56	12	3	..	7	7	41	26

Curry powder 1 (1), White pepper 1 (0).

57	31	4	..	16	2	2	..	..	..	..	..	..
9	5	3	..	5	..	1	..	..	..	..	..	..
9	5	..	..	..	..	2	..	..	..	..	..	..
4	2	2	..	7	..	..	..	..	..	..	..	..
4	2	5	2	2	..	2	..	..	..	..	1	..
9	5	..	..	4	..	..	..	..	..	..	1	..
16	10	14	11	..	..	1	..	..	..	..	..	..
5	5	..	..	..	..	..	..	..	..	..	..	..
113	65	28	13	34	2	8	..	..	..	..	2	..

6	2	2	2	2	1	2	1	4	1	1
2	2	3	2	2	2	2	1	4	1	1
1	2	3	1	1	4	1	1	1	1	1
2	2	2	2	2	1	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2
1	2	2	2	2	2	2	2	2	2	2
1	2	2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2	2
3	2	2	2	2	2	2	2	2	2	2
26	2	31	2	12	1	25	1	4	19	6

Sweets 2 (2), Honey 1 (0).

1	..	5	..	..	..	1	..	..	..	..	..	..
1	..	12	2	1	..	6	1	3	..	..	..	1
6	..	5	..	9	1	3	2	2	..	1	..	3
1	..	9	2	..	..	4	1	8	1	6	4	2
1	..	4	1	10	..	6	2	3	..	12	1	..
2	..	7	1	1	..	2	1	..	..	6	2	..
..	..	7	..	..	..	2	1	3	2	8	7	1
12	..	49	6	21	1	23	8	20	3	33	14	7

Sweets 3 (2), Tea 1 (0), Honey 2 (0), Kusuma oil 1 (0).

APPENDIX

Number of samples received and found adulterated from municipalities during

Serial number and places.	Annual quota of samples.	Grand total.			Milk.		Ghee.		Butter.	
		Total.	Adulterated.	Percentage adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
9. East Godavari district.										
76 Kakinada .. M.	288	287	186	64.8	201	167	37	12	1	..
77 Rajahmundry. M.	216	235	182	77.9	207	177	9	2	1	..
78 Peddapuram .. M.	72	73	32	43.8	40	28	8	2	1	1
79 Amalapuram .. M.	96	97	36	37.1	61	32	3	1	..	..
80 Mandapeta .. Pt.	48	38	29	76.3	22	22	1	..	6	4
81 Pithapuram .. Pt.	48	48	20	41.7	32	16	1	..	..	..
82 Samalkot .. Pt.	48	35	12	34.3	30	12	..	..	..	..
83 Ramachandrapuram .. Pt.	48	48	21	43.8	26	21	4	..	..	..
84 Razolo .. Pt.	48	48	28	58.3	31	25	1	..	..	..
85 Tunj .. Pt.	48	49	24	49.0	31	21	1	..	..	..
Total ..		958	570	59.5	681	521	65	18	9	5
10. West Godavari district.										
86 Eluru .. M.	144	144	91	63.2	115	84	11	4	2	..
87 Bhimavaram .. M.	48	56	40	71.4	32	29	2	..	1	..
88 Palacole .. M.	48	49	36	73.5	31	25	4	1	..	..
89 Akiividu .. Pt.	48	48	23	47.9	22	16	7	3	..	..
90 Kovvur .. Pt.	48	48	30	62.5	28	24	5	2	..	..
91 Narsapur .. Pt.	48	48	32	66.6	31	28	8	3	..	..
92 Nidadavole .. Pt.	48	48	33	68.8	35	28	1	..	4	3
93 Polavaram .. Pt.	48	48	22	45.8	10	10	4	1	..	..
94 Tadepalligudem .. Pt.	48	48	22	45.8	16	14	5	1	2	1
95 Tanuku .. Pt.	48	52	30	57.7	28	20	5	1	6	4
Total ..		589	359	60.9	348	278	52	16	15	8
11. Guntur district.										
96 Guntur .. M.	288	295	125	42.1	136	87	36	11	11	2
97 Ongole .. M.	96	98	47	48.0	27	20	26	6	2	..
98 Chirala .. M.	96	95	43	45.3	23	19	1	1	38	15
99 Tenali .. M.	96	96	63	65.6	46	42	3	1	10	3
100 Narasaraopet .. M.	48	48	15	31.2	11	10	3	1	5	3
101 Bapatla .. Pt.	48	46	22	47.8	23	19	8	..	..	..
102 Mangalagiri .. Pt.	48	52	20	38.5	23	10	9	3	1	1
103 Ponnur .. Pt.	24	24	12	50.0	9	6	3	1	..	..
104 Nidubrolu .. Pt.	24	24	7	29.1	6	4	9	2	2	..
105 Repalle .. Pt.	48	48	21	43.8	29	19	1	..	1	..
106 Sattenapalle .. Pt.	48	48	16	33.3	15	14	1	..	5	1
107 Vetapalem .. Pt.	48	48	8	16.6	6	4	2	..	2	1
Total ..		922	399	43.3	351	254	102	26	77	26
12. South Kanara district.										
108 Mangalore .. M.	216	225	155	68.8	143	115	4	..	1	1
109 Udipi .. M.	48	49	33	67.3	42	32	2	..	..	..
110 Kasaragod .. Pt.	48	48	28	58.3	40	27	1	..	..	..
Total ..		322	216	67.1	225	174	7	..	1	1

* Miscellaneous comprises—Curry powder 2 (0), Chloory 5 (5).

* Miscellaneous comprises—Sweet 1 (1), Tea 4 (1).

DIX A—cont.

and panchayat boards working the Madras Prevention of Adulteration Act 1950-51—cont.

Gingelly oil.		Coconut oil.		Groundnut oil.		Coffee.		Turmeric.		Dhalls and flours.		Miscellaneous.*	
Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
30	2	6	1	2	..	3	..	..	..	6	4	1	..
5	2	4	..	1	..	8	..	..	..	..	..	..	..
5	..	8	1	1	..	3	..	..	..	6	..	..	..
9	..	12	3	1	..	9	..	..	..	..	..	..	..
2	..	5	3	..	..	1	..	..	..	..	..	..	..
2	1	5	1	2	..	2	1	..	..	4	1	..	..
4	..	..	..	..	..	..	..	..	..	1	..	..	..
7	..	7	..	..	..	3	..	..	..	..	..	1	..
3	1	4	..	2	..	1	1	..	..	6	1	..	..
2	..	6	3	3	..	2	..	..	..	3	..	1	..
69	6	57	12	12	..	32	..	..	..	26	6	7	..
tea 3 (0), honey 3 (0), mineral oil 1 (0).													
2	1	3	..	6	1	1	..	..	..	4	1	..	..
..	..	10	5	..	..	1	..	1	1	5	3	4	..
..	..	9	7	1	1	..	..	..	..	3	2	1	..
1	..	11	2	..	..	1	..	1	..	5	2	..	..
8	4	2	..	..	..	1	..	1	..	3	..	..	..
4	1	4	..	..	..	3	1	..	..	3	1	..	..
1	..	1	..	..	..	..	..	..	..	..	..	..	..
8	1	3	..	4	1	3	1	2	..	12	7	2	..
1	..	7	1	..	..	3	2	1	1	13	3	..	..
..	..	6	2	..	..	2	..	1	1	2	1	2	..
25	7	56	17	11	3	15	4	8	3	50	20	9	..
sweets 1 (0), tea 1 (0), honey 4 (2), mineral oil 1 (1).													
37	7	25	..	15	2	6	..	16	13	1	1	12	..
5	1	7	1	2	..	2	1	6	4	20	13	..	..
4	1	8	..	5	..	3	..	3	2	9	5	1	..
5	3	8	..	..	..	7	3	4	4	10	4	1	..
7	..	15	..	..	..	5	..	2	1	..	..	3	..
..	..	1	..	1	..	..	..	4	2	7	1	2	..
2	..	2	..	1	..	3	2	1	..	1	..	9	..
6	3	..	..	2	..	3	1	1	1	..	..	..	..
..	..	2	..	1	..	2	..	1	..	..	..	1	..
7	..	..	..	..	..	7	..	2	2	1	..	..	..
6	1	11	..	10	..	..	..	..	..	..	..	..	..
3	..	11	..	7	..	2	..	6	..	8	3	1	..
82	16	90	1	44	2	40	7	46	29	57	27	30	1
karaboondi 1 (1), sweets 16 (5), honey 5 (0), Dalda and vegetable oil 1 (0).													
3	1	10	..	..	..	19	1	1	..	40	36	4	..
..	..	..	..	..	..	4	..	..	..	..	..	..	..
1	..	1	..	..	..	2	1	..	..	..	..	..	..
4	1	14	..	..	..	25	2	1	..	40	36	5	..

APPEN

Number of samples received and found adulterated from municipalities during

Places.	(1)	Annual quota of sample.	Grand total.			Milk.		Ghee.		Butter.	
			Total.	Adulterated.	Percentage adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		
13. Krishna district.											
111 Vijayavada .. M.	360	358	203	56.8	260	176	32	12	15	4	
112 Masulipatnam .. M.	144	145	62	42.9	67	48	34	7	5	1	
113 Gudivada .. M.	96	96	23	24.0	48	13	4	3	10	3	
114 Avanigadda .. Pt.	..	32	4	12.5	3	3	2	..	..	..	
115 Jaggayyapet .. Pt.	48	46	14	30.4	21	12	5	..	..	..	
116 Nuzvid .. Pt.	48	44	29	65.8	34	27	3	1	..	..	
117 Tiruvur .. Pt.	48	44	10	22.7	8	5	3	..	..	..	
118 Gudur .. Pt.	No samples taken.										
Total ..	765	345	45.1	441	234	83	23	30	8		

* Miscellaneous comprises.—Sweets 3 (2).

14. Kurnool district.											
119 Kurnool .. M.	96	102	62	60.8	67	50	17	7	2	1	
120 Nandyal .. M.	72	73	32	43.9	24	21	5	..	..	..	
121 Dhone .. Pt.	48	48	21	43.7	42	18	6	3	..	..	
122 Giddalore .. Pt.	48	47	15	31.9	12	8	2	1	..	..	
123 Markapur .. Pt.	48	48	12	25.0	17	6	4	..	..	..	
Total ..	318	142	44.6	162	103	34	11	2	1		

* Miscellaneous comprises.—Tea 1 (0).

15. Madurai district.											
124 Madurai .. M.	1,200	1,204	337	28.0	893	290	21	10	30	10	
125 Dindigul .. M.	96	99	56	56.6	70	55	2	..	..	..	
126 Palni .. M.	96	97	73	75.2	88	71	2	1	..	..	
127 Bodinayakanur .. M.	72	72	31	43.0	61	29	..	..	..	..	
128 Kodaikanal .. M.	48	60	15	25.0	56	14	1	..	..	..	
129 Periyakulam .. M.	48	52	33	63.4	31	22	4	3	..	..	
130 Allinagaram .. Pt.	48	48	30	62.4	39	27	..	..	..	..	
131 Ayakudy .. Pt.	48	48	9	18.7	30	9	..	..	..	..	
132 Batlagundu .. Pt.	48	50	12	24.0	20	5	3	..	..	..	
133 Chinnamanur .. Pt.	48	49	21	42.8	34	20	3	1	..	..	
134 Oumbum .. Pt.	48	56	16	28.5	36	12	..	..	..	..	
135 Melur .. Pt.	48	50	21	42.0	46	21	..	..	..	..	
136 Nilakkottai .. Pt.	48	48	10	20.8	17	7	..	..	..	..	
137 Sholavandan .. Pt.	48	46	11	23.9	30	10	..	..	..	..	
138 Tirumangalam .. Pt.	48	48	16	33.3	36	15	..	..	1	..	
139 Usilampatti .. Pt.	48	48	24	50.0	28	24	2	..	..	..	
Total ..	2,075	715	34.5	1,505	631	38	15	31	10		

* Miscellaneous comprises.—Sweets 13 (9), tea 5 (0).

16. Malabar district.											
140 Kozhikode .. M.	288	319	169	53.1	163	97	34	14	12	6	
141 Palghat .. M.	144	173	97	50.2	158	87	1	..	3	2	
142 Cannanore .. M.	96	103	48	46.6	36	24	15	2	2	1	
143 Cochin .. M.	48	48	10	20.8	16	6	2	2	2	2	
144 Tellicherry .. M.	72	72	46	63.8	38	27	10	1	3	3	
Total ..	715	370	51.8	411	241	62	19	22	14		

* Miscellaneous comprises.—Sweets 1 (1), tea 55 (18).

DIX A—cont.

and panchayat boards working the Madras Prevention of Adulteration Act 1950-51—cont.

Gingelly oil.		Coconut oil.		Groundnut oil.		Coffee.		Turmeric.		Dhalls and flours.		Miscellaneous.*	
Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
12	2	11	2	10	..	11	3	6	3	1	1	..	..
17	5	13	..	4	1	5	..	..	..	2	..	..	1
6	..	7	..	7	1	7	1	2	..	4	..	..	..
2	..	7	..	3	..	9	1	2	..	..	..	..	..
2	..	10	1	6	1	1	..	..	..	1	..	2	1
..	..	2	..	..	..	..	..	1	..	2	..	..	..
6	..	13	2	1	..	2	..	6	..	5	3	..	..
No samples taken.													
45	7	63	5	31	3	35	6	16	3	15	4	6	2

honey 2 (0), pakoda 1 (0).

..	..	6	2	2	..	3	..	..	..	3	2	2	..
1	..	5	..	..	..	26	10	2	..	6	1	4	..
..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	1	9	1	3	..	10	3	1	..	4	1	1	..
3	..	11	..	4	..	5	3	1	..	3	3	..	..
9	1	31	3	9	..	44	16	4	..	16	7	7	..

knsama Oil 6 (0).

80	7	77	3	9	2	72	10	9	2	10	3	13	..
23	..	2	..	..	..	..	..	..	..	..	..	2	1
4	..	..	..	1	..	..	..	2	1	..	..	..	..
5	..	1	..	1	..	2	2	..	..	..	..	2	..
..	..	..	..	2	1	1	..	..	..	..	..	..	..
5	1	1	1	3	..	1	..	..	..	..	..	7	6
5	2	1	..	1	..	2	1	..	..	..	..	..	..
7	..	9	..	2	..	..	..	..	..	..	..	..	..
6	..	6	..	1	..	4	1	5	4	3	..	2	2
3	..	4	..	..	..	2	..	3	..	..	..	..	..
5	..	7	1	..	..	7	2	..	..	..	..	1	1
1	..	2	..	..	..	..	..	..	..	..	..	..	..
15	2	3	..	9	..	4	1	..	..	..	..	..	..
5	1	5	..	6	..	..	..	..	..	..	..	..	..
6	..	1	..	..	..	4	1	..	..	..	..	..	..
7	..	5	..	..	..	4	..	1	..	..	..	1	..
177	13	124	5	35	3	104	18	20	7	13	3	28	10

honey 5 (0), Dalda and vegetable oil 2 (0), chicory 3 (1).

10	..	12	1	2	..	2	1	2	1	36	32	46	17
2	..	..	..	..	..	..	..	..	..	8	7	1	1
9	1	6	..	..	..	7	4	..	..	22	15	6	1
7	..	15	..	1	..	1	..	..	..	..	..	4	..
2	..	2	..	..	..	3	3	..	..	11	11	3	1
30	1	35	1	3	..	13	8	2	1	77	65	60	20

honey 3 (0), Dalda and vegetable oil 1 (1).

APPENDIX

Number of samples received and found adulterated from municipalities during

Places.	Annual quota of samples.	Grand total.			Milk.		Ghee.		Butter.	
		Total.	Adulterated.	Percentage adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
21. Tanjore district.										
183 Tanjore .. M.	216	216	96	44.4	120	65	17	9	24	13
184 Kumbakonam .. M.	144	164	75	45.7	128	65	2	..	3	3
185 Nagapattinam .. M.	144	156	26	16.6	86	21	2	..	4	4
186 Mayuram .. M.	96	96	50	52.0	67	40	2	..	5	3
187 Mannargudi .. M.	48	48	19	39.5	40	19	..	..	..	..
188 Tiruvarur .. M.	48	48	24	49.9	37	24	..	..	..	..
189 Ayyampet .. Pt.	48	47	19	40.4	32	17	1	..	1	..
190 Namilam .. Pt.	48	48	23	47.8	39	23	..	..	..	..
191 Papanasam .. Pt.	48	49	19	38.8	42	17	..	..	..	..
192 Pattukkottai .. Pt.	48	48	11	22.9	19	10	1	..	..	..
193 Sirkali .. Pt.	48	47	21	44.6	30	20	..	..	4	1
194 Tiruvaiyaru .. Pt.	48	47	27	57.3	36	27	2	..	..	..
195 Tiruturaipundi. Pt.	48	52	27	51.9	44	25	..	..	..	..
196 Tiruvadamardur Pt.	48	52	7	13.4	24	3	..	..	1	..
Total ..	1,118	444	39.7		742	376	27	9	42	24

22. Tiruchirappalli district.

* Miscellaneous comprises—Sweet 1 (1), tea 3 (0).

197 Tiruchirappalli. M.	336	334	154	45.1	266	138	18	9	7	..
198 Karur .. M.	96	98	60	61.2	71	52	1	..	..	..
199 Pudukkottai .. M.	96	97	41	42.3	52	24	1	1	..	..
200 Srirangam .. M.	48	48	16	33.3	27	10	4	2	3	1
201 Gunaseelam † .. Pt.	..	6	5	83.3	1	..	1	1	..	..
202 Ariyalur .. Pt.	48	50	28	56.0	39	24	..	..	..	..
203 Kulittalai .. Pt.	48	48	22	45.8	41	20	..	..	..	..
204 Lalgudi .. Pt.	48	43	23	53.4	35	20	..	..	..	..
205 Jayankondam .. Pt.	48	48	21	43.7	43	21	..	..	..	..
206 Musiri .. Pt.	48	49	29	59.2	39	27	..	..	..	..
207 Manapparai .. Pt.	48	48	30	62.6	39	27	2	1	..	..
208 Turaiyur .. Pt.	48	49	19	38.8	22	13	..	..	..	..
Total ..	918	448	48.8		674	380	27	14	10	1

23. Tirunelveli district.

* Miscellaneous comprises—Sweets 14 (10), tea 4 (0), honey 5 (3).

209 Tirunelveli .. M.	216	286	155	54.3	193	114	50	13	6	4
210 Tuticorin .. M.	144	343	174	50.7	220	108	15	8	5	1
211 Palayamkottai. M.	96	96	40	41.7	77	35	4	2	1	1
212 Melapalayam .. M.	48	48	25	52.1	21	15	..	..	..	..
213 Ambasamudram Pt.	48	48	25	52.1	38	22	2	1	..	..
214 Courtallam .. Pt.	48	51	27	52.8	44	24	..	..	..	..
215 Ettayapuram .. Pt.	48	42	11	26.2	21	10	..	..	..	..
216 Kalladaikurichi. Pt.	48	49	20	40.7	35	16	4	4	..	..
217 Kadayannallur .. Pt.	48	53	37	69.8	50	36	..	..	..	..
218 Koilpatti .. Pt.	48	48	28	58.3	36	27	..	..	..	..
219 Puliyaugudi .. Pt.	48	48	18	37.5	42	15	..	..	..	..
220 Sankarankoil .. Pt.	48	51	37	72.5	30	26	5	2	..	..
221 Srivaikuntam .. Pt.	48	48	35	72.9	40	30	..	..	..	..
222 Tenkasi .. Pt.	48	50	26	52.0	22	15	1	..	..	..
223 Tiruchendur .. Pt.	48	54	14	25.9	40	11	6	3	..	..
224 Vikramasingapuram. Pt.	48	61	34	55.8	44	28	1	1	..	..
225 Viravanallur .. Pt.	48	48	20	41.7	27	13	..	..	..	..
Total ..	1,424	720	51.0		980	545	88	34	12	6

* Miscellaneous comprises—Sweet 25 (16), tea 1 8 (7)

DIX A—cont.

and panchayat boards working the Madras Prevention of Adulteration Act 1950-51—cont.

Gingelly oil.		Coconut oil.		Groundnut oil.		Coffee.		Turmeric.		Dhalls and flours.		Miscellaneous.	
Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
36	9	10	..	..	..	9	..	..	..	..	..	..	..
18	4	8	2	2	..	4	..	..	..	..	..	1	1
34	1	19	..	3	..	4	..	1	..	..	..	3	..
19	6	2	..	..	..	..	..	..	..	1	1	..	..
6	..	2	..	..	..	..	..	..	..	..	..	..	..
6	..	3	..	1	..	1	..	..	..	..	..	..	..
7	2	3	..	..	..	2	..	..	..	..	..	1	..
5	..	4	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	2	1	2	1	..	..	..	..
20	..	6	1	..	..	2	..	..	..	..	..	..	..
7	..	4	..	1	..	1	..	..	..	..	..	..	..
4	..	2	..	3	..	..	..	..	..	..	..	1	..
4	1	2	..	..	..	1	..	..	..	1	..	..	1
26	4	..	..	..	..	..	..	..	..	..	..	..	..
195	27	65	3	10	..	26	1	3	1	2	1	6	2

honey 1 (1), dalia and vegetable oil 1 (0).

23	4	6	..	2	..	8	2	2	..	..	..	2	1
6	..	6	..	..	..	9	7	2	..	..	..	3	1
23	5	4	1	3	1	11	5	..	..	..	..	3	..
4	..	..	..	4	..	..	..	3	2	..	..	3	1
..	..	..	..	..	..	1	1	..	..	..	..	3	3
4	1	..	..	..	..	2	..	..	..	..	..	5	3
3	..	..	..	..	..	2	..	..	..	..	..	2	2
3	1	1	..	..	..	1	..	..	..	..	..	3	2
2	..	1	..	..	..	2	..	..	..	..	..	..	..
4	..	3	1	..	..	3	1	..	..	..	..	..	..
4	1	2	1	..	..	1	..	..	..	..	..	1	..
13	..	11	3	..	..	2	2	..	..	..	..	1	1
89	12	34	6	9	1	42	18	7	2	..	..	25	14

dalia and vegetable oil 2 (1). † For festival only.

2	..	2	..	..	..	8	6	1	..	13	12	11	6
21	7	11	1	2	1	11	5	..	..	56	43	2	..
10	..	1	..	..	..	2	1	..	..	..	..	1	1
10	2	..	..	..	..	5	2	..	..	2	1	10	5
2	..	..	..	..	..	4	2	..	..	2	..	..	..
3	..	1	..	..	..	..	..	..	..	3	3	..	..
6	..	4	..	..	..	10	1	..	..	..	..	1	..
5	..	2	..	..	..	1	..	..	..	1	..	1	..
2	..	..	..	..	..	..	..	..	..	..	..	1	1
4	..	3	1	..	..	2	..	..	..	3	..	..	..
..	..	2	..	2	..	3	..	..	..	4	3	..	..
1	..	1	..	..	..	..	..	..	..	10	9	..	..
3	..	2	..	..	..	5	2	1	..	14	9	2	..
5	..	5	..	1	1	..	..	..	..	..	..	3	..
6	..	..	..	..	..	..	..	..	..	4	4	..	..
9	..	1	..	..	..	1	..	..	..	2	1	8	6
89	9	35	2	5	2	52	19	2	..	114	85	47	24

honey 3 (0) and choleury 1 (1).

APPENDIX

Number of samples received and found adulterated from municipalities during

Places.	Annual quota of samples.	Grand total.			Milk.		Ghee.		Butter.	
		Total.	Adulterated.	Percentage adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
24. Visakhapatnam district.										
226 Visakhapatnam. M.	283	288	210	72.8	265	204	7	2	5	1
227 Anakapalle .. M.	144	144	38	26.4	45	30	5	2	1	1
228 Vizianagaram .. M.	96	95	61	64.2	84	56	4	2	..	..
229 Bheemunipatnam M.	48	48	31	64.6	41	28	1	..	..	..
230 Srikakulam .. M.	48	49	26	53.1	39	25	1	1	..	..
231 Bobbili .. Pt.	48	48	22	45.9	32	20	2	..	..	..
232 Onodavaram .. Pt.	48	40	11	27.5	16	5	4	3	..	..
233 Narasapatnam. Pt.	48	48	15	32.6	25	12	3	..	..	..
234 Palakonda .. Pt.	48	47	23	48.9	20	15	3	..	..	..
235 Parvathipuram. Pt.	48	44	26	59.1	25	20	2	1	..	..
236 Salur .. Pt.	48	34	10	29.4	24	9	..	..	..	..
237 Sompeta .. Pt.	..	20	9	45.0	17	7	2	1	1	1
238 Yellamanchili. Pt.	48	82	48	58.5	67	43	3	..	..	..
Total ..		985	530	53.8	700	474	37	12	7	3

* Miscellaneous comprises.—Sweet 1 (1),

M. = Municipality.

Pt. = Panchayat Board.

DIX A—cont.

and panchayat boards working the Madras Prevention of Adulteration Act 1950-51—cont.

Gingelly oil.		Coconut oil.		Groundnut oil.		Coffee.		Turmeric.		Dhals and flours.		Miscellaneous.*	
Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.	Total.	Adulterated.
(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
3	1	2	..	1	1	4	1	..	..	..	..	1	..
22	..	19	1	33	3	10	..	5	1	..	..	4	..
1	1	2	..	2	1	..	..	..	..	..	..	2	..
..	..	6	3	3	..	..	..	1	..	..	..	..	..
4	..	1	..	3	2	7	..	..	..	..	..	2	..
11	..	4	..	3	1	4	..	..	..	5	3	1	..
4	..	4	..	3	..	4	3	..	..	5	3	2	..
2	..	3	..	1	..	4	..	..	..	4	3	1	..
3	..	4	1	6	..	1	..	..	..	..	..	1	..
3	2	2	..	..	..	..	..	..	..	..	..	..	..
9	1	..	..	..	..	1	..	..	..	4	3	..	..
..	..	..	2	1	..	..	..	..	..	..	..	..	..
3	1	3	2	8	8	31	4	6	1	20	13	12	..
70	6	46	7	58	8	31	4	6	1	20	13	12	..

tea 5 (0), honey 4 (1), mustard oil 2 (0).

APPENDIX B.

Statement showing the total amount of fines levied, number of convictions, average fine, etc., in 1950-51.

Name of municipality.	Number of pending cases.	Number of convictions.	Fines in analysis cases.	Fines in non-analysis cases.	Total fines.	Maximum fine.	Minimum fine.	Average fine.	Average fine in 1949-50.
(1)	(2)	(3)	(4) RS.	(5) RS.	(6) RS.	(7) RS.	(8) RS.	(9) RS.	(10) RS.
MUNICIPALITIES.									
CLASS A.									
1 Madurai ..	46	289	18,895	245	19,140	200	10	65	81
2 Vijayavada ..	35	164	6,980	10	6,990	100	10	42	61
3 Tiruchirappalli ..	2	125	5,405	240	5,645	100	20	43	46
4 Kozhikode ..	1	138	4,615	336	4,951	200	2	33	40
5 Coimbatore ..	4	191	12,979	85	13,064	200	20	78	78
6 Kakinada ..	4	139	9,045	60	9,105	150	10	65	73
7 Guntur ..	20	88	5,060	1,280	6,340	200	10	57	34
8 Salem ..	40	167	5,383	136	5,519	100	3	32	78
9 Visakhapatnam ..	12	190	9,970	125	10,095	100	15	47	39
10 Ootacamund ..	1	115	4,618	98	4,714	100	5	40	53
11 Rajahmundry ..	8	174	12,167	147	12,314	150	15	70	42
12 Mangalore ..	21	132	8,880	30	8,910	200	20	67	69
13 Tanjore ..	2	94	7,295	381	7,676	200	25	89	67
14 Tirunelveli ..	28	125	4,444	300	4,744	100	10	36	44
15 Anakapalle ..	3	34	1,500	186	1,686	100	15	44	76
16 Bellary ..	24	42	1,504	..	1,504	105	19	34	56
17 Kancheepuram ..	106	..	3,759	105	3,864	100	5	35	49
18 Coonoor ..	..	57	1,709	25	1,734	65	1	30	52
19 Cuddalore ..	..	67	1,765	61	1,826	80	10	26	28
20 Eluru ..	1	87	4,583	54	4,637	100	10	53	40
21 Kumbakonam ..	..	74	5,520	..	5,520	175	15	75	79
22 Masulipatnam ..	2	60	1,660	32	1,692	100	5	27	26
23 Nagapattinam ..	..	26	1,905	..	1,905	100	25	73	52
24 Nellore ..	1	60	1,701	42	1,743	100	8	28	36
25 Palghat ..	..	95	4,256	91	4,347	100	15	45	53
26 Tuticorin ..	11	159	5,176	45	5,221	100	15	32	43
27 Vellore ..	13	37	871	120	991	50	2	31	39
28 Pollachi ..	..	91	4,637	145	4,782	125	10	51	45
CLASS B.									
1 Adoni ..	7	52	1,730	266	1,996	65	20	33	31
2 Amalapuram ..	..	36	1,050	120	1,170	80	10	29	44
3 Cannanore ..	..	39	1,355	85	1,440	75	5	36	44
4 Chidambaram ..	2	25	1,372	30	1,402	100	20	55	35
5 Chirala ..	8	35	815	150	965	75	10	23	27
6 Cuddapah ..	4	33	850	..	850	100	1	25	71
7 Dindigul ..	2	53	1,186	30	1,216	50	10	22	20
8 Erode ..	..	50	1,955	..	1,955	100	5	40	77
9 Gudivada ..	..	23	1,160	..	1,160	100	10	50	44
10 Hospet ..	3	45	1,990	139	2,132	90	10	44	72
11 Karaikudi ..	1	32	1,165	..	1,165	125	10	36	44
12 Karur ..	..	59	2,800	150	2,950	125	15	47	57
13 Kurnool ..	3	57	1,747	..	1,747	88	6	30	29
14 Mayuram ..	..	51	3,925	140	4,065	125	50	78	61
15 Ongole ..	2	71	2,380	95	2,475	150	20	55	41
16 Palni ..	..	43	3,217	110	3,327	100	10	44	43
17 Palayamkottai ..	2	38	1,275	30	1,305	75	5	38	35
18 Pudukottai ..	..	39	2,510	60	2,570	100	10	64	70
19 Tenali ..	4	56	2,337	30	2,367	200	10	41	36
20 Tiruppur ..	..	4	2,623	120	2,743	125	5	34	39
21 Udumalpet ..	..	51	1,895	50	1,945	100	15	37	40
22 Virudunagar ..	..	30	1,730	39	1,769	200	5	57	47
23 Visianagaram ..	4	55	2,105	30	2,133	80	10	38	31
24 Villupuram ..	6	36	2,130	71	2,201	100	25	59	41

APPENDIX B—cont.

Statement showing the total amount of fines levied, number of convictions, average fine, etc., in 1950-51—cont.

Name of municipality.	Number of pending cases.	Number of convictions.	Fines in analysis cases.	Fines in non-analysis cases.	Total fines.	Maximum fine.	Minimum fine.	Average fine.	Average fine in 1949-50.
(1)	(2)	(3)	(4) RS.	(5) RS.	(6) RS.	(7) RS.	(8) RS.	(9) RS.	(10) RS.
MUNICIPALITIES—cont.									
CLASS C.									
Quota 6 samples.									
1 Anantapur ..	1	45	1,532	..	1,532	100	10	34	42
2 Bodinayakanur ..	1	30	1,505	..	1,505	100	10	50	34
3 Devakottai ..	..	17	590	..	590	75	10	34	71
4 Hindupur ..	2	43	980	..	980	60	10	24	36
5 Peddapuram ..	..	32	1,379	105	1,484	120	10	43	63
6 Nandyal ..	1	31	1,465	20	1,485	100	20	47	35
7 Proddatur ..	..	18	375	..	375	50	10	20	41
8 Rajapalayam ..	..	39	1,483	..	1,483	100	5	38	38
9 Srivilliputtur ..	..	24	800	35	835	100	10	33	37
10 Tellocherry ..	..	43	1,530	..	1,530	100	15	36	51
11 Tiruvannamalai ..	5	26	1,045	29	1,074	100	15	40	21
Quota 4 samples.									
12 Ambur ..	7	30	1,200	..	1,200	100	20	40	48
13 Aruppukottai ..	..	15	440	15	455	40	10	29	28
14 Bhimavaram ..	6	34	1,820	..	1,820	100	20	53	67
15 Bheemunipatnam ..	2	28	920	30	950	50	15	32	38
16 Cochin ..	..	10	325	10	335	60	10	32	38
17 Srikakulam ..	1	25	1,145	..	1,145	200	25	45	40
18 Chingleput ..	1	27	630	22	652	60	10	23	30
19 Chittoor ..	26	8	245	..	245	40	5	30	36
20 Dharapuram ..	2	23	985	..	985	100	10	43	33
21 Gobichettipalayam ..	..	37	1,668	80	1,748	100	10	45	52
22 Gudiyattam ..	5	21	900	25	925	100	20	42	30
23 Guntakal ..	1	32	1,390	..	1,390	100	10	43	28
24 Kodalkanal ..	..	15	390	40	430	50	15	26	26
25 Melapalayam ..	..	23	650	9	659	60	10	28	39
26 Mettupalayam ..	..	43	1,810	10	1,820	70	5	42	49
27 Mannargudi ..	..	19	1,325	145	1,470	100	50	69	32
28 Narasaraopet ..	2	13	512	..	512	110	20	39	34
29 Palakole ..	..	34	1,144	30	1,174	60	14	31	33
30 Periyakulam ..	..	33	1,720	189	1,909	130	10	52	44
31 Rasipuram ..	..	37	1,365	..	1,365	70	10	39	31
32 Srirangam ..	..	16	950	..	950	100	30	59	40
33 Salur ..	5	5	350	..	350	100	27	70	38
34 Sivakasi ..	..	7	314	4	310	75	25	44	55
35 Tadpetri ..	..	8	267	10	277	50	10	33	37
36 Tindivanam ..	..	21	502	..	502	100	5	23	24
37 Tirupati ..	2	12	470	..	470	125	10	39	36
38 Tiruvallur (Chingleput district).	2	32	800	..	800	50	10	25	26
39 Tirupattur (North Arcot district).	6	9	400	..	400	80	30	44	..
40 Tiruvetur (Tanjore district).	..	23	1,155	155	1,310	120	25	50	67
41 Udipi ..	..	33	899	5	904	50	12	27	50
42 Vaniyambadi ..	1	32	1,515	..	1,515	100	20	47	48
43 Walajahpet ..	..	7	68	15	83	20	18	10	48

APPENDIX B—cont.

Statement showing the total amount of fines levied, number of convictions, average fine, etc., in 1950-51—cont.

Name of panchayat board.	Number of pending cases.	Number of convictions.	Fines in analysis cases.	Fines in non-analysis cases.	Total fines.	Maximum fine.	Minimum fine.	Average fine.	Average fine in 1949-50.
(1)	(2)	(3)	(4) RS.	(5) RS.	(6) RS.	(7) RS.	(8) RS.	(9) RS.	(10) RS.
PANCHAYAT BOARDS.									
<i>Anantapur district.</i>									
1 Dharmavaram ..	..	22	933	..	933	100	10	42	36
2 Gooty ..	..	3	720	..	720	40	15	30	21
3 Kadiri ..	..	32	1,130	200	1,330	100	5	41	43
4 Penukonda ..	..	16	435	..	435	50	10	28	20
5 Uravakonda ..	..	21	220	..	220	20	5	10	32
<i>North Arcot district.</i>									
6 Arni ..	..	2	690	..	690	50	10	38	55
7 Arkonam ..	..	2	825	12	837	50	10	33	44
8 Arcot ..	..	19	560	..	560	50	10	29	50
9 Ranipet ..	..	21	540	..	540	60	10	15	40
<i>South Arcot district.</i>									
10 Bhuvanagiri ..	..	11	260	..	260	35	15	23	34
11 Kallakurichi ..	..	2	1,090	..	1,090	100	5	32	33
12 Nellikuppam ..	..	1	265	5	270	50	12	25	33
13 Panruti ..	..	1	185	..	185	50	10	26	28
14 Tirukkoyilur ..	..	10	325	..	325	60	10	32	46
15 Vriddhachalam ..	..	16	1,040	..	1,040	100	30	65	39
<i>Bellary district.</i>									
16 Harpanahalli ..	..	34	1,020	..	1,020	75	15	30	28
17 Rayadrug ..	..	18	490	..	490	60	10	27	35
18 Yemmiganur ..	..	28	915	80	995	65	25	32	40
<i>Coimbatore district.</i>									
19 Avanashi ..	..	33	1,319	..	1,319	60	15	39	59
20 Bhavani ..	..	15	480	..	480	70	10	32	45
21 Kurichi ..	..	31	1,575	..	1,575	100	25	50	74
22 Satyamangalam ..	..	1	1,575	155	1,730	100	10	48	46
<i>Chingleput district.</i>									
23 Alandur ..	..	2	252	..	252	30	5	18	78
24 Madurantakam ..	..	20	600	40	640	75	15	30	29
25 Poonamallee ..	..	2	250	11	261	50	10	17	48
26 Tiruvottiyur ..	..	3	585	..	585	50	7	25	29
27 Sriperumbudur ..	..	25	763	..	763	75	8	30	..
<i>Chittoor district.</i>									
28 Kalahasti ..	..	19	735	..	735	75	10	38	21
29 Kuppem ..	..	2	705	172	877	100	20	45	40
30 Madanapalle ..	..	5	465	56	521	65	10	21	32
31 Madanapalle Sana-torium.	..	32	780	15	795	30	15	24	30
32 Punganur ..	..	3	445	..	445	85	20	31	44
33 Palmanar ..	..	12	405	3	408	100	5	33	39
34 Puttur ..	..	1	440	..	440	60	15	31	30
35 Tirumalai Hills ..	..	5	130	..	130	50	10	26	39
36 Tiruttani ..	..	17	880	15	895	40	15	22	44
37 Vayalpad ..	..	1	50	..	50	50	50	50	71
<i>Cuddapah district.</i>									
38 Badvel ..	..	12	325	..	325	50	10	27	102
39 Jammalamadugu ..	..	9	285	..	285	60	20	31	42
40 Pulivendla ..	..	4	165	..	165	40	5	41	47
41 Rajampet ..	..	21	630	130	760	75	15	30	46
42 Rayachoti ..	..	26	740	..	740	50	20	29	24

APPENDIX B—cont.

Statement showing the total amount of fines levied, number of convictions, average fine, etc., in 1950-51—cont.

Name of panchayat board.	Number of pending cases.	Number of convictions.	Fines in analysis cases.	Fines in non-analysis cases.	Total fines.	Maximum fine.	Minimum fine.	Average fine.	Average fine in 1949-50.
(1)	(2)	(3)	(4) RS.	(5) RS.	(6) RS.	(7) RS.	(8) RS.	(9) RS.	(10) RS.
PANCHAYAT BOARDS--cont.									
East Godavari district.									
43 Mandapeta	1	26	1,205	..	1,205	75	20	46	44
44 Pithapuram	..	19	515	..	515	70	10	27	34
45 Samalkot	3	9	222	..	222	50	12	24	32
46 Ramachandrapuram ..	..	22	770	10	780	100	15	35	32
47 Razole	..	28	867	..	867	55	10	30	40
48 Tuni	..	23	960	250	1,210	80	10	40	34
West Godavari district.									
49 Akividu	2	20	951	105	1,056	100	20	47	48
50 Kovvur	..	30	1,485	..	1,485	80	20	49	54
51 Narasapur	2	30	965	115	1,080	70	20	35	31
52 Nidadavole	..	31	1,685	..	1,685	200	30	54	40
53 Polavaram	3	16	720	30	750	75	20	45	46
54 Tadepalligudem	..	21	920	..	920	75	20	43	68
55 Tanuku	..	30	1,085	103	1,188	70	10	36	46
Guntur district.									
56 Bapatla	..	22	972	..	972	50	10	44	44
57 Mangalagiri	..	19	591	60	651	50	10	31	32
58 Ponnur	3	11	370	..	370	100	10	33	40
59 Nidubrolu	2	5	195	..	195	75	20	39	31
60 Repalle	..	21	605	..	605	60	10	28	74
61 Sattenapalle	..	16	457	30	487	50	10	28	31
62 Vetapalem	1	6	120	27	147	20	20	20	26
South Kanara district.									
63 Kasaragod	..	28	735	205	940	55	15	26	49
Krishna district.									
64 Avanigadda	..	4	148	5	153	50	20	29	39
65 Jaggayyapeta	..	12	380	85	465	50	15	31	43
66 Nuzvid	1	28	658	195	853	60	11	23	30
67 Tiruvur	..	10	139	40	179	25	2	14	36
68 Gudur	..	..	No samples received.						
Kurnool district.									
69 Dhone	..	20	930	..	930	100	10	46	48
70 Giddalur	1	14	610	278	888	100	15	43	33
71 Markapur	..	12	785	..	785	200	20	75	21
Madurai district.									
72 Allinagaram	7	20	897	..	897	100	12	44	57
73 Ayakudy	..	8	295	80	375	75	5	36	27
74 Batlagundu	..	12	330	..	330	50	5	26	31
75 Chinnamanur	..	21	845	..	845	100	10	40	67
76 Cumbum	..	15	675	..	675	105	10	45	64
77 Melur	1	16	565	..	565	50	15	35	59
78 Nilacottai	..	10	240	..	200	40	15	24	39
79 Sholavandan	1	9	200	..	200	30	15	22	30
80 Tirumangalam	..	16	415	..	415	60	10	25	19
81 Uthampatti	13	10	440	..	440	100	10	41	30
Nellore district.									
82 Gudur	3	18	435	..	435	50	10	25	35
83 Kandukur	7	8	212	..	212	50	2	26	40
84 Kovvur	..	13	450	..	450	50	25	32	22
85 Kavali	6	12	241	..	241	50	1½	20	15

APPENDIX B—cont.

Statement showing the total amount of fines levied, number of convictions, average fine, etc., in 1950-51—cont.

Name of panchayat board.	Number of pending cases.	Number of convictions.	Fines in analysis cases.	Fines in non-analysis cases.	Total fines.	Maximum fine.	Minimum fine.	Average fine.	Average fine in 1949-50.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.
Nellore district—cont.									
86 Nayudupet ..	..	18	855	..	855	100	30	47	47
87 Sulurpet ..	..	16	615	..	615	50	30	38	33
88 Venkatagiri ..	1	20	715	..	715	75	15	35	34
Nilgiri district.									
89 Kotagiri ..	..	15	520	..	520	100	10	34	40
Ramanathapuram district.									
90 Mudukulathur ..	..	8	227	80	307	50	2	40	33
91 Kilakarai ..	..	10	265	..	265	50	10	26	19
92 Kandanoor ..	3	11	290	25	315	75	5	26	38
93 Pallathur ..	..	15	383	..	383	75	5	27	43
94 Paramakudy ..	..	26	815	210	1025	70	10	31	49
95 Ramanathapuram ..	..	16	406	14	420	50	15	25	24
96 Rameswaram ..	..	24	565	..	565	50	10	23	30
97 Sattur ..	..	25	1,250	..	1,250	100	20	50	56
98 Sivaganga ..	3	17	609	35	644	70	7	36	57
99 Tirupattur ..	2	18	525	..	525	75	20	29	42
100 Venkateswara-puram.	..	..	..	No convictions	..	..	..	..	..
101 Kanniseri ..	..	16	590	30	620	75	20	36	..
Salem district.									
102 Dharmapuri ..	..	36	1,730	125	1,855	200	15	48	47
103 Harur ..	..	7	220	30	250	50	5	32	35
104 Idappadi ..	..	23	770	..	770	70	20	33	25
105 Namakkal ..	..	36	1,122	..	1,122	75	7	31	64
106 Shevaroyis ..	5	7	145	..	145	30	5	20	42
107 Tiruchengode ..	1	38	1,685	50	1,735	100	15	41	43
Tanjore district.									
108 Ayyampet ..	..	18	1,485	75	1,560	150	50	82	67
109 Nannilam ..	..	23	1,400	..	1,400	150	5	60	52
110 Papanasam ..	..	19	1,170	..	1,170	100	20	61	57
111 Pattukkottai ..	..	11	340	10	350	50	10	31	63
112 Sirkali ..	..	20	1,745	..	1,745	200	25	87	68
113 Tiruvaiyar ..	2	25	966	20	986	60	20	38	27
114 Tiruturaiyandi ..	..	19	1,030	..	1,030	75	35	54	51
115 Tiruvadamardur ..	..	6	470	..	470	100	25	78	60
Tiruchirappalli district.									
116 Gunaseelam ..	1	4	195	..	195	75	40	49	40
117 Ariyalur ..	..	29	723	16	739	50	8	35	23
118 Kulittalai ..	..	22	1,141	..	1,141	100	25	51	56
119 Lalgudy ..	..	23	735	50	785	80	10	32	48
120 Jayankondam ..	..	21	409	7	416	50	8	19	33
121 Musiri ..	..	29	1,710	..	1,710	90	25	58	51
122 Manapparai ..	2	28	965	43	1,008	50	20	35	34
123 Turaiyur ..	..	16	415	..	415	50	15	25	34
Tirunelveli district.									
124 Ambasamudram ..	..	25	960	..	960	60	10	38	41
125 Courtallam ..	1	26	890	100	990	150	15	38	24
126 Ettayapuram ..	5	4	110	..	110	50	20	27	20
127 Kallidaikurichi ..	..	19	880	..	880	75	10	46	40
128 Kadayanallur ..	20	14	610	160	770	80	10	43	40

APPENDIX B—cont.

Statement showing the total amount of fines levied, number of convictions, average fine, etc., in 1950-51—cont.

Name of panchayat board.	Number of pending cases.	Number of convictions.	Fines in analysis cases.	Fines in non-analysis cases.	Total fines.	Maximum fine.	Minimum fine.	Average fine.	Average fine in 1949-50.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.
Tirunelveli district—cont.									
129 Koilpatti ..	2	25	1,135	5	1,140	150	15	45	42
130 Puliyangudi ..	..	18	514	..	514	52	20	28	40
131 Sankarankoil ..	1	36	1,162	140	1,302	70	15	32	49
132 Srivaikuntam ..	1	34	920	..	920	50	15	27	14
133 Tenkasi ..	3	17	719	91	810	60	10	33	46
134 Tiruchendur ..	..	14	685	121	806	80	30	48	22
135 Vickramasingapuram	6	23	745	..	745	50	10	32	45
136 Viravanallur ..	4	16	480	..	480	40	15	30	49
Visakhapatnam district.									
137 Bobbili ..	..	22	1,580	310	1,890	150	20	71	60
138 Chodavaram ..	..	5	110	..	110	30	15	22	25
139 Narasapatam ..	2	13	243	..	243	40	5	18	25
140 Palakonda ..	..	21	725	35	760	55	10	33	33
141 Parvatipuram ..	..	18	1,255	365	1,620	100	20	70	48
142 Sompota ..	2	7	505	..	505	75	30	72	29
143 Yellamanchili ..	..	46	1,665	99	1,764	80	10	36	43



HEALTH DEPARTMENT

G.O. No. 1470, 5th May 1952

Administration Report—King Institute, Guindy—1950-51—Reviewed

READ—the following paper :—

From the Director of Medical Services, Ref. No. 15761-2M/52, dated
5th April 1952.

Order—No. 1470, Health, dated 5th May 1952.

Recorded.

2. *Vaccination*.—The number of vaccinations during the year under review for the period from 1st April to 31st December 1950 was 5,353,854 as against 4,420,561 during the period from 1st April 1949 to 31st March 1950. Due to the change over to the calendar year for purposes of compilation and analysis returns for the period from 1st April to 31st December 1950 have alone been taken into consideration. The number of vaccinations increased further, compared to the figure of last year, steadily nearing the target of six million vaccinations fixed in G.O. No. 1862, P.H., dated 20th May 1949.

3. *Vaccine lymph*.—The year under review witnessed the largest quantity of vaccine supplied in recent years. The percentage of lymph unaccounted for during the year declined from 56.4 of the previous year to 38.2. Steps should be taken as already indicated in the reviews of previous years to see that the delays in the submission of returns are minimised still further as no returns were received for above 2 million doses of vaccine issued during the year under report.

4. *Prophylactic vaccines*.—There was a sharp increase in the total quantity of anti-cholera vaccine supplied during the year from 6.25 million doses of the previous year to 10.5 million doses including 3.5 lakhs doses supplied to Hyderabad and this was due to the outbreak of cholera in an epidemic form in the State. The manufacture and supply of prophylactic vaccines during the year continued to be maintained satisfactorily.

5. *Diagnostic department*.—During the year, 13,459 specimens were received for Bacteriological examination in the department, representing the largest number ever examined during the previous years. The total number of serological tests done during the year was 98,552 as against 98,776 of the previous year.

6. *Blood bank*.—Twenty-three Medical Officers were trained in the technique of blood transfusion and resuscitation. A central supply scheme was started with effect from 1st April 1950 to supply blood bank equipment to the various blood banks in the State. As usual, the blood transfusion service was popularized through blood bank stalls opened in five exhibitions held in different parts of the State.

No. 1470, HEALTH, 5TH MAY 1952

7. *Department of water analysis and algae control.*—The Government Experimental Fitter Station at Kilpauk which was under the administrative control of the Director, King Institute, Guindy, since 1940, was transferred to the administrative control of the Sanitary Engineer from 1st January 1951. A conference of Officers carrying on research on the subject of Flourosis at the different research institutions in the State was convened on 20th January 1951 at the King Institute, Guindy, to determine the future lines of research work on the problem and to co-ordinate the efforts of the different institutions. The recommendations of the Conference are under consideration by Government.

The Government desire to impress on the authorities concerned the imperative need for bestowing more attention to the improvement of the quality of drinking water in the areas under their control and the importance of carrying out the suggestions made by the Water Analyst from time to time, from the health point of view.

8. *General.*—The working of the institute during the year continued to be satisfactory.

(By order of His Excellency the Governor)

S. R. KAIWAR,

Secretary to Government.

- L. 4:5. S.M. A. K. 11/5/52
- To the Director of Medical Services, Madras-6.
- „ the Director of Public Health, Madras.
 - „ the Sanitary Engineer (through the Chief Engineer).
 - „ the Director of King Institute, Guindy (through the Director of Medical Services).
 - „ all Presidents of District Boards.
 - „ all Executive Authorities of Municipal Councils (through Chairmen).
 - „ the Mayor, Corporation of Madras.
 - „ the Accountant-General, Madras.
 - „ the Inspector of Municipal Councils and Local Boards.
 - „ the Honorary Director of Indigenous Medicine, Madras.
 - „ the Inspector-General of Prisons (through the Home Department).
 - „ the Principals of Engineering Colleges.
 - „ the General Manager, Southern Railways (with C.L.).
 - „ the General Manager, Bengal-Nagpur Railway (with C.L.).
 - „ the Librarian, Legislative Assembly Secretariat.
 - „ the Librarian, Madras Secretariat Library.
 - „ the Departments of the Secretariat concerned including Home.
 - „ the Director, Pasteur Institute, Coonoor.
 - „ the High Commissioner for India (with copies for India Office, Ministry of Health, British Museum).
 - „ the Madras Medical Association.
 - „ the Madras University.
 - „ the Andhra University.
 - „ the Annamalai University.
 - „ the Connemara Public Library, Madras.
 - „ the Madras Chamber of Commerce, Madras.
 - „ the Southern India Chamber of Commerce, Madras.
 - „ the Government Analyst, Madras (Analyst's report only).
 - „ others vide Appendix to G.O. No. 2142 P.H., dated 13th September 1934).
 - „ the Secretary, Public Service Commission, Madras (with C.L.).

