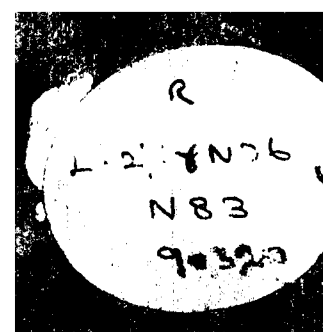




REPORT ON THE HEALTH CONDITIONS IN THE STATE OF TAMIL NADU 1976.

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1. VITAL STATISTICS.

The area of the State is 1,30,069 square kilometres and the Mid-Year Estimated Population is 45,173,000.

The registration of births and deaths was compulsory. The following were the vital rates recorded during 1976.

Birth Rate 22.61 per 1000 Mid-Year Estimated population.

Death Rate 8.01 per 1000 Mid-Year Estimated population.

Infant Mortality Rate 47.6 per 1000 live births.

Still Birth Rate 19.74 per 1000 live and still births.

Maternal mortality rate 2.32 per 1000 live and still births.

Births.—The number of births recorded in 1976 was 10,21,263 of which 5,28,397 were males and 4,92,866 females, giving a birth rate of 22.61 per 1000 Mid-Year Estimated Population. The Sex ratio at Birth Male/Female is 107:100.

Still Births.—The number of still births recorded in 1976 was 20,567 of which 11,239 were males and 9,328 were females giving a still birth rate of 19.74 per 1,000 live and still births.

Deaths.—The number of deaths recorded in 1976 was 3,61,921 of which 1,90,398 were males and 1,71,523 were females giving a death rate of 8.01 per 1,000 Mid-Year Estimated Population.

The following table gives the number of deaths in different age groups:

Age group.	Number of deaths.	mortality rate.
(1)	(2)	(3)
Under one year	48,630	s 47.6
1— 4 years	44,612	9.4
5— 9 years	11,953	2.0
10—14 years	7,096	1.4
15—24 years	5,862	3.17
25—34 years	19,910	2.96
35—44 years	23,202	4.1
45—54 years	31,538	7.7
55—64 years	43,166	7.4
65—74 years	51,556	49.6
75 and above	62,552	173.2
Age not stated	21	..
Total ..	3,61,921	8.01

Death of children below one year is always expressed as infant mortality rate per 1,000 live births.

The following table gives the number of deaths recorded due to various causes as reported by rural Registrar :—

Cause of Death*	Number of deaths.	Death rate.
(1)	(2)	(3)
Cholera	134	Below .01
Measles	91	Below .01
Malaria	4	Below .01
Fevers	69,101	1.53
Dysentery	8,679	0.19
Diarrhoea	13,111	0.29
Respiratory diseases	34,600	0.77
Suicides	2,436	0.05
Wounds and Accidents.. .. .	5,141	0.11
Snakebites	1,162	0.05
Killed by wild beasts	74	Below .01
Rabies	321	0.01
Deaths due to child birth	2,418	2.32
Other causes	2,24,559	4.98
Total	3,61,921	8.01

* The causes of death given above are as per the Birth and Death returns received from the rural areas and not as reported by Health Officers.

Sample Registration Scheme.—Sample Registration Scheme aims at getting reliable estimates of vital rates through a process of continuous enumeration combined with an independent half yearly survey once in six months. During the year 1976, the sample registration scheme was continued in 150 rural sample units. The following were the vital rates recorded under sample Registration (Rural) Scheme during 1976.

Birth Rate—32.2 per 1000 population.

Death Rate—16.8 per 1000 population.

Infant Mortality Rate 120.0 per 1000 live births.

Still Birth Rate 24.8 per 1,000 live births and still births.

In 100 urban units, sample registration scheme was conducted by the Director of census operations. Including these figures the birth and death rates work out to 30.5 and 14.6 respectively.

The vital rates obtained through Sample Registration are higher than the vital rates recorded under Civil registration because in Sample Registration Scheme we have the advantage of continuous enumeration combined with independent half-yearly surveys. The Statistical Assistant Director, Department of Public Health and Preventive Medicine is the Supervising Officer for the Scheme.

Model Registration Scheme.—The Scheme aims at obtaining cause specific death statistics in rural areas. The Scheme was implemented in 34 Primary Health Centres of the State, selected on a sample random basis at the rate of one per 10,00,000 population as per 1961 census.

The following table gives the percentage of deaths due to the major causes recorded under model Registration Scheme :

Major causes	Percentage of deaths.
Accidents and Injuries	... 2.4
Child Birth and Prognancy	... 1.1
Fevers	... 9.5
Digestive Disorders	... 10.8
Disorders of Respiratory system	... 11.0
Disorders of Central Nervous system	... 11.0
Diseases of Circulatory system	... 16.6
Other clear symptom	... 7.4
Causes peculiar to infancy	... 12.0
Senility	... 22.6
The rest	... 2.0

It can be seen that only 2 per cent of the total deaths fall under "The rest" group while the same group under civil registration accounts for nearly 60 per cent of the total deaths. The Scheme if extended to more Primary Health Centres will give a good idea about the mortality profile and this is under consideration. The Statistical Assistant Director, Health and Preventive Medicine supervises the working of the Scheme.

II. CONTROL OF COMMUNICABLE DISEASES.

(a) **Cholera.**—As reported by Health Officers there were 853 attacks and 47 deaths due to Cholera as against 2358 attacks and 65 deaths in 1975.

The cholera control programme was continued in the four endemic districts, viz., North Arcot, South Arcot, Coimbatore and Tiruchirapalli. 162 special cholera workers and six cholera supervisors are working in the above districts. There were four cholera combat teams, seven mobile epidemic units, three epidemic control units and two epidemiological Unit. All those units were provided with adequate staff with vehicles to attend to epidemic control work. The staff of these units visit the infected areas and attend to the preventive and control measures like mass inoculation chlorination of water sources, attention to environmental sanitation, etc. The staff attached to the epidemiological units carry out epidemiological investigations in order to take preventive measures and study the epidemiological pattern of the disease.

Due to the prompt and timely treatment and other containment measures taken the incidence of cholera has been considerably reduced.

During November-December 1976, there were unprecedented floods in Madras city. As such floods are likely to cause a severe outbreak of cholera, all preventive measures were immediately taken by mobilising all the staff. Five lakhs sixty-four thousand five hundred and twenty-seven anti-cholera inoculations and 19,171 TAB inoculations were performed in the City.

(b) **Plague.**—The State continued to be free from plague. However there were two suspected rat fails, one in Chettypatty village of Salem district and the other in Vellore Municipality. On examination all the smears were found to be segative for p. pestis. Even though the State continues to be free from plague, precautionary anti-plague measures were instituted in the plague endemic areas of Dharmapuri, Coimbatore. The Nilgiris and North Arcot districts. Examination of sera collected from rodents was also done to find out any incidence of plague infection among the rodents as a precautionary measure.

(c) *Smallpox*.—The State continued to be free from Smallpox during the year 1976.

During 1976, two State-wide intensive search for smallpox cases were carried out one in April 1976 and another in November 1976. In addition an urban search was conducted during August 1976. Not even a single case of smallpox was found during these searches thus confirming the smallpox free status of Tamil Nadu. Out-patient enquiries for eruptive fever cases in all Primary Health Centres, Government Hospitals and dispensaries. Regular market searches, Investigation of every rumour brought to the notice were the activities carried out, careful documentation of the results of the surveillance activities was done.

During the year 13.67 lakhs of primary vaccinations and 45.37 lakhs of re-vaccinations were performed.

(d) *Malaria*.—During the year 1976, the National Malaria Eradication Programme continued to function with 28.40 units in maintenance phase and 3.75 units in consolidation phase.

The Basic Health Services established in 1969 continued to function in the maintenance phase areas. The Centrally-sponsored NMEP continued to function in the consolidation areas and the urban malaria scheme in Madras city and in the towns of Salem, Rasipuram Tuticorin and Elampillai also continued to function.

During the year 1,01,305 malaria cases were recorded. Out of this 46,484 cases were reported from the five towns implementing urban malaria scheme. The State is facing the problem of resurgent malaria since 1974. The set back was due to factors like (1) vector resistance to DDT, (2) Possible extra domiciliary transmission, (3) absence of urban surveillance and (4) Problems of spray refusal. The conventional DDT spraying was becoming less productive and its replacement with the malathion for spraying problem areas has become necessary. It has also become necessary to adopt supplemental measures like larval control and mass drug administration for achieving confined to coastal areas of Ramanathapuram district and the river basin of Dharmapuri, Salem, North Arcot and South Arcot districts. Highest incidence was recorded in Madras city among urban areas and Chengalpattu taluk among rural areas.

Anti-larval measures were intensified by staff and resources mobilisation. Abate, a newer larvicide was used to achieve effective larval control. Focal spraying with DDT and Pyrethrum, radical treatment of positive cases with drugs, etc., were intensified with the available resources. Urban surveillance has been sanctioned for five towns in the State, viz., Madras, Madurai, Coimbatore, Tiruchirappalli and Vellore.

In the rural areas two rounds of spraying with DDT were given in the problem areas laying greater emphasis on completion of each round within shortest time and on achievement of maximum coverage. Active and passive surveillance have been intensified in the problem areas and the positive cases detected were given radical treatment with drugs. Larval control measures were carried out in Coastal Ramanathapuram, Dharmapuri, Arcot areas to supplement DDT spraying in all effort to reduce malaria incidence. An entomological team has been set up for carrying out field studies of the problem of rural malaria in the State. At the Central Malaria Laboratory and Museum training classes including lectures and demonstrations were conducted on malaria, filaria and other insect borne diseases to the batches of students from Medical Colleges, Engineering College, Guindy and Health Visitors School. Cross check of examined slides, confirmation of positive slides, preparation and distribution of stains were some of the other activities of the Central Malaria laboratory.

Filaria.—The Twelve Filaria Control Units at Chengalpattu, Kancheepuram, Vellore Chidambaram, Cuddalore, Kumbakonam, Thanjavur, Nagapattinam, Srirangam, Pudukkottai and Madras city continued to do anti-larval measures. The Anti-larval operations were carried out by applying mosquito larvicidal oil over the surface of drains cess-

pools, etc. A quantity of 12,77,201 litres of mosquito larvicidal oil and a quantity of 5,624 litres of pyrosene was spent. The overall *C. fatigans* density in all the control unit has 89.3 per 10 man hours. Dissection of mosquitoes collected was done to find out infectivity rates. Besides anti-larval operations, minor engineering measures such as canalisation of drains, filling up of low lying areas, etc., were carried out to avoid stagnation of sullage water. Night blood surveys were carried out. The detected cases were directed to nearby hospitals for treatment. A total of 1,27,941 persons were examined and out of them 1,932 persons were found to show microfilariasis. During the parasitological surveys conducted 1,55,795 persons were examined and out of them 6,519 were found to be positive for microfilaria, giving a microfilaria rate of 4.2 per cent. 383 persons were found to be positive for the disease giving a disease rate of 0.24 per cent. Propaganda work regarding the importance of anti-larval measures was done seeking the co-operation of the public.

Besides the National Filaria Control Programme, grant-in-aid schemes were implemented in local bodies.

Yaws.—Six Yaws Eradication Units were functioning in the districts of Madurai, Tiruchirappalli, Dharmapuri, South Arcot and Salem, stationed at Palani, Periakulam, Karur (ot) Kulithalai, Dharmapuri, Cuddalore and Kollihills. Each Unit is headed by a Health Inspector. A Special Health Officer has been stationed at Dindigul for supervision of all the above units and treatment of Yaws cases.

The Health Inspector visits each village and hamlets through a house-to-house visit to detect cases of Yaws and their contacts. The Special Health Officer verifies the diagnosis and gives treatment.

During the years under report, 1,322 villages including hamlets were surveyed and diagnosis and gives treatment.

Guineaworm.—Guineaworm Eradication Programme is implemented in all the districts of Tamil Nadu except Kanyakumari and The Nilgiris. The operational area has been divided into six units each unit having an entomological assistant.

The main programme is treatment of drinking water sources with DDT 50 per cent water wettable powder to kill the vector species (viz) cyclops and treatment of affected persons. During the year under report, 76 cases of Guineaworm were recorded in three infected villages of South Arcot district. The patients were treated with 4% carbolic lotion to alleviate pains in the affected part of the body.

Kala Azar.—One Unit to control Kala Azar is functioning in Ramanathapuram. The programme of work is to do sandfly survey in Ramanathapuram district, detect cases of Kala Azar and direct them to nearby hospitals for treatment. During the year under review 1,994 villages including hamlets were surveyed and five suspected cases were recorded. A total of 1,963 sandflies were collected, identified and dissected.

III. MATERNITY AND CHILD HEALTH SERVICES.

Maternity and Child Welfare Services form the basic foundation of healthy living. The greatest need for the women in the rural areas is skilled attention before, during and after confinement. Hence the care of the mother and child who form the major portion of the population receive the highest priority in the Health Programmes.

Maternity and Child Welfare Services by Panchayat Union.—Under Section 65 (c) of the Tamil Nadu Panchayats Act, 1958, it is the responsibility of the Panchayat Union Council to open and maintain maternity centres at the rate of one maternity centre per every 10,000 population. The panchayat unions receive two-thirds grant from the Government for the first three centres and for the remaining from the Central Government under the Family Welfare Programme. There were 2,880 sub-centres on the whole run by 374 panchayat unions.

Maternity and Child Welfare Services under Backward Area Scheme.—There are 19 maternity and child welfare centres with four sub-centres attached to each, with a staff of one Health Visitor and one Ayah for each main centre and one Maternity Assistant and one Ayah for each sub-centre. These centres continued to do useful work during 1976 also.

Maternity and Child Welfare Centres run by Municipalities.—The municipalities continued to render skilled maternity service in their respective areas through maternity homes and maternity and child welfare centres. The municipalities are given 25 per cent of their recurring expenditure as grant by the State Government towards the maintenance of the maternity and child welfare centres.

The total number of maternity and child welfare centres and the staff position are shown hereunder :—

STAFF POSITION.

<i>Institutions.</i>	<i>Women Medical Officers</i>	<i>Public Health Nurses and Residential Matrons.</i>	<i>Health visitors.</i>	<i>Maternity Assistants/Anns.</i>	<i>Ayaks.</i>
(1)	(2)	(3)	(4)	(5)	(6)
Government	3	6	517	475	113
Municipalities	43	18	77	376	269
Corporation of Madras ..	41	..	71	316	116
Corporation of Madurai ..	13	10	14	92	41
Panchayat Unions	..	..	..	2,880	2,314
Total	100	34	679	4,139	2,853

<i>Institution.</i>	<i>Maternity Homes.</i>		<i>Maternity Centres with beds.</i>		<i>Maternity Centres without beds</i>	<i>Total</i>
	<i>Number.</i>	<i>Beds.</i>	<i>Number.</i>	<i>Beds.</i>	<i>Centres without beds Number.</i>	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Institute of Public Health, Poonamallee.	7	34	..	..	1	8
Backward Area Scheme ..	..	..	..	..	95	95
Primary Health Centres ..	..	..	383	2,258	..	383
Panchayat Unions	..	..	..	..	2,880	2,880
Municipalities	82	630	165	495	183	430
Corporation of Madras ..	31	379	..	..	20	51
Corporation of Madurai ..	15	272	2	13	2	19
Total	135	1,315	550	2,806	3,181	3,866

STAFF POSITION

Health Visitors Training.—Two kinds of training is imparted. Regular course of 18 months duration for Auxiliary Nurse Midwives and integrated course of 30 months duration. A stipend of Rs. 50 is paid to the students and the training is imparted free of charge. Thirteen persons were qualified in 1976. Totally 1,181 candidates have been trained so far.

Immunisation Programme.—The programme was launched in the State in 1964 through the agency of Primary Health Centres and sub-centres. The children in the age group of 0-5 years are taken up for immunisation with triple vaccine. The Scheme is being implemented in all the Primary Health Centres at present. Besides this regular DPT Programme, a special DPT Programme is also being implemented in 60 Primary Health Centres. In all these 60 Primary Health Centres a third Health Visitor has been posted and 13 District Public Health Nurses have also been posted in the districts to supervise the work.

During 1976-77, a total of 262,209 children were immunised.

School Health Programme.—School Medical Inspection is being conducted in 48 Primary Health Centres and five Municipalities. As far as the rural areas are concerned the Medical Officer incharge of the Primary Health Centre is vested with the responsibility of implementing the programme with the assistance of a Health Visitor, posted for this work. The target is to check 2,000 school children per annum. In the Urban areas, viz., Kancheepuram, Cuddalore, Coimbatore, Thanjavur and Tiruchirappalli one Medical Officer in the rank of a Civil Surgeon and two Health Visitors have been posted, supervised by the concerned Municipal Health Officer. The annual target for an urban unit is 10,000 children. At the headquarters there is one Health Officer assisted by a Statistical Assistant.

During 1976-77, 79,271 school children were examined in rural areas and 41,209 children were examined in urban areas.

IV. NUTRITION.

The activities of the Nutrition bureau can be classified, under the categories (1) Laboratory, Services and Nutrition Education, (2) Diet and Nutrition surveys for vulnerable groups and (3) Training Programmes.

The Bio-chemical Laboratory attached to the Nutrition Bureau carried out a survey to assess the prevalence of Anaemia in rural areas of the State. The results revealed that 57.6 per cent of the pre-school children. Sixty-four per cent of the ante-natal mothers and 68 per cent of the post-natal mothers had haemoglobin level below normal. The Bacteriological Laboratory carried out bacteriological examination of sea foods. The Nutrition Research Laboratory carried out practical kitchen demonstration of cheap recipes and educated the public on the nutritional values of these cheap recipes so that they can make good use of the locally available foodstuffs.

Base line diet and nutrition surveys were conducted in 22 applied nutrition programme blocks in the State in respect of pre-school children, pregnant and lactating mothers. The results indicated that vitamin-A deficiency was found to be more prevalent in Dharmapuri, North Arcot, Chingleput and Ramanathapuram districts than in other districts. Anaemia was found to be more prevalent in South Arcot, North Arcot Chingleput, Ramanathapuram and Kanyakumari districts.

Training on scientific nutrition for para-medical workers are carried out twice a year. So far 30 batches have been trained, each batch consisting of about 30 candidates. Classes on Public Health aspect on nutrition were conducted for the students undergoing Dieticians Course in Voluntary Health Services, Adyar.

An integrated Child Development Services Scheme was implemented in the (1) Thalli block in Dharmapuri district and Nilakottai block in Madurai district as Rural Project, (2) Slum areas of Madras City for the Urban Project.

In the rural project 31,348 pre-school children, 10,594 ante-natal mothers and 9,552 post-natal mothers were given health check-up. 21,582 were immunised with B.C.G., 19,862 with small-pox vaccination, 21,957 with DPT, 636 with DT, 3,910 with vitamin-A concentration and 1,002 with Tetanus Toxoid.

Yet another scheme launched was a Scheme to prevent and control blindness among children due to malnutrition and Vitamin-A deficiency. The programme is implemented in one block in each district where the Applied Nutrition Programme is not in operation and in coordination with the Social Welfare department and Rural Development Department. Twelve blocks have been taken up so far. To start with necessary surveys have been conducted among the pre-school children of the villages of these blocks and Vitamin-A concentrated, is to be given once in six months to those found suffering from Vitamin-A deficiency to prevent the blindness among children.

Another programme "Integrated Nutrition Programme" for Family Welfare acceptors with assistance of CARE organisation is implemented in Salem Municipality and in Kannururichi block in Salem district from September 1976. The Scheme envisages supply of nutritious food stuff prepared out of the materials supplied by CARE Organisation, Immunisation, Health check-up, and supply of vitamin tablets, etc., to the expectant and nursing mothers and pre-school children selected from among the families of Family Welfare acceptors.

Under the Tribal development Scheme the following has been for the development of hill tribes in Kairavan hills (1) Establishment of one Mobile Medical Unit to provide health coverage to the tribals—On completion of training in Sexually transmitted diseases two Medical Officers have been posted to the Mobile Medical Unit at Athur, (2) provision of increased laboratory facilities at the Taluk Hospitals, Harur, Kallakurichi and Athur to provide clinical tests to the tribal population. (3) Three Health Inspectors have been appointed for immunising the children and also to look after Hygienic and environmental problems in these areas. Plans are also ahead to provide RCAP latrines to the tribal people of Kairavan Hills.

V. PRIMARY HEALTH CENTRES.

The Primary Health Centre is a multipurpose unit established at the peripheral level to render preventive, curative and health promotive services in the rural community in every block. All important national schemes like National Malaria Eradication Programme, National Smallpox Eradication Programme, National Polio Control Programme and Family Welfare Programme and other schemes are implemented through these Primary Health Centres.

The State has 382 Primary Health Centres and out of these 236 Primary Health Centres are functioning in Government buildings. Construction of dispensary buildings for another 28 Primary Health Centres are nearing completion.

The annual provision of Rs. 10,000 per Primary Health Centre for the purchase of drugs has been increased to Rs. 12,000 per Primary Health Centre per annum in order to keep the Primary Health Centre with adequate quantity of essential and life saving drugs. Similarly in the case of sub-centres this provision has been increased by Rs. 200 per sub-centre per annum.

Posting up of a third Medical Officer in each of the 382 Primary Health Centres has been contemplated in a phased manner in order to have the services of medical officers round the clock at the Primary Health Centres and also for the intensive visit to sub-centres and also for the effective supervision of School Health Programme, DPT immunisation programme, etc. 130 Medical Officers have been posted.

For the development of medical care under the Integrated development of "The Nilgiris" district establishment of additional Primary Health Centres have been envisaged. As additional primary Health Centre has been established for Ootacamund block at Thuneru with full complement of staff.

VI. PREVENTION OF FOOD ADULTERATION.

The provisions of the Food Adulteration Act was implemented strictly with the help of the following three laboratories:—

- (1) The Government Analyst, King Institute, Guindy;
- (2) The Public Analyst, Principal Public Health laboratory, Coimbatore; and
- (3) The Public Analyst, Corporation of Madras.

During the year 1976, a total of 23,864 samples were analysed out of which 5,660 samples were found to be adulterated representing 23.7 per cent.

Totally 6276 prosecutions were launched. 5428 were convicted. Some cases were still pending in court. A sum of Rs. 12,61,842 was realised by way of fines.

The water analysis Department of the King Institute, Guindy and the Water Analysis branch of the principal Public Health Laboratory at Coimbatore continued to maintain the analytical control over the hygienic quality of the drinking water supplies in the State.

During the year 1976, 8099 water samples were received and tested in connection with periodical testing of protected water supplies. 1783 samples were received and tested in connection with rural water supply scheme. 11 new water supplies were included under the periodical, analytical examination, 13,466 water samples were tested for bacteriological, biological, physical and chemical characteristics. 71 important field investigations and researches were carried out.

VII. HEALTH EDUCATION BUREAU.

(a) *Administration and Study Unit.*—The object of the Unit is to identify the barriers in the implementation of various health programmes and to suggest solutions based on existing research finding as well as through carrying out specially designed studies. During 1976, two Research reports were brought out. Four papers and booklets were also brought out. The Unit participated in the activities of the bureau.

(b) *Field Study Demonstration Centre.*—The Field Study Demonstration Centre took health education classes on various health topics. The team took active part in the promotion of environmental sanitation and nutrition. In four villages, RCA type Latrines were constructed. 50 houses were selected under Somangalam Rural reconstruction project. Cooking demonstration on Bengal gram cunjee and ragi pakoda were demonstrated in five villages.

Adult literacy education programmes were conducted in four districts. Teachers Association meetings were conducted. Leaders education sessions were conducted. 46 Health Visitor students in two batches were trained in community organisation specially ante-natal and post-natal education. The team guided and supervised and helped the Diploma in Health Education Schemes from Calcutta for two months supervisory field training on Leprosy Project.

The team took up major hospitals for Hospital education. To begin with after 1½ years of training and guidance the institute of Paediatrics developed health education week and health activities were carried out. Training in mental hospital and Government General Hospital are in progress.

(c) *Teacher Training Unit.*—Health Education training was conducted in six batches. 124 teachers were given training. Trainees were given opportunity to practice what they were taught. The practical training included preparation of health lessons, preparation of menus for balanced diet, chlorinations of water, village survey, screening of communicable diseases in children. They were taken to different institutions on field visit. They practised teaching lessons in health.

The unit participated in the flood relief work in Madras city. Under "Documentation Programme" Allapakkam village was selected for community work. Health education training programme was carried out for week to the teachers of Elementary School at Allapakkam. D.P.T. was administered to the children in the village.

95 children were examined at Nandanam under School Health Programme. Medicines were given for defective children. Similar programme was carried out at Panchayat Union Higher Elementary School, Porur. The Unit participated in the S.C.E.R.T. Programme.

(d) Media.—The Media Unit planned, organised and followed up various mass education programmes in the rural and urban areas and produced and distributed various educational materials on health.

The Public Health press brought out publications and they were distributed to various agencies.

The Film library sent 1,237 films to various Government and Voluntary Organisations for screening to the public, educational institutions, etc.

The puppetry unit conducted 55 puppet shows on various health topics like Nutrition, Cholera control, smallpox, vaccination, malaria, etc.

The Mobile Exhibition Unit was deputed to several Places for organising health exhibitions.

Voluntary organisations were involved in health information communication programmes.

INSTITUTE OF PUBLIC HEALTH, POONAMALLEE.

(a) Health Unit, Poonamallee.—The following were the vital rates recorded in the Health Unit area in 1976.

Births 3128

Birth Rate 28.6 per 1000 population.

Deaths 1144

Death Rate 10.5 per 1000 population

Infant Deaths 213

Infant Deaths Rate 68.1 per 1000 live births

Still Births 70

Still Birth Rate 21.9 per 1000 live and still births.

Maternal Deaths 1

Rate: 0.3 per 1000 live and still births

All possible steps were taken to improve the birth and death registration.

In the year 1976, 28 cases of suspected cholera were transported to the Infectious disease hospital. All preventive and control measures were taken in and around the infected villages. A total of 19,496 anti cholera inoculations were done.

In the year 1976, three active search programmes were carried out under the "Intensive Search for Smallpox" programme. Vaccination work was carried out as usual. A total of 3688 primary vaccinations and 18045 re-vaccinations were done.

The Villages in the Health Unit area were under Surveillance supervision under National Malaria Eradication Programme. The National Filaria Control Programme was implemented through anti-larval measures with Government subsidy in the major Panchayats of Poonamallee, Thirumazhisai, Kunrathur and Mangadu.

The entire Health Unit area was free from Kala Azar and Guinea worm infection.

The maternity and child health services were rendered through:—

1. Domiciliary, midwifery care conducted by the maternity assistants of the main and sub-centres.

2. Institutional midwifery care in the centres.

3. Pre-natal and post-natal care of mothers in the clinic and in the houses.

4. Cure of the mother and of the infant up to one year of age and pre-school child.

5. Training of practising indigenous Dais and continuous supervision of their techniques of domiciliary midwifery and

6. Care of the school children dealt with under School Health.

All the expectant mothers in the area were registered for pre-natal advice and education for ensuring proper skilled care during their delivery. 31.42 per cent of the total births, were conducted by the Health Unit maternity assistants.

The School Health Programme was implemented during 1976. During the year 1976, 1,000 school going children were given medical check up. 100 Health talks were given.

The D. P. T. and Booster dose immunisation programme was carried out successfully.

First dose 1833

Second dose 1485

Booster dose 1681

The Family Welfare clinics were conducted along with regular maternity and child health clinics. During 1976, 323 tubectomy and 23 vasectomy were done. 32,500 mothers were educated about Family Welfare methods. Improvement of environmental sanitation is yet another field of public health activity in which Health Unit was involved. Towards this Health education was given to the people, direct and group discussion were held with the people. The importance of latrine and its usage was explained to the public. In the Health Unit area all the villages have protected water supply. All the public, private wells were periodically and systematically inspected and chlorinated.

Nutrition programme and diet surveys were carried out in order to educate the public on the importance of food and nutrition. The prevention of food adulteration act was implemented vigorously.

Sanitary arrangements were done for all the fairs and festivals in the Health Unit area and due to the elaborate sanitary arrangements made all the fairs and festivals passed off without any outbreak of epidemics.

(b) Orientation Training Centre.—During the year 1976, five batches of training were held. 40 Medical Officers, 16 Health Inspectors and 20 Health Visitors were trained. The trainees were involved in conducting household health survey, scar survey and family planning survey, etc. They were taken to various institutions. The short-term training course for the newly appointed Health Officers was conducted in four batches in 1976. 18 Health Officers were trained. Trainees from various institutions visited the Orientation Training Centre for practical training.

(c) Research-cum-Action Project.—Under the conversion programme, a total of 2,796 dry latrines were constructed in the four districts of Chingleput, Thanjavur, Madurai and Tirunelveli.

Chingleput	981
Thanjavur	773
Madurai	922
Tirunelveli	100

Further the staff visited every latrine that was constructed in 1974-75 and 1975-76 to see how they were used and maintained. Most of the latrines were found to be under use. In anticipation of sanction from the Government preliminary preparations were done for the conversion programme 1976-77. House to House survey was conducted and those who were interested in the construction of ROAP latrine were asked to make formal application. Public were motivated through individual contacts, group discussions and demonstrations.

Under the regular rural sanitation programme 1,032 latrines were constructed.

Chingleput : 58

Thanjavur : 415

Madurai : 375

Tirunelveli : 184

The Nutrition programme at Valarpuram was continued. Detailed surveys were done. Medical analysis was carried out with the help of house surgeons utilising the ICMR schedule. Improvement in nutritional status since the inception of the supplementary feeding programme has been assessed. Drugs procured from the Health Unit, based on the medical analysts were distributed. Detailed check up of the ante-natal cases were done. The people who were affected with communicable diseases were referred to hospital. Individual contacts were done to impart a good dose of nutrition education to them. Seeds were distributed for Kitchen garden and importance of the same was stressed. During the individual contact, ante-natal mothers with more than two children were educated on the importance of small family norm. The RCAP staff took part in the various training conducted by the Institute of Public Health.

SALIENT FEATURES OF PUBLIC HEALTH ADMINISTRATION REPORT FOR 1976.

1. *Vital Statistics*.—The Birth rate recorded for 1976 was 22.6 per thousand of mid-year estimated population as against 22.9 in 1975.

The Death rate recorded for 1976 was 8.01 per thousand of mid-year estimated population as against 8.3 in 1975.

The Infant mortality rate recorded for 1976 was 47.6 per 1,000 live births as against 46.6 in 1975.

The maternal mortality rate recorded for 1976 was 2.3 per 1,000 live and still birth as against 2.1 in 1975.

The still birth rate recorded for 1976 was 19.74 per 1,000 live and still births as against 18.6 in 1975.

The Birth and Death based on Sample Registration for rural and urban areas combined are :—

Birth Rate : 30.5

Death Rate : 14.6

2. Control of Communicable Diseases.—

Cholera.—During 1976, there were 853 attacks and 47 deaths as against 2,358 attacks and 65 deaths in 1975.

Smallpox.—The State was free from Smallpox, 13.67 lakhs of primary vaccinations and 45.37 lakhs of revaccinations were performed.

Plague.—The State was free from Plague.

Dysentery and Diarrhoea.—There were 21,880 deaths due to dysentery and diarrhoea in 1976 as against 20,997 in 1975.

Malaria.—There were 1,01,305 cases of malaria as against 74,879 in 1975. All control measures were taken.

Filaria.—The Twelve Filaria control units continued their anti-larval measures.

Respiratory Diseases.—There were 84600 deaths due to respiratory diseases as against 32315 deaths in 1975.

Yaws.—During 1976, 1322 villages including hamlets were surveyed and 275 cases were detected and treated.

Guineaworm.—During 1976, 76 cases were recorded in the three infected villages of South Arcot district.

Kala Azar.—During 1976, 1994 villages including hamlets were surveyed and 5 suspected cases were recorded. 1968 sand flies were collected, identified and dissected.

3. *Maternity and child health services*.—There were 3866 maternity and child health centres at the end of 1976 serving the people.

4. *School Health Programme*.—During 1976-77, 1,20,480 school children were examined.

5. *Primary Health Centres*.—The State has 382 Primary Health Centres and out of these 233 Primary Health Centres were functioning in Government buildings. The annual provision of Rs. 10,000 in a Primary Health Centre for purchasing drugs has been increased to Rs. 12,000 per annum and in the case of sub-centre it has been increased by Rs. 200.

6. *Prevention of Food Adulteration*.—During 1976, 23864 food samples were analysed. Out of this 5,660 samples were found to be adulterated representing 23.7 per cent.

7. *D.P.T. Immunisation*.—During 1976-77, 2,62,209 children were immunised with all the three doses.

The Administration of the Department was satisfactory.

ESTABLISHMENT LIST OF FINANCE DEPARTMENT

(As on 1st January 1979)

STAFF IN BILLS SECTIONS

CHIEF WATER ANALYST.

Thiru S. Venkataraman, M.A., D. Stat., C. Chem., A.R.I.C.

ASSISTANT WATER ANALYSTS.

1. Selvi S. Chellam, M.A.
2. Thiru K. Venkatakrishnan, B.Sc.
3. Thiru A. V. Varadharajan, B.Sc.
4. Thiru R. M. Veerappan, B.Sc.
5. Thiru R. Srinivasan, M.Sc.
6. Thiru G. Rajendran, B.Sc.
7. Thiru V. Sathyamoorthy, B.Sc.

Medical Biologist :

Dr. K. M. Veerannan, M.A., M.Sc., Ph.D.

JUNIOR WATER ANALYSTS.

1. Thiru B. Kamalakkannan, B.Sc.
2. Thiru C. Bhasker, B.Sc., A.I.C.
3. Thiru T. S. Venkataraman, B.Sc.
4. Thiru T. G. Kuppuswamy, B.Sc., B.L.
5. Thirumathi C. Parvathy, B.Sc.
6. Thirumathi S. Meenakshisundaram, B.Sc.
7. Thiru G. Balasubramaniam, B.Sc., A.I.C.
8. Thirumathi A. Indirani, B.Sc.
9. Thiru Jacob M. Arulappan, M.Sc.
10. Thirumathi Juliet Vanaja, B.Sc. (Leave from 23rd December 1974).
11. Thiru S. A. Mohamed Tahar, B.Sc.
12. Thiru V. Palaniappan, B.Sc.
13. Thiru A. Kulasekaran, M.Sc.
14. Selvi M. Suriyakala, B.Sc. (From 23rd July 1976 to 4th November 1976).

OTHER LABORATORY STAFF.

1. Technical Assistant—1.
2. Algae Collector—1.
3. Health Inspectors—7.
4. Technical Grade I—12 (One post from 23rd July 1976 to 22nd January 1977).
5. Technician Grade II—8.
6. Laboratory Peons—7 (One post from 23rd July 1976 to 22nd January 1977).
7. Gardner—1.

8. Last Grade Government Servant—4.
9. Driver—1.
10. Cleaner—1.
11. Sweeper—1.

OFFICE STAFF.

1. Thiru K. Radhakrishnan—Accountant.
2. Store Clerk in the Grade of Assistant—1.
3. Junior Assistants—2.
4. Junior Assistant-cum-Typist—1.
5. Steno-Typist—1.
6. Typists—3.
7. Record Clerk—1.

FINANCE.

Receipts.—Income derived by cash, cheques and adjustments bills towards the analytical fees and other services rendered to private bodies, local bodies and others amounted to Rs. 70,901.44. The value of free services rendered in the collection, field and laboratory tests on samples taken from the protected water supplies and other water supply schemes worked out to Rs. 1,36,560.00. The total income for the year would amount to Rs. 2,07,461.44.

Expenditure.—This department incurred an expenditure of Rs. 6,03,729.54 towards pay and allowances of laboratory and office staff, travelling allowances, contingent, cost of instruments and chemicals and sundries.

GENERAL.

Unlike the year 1975, which was a year of drought, the year 1976 had heavy rains in Tamil Nadu, causing unprecedented floods in Madras. As a result of the floods, many areas in Madras city were inundated and the affected people were evacuated and housed in various flood relief camps in the city. To inspect the water supply arrangements and to evaluate the sanitary chemical and bacteriological quality of the water supplied to the various rehabilitation camps of flood victims in Madras city, a sanitary survey and special collection of water samples were carried out by this department and the results and suggestions were furnished to the Director of Public Health and Preventive Medicine and the Health Officer, Corporation of Madras during the period.

Samples of water from the various zones in Madras City were also collected and tested for their bacteriological quality. All the pit taps were advised to be either raised or closed to prevent back siphonage during non supply hours and thus eliminate any possibility of contamination.

The Government in Memo. No. 136167. A 11.1/74-2, Finance, dated 30th November 1974 in which Government have ordered that officers and subordinates should limit their travelling allowance claims to only 50 per cent of their pay, has affected the normal collection and testing of samples from protected water supplies in Tamil Nadu in this laboratory. This restriction has also affected the field investigation relating to industrial waste pollution control, air pollution and water pollution control work. As this monitoring work is an essential programme the Government has been requested to exempt this department from the Travelling Allowance restriction and orders are awaited.

Due to restriction on petrol, the work of the department was much hampered as many investigations and inspections could not be carried out.

The Chief Water Analyst continued to inspect a number of major and minor industries to assess the extent of pollution of the environment caused by the various effluents and gases discharged from these.

Proposals have been submitted for the creation of a Gazetted Assistant Post and other supporting ministerial staff to relieve the scientific personnel from doing office work. So far these have not been sanctioned.

As per G.O. Ms. No. 90, Public Works Department, dated 20th January 1970, the Public Works Department completed the construction of the new building but have not so far provided laboratory furniture, construction of overhead tank for storing water and other pending civil and electrical works. The Public Works Department has been addressed and reminded to complete these pending works. The revised estimate for the pending works relating to these have been obtained and submitted for administrative sanction.

The starting of regional laboratories for water, sewage, industrial waste, air pollution, etc., is also very essential so as to expand and intensify the laboratory services to the public and in monitoring the extent of environment pollution and degradation. This would also achieve the cherished objectives of the Government for providing safe and wholesome protected water to the villages, towns and cities in the respective regions. So it would be imperative to start regional laboratories at Madurai and Thanjavur in the first phase for carrying out analysis of water, sewage and industrial wastes for controlling and monitoring the environmental pollution.

The problem of pollution of the land, air and water is increasing day by day due to the rapid industrialisation and so periodical inspection becomes a necessity. The analytical and field investigation activities have thus increased considerably. In order to carry out these increased activities effectively, proposals have been submitted already for strengthening the analytical staff in this regard and the early sanction of these proposals would go a long way in carrying out frequent monitoring of the environment.

At present the Chief Water Analyst is in general administrative charge of the department. He directs and coordinates the work of the different sections of the department. There are eight sections each headed by an Assistant Water Analyst (Gazetted). He has to peruse all reports relating to the periodical examination of all the protected water supplies, private supplies, rural water supplies, sewage and industrial waste analysis, air pollution surveys, research schemes, Annual reports, special reports, etc.

He has also attend meetings held by organisations like the Indian Standards Institution for drafting standards and also to participate in Seminars and Symposia held at different parts of the country. He has also to give lectures to the trainees, engineers and health officers undergoing training.

In view of these, it would be physically and extremely difficult for Chief Water Analyst to shoulder the ever increasing load of administrative and technical work without the assistance of a Deputy Chief Water Analyst.

In this connection it may be stated that the Government Analyst for Food and Drugs is provided with a Deputy Government Analyst who is of great assistance to the Government Analyst in looking after some major portion of work in that department. This department which is having both indoor and out-door activities unlike the Food Analysis Laboratory, has not been provided with a Deputy Chief Water Analyst all these years, though the variety and nature of work and the load has been mounting beyond measures. In view of these facts the sanction of a Deputy Chief Water Analyst is absolutely essential and proposals have been submitted already in this regard, and sanction is awaited.

During the year under report, this laboratory has been the main centre of activities relating to environmental pollution control and research. The variety and scope of the large number of problems successfully investigated in the field during the year, show that local bodies, private institutions, departments of Government, the industries and the public have come to recognise and appreciate the necessity, the importance and usefulness of such activities and investigations undertaken by the laboratory for elucidation advice and assistance.

The good amount of work turned out by this laboratory is due to the keen interest evinced by the various categories of the staff in this department.

ACTIVITIES OF THE DEPARTMENT.

Each water supply is visited 3 times a year and water samples from the various protected water supplies including hospitals, jails, railway stations and other institutions are collected and tested both for chemical and bacteriological examination. The hygienic quality of the water supplies is thus checked and monitored periodically by this department. The full details of the water supplies under periodical examination are given in Table I.

The department offers an integrated and comprehensive laboratory field service to deal with all aspects of environmental sanitation relating to protected water supplies, new water supply investigations, rural water supplies, sewage treatment and disposal, air pollution, sanitary microbiology, food bacteriology, etc. Testing of disinfectants to assess their germicidal value (R. W. Coefficient and supply of standard stains of staphylococci and typhoid organisms) are further additions to the sources.

The department has facilities for training candidates in the methods of testing water, milk and milk foods, sewage, industrial wastes and disinfectants for R. W. Coefficient value. Water samples were also received from private parties and sectors to assess suitability of water for specific industrial purposes and necessary advice regarding treatment.

Hospitals in the city are visited thrice a month by a Health Inspector from this department, and he checks up the residual chlorine and collects samples for test. The Health Inspector helps the staff of the hospital to carry out chlorination with proper dose and thus hygienic safety of the hospital water supplies are ensured.

TRAINING AND VISITORS.

Students and trainees from the following institutions were received and taken round and explained the activities of this department.

1. Students of the Short Term Course in Public Health Engineering from the College of Engineering, Guindy, Madras.
2. Final M.B.B.S., Students from the Chingleput Medical College, Chingleput.
3. Health Education Teachers undergoing training in Health Education from the Institute of Public Health, Poonamallee.
4. Final M.B.B.S., students from Thanjavur Medical College, Thanjavur.
5. Home Science, students from the Queen Mary's College, Madras.
6. Final M.B.B.S., Students from the Kilpauk Medical College, Kilpauk, Madras-5.
7. Students from Madras Medical College, Madras.

The Chief Water Analyst has been included as a member and attended the Regional Conference of Indian Association of Occupational Health (Tamil Nadu Branch).

The Chief Water Analyst has been included as member of the Task Force set up by the Central Leather Research Institute, Madras for the satisfactory treatment and disposal of wastes from the tanneries in Tamil Nadu.

The Chief Water Analyst has been included as a member in the SIPCOT Advisory Committee for the satisfactory treatment and disposal of wastes from the industries at SIPCOT, Ranipet and attended the meetings.

The Chief Water Analyst gave a short broadcast in the All-India Radio, Madras on "கிணற்று நீரை குடிநீராக்கும் முறைகள்".

The Chief Water Analyst attended the Seminar on the treatment and disposal of tannery wastes conducted by Central Leather Research Institute, Madras.

The Chief Water Analyst has attended the I. S. I. meetings at New Delhi as a State representative.

Division of Bacteriology.—This division continued to have a check on all the protected water supplies in various districts in Tamil Nadu. The seven Health Inspectors are sent out to collect samples of water from different protected water supplies after doing spot tests for the presence of residual chlorine and those samples are carefully packed and brought to the laboratory at Guindy for complete physical, chemical, bacteriological and biological examinations. Samples from each protected water supply is tested thrice a year and thus quality control is maintained. The particulars of the protected water supplies visited, water sources, type of filtration chlorination, etc., are given in Table I. Samples of water are also received from private parties for assessing their sanitary quality and for use in various types of industries. Table II gives the particulars regarding the number samples tested under each category.

The routine bacteriological examination of water samples consists of the following tests :—

1. Standard Plate count on Agar at 37° C for 24 hours.
2. M.P.N. of Coli-aerogenes group of bacteria after 48 hours incubation at 37° C.
3. The differential and completed test for coliforms.
4. The Faecal Streptococci test.
5. Clostridium Perfringens test.

Special tests are carried out wherever necessary and in cases of water pollution and outbreak of epidemics.

The Department of Chief Water Analyst, King Institute, Guindy, is recognised by Indian Standard Institution for supplying stock cultures of Salmonella typhi 786 and staphylococcus aureus NCTC 3750. Requests for the supply of fifty-two cultures of Salmonella typhi and thirty cultures of Staphylococcus Aureus were complied with during this year.

Three samples were tested for Proteolytic and Lypolytic bacterial counts as per I.S.I. method.

Samples of phenyle disinfectants were received from various parties and were tested for Rideal Walker Staphylococcus coefficient and Stability. These details are furnished in Table III.

Monitoring of Sanitary Quality of the Protected Water Supplies in Tamil Nadu.—The percentage of hygienically satisfactory samples of water collected by the Health Inspectors of this Department from various water supplies in the Districts and tested periodically at Guindy laboratory is summarised and given in Table IV.

City Hospital Water Supplies.—A Health Inspector visits at least one hospital daily and checks up the residual chlorine content of the water supply. When there is no evidence of chlorination the Health Inspector gives necessary instructions on the spot such that chlorination is carried out satisfactorily. This is practised throughout the year.

There are at present 12 major hospitals which are covered by the Health Inspectors. Samples are collected and tested at the spot for residual chlorine daily. Samples are also collected and brought to the laboratory for complete bacteriological examination once a month from every hospital.

Special Studies.—The tetrathionate broth which is now being used as enrichment medium for growing salmonella and Shigella group of organisms is not giving satisfactory results. Studies are being made with Selenite-F broth as a better enrichment medium followed by Desoxycholate citrate Agar plating for isolating the S.S. group of organisms.

FIELD INVESTIGATIONS.

Kodaikanal Township.—Use of Lake water for augmenting the Township supply (Tvl. S. Venkataraman and K. Venkatakrishnan)

Due to drought conditions the Pambar water become inadequate for the supply to the township. So it was decided, to pump the lake water for augmenting the township supply during the season time.

The entire lake area was surveyed for its sanitary condition and all the defects were mentioned in the report. It was also advised to post watchman allround the lake to prevent access of men and cattle and conserve the source. The lake water should be filtered through a pressure filter and then chlorinated and supplied as a measure of hygienic safety.

MANDAPAM CAMP.

DIARRHOEA CASES REPORTED AMONG REPATRIATES INVESTIGATION.

(Tvl. S. Venkataraman and K. Venkatakrishnan)

As per the instructions of Director of Public Health and Preventive Medicine a field unit was deputed to Mandapam Camp to investigate the reported cases of Diarrhoea.

The repatriates were supplied with drinking water from two wells which had turned brackish. So the repatriates were taking water from various individual wells using their own vessels (rusty tins) and thus these wells were getting grossly polluted. There were plenty of flies in the camp and the pump in the sewage station was also not working. It was advised to chlorinate the wells daily and to repair the pump for pumping sewage into the sea.

MANDAPAM CAMP—DIARRHOEA CASES—FOLLOWUP ACTION.

(Tvl. S. Venkataraman and K. Venkatakrishnan)

As per the instructions of Director of Public Health and Preventive Medicine and for followup action a field unit was sent to Mandapam camp again.

All the wells in use were checked. It was seen that the sewer lines were being relaid and the pump in sewage pumping station was also being repaired.

The Health Inspector in-charge of Mandapam camp was instructed to chlorinate the wells with proper dose of chlorine and also to keep the surroundings of the camp in a hygienic condition. Samples were collected for detailed examination also.

PANDIAR PUNNAMPUZHA HYDRO-ELECTRIC PROJECT INVESTIGATION.

(Tvl. S. Venkataraman and K. Venkatakrishnan).

At the request of the Superintending Engineer, Hydro Electric Project, a field unit visited Nilgiris District and carried out field tests, like dissolved oxygen, pH, free CO_2 , H.S. alkalinity, corrosivity etc. and also collected samples from the following places for analysis:—

1. Punnampuzha Dam site
2. Diversion Point
3. Pandiar Dam site
4. Power House
5. Umbilimalai—stream
6. Yellamalai—stream
7. Fore bay.

A detailed report about the quality of the waters has been furnished.

Division of Chemistry.—During the year 1976 four thousand two hundred and twenty six samples (4226) were received for physical, sanitary chemical and mineral analysis to assess their potability and suitability for various non-domestic or industrial uses such as boiler feed, cooling, construction, irrigation, food processing, film processing etc.

Two hundred and sixty three (263) samples of bleaching powder used in the various protected water supplies of the State were analysed to assess their quality.

Seven (7) field investigations were conducted during which 297 spot tests were carried out. Samples were also collected during the field investigations and examined in detail at the laboratory at Guindy for their characteristics and reported.

Two samples of urine collected from the inpatients of hospitals were forwarded by the Professor of Medicine, Madurai Medical College and Reader in Medicine, Stanley Medical College, Madras respectively for the estimation of fluorine content. The fluorine contents were found to be 0.2 and 1.4 mg/l respectively.

FIELD INVESTIGATION.

METTUR WELLS POLLUTION STUDIES.

(Tvl. B. Venkataraman, A. V. Varadharajan and G. Balasubramaniam.)

At the request of the Collector of Salem, a scheme was sanctioned for the study of pollution of wells in P. N. Patty and Veerakkalpudur, Mettur taluk, Salem district by the industrial effluents let out from M/s. Chemplast and M/s. R. G. Soda factory.

Out of 350 wells stated to have been polluted by the industrial effluents, 68 wells are irrigation wells and the rest are drinking water wells. Water samples from 46 irrigation wells were tested and reported prior to the sanction of the special scheme.

After the sanction of the special scheme, six trips were made to the Mettur area for the survey and collection of water samples from the remaining affected wells. During the present survey 91 water samples were collected for sanitary chemical analysis to assess their potability. Twenty seven water samples were collected for mineral analysis to assess their suitability for use in irrigation. 186 drinking water wells and one irrigation well were found filled up and closed. Two irrigation wells (listed) were dried up and hence samples could not be collected from them.

Out of the 27 water samples, 5 were found to be usable, 2 were found to be tolerable and the remaining 20 were found to be unsuitable for use in irrigation.

Out of the 91 water samples tested for potability, 17 were found to be usable, 6 were found to be tolerable and the remaining 68 were found to be unsuitable for drinking.

Since the drinking water wells in P. N. Patty and Veerakkalpudur and Pudukottai have been badly affected by the industrial effluents let out from the industries, M/s. Chemplast and M/s. Mettur Chemicals are supplying 10,000 gallons of raw water (from Cauvery) every day to the above villages. The water is filtered and supplied to the villages by the Panchayat Union through public fountains and house connections for 5 hours a day. The Tamil Nadu Water Supply and Drainage Board is now executing a protected water supply scheme for the above villages.

POLLUTION OF WELLS IN KANNADAPALAYAM POLAL TOWN PANCHAYAT CHINGLEPUT DISTRICT.

(Tvl. S. Venkataraman and A. V. Varadharajan).

On the petition received from the residents of Kannadapalayam, Polal town panchayat, Chingleput district that their drinking water wells were polluted by the effluents let out from M/s. Madras Heavy Chemicals, G.N.T. Road, Polal, the Health Inspector, Madhavaram Panchayat Union, Polal collected samples of water from two of the affected wells and forwarded them for analysis on 15th November 1976.

On a preliminary analysis of the two samples of water, the presence of toxic substances were noticed and the Health Inspector was immediately directed to advise the public not to use the water from the wells since they were found polluted.

Both the samples were discoloured and turbid in physical appearance. They were acidic in character and contained 15 and 20 mg/l of total chromium respectively.

As a follow up action the Chief Water Analyst accompanied by the Assistant Water Analyst (Chemical) and Executive Officer of Polal town panchayat inspected M/s. Madras Heavy Chemicals, Polal and the affected wells in Kannadapalayam on 22nd December 1976.

The industry, located in G.N.T. Road, Polal is stated to manufacture sodium acetate, sodium sulphide, saltpetre, sodium formate, zinc sulphate, sulphur roll, sulphur dusting, sodium chromate, chrome oxide green and other industrial chemicals. The industry was not working at the time of inspection. Alum blocks, bleaching powder (in drums), sodium chromate (in bags), Formaldehyde (in drums) were seen stored in the godown rooms. Sulphur was found stocked in the open ground.

Though there was no activity in the factory during the inspection, there was evidence of some chemical processing being carried out. The series of masonry settling tanks in the factory contained some coloured liquids. There was no provision for the treatment of solid and liquid wastes. There was a kutchra drain inside the factory in which the liquid waste discharge were emptied. The liquid wastes are allowed to flow out of the factory into the drainage channel running close by. The channel passes through Kannadapalayam village fields and finally joins a tank. All the draw wells located on either side of the channel had been affected. The residents complained that the well waters had become discoloured resulting in fish mortality. The waters were stated to cause skin irritation and had also become unpalatable.

The samples of effluent collected from

1. The drain inside the factory, and
2. The stagnation in the irrigation channel were found to be highly alkaline and contained excessive amount of total chromium (641 mg/l and 1291 mg/l of total chromium).

In view of the findings it was suggested that the industry might be directed to choose an altogether different site. Since the industry is close to the Red Hills lake and had been discharging wastes containing chromium, it is not advisable to allow it to function any more at this spot.

Division of Rural Water Supply.—This division continued to render useful service in the selection of potable water supply sources to the various villages in our state which lack the basic and primary amenity of a protected water supply. The samples collected and forwarded under various government schemes such as Rural Water supply, village works programme, harijan welfare scheme, drought relief, etc., by the Panchayat Union authorities were received and examined for suitability and the initial and final certificates on potability were issued expeditiously for the speedy implementation of these public welfare works.

One thousand four hundred and thirty six (1436) samples were received from various districts during this year for analysis to assess their physical and chemical characteristics. It is to be mentioned here that not a single sample was received from Nilgiris district.

On the basis of excessive mineral concentrations, excessive hardness, brackishness or harmful concentration of fluorine, 121 samples received were declared unfit for potability and domestic purposes. Of these samples containing fluorine alone in excess of the stipulated tolerance limit of 1.5 mg/l were 89.

Districtwise particulars giving details on the total number of sources tested during the period, total number of samples declared unfit, causes for their rejection etc., have been furnished in the Table VII.

The total number of identical samples received from various districts are given in Table VIII.

Salient Features.—1. Chengalpattu district stores the distinction of having sent the maximum number of samples viz. 114 this year.

2. Not a single sample was received from Nilgiris district.

3. Kanyakumari district sent only one sample during the course of this year.

4. Highest Fluorine was recorded in Dharmapuri district.

Special sample collections were arranged through the District Health Officers to confirm the characteristics and quality of waters in doubtful cases.

It was observed that in most of the suspected cases, samples have been collected wilfully from entirely different "better sources" other than the areas for which the ground level reservoirs or overhead tanks are proposed, evidently to get favourable potability certificates. Infructuous and wasteful expenditure of constructing permanent tanks and reservoirs for wells with non-potable waters were thus avoided by the vigil and careful watch of this division on the quality of water samples sent by the local authorities. Such lapses were brought to the notice of the concerned authorities.

In connection with giving house service connection from the already approved water supply under rural water supply scheme, sample takers from this department were deputed to Achampudur, Tirunelveli district and Ammapet Town Panchayat, Thanjavur district to collect samples for chemical and bacteriological examination and to conduct a sanitary survey.

Division of medical biology.—During the year under review, the division of medical biology carried out a survey of intestinal parasitic and filarial infections among the members of the Water Analysis Department, King Institute, Guindy, Madras. In this connection, 72 stool samples and 216 blood samples were collected and microscopically examined for parasitic cysts, ova and larvae.

Statistical analysis of the data showed that 64.77 per cent were positive for one or more species of parasitic organisms. 23.94 per cent were harbouring single parasite; 28.16 per cent, double parasites; 11.26 per cent, triple and in only one sample four parasites were observed. *Entamoeba coli*, non-pathogenic amoeba was present in 5 (7.04 per cent) samples and it was seen in conjunction with *Entamoeba histolytica* in 9 (12.67 per cent) samples. The biggest round worm, *Ascaris lumbricoides* was present in 6 (8.45 per cent) samples and it was observed along with *Entamoeba coli* in 2 (2.82 per cent) samples and along with *Entamoeba histolytica* in 3 (4.22 per cent) samples. In only one sample, four parasites, namely, *Entamoeba histolytica*, *Giardia lamblia*, Hookworm and *Trichuris trichocephalus* were present.

Out of 71 participants in the investigation, 64 were males and 7 are females. The results indicated that the rate of parasitic infection is comparatively higher in males than females, the values being 65.28 per cent for males and 57.00 per cent for females.

Regarding filarial survey, three blood samples from each subject (wet preparation, thin smear and thick smear), were collected by finger prick and examined microscopically for the presence of microfilaria larva. In view of the practical difficulties in collecting night blood, samples were collected during day time, between 11.00 a.m. and 12.00 a.m. and the smears were stained with eosin. Both thick and thin smears were thoroughly examined microscopically. However, all the samples were negative for microfilaria larval. This survey has been undertaken, in view of the fact that the work spot (Water Analysis Department) of the participants investigated, is situated in between Guindy and Saidapet, close to Adyar river. These areas are considered to be endemic for filarial infection.

The results of microscopic examination of stool and blood samples were communicated to the concerned individuals so as to enable them to get necessary treatment.

During 1976, another survey has been initiated to estimate the degree of intestinal and filarial infections among the slum dwellers in the Metropolitan area in Madras City. This study has been undertaken with the co-operation of the Tamil Nadu Slum Clearance Board. Forty five stool samples and 135 blood samples from the slum dwellers around Saidapet were collected and examined microscopically. Particulars regarding the general living conditions in the area, type of house, economic status, their habits, sex, marital status, diet, sanitary conditions, provision of latrine, mode of disposal of night soil, water supply, drainage, etc., were collected to find out the influence of the cases, samples of night blood were also collected and examined microscopically for environmental factors on the rate of intestinal and filarial infections. In suspected microfilaria larva. The survey is being continued and a detailed report will be submitted after completing the work.

Besides the above surveys, 25 stool samples were received from private parties for microscopic examination. Further, a research paper entitled "Intestinal Parasites of man around Madras" has been sent to "The Indian Journal of Public Health" for favour of publication.

Division of Mobile Field Unit.—This section deals with the problems relating to air pollution caused by the obnoxious gaseous wastes discharged from the different types of major and minor industries in this State. During each investigation, air samples are collected from the environments of these factories at various distances and directions and parts of the day and examined to assess the nature and extent of gaseous pollutants present and to suggest suitable implant control measures to be adopted by the industries for the abatement of atmospheric pollution.

Air pollution means the presence in the outdoor atmosphere of one or more contaminants such as dust, fumes, gas, mist, odour, smoke or vapour in quantities of characteristics and of duration such as to be injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property.

During the year under review as many as fifteen field investigations were carried out and 494 air samples were collected and examined for the estimation of various atmospheric pollutants such as:—

1. Sulphur dioxide
2. Sulphur trioxide
3. Hydrogen sulphide
4. Mercaptans
5. Fluorine compounds
6. Nitrogen oxides
7. Ammonia
8. Chlorine
9. Hydrogen chloride gas
10. Boron and Chromate dust.

The following industries were visited during the year to study the efficiency of the air pollution control measures adopted by them and to conduct air pollution surveys in their environments:—

1. Messrs. Premier Fertilizers Limited, Pachaiyankuppam, Cuddalore.
2. Messrs. Southern Petro Chemical Industries Corporation, Tuticorin.
3. Messrs. South India Viscose Limited, Sirumugai, Coimbatore district.
4. Messrs. Seshasayee Paper and Boards Limited, Pallipalayam, Salem district.
5. Messrs. Coimbatore Pioneer Fertilizers Limited, Muthugoundanpudur, Coimbatore district.
6. Messrs. South India Glass and Enamel Works Limited, Jagir Ammapalayam, district.
7. Messrs. Shaw Wallace and Company, Sulphuric Acid Plant and Glue Factory, Kaduvetty, Chingleput district.
8. Messrs. Mettur Chemical and Industrial Corporation Limited, Mettur Dam, Salem district.
9. Messrs. S. N. Glass Industries, Thiruvottiyur.
10. Messrs. Shaw Wallace and Company, Superphosphate Fertilizers Factory, Avadi.

Air pollution surveys were also carried out in the SIPCOT Industrial Complex, Ranipet, North Arcot district in order to collect baseline data on the prevailing air quality and also in the environs of Manali Industrial Complex area. In this place, the following industries are located very close to each other:—

- (1) Madras Refineries Limited.
- (2) Madras Fertilizers Limited.
- (3) Nagpal Petro-Chem Limited.
- (4) Indian Organic Chemicals Limited.
- (5) Sri Ram Fibres Limited.

At the request of the Secretary, Tamil Nadu Public Service Commission, Madras-2, the oxygen and carbon dioxide contents in the air of the three air-conditioned interview rooms have been estimated by this laboratory and the results were furnished. The oxygen content in the air-conditioned rooms was at the satisfactory level and the concentration of oxygen was fairly at the same level as that present in the air outside.

Water pollution survey around the SIPCOT Industrial Complex, Ranipet was also carried out by this division during this year. SIPCOT Complex has been divided into 10 zones and there are 60 developed plots provided with infrastructural facilities such as water supply and underground drainage system. Each zone is having its effluent treatment units separately comprising of screen well, grit well and oxidation pond. From the oxidation pond the effluent will flow into the nearby irrigation tanks. In order to have a baseline data, water samples from all the nearby irrigation tanks and effluent samples from the oxidation ponds were collected and analysed to ascertain their physical and chemical characteristics.

Effluent samples from the Tamil Nadu Chromates and Chemicals Limited were also collected and tested. A detailed report was sent to the company on the nature of effluent and the measures to be adopted by them for safe disposal of solid and liquid wastes.

FIELD INVESTIGATIONS.

- a. Air Pollution Survey carried out around Messrs Premier Fertilizers Limited, Pachaiyankuppam, Cuddalore, South Arcot district.

(Thiruvalluvar S. Venkataraman, G. Rajendran and T. G. Kappaswamy.)

The District Health Officer, South Arcot district at Cuddalore, has reported in his letter C4/4553/64, dated 22nd April 1975 that Messrs Premier Fertilizers Limited have not implemented the suggestions made at the meeting convened by the District Collector on 29th May 1967 for the abatement of the nuisance on account of obnoxious gaseous wastes discharged from this industry. He has further stated that petitions were being received from the local public about this nuisance and a resolution has also been passed at the Municipal Council, Cuddalore requesting the District Health Officer to take urgent steps for the abatement of atmospheric pollution caused by this factory. At his request a field investigation was carried out by this department between 8th March 1976 and 10th March 1976 in order to study the nature and extent of environmental pollution caused and to assess the efficiency of the control measures if any, adopted by this fertilizer industry.

A study of the gaseous effluents from this industry was carried out previously in July 1970 and it has been recommended that the industry should follow certain control measures. But at the time of present survey it was observed that none of the suggestions offered earlier were not implemented.

The results of analysis of air samples collected on this occasion showed the presence of sulphur dioxide exceeding the permissible concentration. Hence it was reiterated that the industry should take immediate action for the implementation of the recommendation in order to stop polluting the atmospheric air.

2. Air Pollution Survey carried out at the Tuticorin Thermal Power Project Camp site and around SPIC Fertilizer Complex, Tuticorin.

(Thiruvallargal S. Venkataraman, G. Rajendran and T. G. Kuppuswamy.)

At the request of the Chief Engineer (Project and Construction) Tamil Nadu Electricity Board, Madras-2, an air pollution survey was carried out between 24th and 26th March 1976 by this department at the Tuticorin Thermal Power Project camp site and around Southern Petro-chemical Industries Corporation, Fertilizer Complex, Tuticorin, in order to assess—

(1) the nature and the extent of atmospheric pollution caused by the discharge of gaseous effluents; and

(2) to study the effect of such gaseous pollutants to the human beings and vegetation.

SPIC Fertilizer Complex is located about 2 KM on the south of T.T.P.P. Camp site. It was stated by the Assistant Engineer (Civil), T.T.P.P. camps that it has been proposed to construct residential flats (temporary and permanent types) for about 1,000 families in this camp site.

The fertilizer complex of Southern Petro-chemical Industries Corporation has been constructed to manufacture the following products:—

- (1) Ammonia.
- (2) Urea.
- (3) Sulphuric Acid.
- (4) Phosphoric Acid
- (5) DAP/NPK.

The industry has commenced production of ammonia and urea with effect from 22nd June 1975. It was told that the acid plants were not yet commissioned on regular basis. The probable gaseous pollutants evolved from this fertilizer complex are oxides of sulphur, ammonia, fluorine compounds and hydrogen sulphide.

Installation of SO₂ recovery unit, i.e., scrubbing of SO₂ and SO₃ exit gases with ammonia, wet scrubbers to check emission of gaseous wastes containing fluorine compounds and provision of very tall stacks at all the plants are some of the air pollution control measures adopted by the industry.

At the time of visit of the field unit, the factory was under shutdown due to some technical problems. The factory authorities informed that their ammonia and urea plants would be started in a week and the acid plants in another one to two months. In spite of this and with a view to have baseline data of air quality in the absence of functioning of the SPIC plants, air samples were collected at eight places in the T.T.P.P. camp area and around SPIC Industry for estimating the air pollutants.

The presence of SO₂ was recorded (0.244 ppm) on 26th March 1976 at about 200 metres north of factory stack and near SPIC Contractor's Labour Colony. The presence of SO₂ was due to the fuel oil burnt for firing the four boilers in the SPIC Industry. Excepting this, the air analysis revealed the absence of all the other gaseous pollutants tested on this occasion. Hence it was suggested to carry out another air pollution survey at this place when all the SPIC plants are in normal working.

3. Air Pollution Survey conducted in the environments of Messrs South India Viscose Limited, Sirumugai, Coimbatore district.

(Thiruvallargal S. Venkataraman, G. Rajendran and T. G. Kuppuswamy.)

In order to assess the nature and extent of atmospheric pollution caused by the discharge of gaseous wastes from Messrs. South India Viscose Limited Factory at Sirumugai, Coimbatore district an air pollution survey, collection and analysis of air samples were carried out by this department during the first week of November 1976.

This industry is located about 10 KM. away from Mettupalayam on the Mettupalayam-Bhavani Sagar road in an area of about 285 acres. The following products are manufactured in this industry.

1. Wood pulp
2. Rayon yarn
3. Staple fibre
4. Carbondisulphide
5. Sulphuric acid

The probable atmospheric pollutants in the gaseous discharges are sulphur dioxide, sulphur trioxide hydrogen sulphide, carbon disulphide and mercaptans.

Plant Control Measures Adopted.—The gases evolved from the spinning and bleaching sections are sucked by powerful blowers and let into the atmosphere through a tall stack of about 55.5 metres height to effect proper dispersion and dilution on the ambient air. The equipments are closed with glass pannels and ducts are provided at various points to exhaust the gases evolved. Humidified, fresh air is pumped into the spinning hall which to a larger keep the hall free from any gases.

The blow pits of the pulp plant are covered and the evolved gases are conveyed through ducts to an aspirator which out the gases and lets out at sufficient height.

In the sulphuric acid plant the unconverted su ks SO₂ and Unabsorbed SO₃ gases are let off through a high stack. It was also ststed that sulphur is recovered from the H₂S and CS₂ gases.

Samples of air at different directions and distances were collected and examined. The results of analysis showed the absence of H₂S and mercaptants at all the sampling stations. Sulphurtrioxide was present in all the air samples collected and sulphur dioxide was however present only at two places to a level of 0.22 ppm. On an enquiry from the public of surrounding places it is learnt that some times the fumes from this industry, caused odour nuisance and during nights on some days the gaseous discharges caused irritation of eyes, cough, etc. Hence it was suggested that the industry should take all steps to tone up the control Measures adopted for the abatement of air pollution in its environments.

4. Air Pollution Survey conducted around Messrs Seshasayee Paper and Boards Limited, Pallipalayam, Salem district.

(Thiruvallargal S. Venkataraman, G. Rajendran and T. G. Kuppuswamy)

A field investigation and air pollution survey were first conducted by this department during the first week of July 1974. The findings of this survey were discussed by the Tamil Nadu Water and Sewage Purification Committee. The committee then suggested that the industry should adopt better control measures for minimising air pollution and odour nuisance. Since the industry has not intimated this department the measures adopted for minimising the pollution problem a suprise field investigation was carried out by this department on 8th and 9th June 1976 to assess the characteristics of the prevailing ambient air around the industry and the surrounding places.

In this industry about 105 tonnes of paper (Kraft, printing, writing and paper boards) are manufacturd from bamboo and hard wood by sulphate process. There has been no change in the processes manufacture since the last nvestigation. The probable composition of gaseous wastes discharge from th s industry ncludes SO₂, H₂S and mercaptans.

During this investigation samples of air were collected at various places around this industry. A sample of air was also collected at Erode Town which is about 4KM west of paper mills.

It was observed that SO₂ was present at 5 places in the range of 0.48 ppm to 1.96 ppm. These values exceed the prescribed limits. H₂S was present at only one place to the extent of 0.72 ppm. Mercaptan was present to an extent of 0.24 ppm. ta Odappalli Agraharam and Ayakattur. The ambient air at Erode showed the absence of SO₂ H₂S and Mercaptans. During the investigation the weather was sunny and hot and the wind was blowing in the opposite direction, i.e., from Erode to Pallipalayam. It is however likely some un nuisance may be experienced at Erode during rainy seasons and when the wind traverses from Pallipalayam to Erode.

Judging from the result of analysis, it is seen that the air pollution control measures adopted by the industry are not satisfactory. Hence it was reported that the industry should institute necessary satisfactory air pollution control measures for the abatement of odour nuisance.

5. Air Pollution Survey carried out around Messrs Coimbatore Pioneer Fertilizers Limited, Muthugoundanpudur (via) Sular, Coimbatore district.

(Thiruvargal S. Venkataraman, C. Rajendran and T.G. Kuppusamy).

Air pollution survey, collection, and analysis of air samples were carried out in the neighbourhood of Messrs Coimbatore Pioneer Fertilizers Limited during 5th to 7th August 1976. This industry is located about 20 KM from Coimbatore in an area of 28 acres. The following products are manufactured in the factory :—

1. Sulphuric acid - 25 tonnes/day
2. Superphosphate Fertilizer—600 tonnes/month.

The raw materials used in this factory are the rock phosphate and the elemental sulphur. Sulphuric acid is manufactured by the contact process and the super phosphate fertilizer is produced by mixing finely ground rock phosphate with a proportionate quantity of 75 per cent H_2SO_4 in a mixing tank.

The chief pollutants are SO_2 , SO_3 and fluorine compounds. On the days of the survey the super phosphate fertilizers plant was not working due to accumulation of stock. The sulphuric acid plant only was in production.

Samples of air were collected from 9 places around the industry and tested. The results of analysis showed the absence of fluorine compounds at all the sampling places. This is probably due to the non-functioning of the super phosphate plant. SO_2 was however present upto 2.9 ppm V/V. The maximum concentration was recorded at about 300 metres north east of the factory. The levels of SO_2 estimated at 4 places are beyond the permissible values.

On an enquiry from the public of surrounding villages it is learnt that some times the fumes from this fertilizer industry cause irritation of eyes, cough and suffocation. The President, Sular Panchayat union was also informed that similar instances have frequently occurred in the area. Hence the following control measures were suggested :—

1. The stack height of H_2SO_4 plant should be raised to 150 feet from the present height of 60 feet.
2. A suitable wet scrubber may be installed for reducing the discharge of fumes.
3. During start up of the H_2SO_4 plant and the breakdown period, ammonia should be let off close to the stack so that the acidic gases will get neutralised.

In order to assess the nature and extent of atmospheric pollution caused by the discharge of gaseous wastes from Messrs South India Glass and Enamel Works Limited, Jagir Ammapalayam, Salem Air Pollution Survey, collection and analysis of air samples were carried out by this department during 8th and 9th December 1976. This factory is located on the Salem - Bangalore Trunk Road and about 15 KM from Salem town in an area of about 14 acres. The factory had commenced production in 1949 and now manufactures commercial and opal glasswares. The main products manufactured are :

- (1) Bottle
- (2) Jars
- (3) Tumblers, and
- (4) Lamp chimneys

The following raw materials are used for the production of glass in this factory :—

- (1) Quartz and
- (2) Soda ash
- (3) Calcite
- (4) Feldspar
- (5) Fluorspar
- (6) Sodium nitrate
- (7) Borax
- (8) Arsenic trioxide
- (9) Selenium and cobalt oxides
- (10) Cullet.

The quantity of raw materials would vary depending upon the nature of glass manufactured viz. commercial or opal glass.

At the time of visit of the field unit, the factory was under shut down due to some administrative reasons and also accumulation of stocks. If the factory works in full swing the probable gaseous pollutants discharged into the atmosphere would be sulphur dioxide, fluorine compounds and boron. However air sampling was carried out and examined for these gaseous pollutants in order to have a baseline data. The results of analysis revealed that they are absent in the ambient air of factory. The factory authorities have been addressed requesting to inform this laboratory as soon as all the units of their glass factory resume normal production so as to enable this department to carry out another air pollution survey.

7. AIR POLLUTION STUDIES CARRIED OUT AROUND M/s. SHAW WALLACE & COMPANY, KADUVETTI, CHINGLEPUT DISTRICT.

(Thiruvargal S. Venkataraman, G. Rajendran and T. G. Kuppusamy).

The collection and analysis of samples of air from a few places situated at different distances and directions from the Glue and Sulphuric acid factory of Messrs. Shaw Wallace & Company, Kaduvetti, Chingleput District was carried out in different seasons during the year 1964 and reported on the levels of atmospheric pollution caused by the gaseous waste discharge from this industry. Subsequently in order to assess the extent of air pollution in the surrounding places due to waste gases emission a detailed air analysis study was conducted by this department on 20th October 1976 and 26th October 1976.

The following products are manufactured in this factory :—

1. Sulphuric acid—100 tonnes/day
2. Glue—7 tonnes/day.

The probable gaseous pollutants from this factory are SO_2 and SO_3 from the sulphuric acid plants. Samples of air were collected from 8 places and analysed. The SO_2 concentration in the ambient air was estimated to be in the range of 0.22 ppm to 1.22 ppm. They are however above the allowable limits. The level of SO_2 was also observed at these places ranging between 0.23 ppm to 1.5 ppm. Maximum concentration of SO_2 was recorded at about 100 meters east of factory where irritant smell was also noticed at the time of samples collection. On an enquiry from the public it is learnt that so on times the acid fumes discharged from this factory caused irritation of eyes, cough and suffocation.

Based on the recommendations made by the expert team which carried out a detailed survey at Alwaye on the manufacturing processes and the control measures adopted by the sulphuric acid plants, Government in G.O. Ms. No. 1782, Health, dated 18th November 1967 have recommended some of the control measures to be adopted by the sulphuric acid plants. These recommendations have been communicated to the industry for implementation by them to abate air pollution in the environment.

8. AIR POLLUTION SURVEY CARRIED OUT AROUND MESSRS. METTUR CHEMICAL AND INDUSTRIAL CORPORATION LIMITED, METTUR DAM R.S. SALEM DISTRICT.

(Thiruvallargal S. Venkataraman, G. Rajendran and T. G. Kuppuswamy.)

A field investigation and air pollution survey were carried out between 6th and 8th October 1976 by this department in the environments of Messrs. Mettur Chemical and Industrial Corporation Limited, Plant I and Plant II, Mettur Dam in order to assess the nature and extent of atmospheric pollution caused by the discharge of the gaseous wastes from this industry.

This factory is located in an area of about 71 acres (Plant I) and about 137 acres (Plant II) at Mettur Dam on the northern side of Salem-Mettur Road and next to Madras Aluminium Company and Chemicals and Plastics Company Limited.

The following products are manufactured at Plant I and Plant II.

Plant I :

1. Caustic soda—60 tonnes/day
2. Liquid chlorine—40 tonnes/day
3. Stable bleaching powder—12 to 28 tonnes/day
4. Hydrochloric acid—10 tonnes/day
5. Aluminium sulphate—4 tonnes/day
6. Calcium chloride—2 tonnes/day
7. Potassium chloride—2 tonnes/day

Plant II :

1. Rayon Grade Caustic Soda—130 tonnes/day
2. Chlorine—114 tonnes/day
3. Liquid chlorine—10 tonnes/day
4. Hydrochloric acid—60 tonnes/day
5. Bleach liquor—2000 gallons/day
6. Chloromethanes.
 - (a) Methylene chloride—9 tonnes/day
 - (b) Chloroform—3 tonnes/day
 - (c) Carbon tetrachloride—3 tonnes/day

The probable gaseous pollutants discharge from this industry are sulphur dioxide, chlorine and Hydrogen chloride. Air samples were collected in the appropriate absorbing solutions from 10 sampling stations located at distances ranging between 200 metres and 2 KM in different directions and examined for air pollutants. The results of analysis showed the absence of H₂S and Mercaptan at all the places. Sulphur dioxide and fluorides are present upto 0.45 ppm. and 2.05 ppm. respectively in the air sample collected at about 300 metres south of Plant I. However these are absent in the ambient air at other places. Chlorine and HCl gases were present in the range of Nil to 4 mg/m³ and 0.52 ppm to 6.25 ppm respectively. The concentration of chlorine in the air samples collected at 4 places was beyond the permissible limits. HCl gas is also found to be above the limits at all the places of sampling. Hence it was suggested that the industry should adopt latest improvements in chlorine liquefaction techniques for obtaining high efficiency thereby reducing the quantity of vent gases. It was also suggested to increase the efficiency of HCl gas absorption system to avoid dispersion of this pollutant into the atmosphere.

9. FIELD INVESTIGATION ON THE TREATMENT AND DISPOSAL OF GASEOUS WASTES FROM MESSRS. SHAW WALLACE AND COMPANY, AVADI.

(Thiruvallargal S. Venkataraman, G. Rajendran and T. G. Kuppuswamy.)

A detailed field survey and analysis of air samples collected from various distances and directions Messrs. Shaw Wallace and Company Fertilizer factory, Avadi were carried out by this department during February 1970 to assess the effect of atmospheric discharges from this factory in the environment and reported upon.

A surprise follow up air pollution survey was carried out on 19th April 1976, 12th August 1976 and 13th August 1976 to assess the air quality around this fertilizer factory.

The following products are manufactured in this factory.

1. Superphosphate—200 to 240 tonnes/day
2. Sodium silico fluoride—1 to 1.3 tonnes/day
3. Hydrochloric acid—1 tonne/day.

The raw materials used for the production of the above are rock phosphate, sulphuric acid and sodium chloride

The probable gaseous pollutants from this industry are fluorine compounds from the superphosphate plant and unabsorbed HCl gas from the hydrochloric acid recovery plant. Samples of air were collected from 9 sampling points around the industry and examined for the presence of these pollutants. The results of analysis indicate that HCl gas is absent in all the 9 samples on this occasion. Fluorides are however present at two places only to an extent of 1.02 ppm.

This is above the permissible limit prescribed for the ambient air at any one place. In view of this, it is suggested that though the scrubbing of waste gases with water is one of the acceptable measures for the safeguard of public health in such an industry, the industry should probe into the functioning of the scrubber and institute necessary corrective measures such as increasing the number of spray nozzles, number of stages, water supply rate etc., to tune up its efficiency.

Division of Water Biology.—During the year, a total number of two thousand eight hundred and seventy six samples were examined to determine the nature and sequence of biological growths with a view to arrest and carry out timely control measures. The samples examined microscopically include those from rivers, impounded reservoirs, tanks, wells etc., which are the main sources of protected water supply in Tamil Nadu. Samples from rural water supplies, drinking water sources from private bodies, sources for industrial purposes, sewage and effluents were also examined.

A brief survey of the amorphous and crystalline matter present in the samples helped in the interpretation of results.

Out of a total number of one thousand ninety samples examined from the Tamil Nadu protected water supply, the following observations were made.

In Red Hills lake, the main source of Madras City water supply, Hormidium Sp., a filamentous chlorophycean algae was found to grow in profusion. In a sump at A.C. College, Guindy, a trouble some cyanophycean algae Nodulariasp was present in abundance. In a tap sample from the Industrial Estate, Guindy, profuse growth of a chlorophycean algae spirogyrasp posed a problem.

In Papanasam project upper camp, in Hope Lake samples, large number of odour producing diatoms, Asterionella sp and Tabellaria sp were seen throughout the year. Another characteristic iron bearing altitude form Haematococcus was also present. At times, when profusely present this algae imparts red coloration. Crustacean forms indicative of high organic pollution were also present in Hope Lake. In Pambar Reservoir at Kodaikanal, Uroglenopsis sp, another offensive odour producing algae was present.

In Salem municipal raw water, abundance of sponge spicules were noticed. In Dindigul water supply source at Kamarajsaagar, diatom Netrium species was found to occur as a massive culture and the filtered water contained stylaria worms. These are indicative of heavy organic pollution. Kayalpattinam and Tiruchendur water supplies also had algal problems.

In Vennar river source at Thanjavur an order producing diatom *Uroglenopsis* sp was present constantly. Another *Rhizoped* *Biomyxa* Nagans was noticed in a well samples at Arcot municipality. In Thiruttani town 'anchayat source, a rare bacillariophyceae *Meridon* sp was present.

Vaigai river Madurai contained abundance of water mites '*Limnesia fulgida*'.

Fifteen municipalities in Tamil Nadu adopted systematical control measures.

In a total of seven hundred and twenty samples examined from Rural Water Supply sources, the following observations were made, in draw wells at variplalyam' Salem district and in the Salem district, Idayakulam, Ramanathapuram district, Kottur and Orathur, South Arcot district and in a ground level reservoir at Alapuram, Dharmapuri district, *Philodina* sp rotifer *wegrella* sp, lots of stentor, *pedipartna* sp and nematode worms were present in abundance.

A few wells in South Arcot district shown preponderance of a cyanophycean mucilage forming algae *cyclindrocysis* and diatom *Tabellaria* sp. *Tabellaria* is a rarity in wells on pains.

During the year under report, there was a phenomenal increase in the samples received from Rural Water supply sources, perhaps due to augmenting the water supplies. There necessity to examine the completed schemes is also felt to give aesthetic wholesome water supply to villagers.

Two hundred and thirty two samples examined from sources to be used for nondomestic analysis and notable features were as follows :—

In a draw well located at the premises of Namakkal Co-operative Deloling cake and allied Products Limited lots of chlorophycean algae comprising *ocystics*, *closterium* and *cyclotella* in conjunction with rotifers *Filinia*, etc., were causing problem.

Rotifer *Philodina* was abundantly

profuse growth of filamentous chlorophycean algae *Rhizodium* sp and *Helmunches* worms were seen. In a draw well at the Asia Engineering Company, near Ennore seashore, a rare xanthophycean alga *centritratus* sp and abundant growth of colonial volvocales comprising of *Pandorina* sp were noticed.

Large number of rotifers, ciliate protozoans and Nais worms indicative of high organic pollution were seen in the cooling tower, skating ring and tank at Hotel Chola, Madras.

Quantitative enumeration and special examination were carried out on the following investigation samples out of six hundred and sixty six samples.

1. Samples from Pandiar-Ponnampuzha Hydro-electric Project showed profusion of *Nephrocystium* sp a mucilaginous chlorophycean alga, *botryococcus* sp a xanthophycean alga, *Iseggiate* sp and *Gallionella* sp. Sulphur and iron bacteria respectively. Sewage organism *spherotilus* sp and a colonial ciliate form *opercularia* species were also noticed. Sample from the forebay showed filamentous diatoms *Fragellaria* sp. in abundance.

2. On examination. Phkara dam water supply was found to support heavy algal growth comprising species of *Botryococcus* (xanthophyceae), *Oedogonium* sp, *Chlorophyceae*, *Glenodinium* sp (Chrysophyceae). Among the Zooplankton, *Bryocamptus* sp. a rare copepod and stentor sp. were present. These are indicative of high organic pollution.

3. A sample collected from the water supply source at Kodaikanal contained a strange orthoped from *Macrobiotus* sp; odour producing algae *Asterionella* and troglonopsis were also present.

4. Sea water samples collected from tunnel and directly from the sea at Atomic Power Project, Kalpakkam supported growth of lot of marine algae *Chaetoceros* the *Halosphaera* sp. *Certium* sp. *Hanktoniella* sp. Greater intensity of forms was noticed in sea water when compared to the sample collected from the tunnel.

5. One hundred and five investigation samples in connection with mercury pollution were examined from the following places :—

Water sample and bottom sediments from Red Hills lake, Madras, Vaigai river, Tambaraparani river, Cauvery river course, sea water from Kanyakumari and Bay of Bengal and SIPCOT Complex, Rainpet were examined.

In a sample at Kannapatty near Vaigai Bridge, a Chlorophycean algae '*Ecbalocystis* sp', a peculiar sheathed mucilaginous form was found in profusion. Sea sample collected from Kanyakumari contained marine phaeophycean algae *Ectocarpus* sp. A rhizoid *Globigerina* belonging to species *Foraminifera* was found in the bottom sediment sample.

6. An ornamental lotus pond in the premises of Theosophical society, Adyar posted a problem. It was reported that the macrophytic aquatic plant *Vallisneria* was withering and dying owing to the profuse growth of algae and other organisms. The fish population of the lotus pond was also affected. On examination it was found that the water supported luxurious growth of fresh water sponage, penetrating deep and spreading vastly almost shutting out sunlight. Species of filamentous green algae *Raizoclonium*, *Oedogonium* sp and platyhelminthes worm *Rhincomesostomum* sp. and *Rhizopod* *centrophysis* sp. were seen. The water was rather alkaline. Manual periodical eradication of sponge growth and algae and high dosage of periodical chlorination was suggested. Replacement of fresh deeper sand layer for planting *Vallisneria* was also suggested.

Sixty three sewage and industrial waste samples were examined from the following places. Messrs. Indian Organic Chemicals Limited, Tiruchirappalli Distilleries, Ootacamund Municipal Samples, Venkateswara Paper Mills, Nazen Basheer and Company, North Arcot, Brakes India Limited, Padi, M. R. Electronics, Tamil Nadu Dairy Development Corporation, India Glue Corporation, Poonamallee, Food Specialists Limited, Nilgiris, Tamil Nadu Chromates and Chemicals, SIPCOT Complex, etc.

Biological studies are being continued.

Division of Mercury Pollution Studies.—During this year, the major survey work of the river Tambaraparani started during 1975 was continued and completed. The stretch of the river between Sri Vaikuntam and the confluence points near Pazhayakayal and Punnakkayal covering places enroute viz., Sri Vaikuntam, Karunkulam, Alwar Tirunagari, Thenthiruppal, Kadambakulam (a big irrigation tank which receives water from the main river), Mukkani, Senthamangalam were surveyed and several samples of water, bottom sediments and fish specimen were collected and examined. Samples of sea water off Punnakkayal (2 to 3 miles away from shore) and at the points of confluence of the river with the sea were also collected and examined. The examination of 276 samples collected in this survey showed the absence of mercury contamination to this river and at Estuary points.

An intensive survey on the treatment and disposal of mercurial wastes from Messrs. Dharangadhara Chemicals Works, Sahapuram, Tirunelveli district which is manufacturing caustic soda and chlorine by electrolysis using mercury as electrode was also carried out. Investigations of two other industries near by viz. Plastics and Resins Limited and Ilminate Benefication Plant were also carried out simultaneously along with the survey of the nearby creek and the sea, samples collected and examined. The examination of various samples revealed not only the existence of mercury pollution in the area, but also the increase in pollution in the area, compared to that of a preliminary survey carried out last year. A few salient analytical features are represented in the Table XII.

Messrs. Dharangadhara Chemical Works, Sahapuram was instructed to institute effective in plant measures both to prevent leakage loss of mercury and to recover the precious metal in order to prevent hazard to public health and fish mortality.

Another major survey of the river Vaigai was started during this year. At the first instance, the stretch of the river between Vaigai Dam and Madurai City was taken up and 174 samples of water, bottom sediments and fish were collected and examined. The results obtained so far show no contamination in this stretch at present. The survey to be continued to cover the entire course from Gudalur upto confluence point at sea during the coming year. The main tributary viz. Suruliar is also to be taken up for survey.

Under a programme to survey and to collect samples from all important lakes, ponds and impounded reservoirs, etc. Red Hills lake and Korattur lake were surveyed, samples collected and examined during the year. Samples received from Vaigai dam, Stanley Reservoir (Mettur Dam), Manimuthar Dam were also examined and absence of mercury contamination ascertained. Correspondence with the engineers of Public Health Department and Irrigation departments were also continued to receive samples from all other lakes, ponds and impounded reservoir of the state.

A survey of the coastal belt adjoining Kanyakumari district was carried out and samples of sea water from Arabian sea, Indian Ocean and Bay of Bengal (2 to 5 miles away from shore), bottom sediments along the coast and specimen of fish caught in the area were collected and examined. The results showed absence of mercury contamination during this survey.

Out of nearly 200 protected water supplies in the State under routine examination of this department, samples of water or sources of supply received from 27 Municipalities were subjected to examination for ascertaining the absence of mercury contamination as a measure of abundant caution. These have indicated absence of mercury.

An overall survey of SIPCOT Industrial Complex at Ranipet was carried out. During this survey, lakes in and around industrial complex were also covered, and various samples of water, waste water and bottom sediments from lakes and polluting industries in the area such as Tirumalai Chemicals, Tamil Nadu Chromates and Chemicals Limited, Apollo Tubes Limited etc., were collected and examined and the absence of pollution due to mercury ascertained.

A coastal pollution survey in the Bay of Bengal (at 2 to 5 miles from shore) from Vaipour river confluence point to Tambaraparam confluence point was carried out having Tuticorin as the base of operations. With the kind assistance of Fisheries Department 116 samples of water and 42 samples of fish were collected and examined. This survey show absence of mercury contamination in this area.

Division of Sewage and Industrial Waste.—Field investigations on the treatment and disposal of effluents from twenty two industries were carried out.

One hundred and eight samples of industrial effluents before and after treatment were collected and examined to assess their physical, chemical and biological characteristics and the efficiency of treatment provided.

One hundred and seventy nine samples of distillery wastes from The Trichy Distilleries and Chemicals Limited, Tiruchirappalli, were collected from various stages of treatment to assess the performance of the waste treatment units.

Twenty two samples of sewage from sewage treatment works of Ootacamund Municipality, Karur municipality, Thirupattur municipality and Messrs. Brakes (India) Limited, Padi were collected and examined to assess their characteristics and the efficiency of the treatment provided, if any.

Two hundred technical references and problems of treatment and disposal of effluents received from the Director of Public Health and Preventive Medicine and from various industries were studied and technical opinion offered.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES FROM THE DYE HOUSE OF THE CHENNIMALAI WEAVERS' CO-OPERATIVE PRODUCTION AND SALES SOCIETY LIMITED, CHENNIMALAI, COIMBATORE DISTRICT.

(Thiruvallargal S. Venkataraman and R. Srinivasan.)

At the request of the Chennimalai Weavers' Co-operative Production and Sales Society Limited, a field investigation on the treatment and disposal of wastes from their dye house at Chennimalai was carried out to assess the characteristics of the wastes discharge and the present mode of treatment and disposal of wastes and its adequacy.

In this industry varn, kier boiling bleaching and and dyeing are carried out.

Yarn is kier boiled under pressure for 6 to 8 hours using caustic soda, sodaash, tri-sodium phosphate, sodium silicate, etc. It is then washed with water and bleached with bleach liquor. The bleached yarn is washed, soured in sodium bisulphite and washed and the water removed by squeezing and dried. The dyes used for the dyeing of yarn are vat dyes, sulphur dyes, naphthol dyes, etc. Yarn mercerising is not carried out in this industry.

Water for industrial purposes amounting to 68 to 91 m³ (15,000 to 20,000 gallons) per day is derived through the local public connection from the Cauvery water supply scheme. Water is used in the process without any treatment.

The liquid wastes discharge from this industry comprises of wash water after kier boiling, bleaching and dyeing and periodical discharge of both liquors and equipment and floor washings. The total quantity of liquid wastes discharge from this industry is about 82 m³ (18,000 gallons) per day.

The liquid wastes discharge from the industry are intermittent and they are discharged without any treatment into a masonry drain within their premises and then through a kutchra drain running parallel to Perunthurai-Chennimalai road. The effluents traverse a distance of about a kilometre, stagnating in pools and puddles enroute before finally absorbed by the soil.

The chief characteristics of waste discharge from this industry are furnished in the table:—

TABLE

Source	Total solids mg/l.	Total suspended solids mg/l.	5 day B.O.D. mg/l.	Chloride mg/l.	pH.	Total sulphides as S. mg/l.
1. Kier boiling waste ..	4,720	800	2,000	700	9.0	..
2. Composite of boiling and bleaching waste.	3,250	3,500	5,900	1,360	7.3	..
3 Composite of dye house waste.	3,140	300	300	500	11.3	66

The effluent discharge from this industry are characterised by colour, appreciable amount of dissolved mineral matter, high B.O.D. and pH between 6 to 11. They are highly pollutions in nature and are likely to affect the crops if the effluents gain access into the nearby fields and pollute the ground water sources in the area.

Following recommendations were made for treatment of waste discharge from this industry. 1. Kier boiling waste amounting to about 6,000 to 7,000 gallons per day should be segregated and neutralised to PH 7.0 and allowed to settle overnight. The neutralised and settled effluent may then be treated biologically in an oxidation pond or a trickling filter.

2. The effluent discharge from dyeing operation amounting to 7,000 to 8,000 gallons per day should be segregated, equalised and neutralised to PH 7.0 and treated with alum for coagulation and settled overnight for the removal of colouring matter. The settled effluent should be passed through a roughing filter.

3. The biologically treated effluent and the treated dye waste may then be mixed together with the waste discharge from the bleaching section in a common masonry tank and diluted with fresh water to make it conform to IS requirements for land disposal viz: IS 3307-1965 "Tolerance Limits for Industrial Effluents Discharged on land for irrigation purposes" and disposed or in their own lands for irrigation purposes.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES FROM M/s. MADURA MILLS LIMITED, AMBASAMUDRAM.

(Tol. S. Venkataraman, R. Srinivasan and Jacob M. Arulappan.)

A field investigation on the treatment and disposal of wastes from M/s. Madura Mills Limited, Ambasamudram was carried out to ascertain the present position with regard to manufacture, water consumption and the treatment and disposal of wastes and their adequacy.

In this industry cotton and synthetic fabrics are bleached, mercerised and dyed. Yarn dyeing is also carried out. In the process of dyeing vat, reactive and direct dyes are used. There has been no change in the process of manufacture and in the nature of chemicals used. However they have just introduced printing of fabrics.

About 8.9 lakh gallons per day of water derived from south Kodaimelalgian channel is stated to be used for industrial purposes. About 7.6 lakh gallons of water per day derived from Harvey pool is used for cooling, boiler feed and other utilities.

Liquid waste discharge from the industry arises from wash waters after desizing, kiering, bleaching mercerising, and periodical discharge of both liquors.

The effluents discharged from this industry are first segregated into coloured and non-coloured wastes. The coloured wastes are taken through a separate closed masonry drain to a neutralisation chamber where concentrated hydrochloric acid is added manually from time to time for entralisation. The alum is added in the form of a slurry by drip feeding and then clarified in a clariflocculator. The non-coloured wastes are conveyed separately in a closed masonry drain and neutralised with hydrochloric acid. Then the effluent is sprayed and settled in settling tanks. The settled coloured and non-coloured effluents are mixed aerated by spraying and then filtered through a series of sand filters. The effluent from the last filter is collected in a masonry sump and then pumped into a drainage channel which empties into Idaiyar river.

The chief characteristics of the waste discharge from the factory as it is let out into the river were—

5-day B.O.D.	120 mg/l
Permanganate value in 4 hours	88 mg/l
pH	4.7
Hydrogen peroxide	11.6 mg/l

The results of analysis clearly showed that the treatment and disposal measures as adopted by the industry was not satisfactory. The treated effluent did not conform to IS 2490-1977 Part I (Revised), "tolerance limits for industrial effluents discharged into Inland Surface Waters" in respect of 5-day B.O.D. and pH.

The industry was advised to implement the following recommendations:—

(1) The manual addition of hydrochloric acid was not satisfactory. It would be preferable to have a mechanical dosing arrangement for continuous neutralisation and also to take care of fluctuations in the waste quality.

(2) To provide proper aeration, the industry was advised to have spray nozzled instead of the perforations in the pipes.

3. The exhausted bath liquors should be discharged in a regulated manner to avoid flash pollution due to slug discharge of the concentrated wastes.

The industry was also advised to chlorinate the treated sewage effluent from the activated sludge plant so as to leave a residue of 0.5 mg/l of chlorine at the end of 20 minutes contact.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES FROM M/s. SUN PAPER MILLS LIMITED, ARIWANAYAKIPURAM, TIRUNELVELI DISTRICT.

(Tvl. S. Venkataraman and R. Srinivasan.)

A field investigation on the treatment and disposal of liquid wastes from M/s. Sun Paper Mills Ltd., was carried out to assess the characteristics of wastes discharge and to assess the extent of improvement made in respect of treatment and disposal of wastes and its adequacy.

Paper products amounting to 45 to 50 tonnes per day comprising of white paper, writing, printing, kraft etc., are manufactured using raw materials like etc, odai, etc, cotton wood, waste paper, waste cotton, etc. The required pulp is made by both mechanical and semi chemical methods.

Water for industrial purposes amounting to 7 lakh gallons/day is drawn partly from Tambaraparani river and partly from a draw well within their premises. Water is used in chip washing, pulping, pulp cleaning, pulp suspension and for paper making. Water for boiler feed purposes is softened in a zeolite softener prior to use.

The liquid wastes discharge from the industry comprises of black liquor, chip washings, centrifugal and thickener washings, paper machine wastes, equipment and floor washings and regeneration wastes from the softener. The total quantity of liquid waste discharge from the industry is stated to be 4,20,000 gallons/day.

The white water and black liquor are taken in a separate masonry drains and mixed in a collecting tank after traversing a short distance. The mixture of wastes from the collecting tank is pumped through a concrete pipe and finally discharged into an earthen channel which skirts the factory owned lands and stated to be utilised for cultivation of coconut, lime, etc.

The composite of all effluent from the factory had the following characteristics:—

Total suspended solids	1500 mg/l
5-day B.O.D.	560 mg/l
Permanganate value in 4 hrs.	180 mg/l
Sodium Percent	43
pH	6.5

Some evidence of starting up of some cultivation of lime and coconut trees in the area was noticed during the inspection. However, complete utilisation of the effluent for cultivation was not implemented. The diluted effluent was flowing beyond the factory lands and tended to stagnate over a large area.

In the light of the above the industry was advised to take necessary steps for proper management and regulation of the effluent for land disposal based on correct agricultural agronomic and scientific practises. The industry was also asked to take necessary steps to decrease the suspended solids content of the effluent by settlement and chemical treatment.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF EFFLUENT FROM THE INDUSTRIES AT SIPCOT INDUSTRIAL COMPLEX, RANIPET, NORTH ARCOT DISTRICT.

(Tvl. S. Venkataraman and R. Srinivasan.)

A field investigation on the treatment and disposal of wastes from the industries located in the Industrial Complex at Ranipet, North Arcot District to assess:

1. the adequacy of the overall measures adopted for the treatment and disposal of wastes;
2. the effect of discharge of effluents into the irrigation tanks and lakes in the area.

This industrial complex is divided into ten zones and in this area there are 60 developed plots allotted to various industries. At the time of investigation 13 industries commenced production. The rest of the plots were either under various stages of construction or just lying vacant.

Water for industrial purposes amounting to 2 million gallons/day is drawn through an infiltration gallery located near the confluence point of Palar and Ponnai rivers and supplied to the industry by the SIPCOT.

For the treatment of waste discharge from the industries each zone is provided with a waste treatment unit comprising of screen well, grit well and oxidation pond. The overflow from the oxidation ponds will gain access into irrigation tanks and lakes situated in proximity to the oxidation ponds in the respective zones.

The zone wise statement of irrigation tanks and lakes into which the effluent from the oxidation pond are likely to gain access is furnished in the table below:—

Zone No.	Name of the irrigation tank.
I	Agravaram Chitteri.
II	Puliyanthangal irrigation tank.
III	Maniyampattu tank.
IV, IX, X	Karai irrigation tank.
V, VI, VII	Vnnambadi tank.
VIII	Vanampadi Chitteri.

Only the oxidation pond located in Zone No. IX (adjacent to Tamil Nadu Chromates and Chemicals Limited) was overflowing and the effluent joined Karai irrigation tank. The other oxidation ponds were either partially filled up with factory effluents admixed with rain water or under construction.

Samples of effluents were collected from:

1. M/s. Thirumalai Chemicals Limited;
2. M/s. Apollo Tubes Limited;
3. Effluents from the oxidation ponds from the respective zones, and
4. Irrigation tanks and lakes.

The chief characteristics of the effluent from the oxidation pond in Zone No. IX were:

Total solids	1400 mg/l
Total suspended solids	60 mg/l
5-day B.O.D.	1800 mg/l
pH	3.7
Mineral acidity as CaCO ₃	1320 mg/l
Chromium—Hexa.	Nil
as Cr. — Total	0.5 µg/l

Excepting Vanampadi Chitteri, which showed signs of contamination (zinc at Zn 0.1 mg/l, pH 4.0), the other irrigation tanks were not polluted at that time.

Samples of effluent from M/s. Thirumalai Chemicals and M/s. Apollo Tubes Limited showed the following chief characteristics:—

Tests.	Effluent from M/s. Thirumalai Chemicals Ltd.	Effluent from M/s. Apollo Tubes Ltd.
Total solids mg/l	2,400	3,500
Total suspended solids mg/l	100	1,100
5-day B.O.D. mg/l	1,700	40
pH	3.9	4.2
Sulphates as SO ₄ , mg/l	1-00	5,106
Zinc as Zn, mg/l	..	560

The presence of zinc (22 mg/l) in the effluent in the oxidation pond in Zone No. VIII and its acidic pH (4.1) clearly indicated the contamination of the pond caused by the untreated waste discharge from M/s. Apollo Tubes Limited. The excess amount of 5-day B.O.D. (1800 mg/l), low pH (3.7), and the presence of chromium (0.5 mg/l) indicated the pollution caused to the oxidation pond in Zone No. IX by the waste discharge from M/s. Thirumalai Chemicals Limited and Tamil Nadu Chromates and Chemicals Limited. The SIPCOT authorities were advised to take necessary penal action against the erring industries in case of the compliance to the stipulations made at the time of granting health clearance.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTE, FROM THE LEATHER DIVISION OF M/S. ARVIND DISTILLERIES LTD., RANIPET, NORTH ARCOT DISTRICT.

(*Tol. S. Venkataraman and R. Srinivasan.*)

A field investigation was carried out on the treatment and disposal of waste from the finished leather unit of M/s. Arvind Distilleries Limited, Ranipet to assess:

1. the characteristics of waste discharge, and
2. the adequacy of the present mode of treatment and disposal of wastes.

In this industry about 1000 pieces of goat and sheep skins are processed daily. Both E.I. tanned and chrome tanned leathers are used as raw materials. The semi finished skins are washed, semichromed, neutralised, dyed and finished by polishing.

The vegetable tanned leathers are semi chrome by dipping them in chrome extracts in drums until the desired feel is obtained. The semichromed leathers are further fat liquored (sulphonated castor oil is used) to make them soft, dyed and polished.

The chrome tanned leather are washed with water and treated with sodium bicarbonate, borax etc., to remove acidity in the leather. The neutralised leathers are then treated with fat liquors to make them soft and dyed using acid or direct dyes and then polished.

Water for industrial purposes amounting to 10,000 litres/day is derived from a bore well sunk within the factory site.

The liquid waste discharge from the industry comprises mainly of wash waters after rechroming, neutralisation, dyeing and fat liquoring and the various concentrated wastes from each unit operation. The total quantity of liquid waste discharge is stated to be about only 10,000 litres/day (2,200 gallons/day).

The entire waste discharge from the industry is collected in a masonry sump, treated with lime to raise the pH to 7.0. The effluent from the sump is pumped through pipe to the waste treatment unit located on a slopy terrain. The waste treatment unit comprises of four settling pits connected in series. Alum is stated to be added in the first pit and the effluent from the last pit allowed to pass through a charcoal bed and then through four sets of alternating sand and gravel beds. The effluent from the last bed is passed through a parallel rows of lock and spill drains. Final effluent is stated to be utilised for cultivation of Eucalyptus, coconut etc. on about 25 acres of land on the rear side of the factory.

The chief characteristics of waste discharge before and after treatment are furnished in the table below:

Tests	Composite effluent from the factory before treatment.	Effluent from the factory after treatment.
1. Total solids, mg/l	2,840	4,400
2. Total suspended solids mg/l	1,000	2,520
3. B.O.D. mg/l	1,750	1,300
4. PH	4.6	5.9
5. Sulphides as L. mg/l	85	95
6. Chromium Hexa as Cr.—Total	Nil	Nil
7. C.G.D. mg l	22	3.2
	3,583	3,300

The results of analysis of the treated effluent did not conform to IS: 3307-1965 "Tolerance Limits for Industrial Effluents Discharged on Land for Irrigation Purposes". Though the waste treatment measures as adopted by the industry were of acceptable nature, the treatment itself was not carried out in a controlled and methodical way. Hence, the industry was advised to bestow proper attention on waste treatment measures to ensure that the treated effluent conforms to I.S.I. standards.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES FROM M/S. SOUTH INDIA STEELS AND SUGARS LIMITED: MUNDIAMBAKKAM: SOUTH ARCOT DISTRICT.

(Thiruvallargal S. Venkataraman, R. Srinivasan and Jacob M. Arulappan.)

A field investigation on the treatment and disposal of wastes was carried out to assess the characteristics of the wastes discharge from the industry and the adequacy of the present mode of treatment and disposal of wastes.

On an average about 2,500 to 2,700 tonnes of sugarcane is stated to be crushed daily producing about 200 tonnes of sugar. Sugar is manufactured from sugarcane by the double sulphitation process.

The factory derives its water supply amounting to about 37 lakh litres/day, for industrial purposes from bore wells located within their factory premises. Water is used for maceration, dilution, laboratory, condensers of vacuum pans and evaporators, boilers, floor washings, etc. Water used for boiler feed is stated to be softened prior to use.

The present liquid wastes discharge from the industry arising mainly from the mill house, floor and equipment washings, laboratory wastes, cooling waters etc. is likely to be about 2 to 3 lakh litres/day.

The effluents discharged from the factory exclusive of spray pond overflow are let into a masonry drain and then passed through a masonry tank with baffle arrangement, settled in a settling pit and fed into a rectangular pond stated to be an oxidation pond. The effluents discharge from the last treatment unit is let into an earthen channel and allowed to join an *odai* about 300 metres away from the factory. This *odai* joins finally the Vikravandi river after a traverse of about 2 miles.

The chief characteristics of the waste discharge before and after the treatment are given in the table:

TABLE-40A

Tests	Effluent before treatment	Effect after treatment
Total suspended solids mg/l	1,200	500
5-day B.O.D. mg/l	2,300	1,400
Permanganate value in 4 hours mg/3	1,136	552
PH	4.2	4.0
C.G.D, mg/l	5,297	4,615

Judging from the results of analysis of the samples of effluents collected it was evident that the performance of the pond purported to serve as an oxidation pond was not satisfactory. The final effluent discharged from the treatment units also did not conform to IS: 2490-1963, "Tolerance Limits for Industrial Effluents Discharged into Inland Surface Waters". The industry was asked to institute immediately necessary corrective steps to overcome deficiencies in the treatment units.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES FROM M/S. SHAW WALLACE AND COMPANY: CHINGLEPUT DISTRICT.

(Thiruvallargal S. Venkataraman and R. Srinivasan.)

A surprise investigation was carried out on the treatment and disposal of wastes from M/s. Shaw Wallace and Company, Avadi to ascertain—

1. the steps taken by them for the abatement of pollution, and
2. to assess their adequacy.

In this industry about 200 to 240 tonnes/day of superphosphate is produced by the interaction of rock phosphate with sulphuric acid. The product of interaction is cured in a 'den' taken to godown, pulverised and bagged.

About 1 to 1.5 tonnes/day of sodium silicofluoride is manufactured at a by-product by scrubbing the gaseous wastes discharge from the superphosphate manufacture with water and treating the hydrofluosilicic acid formed with brine. The product is centrifuged washed and dried.

About 1 tonne of 32 per cent hydrochloric acid is also manufactured per day. For this, concentrated sulphuric acid is diluted with effluent discharged from the sodium silicofluoride plant containing 2.5 per cent hydrochloric acid. The gaseous hydrogen chloride evolved is scrubbed with water counter currently in a plate scrubber.

About 24,000 gallons per day of water derived from bore-wells is stated to be used in this industry, mainly for cooling, scrubbing of waste gases, preparation of brine, dilute sulphuric acid, etc.

The liquid wastes discharge from this industry comprises of filterpress wash waters from the silica recovery unit, centrifuge liquor from the sodium silicofluoride plant containing about 2.5 per cent hydrochloric acid and equipment and floor washings. The total quantity of liquid wastes discharge from this industry is stated to be about 5,000 to 6,000 gallons per day. The major portion of these wastes is stated to be utilised for the manufacture of hydrochloric acid and the rest sent to their sister concern at Kaduvetti for deliming purposes. It was categorically stated that no liquid waste is discharged outside their premises.

A kutchra drain runs by the side of this industry and joins the Avadi lake after a traverse of about two kilometres. It was also observed that effluent was stagnating in pools and puddles in this kutchra drain.

The chief characteristics of the stagnating wastes from the industry collected from the kutchra drain and also Avadi lake water near its mouth where the effluent drain joins and also from the farthest end furnished below:—

Source.	Total solid mg/l	Total dissolved mg/l	5-day B.O.D.	PH	Fluoride as F.	Silica as SiO ₂
1. Strengthening waste collected from the kutchra drain.	3600	3540	54	2.6	236	400
2. A sample of water from Avadi lake near the place where effluent channel join the lake.	720	680	10	4.0	68	80
3. Sample of water collected at the farthest end of the lake.	440	400	8	5.8	36	40

The results of analysis of liquid wastes discharged from the industry and the water samples collected from the Avadi lake indicated beyond doubt that this lake has been polluted by the surreptitious discharge of liquid waste from this industry. The presence of excessive amount of fluorine in the lake water and its low pH were convincing proofs of this finding. In the light of the above the claim of the industry that they are not letting out of the wastes discharge outside their premises is totally incorrect. As continued and surreptitious discharge of the wastes into the lake would cause irreparable damage to the ecosystem of the lake the Government was requested to take necessary penal action for not providing any antipollution control measures.

**AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES
FROM THE DAIRY OF THE TAMIL NADU DAIRY DEVELOPMENT
CORPORATION LIMITED, AMBATTUR.**

(Thiruvallargal S. Venkataraman, R. Srinivasan and S.A. Mohamed Takar)

A field investigation on the treatment and disposal of wastes from the dairy of Tamil Nadu Dairy Development Corporation Limited, Ambattur was carried out to assess:—

- (1) the characteristics of the wastes discharge; and
- (2) the adequacy of the present mode of treatment and disposal of wastes.

In this dairy about 75,000 litres per day of fresh milk and powder milk (totalling 37.5 per cent of the rated capacity) are processed. Milk is received in bulk through rials or road tankers. It is pasteurised, stored and despatched through road tankers. Milk is also made from milk powder and water, butter oil is injected to it, thoroughly homogenise in homogeniser and mixed with fresh milk and despatched for distribution in Madras City, through road tankers. By-products like ghee, butter, etc., are not manufactured.

Water for industrial purposes amounting to about two lakh litres per day is derived from the industrial estate water supply. A part of the water is softened in an change water softener and used for boiler feed cooling of compressors, vacuum pumps homogenisers, etc.

The liquid wastes discharge from the dairy comprises mainly of process waste waters, floor and equipment washings, cooling water bleed off, regeneration wastes discharge from the softener, etc. The total quantity of liquid wastes discharge from the dairy is stated to be about one lakh litres per day.

The liquid wastes discharge from the dairy is treated in an activated sludge plant provided by Door Oliver. It incorporate gift well, grease tank, separation tank and a clarifier. A part of the sludge from the clarifier is stated to be returned to the accelerator to provide seeding. A portion of the sludge from the clarifier is let off periodically and dried on sludge drying beds. The liquid effluent from the clarifier is discharged through a kutchra drain running parallel to the southern side of the railway track. The effluent was found stagnating at the railway culvert.

The regeneration waste discharged from the softener is let out in an earthen pond within their own premises.

The chief characteristics of the effluents discharged from the Dairy before and after treatment are furnished under table below:

The dairy was functioning about an hour in the morning and an hour in the evening. Consequently the discharge of effluent from the dairy was only intermittent. The activated sludge plant worked only when sufficient effluent got collected in the sump and that too at long intervals.

Source.	Total solids mg.	Total susp. solids mg.	5-day B.O.D.	Premanganate value in 4 hours mg.	pid.	Oil and greased mg.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Effluent from the dairy collected from the sump.	16,420	14,500	1,800	208	5.8	490
2 Final effluent from the dairy after treatment as it is discharged outside.	1,800	200	300	108	6.1	75

The results of analysis of effluents from the dairy before and after treatment also showed the improper functioning of the waste treatment unit. The dairy was advised to explore the problem and institute necessary corrective measure to improve the efficiency of performance of the activated sludge plant.

**AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES FROM MESSRS. ASHOK
LEYLAND LTD., ENNORE, MADRAS.**

(Thiruvallargal S. Venkataraman, R. Srinivasan and Jacob M. Arulappan).

An investigation on the treatment and disposal of wastes from M/s. Ashok Leyland Limited was carried out to assess—

- (1) the characteristics of the wastes discharge from the industry, and
- (2) the present mode of treatment and disposal of wastes and their adequacy.

In this industry manufacture of components for automobiles, fabrication and assembly of bodies for trucks, buses, etc., are carried out. The major wet processing operations include pickling copper and cadmium plating, Passivation, case hardening etc. The components are decessed by vapour tri chloro ethylene process and pickled in hydrochloric acid. This is followed by copper plating using copper cyanide and sodium cyanide in the plating bath. Whenever cadmium plating is done a cadmium salt (kutsal) is used in the plating bath. These processes are followed by rinsing in the fresh water swms. Case hardening is done in salt bath using sodium cyanide. After case hardening the components are quenched in water. The gaseous wastes coming out of the cyanide bath during case hardening operation are stated to be trapped in a chamber and scrubbed with water to minimise atmospheric pollution.

About 75,000 gallons of water per day derived from open draw wells is stated to be used as such in the industrial operations without any treatment. Water is used for cooling, electroplating operations and in the scrubbing of gaseous wastes from the case hardening section.

Liquid waste discharge comprises of cooling water bleed off, swill water after electroplating, periodical discharge of concentrated bath liquor, quench water after case hardening and scrubber liquor used for scrubbing off gases from the case hardening process.

The effluents discharged from the industry are collected in a collection tank and treated with bleaching powder and caustic soda and pH adjusted to 7.5 and let out into the drain. The effluents after treatment are conveyed through a masonry drain cutting across the Ennore High Road, and through the vacant lands belonging to the industry opposite to the factory premises and adjoining Buckingham Canal and allowed to stagnate.

The chief characteristics of the wastes discharge from the industry before and after treatment are furnished below:—

Source.	Total solids mg/l.	5-day B.O.D mg/l	PH	Cyanide as CN mg/l.	Cadmium as Cd mg/l.	Copper as Cu mg/l.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Sample of effluent from the electroplating section before treatment.	1,440	80	6.7	82	20	10
2 Sample of effluent from the electroplating section after treatment.	2,200	60	10.0	21	7.5	5
3 Sample of knal effluent as it is discharged through drains from the factory premises.	1,400	60	8.5	6	0.56	0.5
4 Sample of stagnation effluent in the lands on the western side of the factory.	1,440	30	8.5	0.09	0.25	0.6

The results of analysis of effluents indicate the presence of toxic substances like copper, cadmium, cyanide, etc., in appreciable amount. The measures as adopted by the industry for the treatment and disposal of wastes have not brought about any improvement for the treated effluent contained copper, cadmium and cyanide. Hence the industry was advised to implement the following measures:—

(1) The cyanide waste should be properly treated by alkaline chlorination method for complete destruction of cyanide. Other toxic metals like copper, cadmium, etc., should also be treated by chemical precipitation methods and the treated wastes should be discharged through pipe lines into the sea.

(2) The mole and the place of disposal of wastes into the sea should be fixed in consultation with the Fisheries Department.

(3) The entire solid cyanide waste should be treated for the destruction of cyanide. Then the treated waste should be disposed off into the sea. The sludge obtained from the liquid cyanide waste treatment should also be similarly disposed off into the sea.

(4) The effluent discharged into the sea should conform to the standards prescribed by I.S.I. for marine disposal.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES FROM
MESSRS FOOD SPECIALITIES LIMITED. CHERAMBADI, NILGIRIS DISTRICT.

A field investigation on the treatment and disposal of wastes from Messrs Food Specialities Limited was carried out to ascertain—

- (1) The Various processes carried out,
- (2) the characteristics of waste discharge and
- (3) the present mode of treatment and disposal of wastes and their adequacy.

In this industry, approximately 100 Kgs, per day of instant tea is manufactured from about 8,000 Kgs. of green tea leaves.

Freshly out green tea leaves are first withered in withering troughs for 8 to 18 hours by passing cold air and washed with fresh water in a washing tank. The washed leaves are ground in a mill and fermented in fermentation tanks with demineralised water and by admitting cold air. The fermented leaves are then sent to the extractor for extraction of recoction with steam. The tea extract is evaporated in single effect evaporator and subsequently dried in a spray drier and packed. Nochem cal is stated to be used in the process.

Water for industrial purposes totalling about 2,00,000 litres per day is derived from Choladi river running on the northern side of the factory adjoining it. Water is used for washing of tea leaves, milling, extraction, cooling, boiler feed, floor, equipment washings, regeneration of iron exchange beds, etc.

The water is treated with slum, if turbid, settled, filtered chlorinated and used. The water for industrial purposes is filtered and deionised prior to use.

About 7,000 Kgs. of spent tea leaves discharged from the extraction process are disposed off in a deep valley in a nearby tea plantation.

Liquid wastes discharge from this industry comprise mainly of tea leaves wash waters floor and equipment washings, laboratory was water, cooling water bleed off, regeneration wastes discharge from the demineraliser. The total quantity of liquid waste discharge from the industry is about 18,700 gallons per day.

The regeneration waste discharge from the demineraliser amounting to 2,200 gallons per week is stated to be treated with lime in a masonry sump and disposed of into a soak pit within the premises.

The rest of the wastes discharge from the industry are conveyed through masonry drain and allowed to pass through a slopy drain having cascading arrangement and then disposed off into the choladi river.

The results of analysis of the composite sample of tea leaves wash waters and tea leaves wash wastes after cascading are furnished in the table.

Tests.	Composite of tea leaves wash water	
	before treatment.	after cascading.
(1)	(2)	(3)
Total solids mg/l	60	70
Total suspended solids mg/l	20	20
5-day B.O.D. mg/l	4	2.2
pH	6.8	7.0
Insecticides	Nil.	Nil.

The results of analysis of liquid wastes discharge from the industry conformed to IS/2190-1974 Part I (Revised) "Tolerance Limits for industrial effluents discharged into inland surface waters". Further the discharge of effluents into the Choladi river did not materially alter its physical and chemical characteristics.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF WASTES
FROM M/s. M. R. ELECTRONIC COMPONENTS LIMITED: INDUSTRIAL

ESTATE, GUINDY, MDRAS-600 032.

(Tol S. Venkataraman and R. Srinivasan.)

A field investigation on the treatment and disposal of waste discharge from M/s. M. R. Electronic Components Limited, Industrial Estate, Guindy, was carried out to ascertain:

1. the processes carried out at this industry,
2. to assess the characteristics of waste discharge; and
3. the present mode of treatment and disposal of wastes adopted by the industry and their adequacy.

In this industry M. R. volume controls and switches are manufactured. About 4 Kgs. of M. S. and brass components like rods, caps, etc., are zinc plated passivated in chromic acid solution prior to use.

Water for industrial purposes mainly for plating amounting to 3500 litres (800 gallons approximately) per day is derived from a draw well situated within the premises. Water is stated to be used without any treatment.

The liquid wastes discharge comprises of swills after pickling, plating passivation, etc., and the periodical discharge of concentrated liquors like alkaline metal cleaner, pickle liquor, chrome passivation wastes. The total quantity of liquid wastes discharge from the industry is about 3,000 litres (670 gallons approximately) per day.

For effluent treatment purposes, the industry has constructed three underground tanks lined with acid proof bricks. These tanks are separated by partition walls. The wash waters from the pickling tanks are let out into underground tank No. I. About 20 Kgs. of sodium carbonate is stated to be added and mixed in this tank. The chromic acid passivation wash waters are stated to be treated with ferrous sulphate (50 Kgs. per day) in the passivation tank itself and let out into tank No. I and mixed. The second

swill waters from zinc plating are stated to be treated with 20 Kgs./day of ferrous Sulphate in the swill itself and let out into the tank No. II and then treated with above 10 Kgs. of Sodium Carbonate and mixed. The overflow of effluent from tanks I and II gain access into tank No. III. Required quantity of potash alum is stated to be added to all the three tanks, mixed and allowed to settle overnight. The settled/treated waste is then pumped out from all the three tanks one by one into the industrial estate sewer which joins the Adayar river after a traverse of 1 to 2 kilometre. The settled sludge has stated to be taken out once a month and dried in an open masonry tank.

The chief characteristics of the treated effluent from the three tanks are tabulated below:

					Effluent from tank I after treatment.	Effluent from tank II after treatment.	Effluent from tank III after treatment.
	(1)	(2)	(3)	(4)			
Total solids mg. l	..	..	..	..	5,700	7,860	7,660
Total suspended solids mg. l	..	..	..	..	160	1,000	940
Chloride as Cl mg. l	..	..	..	..	1,460	1,400	1,380
pH	..	..	..	..	7.3	7.2	7.1
Cyanide as CN mg. l	..	..	..	..	0.64	11.5	10.2
Zinc as Zn mg. l	..	..	..	..	65	654	640
Chromium—Hexa	..	..	..	..	17.5	..	..
as Cr. mg. l—Total	..	..	..	..	31.5	..	..
Sulphate as SO ₄ mg. l	..	..	..	..	1,000	1,900	1,874
Sodium as Na mg. l	..	..	..	..	1,500	1,500	1,500

From the results of analysis it is seen that the measures adopted by the industry for the treatment of pickling, zinc plating and chrome passivation wastes are far from satisfactory. The discharge of such wastes without proper treatment into the industrial estate drains which ultimately joins Adayar river is an objectionable practice and it possesses dangerous consequences to the ecosystem of the river.

In this connection it was suggested that there should be complete and clear cut segregation of pickling, zinc plating and chromium passivation wastes discharge. The wastes discharge from pickling section should be neutralised to pH 7-C preferably with lime or sodium carbonate. The quantity of hexavalent chromium from the passivation tank should be estimated daily and the pH of the effluent adjusted to below 3.0 and reduced with calculated quantities of ferrous sulphate and allowed to settle. Afterwards lime or sodium carbonate may be added to raise the pH to between 8 and 9 and allowed to settle overnight. The segregated cyanide waste should be treated by alkaline chlorination method by batch process.

The effluent discharged from the industry after treatment should conform to IS 2400—1974 Part I (Revised) "Tolerance limits for industrial effluents discharged into inland surface waters."

The industry was advised to carry out all the treatment measures at the earliest to avoid pollution problem.

AN INVESTIGATION ON THE TREATMENT AND DISPOSAL OF EFFLUENT FROM MESSRS. INDIAN ORGANIC CHEMICALS LIMITED, MANALI.

(Tel. S. Venkataraman, R. Srinivasan and Jacob M. Arulappan).

A field investigation on the treatment and disposal of wastes from the Indian Organic Chemicals Limited, Chinnasekkadu was carried out to assess the characterisation of the effluent discharged and the adequacy of the method of treatment adopted, if any, and the mode and place of disposal of the effluent.

In this industry 6,100 tonne/annum of polyester staple fibre are manufactured from dimethyl terephthalate and ethylene glycol by condensation.

The daily consumption of water for industrial purposes at the moment is stated to be about 2730 m³ (6 lakh gallons) per day. Water is stated to be softened by base exchange process and also by demineralisation. Water is used in the industry for quenching the polyester fibre bonds and filaments, cooling, boiler, base wash of the filters and water softener, floor washing, etc.

The total quantity of the liquid waste discharge from the industry is about 1818 to 2272 m³ (4 to 5 lakh gallons) per day.

The process effluents coming out of the recovery unit once a week is approximately 6 m³ (1400 gallons) at full operational level. This is separated from the rest of the effluents and settled in a masonry tank of size 12 m x 5 m x 1.25 m having two compartments. The overflow from this mixes with rest of the effluents from the industry. The sludge from this settling tank is taken out once a month and dumped within their premises. The settled recovery unit effluent and the rest of the effluents discharged from the industry are mixed together and conveyed through an open masonry drain to a distance of about 200 M and disposed off into an open shallow land outside the factory premises and allowed to stagnate.

The chief characteristics of the composite of waste from the factory and the stagnating effluent outside the factory premises are given in the table.

Source.	Total solids mg./l.	Total susp. solids	5-day B.O.D. mg./l.	Chloride as Cl mg./l.	pH.	Chro- mium as Cr.	Tita- nium as Ti.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Composite of waste from the factory.	2,020	120	40	580	7.7	Hexa. 2.0 Total 2.4	Absent.
Stagnating effluent collected outside the factory premises.	740	80	55	240	7.4	Hexa. 2.0 Total 2.6	Absent.

The industry adopts no satisfactory method of treatment and disposal of wastes. The effluent discharge from the industry had a disagreeable odour and contained hexavalent chromium 2.0 mg/l as Cr. The entire waste discharged from the industry is allowed to stagnate on a vast area of land near the Sathangaduthangal abutting Manali-Thiruvethiyur road. The effluents also gained access into Sathangaduthangal. The effluent discharge from the industry also did not conform to IS 2490—1963 "Tolerance Limits for industrial effluents discharged into inland surface waters" in respect of chromium.

Samples of sewage from the various stages of treatment in the sewage treatment plant of M/s. Brakes India Limited, Padi, were collected and examined to assess:

1. their chemical characteristics and
2. the efficiency of performance of the sewage treatment plant.

About 60,000 gallons (approximately) of sewage are stated from the provies is of a hour units each provided with surface aerators, providing a detention of hered clarifier providing a detention of 8 hours for further purification A part of the a kutlha drain which joins Villivakkames tank. The sludge forced in the secondary clarifier is consolidated in aludge concellation tank and dried in aludge drying bads.

The results of analysis of the raw and the treated sewage are furnished in the table:

Tests.	Raw sewage collected from sump.	Effluent from the aerator.	Effluent from secondary clarifier.
(1)	(2)	(3)	(4)
Total solids, mg./l	1,580	1,520	1,520
Total suspended solids mg./l	80	60	60
5-day B.O.D. mg./l	160	120	100
Permanganate value in 4 hrs, mg./l	52	36	28
Total natrogen as N mg./l	90	80	79
pH	8.2	7.6	7.7
Sulphates as SO ⁴ , mg./l	116	82	82

The raw sewage was slightly greyish in colour and a disagreeable odour. It was weak in strength as per McGowan's formula

The effluent from the aerator was slightly greyish in colour and had a disagreeable odour the aerator effluent showed an unprovent of only 25 per cent in 5 day B.O.D. and 31 per cent in permanganate value in 4 hours over that of raw sewage.

The effluent from the secondary clarifier was slightly greyish in colour and had a disagreeable odour. It showed an improvement of 38% in 5-day B.O.D. and 46% in permanganate value in 4 hours over that of raw sewage.

Judging from the results of analysis it was seen that the performances of the aerator and the secondary clarifier units were far from satisfactory. The industry was advised to improve the efficiency of the treatment plant so as to conform to IS:4764—1968 "Tolerance Limits for sewage effluents discharged into inland surface waters" at all times

TABLE I.

PROTECTED WATER SUPPLIES INCLUDED IN THE LIST OF PERIODICAL ANALYSIS, 1976.

Serial number.	Nature of sources.										Filtration.				Chlorination.		
	Total number of	Places.	Sources.	Imp. reservoirs.	River or stream	Tank.	Well.	Infiltration gallery and Infil well.				Mechanical.		Automatic liquid chlorine.	Mechanical.	Bleaching powder.	
								Bed.	Bank.	Slow sand filters.	Pressure filters.	Gravity.	Infiltration gallery or infiltration well.				Not filtered.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1 Municipalities	48	108	13	9	3	39	31	13	4	2	6	44	52	49	1	58	..
2 Panchayat Boards and Townships	22	27	3	13	3	..	3	5	4	..	3	8	12	6	..	21	..
3 Prisons and approved schools	15	16	2	..	..	7	7	..	1	..	2	7	7	9	..	6	1
4 Railway stations	23	24	1	1	..	17	3	2	..	..	3	5	16	11	4	9	..
5 Hospitals	50	62	17	5	2	15	20	3	9	1	14	23	15	30	..	32	..
6 Other institutions	23	48	9	6	1	32	..	..	5	2	8	..	35	14	..	34	..
7 Swimming pools	2	2	..	..	..	2	..	..	..	2	..	..	..	2	..	..	..

TABLE II.

DETAILS OF SAMPLES TESTED BACTERIOLOGICALLY.

Serial number	particulars.	Number of samples.
(1)	(2)	(3)
1	Protected water supplies	1,889
2	Government City Hospital	609
3	Miscellaneous samples from Government agencies	271
4	Miscellaneous samples from private agencies	248
5	Sewage samples	2
	Total ..	3,019

TABLE III.

Serial number.	particulars.	Number of samples tested.
(1)	(2)	(3)
1	Rideal Walker Co-efficient test	4
2	Staphylococcus aureus co-efficient test	1
3	Stability test	1

TABLE IV.

PERCENTAGE OF HYGIENICALLY SATISFACTORY SAMPLES.

Serial number	place.	Head works.	Distribution.
(1)	(2)	(3)	(4)
		PERCENT.	PERCENT.
1	Municipality	87	83.5
2	Panchayat	84	72.5
3	Railway station	50	93
4	Government Hospitals	..	72
5	City Hospitals	..	80
6	Other institutions	73	74
7	Junior approved schools and jails	..	73

TABLE V.

DETAILS OF WATER SAMPLES AND CHEMICALS USED IN WATER TREATMENT RECEIVED FOR PHYSICAL AND CHEMICAL TESTS.

Serial number and particulars.	Number of samples tested.
1 Protected water supplies	2,180
2 Miscellaneous Government water supply investigation schemes, private parties and special investigations.	1,614
3 Non-domestic purposes	532
4 Scales	2
5 Bleaching powder	263
6 Urine for fluorine	2
7 Rural water supplies.. .. .	1,433
8 Number of reagents and solutions prepared	4
9 Water for H ₂ S estimation	23
	2

TABLE VI.

DETAILS OF SAMPLES OF WATER TESTED FOR NON-DOMESTIC USES.

Serial number and particulars.	Number of samples tested.
1 Air conditioning	10
2 Bleaching and dyeing	6
3 Boiler feed purpose.. .. .	24
4 Construction	18
5 Corrosiveness	7
6 Concreting	3
7 Distilled water as per I.S.I.	2
8 Dialysis	3
9 Electroplating	2
10 Fruit processing	1
11 Food processing	1
12 Fire fighting	1
13 Gardening	8
14 Heat exchangers	2
15 Humidification	1
16 Irrigation	32
17 Indian made foreign liquor	4

Serial number and particulars

number of
samples
tested.

18 Jams, pickles, squarhes	1
19 Laser equipment	2
20 Laundry	2
21 Mercerising	2
22 Photography	6
23 Pharmaceuticals	1
24 Rinsing of bottles	1
25 Tanning \	1
26 Water cooling	2
27 Washing and servicing of vehicles	9
28 Other general industrial uses	117
Total ..	266

TABLE VII.

TABLE SHOWING THE TOTAL NUMBER OF SAMPLES TESTED DURING 1976, TOTAL NUMBER OF SAMPLES DECLARED UNFIT AND CAUSES FOR REJECTION UNDER RUREL WATER SUPPLY SCHEMES.

Serial number and name of district.	Number of samples tested.	Causes for rejection.			
		High solids.	Iron.	Fluorine.	Total rejected.
(1)	(2)	(3)	(4)	(5)	(6)
1 North Arcot	34	2	1	3	6
2 South Arcot	87	1	2	..	3
3 Chengalpattu	114	6	2	..	8
4 Coimbatore	3	..	..	2	2
5 Dharmapuri	76	..	1	24	25
6 Kanyakumari	1	..	..	..	..
7 Madurai	101	5	1	9	15
8 Nilgiris	..	..	..	..	..
9 Ramanathapuram	41	..	..	2	2
10 Salem	112	22	1	15	38
11 Thanjavur	32	..	1	..	1
12 Tiruchirappalli.. .. .	74	1	7	7	15
13 Tirunelveli	31	1	1	2	4
14 Pudukkottai	12	1	1	..	2
Total ..	718	39	18	64	121

TABLE VIII.

TABLE SHOWING THE TOTAL NUMBER OF IDENTICAL SAMPLES RECEIVED FROM VARIOUS DISTRICTS DURING THE YEAR 1976.

Serial number	Name of the district.	Number of samples found identical.
(1)	(2)	(3)
1 North Arcot	..	..
2 South Arcot	..	..
3 Chengalpattu	..	5
4 Coimbatore	..	..
5 Dharmapuri	..	4
6 Kanniyakumari	..	..
7 Madurai	..	2
8 Nilgiris	..	..
9 Ramanathapuram	..	..
10 Salem	..	..
11 Thanjavur	..	..
12 Tiruchirappalli	..	2
13 Tirunelveli	..	..
14 Pudukkottai	..	2
Total ..	..	15

TABLE IX.

DETAILS OF SAMPLES EXAMINED MICROSCOPICALLY DURING THE YEAR 1976.

Serial number.	Particulars.	Total number.
(1)	(2)	(3)
1 Protected water-supply scheme.	..	1,090
2 Miscellaneous sources	..	664
3 Non-domestic purposes	..	232
4 Rural water-supply scheme	..	720
5 Sewage and industrial waste samples	..	63
6 Mercury pollution samples	..	105
Total ..	..	2,876

TABLE X.

PARTICULARS REGARDING THE NUMBER OF INVESTIGATIONS AND AIR-POLLUTION SURVEYS CARRIED OUT OF DURING THE YEAR 1976.

1. Number of field investigations and air-pollution surveys conducted	..	15	
2. Total number of air samples collected and examined	.. ..	494	
<i>Serial number.</i>	<i>Type of industries surveyed.</i>	<i>Number.</i>	<i>Number of air samples.</i>
(1)	(2)	(3)	(4)
1 Fertilizer	.. ..	5	257
2 Paper and boards	.. ..	1	27
3 Chemicals	.. ..	2	116
4 Glass	.. ..	2	12
5 Viscose rayon	.. ..	1	40
6 Glue and sulphuric acid	.. ..	1	24
7 Others	.. ..	1	18

TABLE XI.

PARTICULARS REGARDING THE NUMBER OF INVESTIGATIONS CARRIED OUT AND EFFLUENT SAMPLES EXAMINED DURING THE YEAR 1976.

Number of samples—Sewage	.. ..	22
Number of industrial waste samples	.. ..	108
Number of distillery wastes	.. ..	179
Number of tannery wastes	.. ..	35
Number of water pollution survey	.. ..	38
Number of field investigations carried out	.. ..	22

<i>Type of industry.</i>	<i>Number of industries.</i>	<i>Number of samples.</i>
(1)	(2)	(3)
<i>Connected with Industrial Wastes :</i>		
1. Chemical industry	2	9
2. Dairy	1	9
3. Electroplating industry	2	22
4. Fertilizer industry	2	11
5. Finished leather industry	2	14
6. Felatine and glue	2	11
7. Instant tea industry	1	8
8. Laundry wastes	2	2
9. Paper industry	3	21
10. Photofilm industry	1	8
11. Sugar industry	1	4
12. Synthetic fibre industry	1	4
13. Textile industry	2	24
14. Solid waste disposal	2	4

TABLE XII.

<i>Number and source.</i>	<i>Mercury concentration Hg.</i>			
	1975		1976	
	<i>Waste water.</i>	<i>Bottom sediment.</i>	<i>Waste water.</i>	<i>Bottom sediment.</i>
(1)	(2)	(3)	(4)	(5)
1 Combined waste waters from Dharangadhara Chemical Works, Sahapuram.	400mg/l	19mg/Kg	50mg/l	86mg/Kg
2 Combined waste waters from Dharangadhara Chemical Works, Illminite and Plastics Resins and Chemicals Ltd.	165mg/l	9.25mg/Kg	980mg/l	25.5mg/Kg
3 Polluted creek at the point of admixture with sea.	2mg/l	1.05mg/Kg	7.5mg/l	190mg/Kg
4 Sea at Kayalpattinam	Nil.	—	2.5mg/l	80mg/Kg
5 Sea at Tiruchendur	.. ..	..	1.0mg/l	20mg/Kg

NOTE.—1. Low tide conditions prevailed during 1975 survey and high tide conditions prevailed during 1976 survey.

2. Fish specimen collected at Kayalpatnam during 1975 survey showed mercury to the extent of 0.1 mg/Kg whereas during this year mercury concentration is 155 mg/Kg.

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1. General.

• Analysis of food samples under the Prevention of Food Adulteration Act.

3. Convictions and sentences under the Prevention of Food Adulteration Act.

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5. Examination of foods for chemical poisons and spoilage.

6. Analysis of diet articles received from Government Hospitals, other Government Institutions and Private parties.

7. Railways.

8. Analysis of samples of Drugs under the Drugs and Cosmetics Act.

9. Training.

10. Miscellaneous.

GOVERNMENT ANALYST SECTION.

REVIEW OF ACTIVITIES DURING 1976.

Introduction.---Thiru N. Srinivasan, M.A., C. CHEM., F.R.I.C., Public Analyst, Coimbatore, on promotion as Government Analyst took charge of office of Government Analyst on the forenoon of 3rd January 1976 relieving Thiru M. V. Narayanan, M.A., C. CHEM., F.R.I.C., Deputy Government Analyst, from additional charge of the post of Government Analyst.

1. *General—Staff.*---The sanctioned staff of this laboratory consists of the Government Analyst, the Deputy Government Analyst, 13 Senior Analysts, 14 Junior Analysts, one Technical Assistant, five Technicians Grade I, three Technicians Grade II, nine Last Grade Government Servants and one Menial. The ministerial staff consists of one Superintendent, one Accountant, five Assistants, one Store-keeper, one Junior Assistant, one Steno Typist, five Typists and one Record Clerk.

The following posts were vacant during the periods noted against them:—

One post of Senior Analyst from 30-9-1975 to 18-7-1976.

One post of Senior Analyst from 10-2-1976 to 18-7-1976.

Two posts of Junior Analyst from 1-2-1976 to 31-3-1976.

One post of Junior Analyst from 1-4-1976 to 30-4-1976.

Three posts of Junior Analyst from 1-7-1976 to 31-7-1976.

Five posts of Junior Analyst from 1-11-1976 onwards.

One post of Technician Grade I from 15-7-1972 to 31-5-1976.

One post of Technician Grade I from 10-9-1972 to 31-5-1976.

One post of Technician Grade I from 1-6-1976 to 31-7-1976.

One post of Technical Assistant from 22-12-1971 to 31-5-1976.

Four posts of Junior Analyst from 1-8-1976 to 31-10-1976.

Scientific work.---As in the previous years, the work of the Government Analyst's section comprised the following:—

(1) Analysis of foods under the Prevention of Food Adulteration Act and under the other penal statutes and control orders.

(2) Examination of food for chemical poisons, contamination and spoilage.

(3) Analytical service in respect of diet supplies to Government Hospitals, other Government departments, Institutions and private parties.

(4) Analysis of Drugs and Cosmetics under the Drugs and Cosmetics Act.

(5) Analytical service in respect of drugs received from Government Hospitals and Dispensaries.

(6) Analysis of Drugs from private parties.

(7) Advising Food Inspectors, Municipal Health Officer and other officers working under the Prevention of Food Adulteration Act on problems arising out of the working of Act during sampling, prosecutions, etc., sending proposals for appeal to High Court through proper channel in cases where on perusal of Judgment of Trial Courts, it is felt grounds exist for appeal.

(8) Conducting training course in food inspection and sampling to Food Inspector Trainees.

(9) Training of candidates in food and drug analysis.

2. *Analysis of Food Samples under the Prevention of Food Adulteration Act.*—Samples of food were received under the prevention of Food Adulteration Act from 308 local bodies comprising one Corporation, 79 Municipalities, nine Township Committees, two Cantonment Boards, 181 Town Panchayats, four Panchayats Unions and 29 others. During the year 17,584 samples were received and 17,336 were analysed. 25.5 per cent of the samples were found to be adulterated. Details of samples received and analysed during the year are given below :—

Serial number and nature of samples.	Number of samples received.	Number of samples analysed.	Number found adulterated.	Percent of adulteration
(1)	(2)	(3)	(4)	(5)
1 Beverages—				
(a) Alcoholic	..	..	..	..
(b) Non-Alcoholic	188	169	76	45.0
2 Spices and Condiments	1,095	1,071	125	11.7
3 Sugar, Bura and other Sweetening Agents.	448	460	54	11.7
4 Sweets, Confectionery and other bakery products.	561	564	63	11.2
5 Tea, Coffee, Cocoa and Chicory ..	1,417	1,414	112	8.0
6 Milk	6,854	6,777	3,440	50.7
7 Ghee	133	111	26	23.4
8 Butter, Ice cream and other milk products.	253	227	82	36.1
9 Edible oils and fats	3,537	3,485	324	9.3
10 Vanaspathy	27	29	2	7.0
11 Fruit Products	..	4	2	50.0
12 Cereals and Cereal Products	2,859	2,834	57	2.0
13 Other miscellaneous products	208	191	66	34.6
Total	17,584	17,336	4,429	25.5

3. *Convictions and sentences.*—During the year 4,757 cases of offences under the Prevention of Food Adulteration Act have ended in conviction. Sentences of imprisonment were imposed in 67 cases per terms varying from "till raising of court" to one year rigorous imprisonment. A fine of Rs. 2,000 plus six months rigorous imprisonment was levied in one case. A Fine of Rs. 2,000 was levied in one case. A Fine of Rs. 1,000 plus six months rigorous imprisonment were levied in 37 cases. A fine of Rs. 1,000 was levied in 16 cases. A fine of Rs. 1,200 plus six months rigorous imprisonment was levied in one case. A fine of Rs. 1,000 plus three months rigorous imprisonment was levied in six cases. Total amount of fine realised during the year Rs. 10,88,052.

4. *Details of samples analysed during the year—Milk and its products.*—Six thousand seven hundred and eighty-two samples of milk and milk products were analysed during the year and 3,444 samples were reported as adulterated.

Coffee, Tea, Cocoa and Chicory.—One thousand one hundred and fourteen samples of Coffee and Tea were analysed and of these 112 samples were found to be adulterated.

Sweets, Confectionery and other bakery products.—Of the 551 samples analysed, 60 samples were reported as adulterated due to illegal use of coal tar dye.

Carbonated beverages.—169 samples were analysed, Among these 76 samples were reported as adulterated due to the infringement of Rule 24 or 47 of the Prevention of Food Adulteration Rules or use of non-permitted dyes.

Sugar and other sweetening agents.—450 samples were analysed and 51 samples were found to be adulterated.

Vegetable oils and Fats.—3485 samples were analysed and 324 of these were reported as adulterated either for containing excess free fatty acids for admixture with other oils.

Butter, Ghee and other milk products.—288 samples were analysed and of these 98 samples were found to be adulterated.

Turmeric.—477 samples of turmeric were analysed and 63 samples were found to be adulterated either with lead chromate to toxic inorganic pigment or with other starches.

Dhall.—1643 samples were analysed. Of the samples analysed, 6 samples were reported as adulterated due to high insect infestation and 10 samples were reported misbranded due to the presence of a coal tar dye.

Flours.—Out of 1272 samples of flours analysed 38 samples were found to be adulterated on account of containing excessive amount of sand, grit etc., or misbranding by the use of coal tar dyes.

Miscellaneous.—Out of 193 miscellaneous samples examined, 31 samples were found to be adulterated. A sample of biscuit was found on analysis to contain a non-permitted dye, Rhodamine B. A sample of broken rice was found to contain 50% of extraneous matter. 3 samples of cinnamon bark were reported as adulterated since they contained 50% of extraneous bark. A sample of Cinnamon bark was found to consist entirely of foreign bark. 5 samples of Arrowroot flour were found to consist entirely of tapioca flour. 2 samples of saffron were reported as adulterated due to the presence of coal tar dye. 2 samples of Chunam for betel-leaf were declared adulterated due to the presence of Rhodamine B a non-permitted coal tar dye. A sample of Asafoetida was reported as adulterated, since it contained Colophony resin. 2 samples of gingelly seeds were reported as adulterated due to high Free Fatty acid content of the oil present in them.

5. *Examination of Foods for Chemical Poisons and Spoilage.*—A care food sample reported to be spoiled with pesticide was analysed and found to be free from insecticidal or pesticidal contaminants. It was also found to be free from trace elements like Arsenic, Antimony, Mercury and lead.

A sample of boiled Kappakizhangu was analysed and found to be free from Cyanogenetic glycosides.

Two animal feed samples were analysed and reported on their ash, Acid insoluble ash and protein content.

A wheat flour and a prepared food sample (*சார்பெனல் கூழ்*) were analysed for possible contamination with Datura and Ergot and found to be free from any toxic chemical contaminants or poisons.

A Ragi malt sample was analysed and reported on its moisture, ash, Acid Insoluble ash, protein and fat content and its solubility.

A common salt sample was analysed and reported on for conformity to Prevention of Food Adulteration Rules.

An Oats sample was analysed and reported on its moisture, ash, Acid insoluble ash, protein, crude fibre and other extractive content.

Work is being carried out on a sample, qualitative test for detection of Nigarseed oil in Gingelly oil.

A sample of broken boiled rice received from Sattur was analysed and found to contain 10 parts per million of Arsenic, the presence of which in food articles is hazardous.

A bulgar wheat samples received from Krishnagiri was analysed and declared to be fit for human consumption.

Six samples of salad oil concerned in Cr. No. 18/76 and one sample of salad oil concerned in Cr. No. 19/76 from Dindigul were analysed and found to conform to the specification for salad oil. All the 7 samples were found to be similar in respect of chemical constants.

Two samples of white powder concerned in Cr. No. 19/76 from Dindigul were found on analysis to be similar to each other and to consist of a mixture of wheat and tapioca powder.

A sample of chinnamon bark received from Tiruvarur was analysed and found to consist of foreign bark.

A sample of gunny bag from Tamil Nadu Civil Supplies Corporation Limited, was analysed and the jute twine used for closing the gunny bags was found to contain phosphorous.

A cooked sample of mutton biriyani was analysed and found to be free from toxic substance.

A neem fat sample concerned in Cr. No. 144/76 was analysed and found to consist of fatty acids derived from vegetable oils but not exclusively from neem oil.

A lactometer received from Government Hospital, Cheyyar was declared to be unfit for use as the graduations were off the mark.

Two 50 per cent E.C. of Malathion received from the Tamil Nadu Civil Supplies Corporation were analysed and reported on the percentage of their active constituent.

Two samples of soap were analysed and declared unfit for human consumption.

Sample of rasam, Cabbage, poriyal and buttermilk received from Palani were analysed and found to be free from Chemical poisons.

A sample of bulgar wheat received from the Director of School Education was analysed and declared unfit for human consumption.

An ayurvedic toilet soap was analysed and no incriminatory factor likely to have caused itching of the skin was found in the sample.

A leaf and two samples of sambar received from Palani were analysed and the samples were found to be free from insecticidal and pesticidal residues and elements like Arsenic, Antimony, etc.

Fourteen sample of Soyabean salad oil received from Vembakkam were analysed and found to be highly rancid and were declared unfit for human consumption.

Six samples of wheat and five sample of rice DDVP sprayed and Aluminium phosphide fumigated were received for estimation of possible phosphorous residues.

A sugar sample, found to be moist and damaged has been analysed and the dealer was advised to utilise the stock for the manufacture of confections as early as possible.

A biscuit sample was analysed for possible pesticidal residues and metallic contamination of Arsenic, Antimony etc. and found to be free from the same.

Arrangements are being made to procure Argemone oil to work out identification tests for the same.

Ten samples of boiled rice received from Food Corporation of India were analysed and the uric acid content estimated.

A sample of thur dhal was analysed and uric acid content estimated.

A sample of white power and a sample of Blackgram dhal received from Food Cell were analysed and the white powder was found to be identical with that which has been used for the facing of Blackgram dhal.

Eight samples of bolled rice were analysed for their contamination with auroa and its content estimated.

Two samples of imported Red wheat and Milo received from Food Corporation of India were analysed and were found to contain sulphur.

Two samples of பழையசாதம் and அடை மாங்காய் were received from Ammapet and were found to be free from deleterious heavy metals and chemical contaminants like phosphorous insecticides and chlorinated insecticides.

A sample of Tapioca received was analysed and was found to contain 54 parts per million of Hydrocyanic acid gas.

A sample of rice received from Hosur was analysed and was found to contain 272 mgs. of Arsenic in 100 gms. of the sample 2,710 parts per million against maximum permitted limit of 1.1 p.p.m.

A sample of wheat received from Food Corporation of India, Avadi was found to be contaminated with urea and ammonium sulphate.

A sample of Thur dhal and a sample of greengram dhal insect infested—were analysed for their uric acid content.

6 samples claimed to be original FANTA (beverages) and 6 samples claimed to be duplicate FANTA were analysed and were found to differ in the artificial colours that have been used and Benzoic acid content.

Oil extracted from Ambadi seeds was tested for its general characteristics and was found to answer Halphen's test. Experimental work to evolve an identification test for Ambadi oil is in progress.

The presence of argemone oil in sesame oil was tested by circular paper chromatography and the test was found to be a sensitive one.

A sample of aromax oil received from Komarapalayam was analysed and was found to conform to the specification laid down by Messrs. Burma Shell oil.

A sample of vadai received from Ananda Bhavan Hotel, Krishnagiri was found to be free from metallic and chemical contaminants.

A sample of rice was found to be contaminated with chlorinated insecticide.

A sample of rice received from Food Corporation of India, Cochin was found to be free from Chemical and metallic contaminants.

A sample of hybrid maize seeds received from Vanban was found to be contaminated with 'Captain' to the extent of 1,365 parts per million.

11 samples of Fertilisers DAP, NPK and ANP mixtures were analysed for their contents.

6 samples of Heinz Todden food (about 10 tins) were analysed and were found to be unfit for human consumption.

5 samples of poori, potato, wheat, maida and oil were received from Porur and were found to be free from chemical contaminants.

2 samples of Palkhova and sugar received from Madurai were found to be free from chemical contaminants.

Samples of rice, wheat, Rajinia, Maize and mixed sweepings were analysed for possible residual toxicity of DDVP, Malathion and AIP.

A sample of peppermints was analysed and was found to be free from Phosphorous and Chlorinated insecticide.

A sample of sugar contaminated with oil was analysed and was found to be contaminated with mineral oil.

Samples of Bengalgram flour and Maida flour were tested for alcoholic acidity.

A sample of Malathion 50 percent BC. was analysed and was found to contain 47.9 percent Malathion.

6. *Analysis of diet articles received from Government Hospitals, other Government Institutions and private parties.*—A total of 8,446 samples consisting of food articles were received from Government Hospitals throughout the State during the year. The sample analysed during the year were 9,085 which included samples left over from the previous year. Out of these 869 samples were found either adulterated or otherwise unacceptable.

124 items of different food articles were received from the Superintendent, E.S.I. Hospital, Madras and from the Superintendent, E.S.I. Hospital, Madurai. The number of samples analysed during the year was 148 which included samples left over from previous year. Out of these 9 samples were found not acceptable.

SAMPLES RECEIVED FROM POLICE, MAGISTRATES, OTHER GOVERNMENT INSTITUTIONS, PRIVATE INSTITUTIONS AND PRIVATE PARTIES.

Nature of sample.	Received from	Nature of Report.
(1)	(2)	(3)
16 Samples of Tea Dust ..	.. II Class Magistrate Madurai ..	One sample contained foreign adulterants like tamarind seed coat, Bengal-gram husk, Cashew husk etc. 15 samples Genuine.
5 samples of Phosphates and Sulphates.	Mannargudi	Samples analysed and reported.
1 sample of wheat ..	.. Food Corporation of India ..	Fit for Human consumption.
Sample of Bengal gram flour	.. District Co-operative Supply Society Limited, Salem.	Genuine.
9 samples of Tea dust and suspected to be mixed with Cashewnut dust.	chicory with Sub-Divisional Judicial Magistrate, Thanjavur.	Genuine.
1 sample of white Wheat ..	Food Cell Inspector, Arkonam ..	Unfit for human consumption.
13 samples of cashewnut husk, Washing soda, Red Colour Powder Tea.	Judicial I Class Magistrate, Virudhunagar.	Samples analysed and reported.
12 samples of Ghee ..	.. Madhavaram Dairy Madras, ..	One sample : contained 81 per cent Vanaspathy and two samples contained excess of Free Fatty Acids.
8 samples of oil ..	.. Judicial Magistrate, Nagercoil ..	7 samples : Genuine 1 sample : Adulterated, being a mixture of 7 per cent Castor oil and a mixture of 93 per cent Groundnut Oil and Gingelly Oil.
6 samples of Oils 1 sample of Soya bear oil and 2 samples of white powder.	Judicial II Class Magistrate, Dindigul	All the seven samples of oils were found to be similar in respect of chemical contents. Sample of white powder were found on analysis to be similar to each other and to consist of a mixture of wheat and tapioca.
1 sample of Neem fatty acid ..	.. Sub-Divisional Magistrate, Erode.	Sample contained fatty acids derived from vegetable oils but not exclusively from Neem oil.
1 sample of Soap ..	.. District Health Officer, Tiruchy ..	Sample was found not to contain any harmful ingredients.
2 samples of Malathion ..	.. Tamil Nadu Civil Supplies Corporation, Limited, Madras-10.	Two samples were found to contain 4 per cent Malathion and 27 per cent Malathion respectively.
2 samples of sooji ..	.. Tamil Nadu Civil Supplies Corporation, Salem.	2 samples unfit for human consumption.
2 samples of Edible oils ..	.. Public (Estt. V) Department, Fort St. George, Madras-9.	The Samples found to be refined Groundnut Oil heated over and over again.
6 samples of oil, Coffee with 50 per cent Chicory, Thoor Dhall Butter and pea flour.	Food Inspector, Inspector of Police, Srivilliputhur.	All samples Genuine.
3 samples of Oils ..	.. Sub Divisional Judicial Magistrate, Kovilpatti.	2 samples Genuine one Gingelly Oil Excess Free Fatty Acid.

Nature of sample.	Received from	Nature of Report.
(1)	(2)	(3)
13 samples of oil	Sub-Divisional Judicial Magistrate, Shencottah.	9 samples Genuine 4 samples Adulterated.
1 sample of white powder, 1 sample of Bengal gram dhal, mixed with white powder, 1 sample of Bengal gram dhal.	Food Cell C.I.D., Madras-4 ..	1. White powder : found to be Magnesium Carbonate. 2. Faced with powder identical with Serial No. 1. 3. Free from any facing: processing of dal with any facing material is an offence under PFA Act.
7 samples of ghee, oil, bread, sugar, vanaspathy.	Chief Judicial Magistrate, Tirunelveli	Samples : Genuine 1 sample : Misbranded.
5 samples of Oil, sugar, Turmeric, vanaspathy.	Food Inspector and Inspector of Police, Sivaganga.	samples : Genuine, 1 sample : Slightly excess Free Fatty Acids.
1 sample of Tea dust	Food Inspector and Police Madurai	Adulterated.
2 samples of ghee and Pattani flour	Food Inspector and Food Cell Police, Nagercoil.	Genuine.
34 samples of Coffee powder, drinks, oils, Maida and butter.	Sub-Divisional Judicial Magistrate, Tuticorin.	24 samples : Genuine. 10 samples, adulterated.
4 samples of Oils, Turmeric powder	Judicial I Class Magistrate, Tirunelvely.	3 samples : Genuine. 1 sample : Adulterated.
8 samples of Turmeric oil, flour, tea, chicory and Coffee powder and Raw rice.	Judicial I Class Magistrate, Srivilli-3F puttur.	7 samples : Genuine 1 sample : Adulterated.
15 samples of oils, cereals, ghee, Jaggery rice, Coffee powder and pickles.	Sub-Divisional Judicial Magistrate, Dindigul.	13 samples : Genuine 15 samples : Adulterated.
11 samples of oils, coriander, cereals, flour, Coffee powder and rice 11 samples of oils,	Sub-divisional Judicial Magistrate, Dindigul.	9 samples : Genuine. 2 samples Adulterated;
11 samples of oils, flour, sweets, dhalls Coffee powder, beverages and vanaspathy.	Judicial I Class Magistrate, Srivilli-3 puttur.	10 samples : Genuine 1 sample : Adulterated.
5 samples of dhal Ravai, oil, Coffee powder.	Sub-divisional Judicial Magistrate, Sattur.	4 samples : Genuine. 1 sample Adulterated.
3 samples of oils	Sub-Divisional Magistrate, Kovilpatti	All Samples Genuine.
3 samples of Oil	Chief Judicial Magistrate, Tirunelveli	All samples Genuine.
1 sample of milk	Sub-Divisional Magistrate, Dindigul	Adulterated.
7 samples of Oils	Sub-Divisional Magistrate, Shencottah.	All samples Genuine.
9 samples of milk	Chief Judicial Magistrate, Nagercoil	1 sample : Ignored. 8 samples : Adulterated.
5 samples of Oils ghee and dhalls ..	Sub-Divisional Magistrate, Kovilpatti	All samples : Genuine.
2 samples of Tea leaves and Tea dust	Municipal Health Officer, Coonoor	Tea leaves : Genuine Tea dust slightly Adulterated (Warning)
2 samples of Vanaspathy and Groundnut oil.	Sub-divisional Magistrate, Kovilpatti	All samples Genuine.
1 sample of Groundnut oil	Sub-divisional Magistrate, Shencottah.	Genuine.
11 samples of oils, Turmeric powder, Misky asafoetida, Coffee powder	Sub-Divisional Magistrate, Kovilpatti	9 samples Genuine 2 samples : Not Satisfactory.
8 samples of oils	Do.	7 samples : Genuine. 21 samples : Adulterated.
4 samples of Oils and Mustard ..	Judicial I class Magistrate, Tirunelveli	4 samples : Genuine.
2 samples of Oils	Sub-Divisional Magistrate, Usaim-Patti.	All samples Genuine.

Nature of sample.	Received from	Nature of report
5 samples of Jaggery Powder ..	Food Inspector, Perundurai and Food Cell Sub-Inspector, Coimbatore	All samples genuine
2 samples of honey and pea flour ..	Food Inspector and Food Cell, Sub-Inspector.	All samples genuine
10½ samples of dhall, sugar, turmeric, tea decoction, chilly powder.	Food Inspector, Municipal Health Officer and Food Cell C.I.D., Chingleput.	7 samples genuine. 2 samples adulterated. 1 sample slightly adulterated. s
Sweet powder	Additional Director of Health Services and Family Planning,	Contains Saccharin and dulcin.
1 sample of (கிரீம் பவுண்டு) ..	Food Inspector, Palni and Food Cell Inspector, Theni.	Genuine.
1 sample of curd	Food Inspector, Palani and Food Cell C.I.D., Uthamapalayam.	Too decomposed-Ignored.
1 sample of cream	Do.	Genuine.
1 sample of groundnut oil ..	Food Inspector, Palni and Food Cell C.I.D., Madurai.	Do.
1 sample of ghee	Do.	Adulterated. Vanaspathy 70 percent
1 sample of butter	Food Inspector and Food Cell C.I.D., Theni.	Adulterated. Milk fat content 18 per cent.
samples of groundnut oil ..	Food Inspector and Food Cell C.I.D., Madurai.	Genuine.
7 samples of coloured essence, jaggery, redgram, sweets.	Sub-divisional Judicial Magistrate, Ramanathapuram	Coloured essence adulterated. Jaggery not satisfactory. Redgram sweets genuine.
5 samples of oils, coffee powder, turmeric powder.	Chief Judicial Magistrate, Nagercoil.	Gingelly oil excess free fatty acids. 4 samples genuine.
2 samples of sugars	Judicial II Class Magistrate, Keeranur.	All samples adulterated.
5 samples of chinnamon bark, tea, sweet, gingelly oil and turmeric.	Food Inspector, Nellore Nellore Health Officer, Food Control Cell, Directorate of Public Health and Preventive Medicine A.P.	All samples genuine.
5 samples of gingelly oil, coffee powder, groundnut oil, thoor dhall.	Food Inspector, Tiruvannamalai, Municipal Health Officer, Food Control Cell.	4 samples genuine. 1 sample slightly adulterated warning
15 samples of flour, coffee powder, dalda, turmeric powder, gumin seeds, asafoetida.	Chief Judicial Magistrate, Nagercoil.	13 samples genuine. 2 samples adulterated and misbranded.
40 samples pf fanta	Metropolitan Magistrate, Egmore.	The duplicate samples are different from the original sample.
1 sample of raw honey	Forest Range Officer, Mudumalai.	Genuine.
1 sample of raw honey	Forest Range Officer, Masinagudi	Standard quality.
2 samples of Milk powder ..	Port Health Organisation, Madras-1.	Both unfit for human consumption.
1 sample of Kash mir honey ..	Khadi Gramodyog Bhavan, Madras-2.	Standard quality.
1 sample of sugar	Chief Judicial Magistrate, Tirunelveli.	Adulterated of Rava.
samples of groundnut oil (Posman Brand).	Director of Public Health and Preventive Medicine, Madras.	Refind groundnut oil conforming to standard. But label defective.
Biscuits	District Health Officer, Tiruchirappalli.	Not satisfactory.
2 samples of oil	Judicial Magistrate, Tirunelveli ..	Gingelly oil adulterated and unfit for human consumption. Groundnut oil genuine.
1 sample of ghee	Khadi Bhavan, Madras-2 ..	Unfit for human consumption.
2 samples of coriander	Mr. % O. R. Rajah, Dhall Merchant, Madras-81.	Unfit for edible purposes.

Nature of sample.	Received from.	Nature of report.
(1)	(2)	(3)
1 sample of serbath	Messrs. Janatha Syrup Company, Madurai.	Conform to standards.
1 sample of dhall	Thiru V. M. K. P. Thiyagaraja Nagar, Virudhunagar.	Reported as smooth pea dhall containing slight quantity of Lak dhall about 0.2 per cent by weight.
4 samples of bengal gram dhall flour, blackgram dhall, cane jaggery and thoor dhall.	Thiru M. S. R. Rajagopalan, Madras.	Genuine.
1 sample of ragi malt	Messrs. Mysore Production Corporation, Madras.	Analysed and reported.
1 sample of ghee	Khadi Gramodyog Bhavan, Madras.	Unfit for human consumption.
2 samples of turmeric roots, 2 samples of turmeric powder.	Messrs. K. Narayanaswamy Chetty and Sons, Salem-9.	2 samples of turmeric root Standard quality. 1 sample of turmeric powder standard quality. 1 sample of turmeric powder not of standard quality.
1 sample of cattle feed	The Ootacamund Co-operative Milk Supply Society, Ootacamund.	Reported.
1 sample of sugar	Senior Regional Manager, Tamil Nadu Civil Supplies Corporation, Madras-17.	Standard quality.
1 sample of arrowroot flour ..	Messrs. Sakthi Industries, Madras-49.	Genuine.
5 samples of milk	Thiru N. N. Seshadiri, Tiruchirappalli-1.	3 samples adulterated. 2 samples genuine.
2 samples of starch	Messrs. Britannia and Company, Madras.	Found on analysis as Tapioca starch (Manihot Utilisation).
1 sample of tea	Messrs. Raja Tea Company, Tuticorin.	Found on analysis to contained 85 per cent tea and 15 per cent extraneous matter.
1 sample of milk	Srimathi P. H. Vittal Rao, Kathivakkam.	Genuine.
6 samples of pannari sarbath, fine-appa sarbath, rose sarbath, orange sarbath, grape sarbath, sweet tablets.	Messrs A. V. S. Sweets Company, Thanjavur.	Samples were reported with remarks 'Addition of saccharin to syrups is not permitted under P.F.A. Rules. The dyes present and the content of Benzoic Acid conform to the relevant specification under the Prevention of Food Adulteration Rules
1 sample of dhall	Thiru Gopalakrishnan, Salem ..	Unfit for human consumption.
1 sample of bengal gram flour ..	Thiru G. H. Kailasanatha Rao, Madras.	Genuine.
1 sample of butter	Thiru N. Kandaswamy, Madras-23.	Do.
1 sample of chicof	Messrs. Ambal and Company, Virudhunagar.	Not to conform to standards.
1 sample of maida	Messrs. Britannia Biscuits Company, Madras.	Analysed and reported.
1 sample of ragi malt	The Mysore Products Corporation, Madras-1.	Conforms to I.S.I. specification.
1 sample of tea	Messrs Raja Tea Company, Tuticorin.	Reported to contain excessive tea stalks adulterated with about 2 per cent extraneous matter.
1 sample of bulgar wheat	Health Inspector, P.H.C., Mekalanchinampalli.	Fit for human consumption.
1 sample of Thailand rice	Tamil Nadu Civil Supplies Corporation, Madurai.	Reported to contain Phosphorus.
1 sample of mutton briyani ..	Food Inspector, Polur	Free from any toxic substance.

Nature of sample.	Received from.	Nature of report.
(1)	(2)	(3)
samples of compounded asafoetida.	Thiru Arumugaswamy Nadar, Madurai.	Standard quality.
sample of chicory roots	Messrs Egbers India, Madras-1	Analysed and reported.
1 sample of tamarind	Southern Railway, Rayapuram	Satisfactory.
2 samples of milk powder	Messrs. Indian Red Cross Society, Madras-8.	Unfit for human consumption.
6 samples of beans, potato flour, biscuits, oats flakes, macaroni, cornmeal.	Central Nutrition Bureau of the Office of the Director of Health Services and Family Planning (Public Health Wing), Madras-6.	Reported accordingly.
1 sample of thoor dhal	Messrs. Sathyanarayana and Company, Salem-1.	Adulterated with lak dhal unfit for human consumption.
1 sample of compounded asafoetida.	Messrs. Ramakrishna and Company, Kumbakonam.	Genuine.
1 sample of gingelly oil	Sri Krishna and Company, Madras-1.	Do.
1 sample of (கஸ்துரி வட்டம்)	Messrs. Lakshmi Water Products, Salem.	Reported to contain permitted dyes.
1 sample of babyson	Messrs. Indian Red Cross and Society, Madras.	Babyson unfit for human consumption.
1 sample of Jarmu		Other 2 samples normal quality.
1 sample of wakado		
3 samples of compounded asafoetida.	Thiru C. Manoharan, Madurai	Conforms to standard.
Tea dust	Sri Netaji Tea and Coffee, Company Tuticorin.	Do.
Butter	Thiru M. Kandaswamy, Ayyanavaram, Madras.	Genuine.
3 samples of chicory roots and powder.	Sri Ambal and Company, Virudhunagar.	Conforms to standards.
Compounded asafoetida	Sri Prabhat Trading Company, Madurai.	Do.
Kola	Sri Khamadheni Aerated Works, Madurai-1.	Does not conform to standard.
Pattani flour	Thiru T. C. Sarangapani, Salem	Genuine.
Dhall and flour	Thiru K. Krishnanandhan, Salem.	Dhall unfit for human consumption flour not satisfactory.
Arrowroot flour	Thiru Palaniappa Mudaliar and sons, Madurai.	Conforms to standard.
Ice cream	Sri Hotel Ashoka, Madras	Does not conform to standard.
Dhall	Sri Manivallam, Chengalput	Adulterated.
Strewbry ice cream and vanilla ice-cream.	Sri Aru Ice Company, Madras	Does not conform to standard.
Ice cream	Sri Devi Theatre, Madras	Do.
Pepper and salt	Indian Airlines, Madras-27	Genuine.
2 samples of compounded asafoetida.	Sri Muthiya and Company, Madurai	Conforms to standard.
2 samples of compounded asafoetida.	Sri Mani Trading Company, Madurai.	Do.
1 sample of compounded asafoetida.	Sri Prabhat Trading Company, Madurai.	Reported.
1 sample of compounded asafoetida.	Thiru S. N. Bhasla Tarwar, Ludhiana.	Conforms to standard.

Nature of sample.	Received from.	Nature of report.
2 sample of chocolate	Thiru Jaffar, Madras-14	Both adulterated.
1 sample of ghee	Merchant Association Club, Madras-3.	Genuine.
1 sample of asafoetida	Sri Prabhat Trading Company, Madurai.	Not satisfactory.
1 sample of sugar	Sri Palaniappa Transports, Madras-1.	Unfit for human consumption.
1 sample of chicory	Messrs Spring Havan, Virudhunagar.	Standard quality.
1 sample of ghee	Merchant Association Club, Madras-3.	Not satisfactory.
Dollar supari nut one sample	Sri Bhasker Trading Company Madras-13.	Standard quality.

7. *Railways*.—16 samples of different food articles were received from different Railway food Inspectors in the Southern Railway during the year. The number of samples analysed during the year were 24 including samples left over from the previous year. Out of this two samples were found to be adulterated.

8. *Analysis of samples of drugs under the drugs and cosmetics Act*.—During the year 393 samples were received under the Drugs and Cosmetics Act from the Drugs Inspectors all over Tamil Nadu. 141 samples of Stock mixtures and drugs from Government Hospitals, one sample of flavouring Essence from a Private party (Thiru V. S. Ramachandran, Flavouring Essence Manufacturer, T. Nagar, Madras-17) two samples (one sample of pethidine and one sample of Morphine) from the XIX Metropolitan Magistrate, Saidapet, Madras-15, 2 samples of Absorbent Cotton Wool (Tender samples) from the office of the Director of Medical Education. 15 samples of Absorbent Cotton Wool (Tender samples) from the office of the Director of Health Services and Family Planning and 82 samples of Drugs and Pondicherry State were also received for analysis.

307 samples were reported on under the Drugs and Cosmetics Act from Drug Inspectors. 100 samples from Pondicherry State, One private sample, 2 samples from the XIX Metropolitan Magistrate, Saidapet, Madras-15 and 7 tender samples were also analysed and reported on.

	Number of samples brought forward from the previous year.	Number of samples received during the year.	Number of samples reported on during the year.	Number of samples pending analysis on reporting.
(1)	(2)	(3)	(4)	(5)
From Drugs Inspectors	1,266	404	307	1,363
From Hospitals	94	141	92	431
Tender samples	..	7	7	..
From Private party	..	1	1	..
From XIX Metropolitan Magistrate.	..	2	2	..
From Pondicherry State	87	122	10	119

Eight samples of "Solvex bearing a label stating "Laboratory reagent Not for medical use" were received from Drugs Inspector under Drugs and Cosmetics Act. The label was misleading. It was reported that it had caused the death of people who took it as a drink and that it was sold in the market as surgical spirit. Five of the samples were found on analysis to consist entirely of Methyl alcohol and the other three were found to be a mixture of acetone and methyl alcohol. They were not surgical spirit.

Twenty five items of medicines which were found in side the room No. 2 of Deyal De Lodge at Pantheon Road, Egmore (where Thiru S. M. Krishnan, President, Mohanur Panchayat Union, Salem had stayed and was found unconscious and immediately removed to the Government Hospital, for treatment where he expired on 1st June 1976) were received from the Assistant Director, Tamil Nadu Forensic Science Laboratory, Madras-4 for analysis. Some of the item were found to be tablets used as sedatives and hypnotics and some of them were found to be tranquilizers. This office reported that intake of more than the minimum lethal dose prescribed of the above drugs may cause death.

The attention of higher authorities has been repeatedly drawn to the unmanageably huge arrears of samples of drugs remaining to be analysed and the futility of issuing analytical reports several months after their receipt. It is hoped additional staff asked for analysis will be sanctioned in the near future.

9. *Training.*—Thiru M. R. Sundareswaran, Laboratory Assistant, Community canning and Preservation Centre (Department of Food, Government of India), Madras-17 was given training in food analysis for 15 days during the period from 10th June 1976 to 26th June 1976, on payment of the prescribed fee.

Thirumathi Sigappi, Chemist, Mayilmark Nilayam, Madras-21 was given training in the analysis of Asafoetida for 15 days during the period from 1st July 1976 to 19th July 1976 on payment of the prescribed fee.

2 batches of 25 each of Sanitary Inspectors and Health Inspectors were given training in Food Inspection and Food sampling work during the year.

The Government Analyst conducted instruction classes to the Medical Officers of Primary Health Centres in Madurai, Ramanathapuram, Tirunelveli and Kanyakumari districts on 26th November 1976 to 28th November 1976.

The Government Analyst addressed the seminar of the Tamil Nadu Municipal Sanitary Staff Association at Hotel Ashoka, Madras on 24th December 1976 and dealt in detail with the implications and provisions of Prevention of Food Adulteration Amendment Act, 1976 and the changes in the procedure for sampling and further action under the Act.

The Government Analyst address two batches of trainees in the orientation training centre, Poonamallee on the problem of the Adulteration of Food.

The Deputy Government Analyst conducted instruction classes to the Medical Officers of Primary Health Centres in Chingleput North, Chingleput South, North Arcot, South Arcot and Thanjavur on 23rd November 1976, 24th November 1976, 29th November 1976 and 30th November 1976.

10. *Miscellaneous.*—The Government Analyst, has been nominated as the representative of the State Government in the Central Committee for Food Standards and as the principal member of several committees and sub-committees of I.S.I. he attended the following meetings held by the Central Committee for Food Standards and Indian Standard Institute.

Serial number and date and place.	Name of meeting.	Subject.
5th June 1976 to 18th June at New Delhi	A F DC : 36 and its sub-committees. (1) AFDC : 36:5. (2) AFDC : 36:PI. (3) A F DC : 36.	10th Meeting of Food Hygiene, Sampling and Analysis Sectional Committee.

Serial number date and place.	Name of meeting.	Subject.
27th October 1976 to 29th October 1976 at Mysore.	23rd Meeting of Central Committee for Food Standards.	Consideration of reports of various sub-committees. Manual of guidelines and food Control infrastructure and Draft P.F.A. Rules 1976.
4. 8th December 1976 to 10th December 1976 at Bangalore.	AFDC 34 and its sub-committees. 1. A.F.D.C. 34:1. 2. A.F.D.C. 34:2.	Milk and Milk Products.
5. 17th December 1976 and 18th December 1976 at Calcutta.	Meeting of Analysts Sub-Committee for CCFS.	Consideration of draft P.F.A. rules.

On 25th April 1976 Thiru N. Srinivasan, Government Analyst, addressed a seminar on "Quality Assurance" at Hotel Woodlands under the auspices of Indian Pharmaceutical Association, Tamil Nadu Branch.

The Deputy Government Analyst attended the Court of the Chief Judicial Magistrate at Madurai in connection with Prevention of Food Adulteration cases in C.C. No. 186/76 on 30th August 1976 and 15th September 1976 and the Court of the Judicial First Class Magistrate (Court-I) of Salem in connection with C.C. No. 483 on 30th September 1976.

Office of the Government Analyst,
Kink Institute, Guindy, Madras-22,
dated 5th April 1977.

SRINIVASAN,
Government Analyst.

STATEMENT I.
AREA POPULATION 1976.

Districts.	Area.	Population, 1971.			Population, 1976.		
		Males.	Females.	Total.	Males.	Females.	Total.
		(3)	(4)	(5)	(6)	(7)	(8)
(1)	(2)						
1 Madras	128.0	1,297,195	1,172,254	2,469,449	1,502,000	13,59,000	2,861,000
2 Chengalpattu	7,920.0	1,492,978	1,414,621	2,907,599	1,690,000	15,94,000	3,284,000
3 North Arcot	12,265.0	1,905,360	1,850,437	3,755,797	2,076,000	20,02,000	4,078,000
4 South Arcot	10,898.0	1,836,950	1,780,773	3,617,723	1,996,000	19,23,000	3,919,000
5 Thanjavur	8,261.0	1,779,005	1,767,543	3,546,548	1,929,000	18,99,000	3,828,000
6 Tiruchirappalli	11,114.3	1,606,721	1,585,413	3,192,134	1,752,000	17,18,000	3,470,000
7 Pudukkottai	4,649.1	472,868	177,998	950,866	527,000	5,28,000	1,055,000
8 Madurai	12,629.1	1,982,905	1,955,292	3,938,197	2,182,000	21,41,000	4,323,000
9 Ramanathapuram	12,578.0	1,400,835	459,372	2,860,207	1,520,000	15,72,000	3,092,000
10 Tirunelveli	11,433.0	1,567,558	1,632,957	3,200,515	1,693,000	17,56,000	3,449,000
11 Salem	8,643.0	1,524,329	1,468,287	2,992,616	1,671,000	15,97,000	3,268,000
12 Dharmapuri	9,643.0	852,274	825,501	1,677,775	945,000	916,006	1,861,000
13 Coimbatore	15,673.0	2,235,039	2,138,139	43,783,178	2,460,000	2,345,000	4,805,000
14 Nilgiris	2,549.0	254,120	239,895	494,015	276,000	263,000	539,000
15 Kanyakumari	1,684.0	619,884	602,665	1,222,549	681,000	661,000	1,342,000
Total	1,30,069.0	2,08,28,021	2,03,71,147	41,199,168	22,900,000	2,22,73,000	45,173,000

STATEMENT RECORDED VITAL RATES IN THE STATE OF
TAMIL NADU FOR 1975 AND 1976.

STATEMENT RECORDED VITAL RATES IN THE STATE OF TAMIL NADU FOR 1975 AND 1976.

Serial number and district.	Birth Rate.			Death Rate.			Infant Mortality			
	1975.		1976. Number.	1975.		1976. Number.	1975.			
	Number.	Rate.		Number.	Rate.		Number.	Rate.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1 Madras	95,577	34.28	91,914	32.13	36,482	13.09	33,649	11.76	8,259	86.41
2 Chengalpattu ..	64,712	20.14	61,396	18.70	24,990	7.78	25,456	7.75	2,795	43.19
3 North Arcot ..	105,568	26.81	103,755	25.44	36,281	9.22	36,118	8.86	5,259	49.82
4 South Arcot ..	76,177	19.72	78,241	19.96	25,677	6.65	27,004	6.89	2,602	34.16
5 Thanjavur ..	85,499	22.65	83,375	21.78	32,376	8.46	32,734	8.55	3,155	36.90
6 Tiruchirappalli ..	76,025	22.24	74,178	21.38	35,433	10.37	32,129	9.26	3,511	46.18
7 Pudukkottai ..	17,310	16.71	17,441	16.53	6,897	6.66	6,275	5.95	430	24.84
8 Madurai	103,642	24.38	104,765	24.23	35,722	8.40	34,031	7.87	4,622	44.60
9 Ramanathapuram ..	63,682	20.89	65,792	21.28	22,173	7.37	23,001	7.44	2,565	40.28
10 Tirunelveli ..	84,885	24.94	84,108	24.39	28,048	8.24	29,822	8.65	3,734	43.99
11 Salem	67,441	20.97	67,759	20.73	25,409	7.90	23,470	7.18	2,924	43.36
12 Dharmapuri ..	34,426	18.85	37,827	20.33	11,552	6.33	12,046	6.47	1,203	34.94
13 Coimbatore ..	92,073	19.48	100,842	20.99	31,543	6.67	31,890	6.64	3,644	39.58
14 The Nilgiris ..	12,116	22.86	12,808	23.76	3,004	5.67	3,285	6.09	631	52.08
15 Kanyakumari..	37,564	28.46	37,062	27.62	11,710	8.87	11,011	8.20	2,058	54.79
Total ..	1,016,697	22.88	1,021,263	22.61	367,297	8.27	361,921	8.01	47,392	46.61

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Serial number and district.	Infant mortality.			Still Birth.			Maternal Death.			
	1975.		Rate. (13)	1975.		Rate. (17)	1975.		Rate. (19)	
	Number. (12)	Number. (14)		Number. (16)	Number. (18)					
(1)	(12)	(14)	(13)	(14)	(16)	(17)	(18)	(19)	(20)	(21)
1 Madras	7,757	1,964	84.39	1,964	2,034	21.65	92	0.94	89	0.95
2 Chengalpattu ..	3,038	1,843	49.48	1,843	952	15.27	141	2.18	118	1.89
3 North Arcot ..	5,016	1,633	48.34	1,633	1,837	17.40	278	2.63	300	2.84
4 South Arcot ..	3,175	978	40.58	978	1,058	13.34	257	3.37	296	3.73
5 Thanjavur ..	3,075	2,434	36.82	2,434	2,220	25.94	230	2.69	259	3.03
6 Tiruchirappalli ..	3,418	1,350	46.08	1,350	1,503	19.86	179	2.35	196	2.59
7 Pudukkottai ..	472	251	27.06	251	362	20.33	42	2.45	63	3.54
8 Madurai ..	4,803	2,357	45.85	2,357	2,422	22.60	117	1.13	190	1.77
9 Ramanathapuram ..	2,624	964	39.88	964	1,235	18.43	147	2.31	128	1.91
10 Tirunelveli ..	3,849	1,541	45.76	1,541	1,429	16.21	213	2.51	221	2.58
11 Salem ..	3,145	1,336	46.41	1,336	1,481	21.39	114	1.69	160	2.31
12 Dharmapuri ..	1,304	339	34.47	339	362	9.48	62	1.80	87	2.28
13 Coimbatore ..	4,178	2,435	41.43	2,435	2,783	26.86	210	2.28	224	2.16
14 The Nilgiris ..	756	244	59.03	244	269	20.57	7	0.58	21	1.61
15 Kanyakumari ..	2,025	625	54.64	625	620	16.45	59	1.57	66	1.75
Total ..	48,630	19,294	47.62	19,294	20,567	19.74	2,148	2.11	2,418	2.31

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District.	Birth.			Deaths.			Still Births.			Cholera.	Typh.	T.B.			Kala-az.
	Males.		Total.	Males.		Total.	Males.		Total.			(13)	(14)	(15)	
	(2)	(3)		(5)	(6)		(8)	(9)							
Madras	46,870	45,044	9,19,14	18,268	15,381	33,649	10,72	962	2,034	10	1,064	..	..	6,043	
Chengalpattu wa—															
Kancheepuram	2,864	2,762	5,626	645	592	1,237	195	154	349	..	151	20	58	42	
Tiruvallur	541	555	1,096	147	119	266	22	19	41	..	1	..	25	..	
Chengalpattu	1,842	1,573	3,415	419	238	657	124	105	229	..	2	..	32	6	
Alandur	485	429	914	152	112	264	5	5	10	..	24	..	10	..	
Tambaram	625	618	1,243	134	112	246	12	7	19	..	31	..	6	..	
Madurantakam	601	539	1,140	99	64	163	21	28	49	..	52	..	..	14	
Pallavaram	1,256	1,193	2,463	195	130	325	22	16	38	..	30	1	7	2	
Tiruvotthiyur	299	296	595	208	179	387	1	..	1	..	74	8	29	17	
Total	8,527	7,965	16,492	1,999	1,546	3,545	402	334	736	..	365	29	167	81	

North Arcot.—

Arcot	348	336	684	75	57	132	15	13	28	..	10	..	..	..
Ranipet	665	602	1,267	207	153	360	49	37	86	..	4	11	13	20
Vellore	4,673	4,434	9,107	1,577	1,118	2,695	257	241	498	..	59	166	178	151
Tiruvananthai	1,246	1,160	2,408	232	175	407	114	118	232	..	69	5	19	14
Vaniyambadi	1,050	1,000	2,028	270	243	513	49	26	78	..	137	4	16	60
Gudiyatham	1,550	1,423	2,953	451	440	891	74	56	130	4	193	11	30	11
Tirupattur	1,246	1,095	2,341	178	141	319	68	53	121	..	57	4	11	1
Walajapet	392	413	805	90	68	158	8	14	22	..	12	..	1	..
Arani	964	899	1,863	237	209	446	49	34	83	..	138	..	24	61
Arkonam	947	899	1,846	156	128	284	27	26	53	..	40	5	23	17
Ambur	1,446	1,319	2,765	314	226	550	64	65	129	..	58	5	65	20
Total	14,457	13,580	28,067	3,787	2,968	6,755	774	686	1,460	4	777	211	389	355

South Arcot.—

Cuddalore	2,827	2,594	5,421	494	439	933	188	182	370	..	21	15	57	6
Chidambaram	1,418	1,271	2,689	167	169	336	29	16	45	..	39	..	3	8
Villupuram	1,418	1,318	2,736	197	128	325	49	52	101	..	..	11	15	7
Tindivanam	994	918	1,912	172	114	286	37	31	68	..	15	3	16	38
Punruti	549	455	1,004	79	66	145	20	12	32	..	13	..	8	6
Nellikuppam	504	470	974	143	109	252	3	5	8	..	72	..	10	8
Virudhachalam	894	753	1,647	91	87	178	25	33	58	..	21	3	23	2
Total	8,604	7,779	16,383	1,343	1,112	2,455	351	331	682	..	183	33	132	75

Thanjavur.—

Thanjavur	4,114	3,757	7,871	1,077	683	1,760	341	217	558	..	40	7	25	3
Kumbakonam	3,215	2,891	6,106	581	542	1,123	112	120	232	..	8	10	55	13
Mayuram	2,074	2,048	4,122	342	312	654	137	129	266	..	1	2	21	6
Mannargudi	1,717	1,574	3,291	299	273	572	80	75	155	..	12	3	10	7
Nagapattinam	1,616	1,487	3,103	389	335	724	145	108	253	..	30	1	15	111
Tiruvannamalai	1,014	961	1,975	186	151	337	42	38	80	..	1	5	16	10
Pattukkottai	1,191	1,180	2,371	173	129	302	50	35	85	..	31	..	4	30
Sirkali	610	554	1,164	141	102	243	13	18	31	..	27	3	5	13
Total	15,551	14,452	30,003	3,188	2,527	5,715	920	740	1,660	..	150	31	151	193

Tiruchirappalli.—

Tiruchirappalli	6,233	6,236	12,469	1,796	1,479	3,275	377	372	749	..	122	24	135	144
Karur	1,383	1,287	2,670	314	246	560	93	57	150	..	1	41	33	..
Srirangam	1,278	1,308	2,586	212	193	405	47	49	96	..	5	4	29	19
Manapalai	725	649	1,374	114	111	225	50	42	92	..	14	2	7	21
Turaiyur	576	523	1,099	135	134	269	24	13	37	..	6	1	13	18
Golden Rock	173	154	327	73	40	113	5	6	11	..	11	..	6	2
Pudukkottai	1,816	1,728	3,544	351	256	607	128	98	226	..	11	4	37	59
Total	10,368	10,157	20,525	2,644	2,203	4,847	595	539	1,135	..	159	72	223	204

(1)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
<i>Midasa—</i>	1,057	2,142	89	22	1,239	2	43	34	1,171	1,139	3,663	7,737	2,815	
<i>Chengalpattu—</i>														
Kancheepuram	..	14	102	35	3	26	..	..	785	104	96	200	1	..
Tiruvallur	..	10	10	..	3	18	1	..	198	20	19	39	..	..
Chengalpattu	..	4	14	..	1	56	..	3	538	77	37	114	..	1
Alandur	..	4	6	..	3	8	..	..	209	16	11	27	..	..
Tambaram	..	4	11	..	..	2	..	..	192	19	15	34	..	..
Madurantakam	..	10	..	..	2	1	1	..	83	5	7	12	..	..
Pallavaram	..	2	4	..	..	5	..	..	274	25	20	45	..	..
Tiruvotthiyur	..	19	25	..	3	5	..	..	207	28	22	50	..	..
Total	..	67	172	35	15	121	2	3	2,486	294	227	521	1	1

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North Arcot—

Arcot	..	3	..	..	..	..	..	..	110	12	5	17	..	..
Ranipet	..	3	21	3	..	4	..	2	278	25	21	46	..	1
Vellore	..	39	169	52	7	98	2	2	1,769	282	206	488	3	..
Tiruvannamalai	..	13	19	16	..	9	4	..	239	27	19	46	..	..
Vaniyambadi	..	9	20	5	..	4	..	..	258	64	70	134	..	..
Gudiyatham	..	9	17	3	5	1	..	..	604	77	90	167	3	..
Tirupattur	..	..	6	7	..	2	..	1	230	26	29	55	..	..
Walajpet	..	2	4	..	..	..	..	..	139	14	6	20	..	..
Arani	..	1	19	3	1	6	..	..	193	50	47	97	..	..
Arakonam	..	9	18	4	2	1	1	..	164	31	19	50	..	..
Ambur	..	11	23	8	..	10	1	..	349	69	63	132	..	..
Total	..	99	316	101	15	135	8	5	4,333	677	575	1,252	6	1

South Arcot—

Cuddalore	..	16	21	35	1	123	1	1	632	54	40	94	1	..
Chidambaram	..	1	5	1	1	..	..	..	272	27	21	48	..	..
Villupuram	..	4	11	6	..	9	..	..	272	27	19	46	..	..
Tindivanam	..	3	6	1	2	8	..	..	194	49	29	78	..	..
Puducherry	..	2	6	1	1	1	1	..	106	25	18	43	..	..
Nelikuppam	..	9	10	5	..	3	3	..	132	7	8	15	..	..
Viduthachalam	..	..	13	..	..	..	..	..	115	12	20	32	..	..
Total	..	35	62	50	5	151	5	1	1,723	201	155	356	1	..

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Thiruvannamalai—

Thiruvannamalai	..	28	5	9	74	130	2	5	1,437	139	85	224	..	..
Kumbakonam	..	6	10	16	1	25	..	2	976	63	76	139	1	..
Mayuram	..	7	18	12	24	11	3	..	543	51	55	106	1	..
Mannargudi	..	5	15	7	2	5	1	2	503	56	34	90	..	..
Nagapattinam	..	28	27	32	13	21	2	..	441	50	46	96	2	..
Tiruvavur	..	1	1	1	..	1	1	..	300	35	26	61	..	..
Pattukottai	..	7	12	3	1	1	..	1	213	21	21	42	..	..
Sirkali	..	9	11	3	14	2	1	..	164	22	4	26	..	..
Total	..	92	89	83	129	196	10	10	4,577	437	347	784	4	..

Thiruvallur—

Thiruvallur	..	25	131	26	101	138	5	5	2,430	275	199	474	2	1
Karur	..	6	14	12	1	17	2	..	433	44	31	74	..	..
Sivakasi	..	14	30	2	..	5	1	..	296	22	22	44	..	..
Madurai	..	2	10	2	3	7	..	..	157	18	15	33	..	..
Tamil Nadu	..	3	12	4	..	3	..	..	209	23	23	46	..	..
Golden Rock	..	..	1	..	..	1	..	..	91	7	7	15	..	..
Total	..	50	189	46	105	166	8	5	3,616	389	297	686	2	1
Pudukottai	..	8	21	21	3	26	..	1	416	34	40	74	..	..

BIRTHS, DEATHS, STILL BIRTHS INFANT DEATHS, MATERNAL DEATHS AND CAUSES IN MUNICIPALITIES.—1976

District.	Births.			Deaths.			Still Births.			(11)	(12)	(13)	(14)	(15)
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)					
Madurai—														
Madurai ..	15,103	14,031	29,134	3,380	2,805	6,185	634	489	1,123	..	847	162	256	298
Dindigul ..	3,371	3,128	6,499	758	621	1,379	178	162	340	..	221	13	72	21
Bodinayakanur ..	789	686	1,475	184	177	361	19	20	39	..	57	..	14	..
Periyakulam ..	966	856	1,822	242	294	536	46	40	86	..	46	5	30	9
Palani ..	1,111	970	2,081	288	188	476	32	17	49	..	14	5	44	20
Cumbum ..	705	679	1,384	128	116	244	37	32	69	..	20	4	22	1
Theni-allinagar ..	1,334	1,262	2,596	200	161	361	69	78	147	..	64	5	21	5
Total ..	23,379	21,612	44,991	5,180	4,362	9,542	1,015	838	1,853	..	1,269	194	459	384

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Ramanathapuram—

Rajapalayam	1,429	1,270	2,699	329	260	589	76	69	145	..	85	..	33	..		
Sattur	433	429	862	69	62	131	5	19	24	..	4	1	13	13		
Virudhunagar	1,429	1,363	2,792	211	215	426	53	34	87	..	32	3	40	11		
Karaiikudi	1,042	990	2,032	211	154	365	34	25	59	..	54	..	11	70		
Sivakasi	1,099	975	2,074	123	91	214	21	31	52	..	18	1	29	5		
Devakottai	697	693	1,390	167	147	314	41	33	74	..	28	..	10	19		
Aruppukottai	951	879	1,830	206	201	407	24	24	48	..	64	2	39	2		
Ramanathapuram	1,632	1,592	3,224	312	247	559	133	80	213	..	47	7	27	39		
Paramakudi	901	772	1,673	146	114	260	48	42	90	..	38	8	14	5		
Sivaganga	662	634	1,296	150	120	270	32	21	53	..	6	..	10	..		
Srivilliputhur	1,069	1,046	2,115	239	231	470	43	44	87	..	55	5	19	29		
Total ..	11,344	10,643	31,987	2,163	1,842	4,005	516	422	932	..	431	27	245	193		

Tirunelveli—

Tuticorin	..	..	3,518	3,550	7,068	695	576	1,271	..	36	23	59	..	154	39	100	44
Tirunelveli	..	..	1,605	1,586	3,191	393	328	721	28	28	19	47	..	68	2	51	19
Palayamkottai	..	..	2,219	2,089	4,378	554	357	911	173	173	141	314	..	7	13	73	3
Melapalayam	..	..	734	739	1,473	173	128	301	..	26	13	39	..	95	..	23	5
Shengottah	..	..	..	430	941	125	134	259	..	27	18	45	..	3	..	9	27
Tenkasi	..	..	985	871	1,856	169	150	319	45	45	..	40	..	42	..	9	..
Kadayanallur	..	..	911	860	1,771	196	132	328	51	51	45	96	..	69	..	21	61
Sankarankoil	..	..	529	494	1,023	222	165	387	26	26	18	44	..	54	2	4	24
Kovilpatti	..	..	1,224	1,131	2,355	207	145	352	58	58	51	109	..	46	4	33	23
Puduchgudi	..	..	320	282	602	53	45	98	6	6	2	8	..	21	..	5	1
Total	..	..	12,626	12,032	24,658	2,787	2,160	4,947	476	476	370	846	..	569	60	328	207

Salem—

Rasipuram	..	..	956	891	1,847	132	142	274	39	39	78	..	9	2	11	22	83
Attur	..	..	1,296	1,218	2,514	158	147	305	91	74	165	..	10	3	1	4	
Edappadi	..	..	569	586	455	93	64	157	20	5	25	..	1	4	9	..	
Trichengodu	..	..	981	918	899	127	126	253	58	55	113	..	39	4	17	..	
Namakkal	..	..	1,002	938	1,940	119	84	203	52	31	83	..	15	..	11	10	
Sivagangulam	..	..	359	325	684	28	16	44	11	4	15	..	15	1	..	4	
Salem	..	..	7,845	7,310	15,155	2,214	1,883	4,097	418	308	726	1	39	384	258	214	
Total	..	..	13,008	12,186	25,194	2,871	1,462	5,333	689	516	1,205	1	128	398	307	250	

Pudukottai—

Pudukottai	1,205	1,106	2,311	134	88	222	94	66	160	..	8	..	21	..		
Total ..	1,108	1,087	2,195	246	178	424	65	46	111	..	4	15	36	21		

Total ..	2,313	2,193	4,506	380	266	646	159	112	271	..	12	15	57	21		
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(1)—cont.	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
Madurai—														
Madurai	33	53	47	55	196	..	21	..	4,214	583	507	1,090	3	..
Dindigul	6	11	1	5	44	..	..	..	985	141	113	254	..	..
Bodinayakanur	12	1	..	2	3	3	..	..	268	46	32	78	..	..
Periyakulam	40	8	7	7	5	1	..	..	348	43	52	95	..	..
Palani	9	33	6	12	22	2	..	..	308	36	24	60	1	..
Cumbam	2	5	4	..	5	..	..	..	181	36	35	71	..	..
Thendallinagaram	21	13	9	4	..	..	..	..	219	63	56	119	..	..
Total ..	123	124	74	85	276	6	21	..	6,523	948	819	1,767	4	..

Ramanathapuram—														
Rajapalayam	11	38	4	1	6	1	..	..	410	45	32	77	..	..
Sattur	9	4	..	5	2	..	..	..	80	8	8	16	..	..
Virudhunagar	2	10	3	..	8	1	..	..	315	49	40	89	1	..
Karaikudi	3	..	..	3	2	..	..	..	222	20	12	32	..	..
Sivakasi	4	..	1	..	3	..	..	..	153	28	12	40	..	..
Devakottai	2	11	6	2	3	..	..	..	233	28	38	66	..	..
Aruppukottai	7	5	2	4	3	2	..	..	276	27	30	57	1	..
Ramanathapuram	9	5	21	3	28	..	..	..	373	48	36	84	..	..
Pattanam	3	11	1	..	..	..	..	..	180	20	12	32	..	..
Sivaganga	..	5	2	10	..	2	..	..	235	32	15	47	..	..
Srivilliputhur	22	..	10	3	5	..	..	..	322	54	38	92	..	..
Total ..	72	89	50	31	60	6	..	..	2,799	359	273	632	2	..

Thiruvallur—														
Tuticorin	26	39	14	18	42	..	..	..	795	160	111	271	..	..
Thiruvallur	1	..	..	..	2	..	..	..	568	31	39	70	..	..
Pattanam	2	6	54	25	88	4	..	..	642	58	51	109	3	..
Madurai	..	20	2	..	..	..	..	..	156	43	48	91	..	..
Sivakasi	2	..	3	2	3	..	..	..	210	24	29	53	..	..
Thiruvallur	6	5	3	..	..	..	..	..	254	18	20	38	..	..
Kadambalur	2	3	4	4	9	..	..	..	155	58	48	106	..	..
Sankarankoil	17	6	4	1	3	1	..	..	271	43	35	78	..	..
Kovilpatti	14	5	7	14	17	2	..	..	187	44	36	80	..	..
Pullangudi	..	..	2	..	..	1	..	..	68	2	4	6	..	..
Total ..	70	84	84	64	155	8	..	..	3,306	481	421	902	3	..

Salem—														
Rasipuram	5	1	..	5	5	5	1	..	213	19	42	61	..	..
Attur	6	..	5	..	4	..	..	..	271	42	25	67	..	..
Edappadi	2	..	1	..	..	..	..	..	139	6	12	18	1	..
Trichengodu	..	2	5	3	4	..	..	..	179	15	13	28	..	..
Manakal	1	..	8	4	11	2	2	..	139	16	14	30	..	..
Suramangalam	..	..	..	1	3	..	..	..	19	6	6	12	..	..
Salem	86	39	66	2	1	..	2	..	2,994	446	349	795	6	..
Total ..	100	43	85	15	28	7	5	..	3,954	550	461	1,011	7	..
Dindigul—														
Dindigul	..	6	7	16	23	..	..	..	144	7	9	16	..	..
Kanniyakumari—														
Kanniyakumari	20	4	7	..	12	2	..	..	303	67	42	109	..	..
Total ..	20	10	14	16	35	2	..	..	444	74	51	125	..	..

BIRTHS, DEATHS, STILL BIRTHS, INFANT DEATHS, METERNAL DEATHS AND CAUSES IN MUNICIPALITY.

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
<i>Coimbatore</i>														
Coimbatore	10,460	9,823	20,283	2,396	1,785	4,181	420	360	783	..	1,351	100	178	253
Erode	4,917	4,645	9,562	658	485	1,143	271	207	478	..	23	20	28	40
Tiruppur	2,459	2,224	4,683	532	504	1,036	94	82	176	..	117	32	68	25
Pollachi	2,293	2,201	4,494	492	433	925	150	331	281	..	30	3	38	56
Dharapuram	894	899	1,793	138	128	266	44	39	83	..	..	7	11	6
Udumalpet	1,290	1,079	2,369	226	173	399	82	59	141	..	2	5	30	3
Mettupalayam	1,176	1,067	2,243	192	166	358	42	51	93	..	..	7	20	15
Gobichettipalayam	1,509	1,280	2,798	210	183	393	101	76	177	..	1	7	26	17
Singanallur	1,163	1,121	2,284	410	337	747	39	..	86	..	10	6	..	42
Sathiyamangalam	369	332	701	70	62	132	5	6	11	..	2	14	8	1
Total ..	26,730	24,671	51,201	5,324	4,256	9,580	1,248	1,061	2,309	..	320	201	459	458

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THE NILGIRIS—

Ootacamund	1,564	1,372	2,936	445	358	803	29	27	56	1	8	172	20	131
Coonoor	939	903	1,842	241	176	417	27	23	60	..	11	33	..	53
Total ..	2,503	2,275	4,778	686	534	1,220	66	50	116	1	19	205	28	184

KANYAKUMARI—

Nagercoil	3,793	3,579	7,372	823	640	1,463	134	..	244	..	19	49	25	83
Colachel	250	240	490	67	57	124	3	..	4	..	36	..	..	..
Kazhithurai	495	450	945	61	47	108	29	..	52	..	2	11	..	2
Padmanabapuram	369	377	746	67	59	126	2	..	2	..	1	..	..	4
Total ..	4,907	4,646	9,553	1,018	803	1,821	168	134	302	..	58	60	25	89

BIRTHS, DEATHS, STILL BIRTHS, INFANT DEATHS, METERNAL DEATHS AND CAUSES IN MUNICIPALITIES—cont.

Coimbatore—

Coimbatore	100	92	35	30	259	8	3	..	2,978	479	360	839	10	..
Erode	2	5	49	..	91	1	1	..	879	106	103	209	4	..
Tiruppur	18	11	13	7	19	2	..	..	718	115	81	196	6	..
Pollachi	56	..	11	1	1	4	..	..	723	111	93	204	2	..
Dharapuram	2	..	2	2	8	2	1	..	225	23	18	41	..	..
Udumalpet	..	4	5	..	10	1	3	..	335	62	37	99	1	..
Mettupalayam	1	9	5	..	..	6	..	..	295	35	22	57	..	..
Gobichettipalayam	1	8	7	31	19	..	..	..	276	59	37	66	..	..
Singanallur	15	8	..	5	6	3	..	..	600	36	57	93	..	..
Sathiyamangalam	..	..	..	3	2	2	..	..	100	6	3	9	..	..
Total ..	195	137	127	79	415	29	8	..	7,129	1,032	811	1,823	23	..

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THE NILGIRIS—

Ootacamund	7	8	7	8	18	..	..	..	432	112	93	205	..	..
Coonoor	1	7	3	5	4	..	4	..	287	45	31	76	1	..
Total ..	8	15	10	13	22	..	4	..	710	157	124	281	1	..

KANYAKUMARI—

Nagercoil	48	3	18	13	39	3	7	..	159	127	110	237	3	..
Colachel	2	..	..	..	3	..	1	..	83	11	15	26	..	..
Kazhithurai	2	..	..	..	1	..	..	..	90	8	8	16	..	..
Padmanabapuram	4	1	..	..	..	..	..	..	116	7	6	13	..	..
Total ..	56	4	18	13	43	3	8	..	144	153	139	292	3	..

STATEMENT SHOWING POSITION OF ARREAR RETURNS 1976.

Serial number and Districts.	Number of return Due.	Number of return Received.	Return Balance.	Percent due not received balance percentage.
(1)	(2)	(3)	(4)	(5)
1 Chengalpattu	15,828	14,794	1,034	6.53
2 North Arcot	19,080	18,349	731	3.83
3 South Arcot	20,220	18,950	1,270	6.28
4 Thanjavur	17,868	17,009	859	4.81
5 Thiruchirappalli	11,040	10,195	845	7.66
6 Pudukottai	5,976	5,531	445	7.45
7 Madurai	10,560	10,207	353	3.34
8 Ramanathapuram	15,732	14,364	1,368	8.70
9 Tirunelveli	10,344	10,043	301	2.91
10 Salem	9,612	9,209	403	4.19
11 Dharmapuri	7,284	7,217	67	0.98
12 Coimbatore	10,308	9,710	598	5.80
13 The Nilgiris	1,152	1,002	150	13.02
14 Kanyakumari	3,456	3,453	3	0.09
Total	1,58,460	1,50,033	8,427	5.35

STATEMENT SHOWING BIRTHS, DEATHS, STILL BIRTHS, INFANT DEATHS BY MONTHS RURAL URBAN STATE DURING THE YEAR 1976.

(1)	January.			February.			March.			April.		
	Male.		Total.	Male.		Total.	Male.		Total.	Male.		Total.
	(2)	(3)		(5)	(6)		(8)	(9)		(11)	(12)	(13)
Births—												
Rural	19,378	18,137	37,515	19,306	17,948	37,254	21,671	20,014	41,685	22,386	20,791	43,177
Urban	18,469	17,420	35,889	18,061	16,683	34,744	20,454	18,774	39,228	19,929	18,858	38,787
STATE	37,847	35,557	73,404	37,367	34,631	71,998	42,125	38,788	80,913	42,315	39,649	81,964
Deaths—												
Rural	11,410	10,147	21,557	10,796	9,764	20,560	10,617	9,693	20,310	9,807	8,792	18,599
Urban	5,509	4,400	9,909	5,638	4,557	10,195	5,413	4,429	9,842	4,47	3,945	8,912
STATE	16,919	14,547	31,466	16,434	14,321	30,755	16,030	14,122	30,152	14,754	12,737	27,511
Still Births—												
Rural	93	95	188	109	79	188	86	59	145	117	89	206
Urban	800	590	1,390	693	616	1,309	844	675	1,519	894	764	1,658
STATE	893	685	1,578	802	695	1,497	930	734	1,664	1,011	853	1,864
Infant Deaths—												
Rural	1,194	1,181	2,375	1,153	1,071	2,224	1,147	984	2,131	1,097	1,000	2,097
Urban	1,003	799	1,802	941	815	1,756	821	705	1,526	889	703	1,592
STATE	2,197	1,980	4,177	2,094	1,886	3,980	1,968	1,689	3,657	1,986	1,703	3,689
Marginal Deaths—												
Rural	..	58	58	..	86	86	..	123	123	..	98	98
Urban	..	65	65	..	83	83	..	86	86	..	83	83
STATE	..	123	123	..	169	169	..	209	209	..	181	181

STATEMENT SHOWING BIRTHS DEATHS, STILL BIRTHS, INFANT DEATHS, BY MONTHS RURAL URBAN STATE DURING THE YEAR 1976—cont.

	May.			June.			July.			August.		
	Male.		Total.	Male.		Total.	Male.		Total.	Male.		Total.
	(14)	Female. (15)		(17)	Female. (18)		(20)	Female. (21)		(23)	Female. (24)	
Births—												
Rural	23,070	21,427	44,497	25,144	23,120	48,264	27,440	25,412	52,852	26,399	24,545	50,855
Urban	21,343	19,687	41,030	20,228	18,907	39,135	22,240	20,421	42,661	21,264	20,294	41,5
STATE	44,413	41,114	85,527	45,372	42,027	87,399	49,680	45,833	95,513	47,663	44,748	92,41
Deaths—												
Rural	9,735	8,885	18,620	8,531	8,124	16,655	9,397	9,062	18,459	10,098	9,684	19,782
Urban	4,948	4,138	9,086	4,653	3,822	8,475	4,664	3,883	8,547	4,888	4,098	8,986
STATE	14,683	13,023	27,706	13,184	11,946	25,130	14,061	12,945	27,006	14,986	13,782	28,768
Still Births—												
Rural	112	94	206	91	88	179	91	79	170	95	176	..
Urban	877	727	1,604	838	747	1,585	887	733	1,620	817	657	1,47
STATE	989..	821	1,810	929	835	1,764	978	812	1,790	912	738	1,650
Infant Deaths—												
Rural	1,094	1,034	2,128	1,076	997	2,073	1,108	1,039	2,147	1,144	1,147	2,291
Urban	962	807	1,769	895	779	1,674	860	760	1,620	964	823	1,787
STATE	2,056	1,841	3,897	1,971	1,776	3,747	1,968	1,799	3,767	2,108	1,970	4,078
Maternal Deaths—												
Rural	..	130	130	..	121	121	..	152	152	..	129	129
Urban	..	124	124	..	104	104	..	105	105	..	152	101
STATE	..	254	254	..	225	225	..	257	257	..	230	230

STATEMENT SHOWING BIRTHS, DEATHS, STILL BIRTHS, INFANT DEATHS BY MONTHS RURAL, URBAN, STATE DURING THE YEAR 1976—cont.

	September.			October.			November.			December.		
	Male.		Total.	Male.		Total.	Male.		Total.	Male.		Total.
	(26)	Female. (27)		(29)	Female. (30)		(32)	Female. (33)		(35)	Female. (36)	
Births—												
Rural	24,964	23,076	48,040	23,519	21,893	45,412	31,392	19,871	41,263	21,894	20,323	42,217
Urban	21,152	19,642	40,794	21,675	20,588	42,263	22,756	21,238	43,994	24,263	23,888	48,151
STATE	46,116	42,718	88,834	45,194	42,481	87,675	44,148	41,109	85,257	46,157	44,211	90,368
Deaths—												
Rural	11,183	10,797	21,980	11,699	11,224	22,923	11,65	11,329	22,994	12,946	12,638	25,584
Urban	5,422	4,440	9,862	5,191	4,195	9,386	5,073	4,173	9,246	6,168	5,284	11,452
STATE	16,605	15,237	31,842	16,890	15,419	32,309	16,738	15,502	32,240	19,114	17,922	37,036
Still Births—												
Rural	87	76	163	108	90	198	79	66	145	102	80	182
Urban	824	628	1,452	877	731	1,608	843	736	1,579	875	748	1,623
STATE	911	704	1,615	985	821	1,806	922	802	1,724	977	828	1,805
Infant Deaths—												
Rural	1,190	1,078	2,268	1,195	1,083	2,278	1,248	1,212	2,460	1,660	1,546	3,206
Urban	935	869	1,824	924	726	1,650	972	793	1,765	1,127	1,060	2,187
STATE	2,145	1,947	4,092	2,119	1,809	3,928	2,220	2,005	4,225	2,787	2,606	5,293
Maternal Deaths—												
Rural	..	124	124	..	116	116	..	134	134	..	102	102
Urban	..	73	73	..	75	75	..	73	73	..	73	73
STATE	..	1,197	1,197	..	191	191	..	207	207	..	175	175

BIRTHS RURAL—1976.

Districts	January.			February.			March.			April.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Chingleput ..	12,280	1,221	2,501	1,071	1,101	2,172	1,232	1,202	2,434	1,275	1,252	2,527
North Arcot..	2,393	2,194	4,587	2,178	2,073	4,251	2,587	2,449	5,036	2,548	2,474	5,022
South Arcot	1,749	1,622	3,371	1,782	1,606	3,388	1,907	1,843	3,750	2,144	1,940	4,082
Thanjavur ..	1,697	1,537	3,234	1,855	1,769	3,624	2,266	2,047	4,313	1,977	1,984	3,961
Tiruchirappalli	1,388	1,375	2,763	1,407	1,312	2,719	1,838	1,626	3,464	1,800	1,637	3,437
Pudukkottai	660	594	1,254	621	468	1,089	630	567	1,197	541	486	1,027
Madurai ..	1,972	1,750	3,722	1,796	1,635	3,431	2,009	1,929	3,938	2,178	1,948	4,126
Ramanathapuram	1,160	1,107	2,267	1,311	1,253	2,564	1,482	1,445	2,927	1,574	1,482	3,056
Tirunelveli ..	1,972	1,888	3,860	2,038	1,843	3,881	2,265	2,063	4,328	2,101	2,032	4,133
Salem ..	1,325	1,142	2,467	1,197	1,093	2,290	1,330	1,137	2,467	1,511	1,333	2,844
Dharmapuri ..	1,034	975	2,009	1,124	975	2,098	1,227	1,046	2,273	1,390	1,243	2,633
Coimbatore ..	1,370	1,361	2,731	1,498	1,404	2,902	1,588	1,395	2,983	1,822	1,565	3,387
Nilgiris ..	232	208	440	272	247	519	248	228	476	240	234	474
Kanyakumari ..	1,146	1,163	2,309	1,156	1,170	2,326	1,062	1,037	2,099	1,285	1,181	2,466
TOTAL ..	19,378	18,137	37,515	19,306	17,948	37,254	21,671	20,014	41,685	22,386	20,791	43,177

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BIRTHS RURAL, 1976—cont.

District.	May.			June.			July.			August.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	
Chingleput ..	1,484	1,283	2,764	1,559	1,400	2,959	1,913	1,826	3,739	1,887	3,762	3,649
North Arcot..	2,852	2,689	5,541	3,292	2,964	6,256	3,766	3,497	7,263	3,642	3,426	7,068
South Arcot	2,456	2,125	4,581	2,866	2,625	5,491	3,304	2,899	6,208	3,208	2,916	6,124
Thanjavur ..	1,868	1,797	3,665	1,808	1,798	3,606	1,809	1,663	3,472	1,744	1,627	3,371
Tiruchirappalli	1,764	1,653	3,417	2,094	1,932	4,026	2,309	2,240	4,549	2,372	2,178	4,550
Pudukkottai	519	475	994	687	624	1,311	638	623	1,261	644	651	1,295
Madurai ..	2,292	2,151	4,443	2,361	2,164	4,525	2,466	2,146	4,642	2,123	1,906	4,029
Ramanathapuram	1,463	1,409	2,872	1,659	1,558	3,217	1,973	1,758	3,731	1,905	1,901	3,806
Tirunelveli ..	1,986	1,940	3,926	2,085	1,986	4,071	2,152	2,095	4,247	2,123	1,951	4,074
Salem ..	1,672	1,388	3,060	1,725	1,462	3,187	1,942	1,730	3,679	1,894	1,689	3,583
Dharmapuri	1,343	1,299	2,642	1,655	1,465	3,110	1,695	1,450	3,145	1,440	1,302	2,742
Coimbatore ..	1,810	1,782	3,592	1,871	1,664	3,535	1,976	1,910	3,886	1,991	1,801	3,792
Nilgiris ..	275	208	483	244	234	478	224	258	482	268	225	493
Kanyakumari	1,289	1,228	2,517	1,238	1,244	2,482	1,273	1,287	2,560	1,158	1,119	2,277
TOTAL ..	23,070	21,427	44,497	25,144	23,120	48,264	27,440	25,412	52,852	26,399	24,454	50,85

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BIRTHS RURAL, 1976—cont.

Districts.	September.			October.			November.			December.			Total.		
	Male.		Female.	Male.		Female.	Male.		Female.	Male.		Female.	Male.		Female.
	(26)	(27)		(29)	(30)		(32)	(33)		(35)	(36)		(37)	(38)	
Chingleput ..	1,767	1,653	3,420	1,363	1,209	2,572	1,354	1,208	2,562	1,215	1,294	2,509	17,397	16,411	33,808
North Arcot...	3,443	3,168	6,611	3,482	3,209	6,691	2,968	2,781	5,749	3,033	2,780	5,813	36,184	33,704	69,888
South Arcot ..	2,636	2,381	5,017	2,442	2,210	4,652	2,363	2,185	4,548	2,451	2,232	4,683	29,308	26,584	55,892
Thanjavur ..	1,794	1,722	3,516	1,660	1,600	3,260	1,585	1,420	3,005	1,977	1,808	3,785	22,040	20,772	42,812
Tiruchirappalli ..	2,402	2,272	4,674	2,238	2,122	4,360	2,097	2,015	4,112	2,088	1,919	4,007	23,797	22,281	46,078
Pudukottai ..	640	573	1,213	547	543	1,090	459	406	865	503	467	970	1,089	6,477	13,566
Madurai ..	2,012	1,849	3,861	2,192	1,889	4,081	1,926	1,929	3,855	2,198	2,048	4,246	5,525	23,374	48,899
Ramanathapuram ..	1,583	1,474	3,057	1,494	1,501	2,995	1,492	1,352	2,844	1,586	1,446	3,030	18,682	17,686	36,368
Tirunelveli ..	1,903	1,728	3,631	1,875	1,701	3,576	1,800	1,708	3,508	1,834	1,734	3,568	24,134	22,669	46,803
Salem ..	1,892	1,632	3,524	1,609	1,503	3,112	1,401	1,205	2,606	1,372	1,207	2,579	18,870	16,651	35,521
Dharmapuri ..	1,598	1,514	3,112	1,596	1,496	3,092	1,453	1,340	2,793	1,200	1,121	2,321	16,755	15,225	31,980
Coimbatore ..	1,811	1,652	3,463	1,684	1,614	3,298	1,457	1,285	2,742	1,403	1,220	2,623	20,281	18,653	38,934
Nilgiris ..	261	237	498	129	124	253	126	136	262	128	115	243	2,647	2,454	5,101
Kanyakumari ..	1,222	1,221	2,443	1,208	1,172	2,380	2,911	901	1,812	906	932	1,838	13,854	13,655	27,509
Total ..	24,964	23,076	48,040	23,519	21,893	45,412	21,392	19,871	41,263	21,894	20,323	42,217	2,76,563	2,56,466	5,33,029

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BIRTHS URBAN 1976.

Districts.	January.			February.			March.			April.		
	Male.		Female.	Male.		Female.	Male.		Female.	Male.		Female.
	(2)	(3)		(5)	(6)		(8)	(9)		(11)	(12)	
(1) Madras ..	3,163	3,073	6,236	3,001	2,928	5,929	3,531	3,267	6,798	3,576	3,313	6,889
Chingleput ..	1,038	963	2,001	814	801	1,615	1,069	990	2,059	1,006	928	1,934
North Arcot...	1,264	1,169	2,433	1,245	1,145	2,390	1,490	1,373	2,863	1,387	1,283	2,670
South Arcot ..	796	712	1,508	728	653	1,381	901	890	1,791	891	852	1,743
Thanjavur ..	1,584	1,506	3,090	1,603	1,425	3,028	1,821	1,667	3,488	1,661	1,697	3,358
Tiruchirappalli ..	1,043	986	2,029	1,014	903	1,917	1,112	1,092	2,204	1,127	1,080	2,207
Pudukkottai ..	121	114	235	137	111	248	149	196	345	114	135	249
Madurai ..	2,283	2,206	4,489	2,195	2,092	4,287	2,322	2,201	4,523	2,299	2,166	4,465
Ramanathapuram ..	1,116	1,037	2,153	1,020	934	1,954	1,195	1,050	2,245	1,185	1,115	2,300
Tirunelveli ..	1,406	1,415	2,821	1,538	1,330	2,868	1,637	1,456	3,093	1,620	1,525	3,145
Salem ..	1,171	1,085	2,256	1,149	1,100	2,249	1,343	1,300	2,643	1,311	1,220	2,531
Dharmapuri ..	221	166	387	231	228	459	278	254	532	264	243	507
Coimbatore ..	2,561	2,340	4,901	2,650	2,370	5,020	2,858	2,350	5,208	2,712	2,530	5,242
Nilgiris ..	321	287	608	313	257	570	330	318	648	332	331	663
Kanyakumari ..	381	361	742	423	406	829	418	370	788	444	440	884
TOTAL ..	18,469	17,420	35,889	18,061	16,683	34,744	20,454	18,774	39,228	19,929	18,858	38,787

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BIRTHS URBAN 1976—cont.

District.	May.			June.			July.			August.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Madras ..	4,027	3,812	7,839	3,260	3,030	6,290	3,908	3,764	7,672	3,989	4,084	8,073
Chingleput ..	952	939	1,891	1,221	1,073	2,294	1,268	1,133	2,401	1,248	1,136	2,384
North Arcot ..	1,363	1,296	2,659	1,340	1,278	2,618	1,518	1,468	2,986	1,507	1,307	2,814
South Arcot ..	1,011	895	1,906	960	935	1,895	1,187	1,022	2,209	1,075	885	1,960
Thanjavur ..	1,722	1,680	3,402	1,838	1,614	3,452	1,709	1,532	3,241	1,725	1,617	3,342
Tiruchirappalli ..	1,274	1,252	2,526	1,115	1,032	2,147	1,303	1,174	2,477	1,287	1,229	2,516
Pudukkottai ..	181	162	343	192	148	340	221	182	403	192	179	371
Madurai ..	2,612	2,402	5,014	2,549	2,365	4,914	2,494	2,297	4,791	2,373	2,145	4,518
Ramanathapuram ..	1,373	1,242	2,615	1,389	1,345	2,734	1,364	1,296	2,660	1,292	1,141	2,433
Tirunelveli ..	1,635	1,509	3,144	1,503	1,429	2,932	1,760	1,594	3,354	1,479	1,504	2,983
Salem ..	1,382	1,301	2,683	1,363	1,276	2,639	1,467	1,373	2,840	1,428	1,345	2,773
Dharmapuri ..	289	253	542	268	274	542	245	272	517	243	262	505
Coimbatore ..	2,809	2,263	5,072	2,506	2,409	4,915	3,053	2,585	5,638	2,650	2,664	5,314
Nilgiris ..	343	320	663	345	312	657	337	340	677	398	391	789
Kanyakumari ..	370	361	731	379	387	766	406	389	795	378	405	783
TOTAL ..	21,343	19,687	41,030	20,228	18,907	39,135	22,240	20,421	42,661	21,264	20,294	41,558

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BIRTHS URBAN 1976—cont.

Districts.	September.			October.			November.			December.			Total.	
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.
(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Madras ..	4,222	3,949	8,171	4,481	4,252	8,733	4,573	4,034	8,877	5,139	5,268	10,407	46,870	45,044
Chingleput ..	1,213	1,212	2,425	1,505	1,373	2,878	1,402	1,254	2,656	1,546	1,504	3,050	14,282	13,306
North Arcot ..	1,600	1,490	3,090	1,529	1,438	2,967	1,630	1,489	3,119	1,673	1,585	3,258	17,546	16,321
South Arcot ..	1,127	961	2,088	944	888	1,832	930	892	1,822	1,127	1,087	2,214	11,677	10,672
Thanjavur ..	1,648	1,579	3,167	1,695	1,602	3,297	1,893	1,701	3,594	2,100	2,004	4,104	20,999	19,564
Tiruchirappalli ..	1,228	1,132	2,360	1,289	1,293	2,582	1,109	1,105	2,214	1,458	1,463	2,921	14,359	13,741
Pudukkottai ..	162	142	304	209	186	395	236	155	391	118	133	251	2,032	1,843
Madurai ..	2,134	1,949	4,083	2,351	2,137	4,488	2,740	2,469	5,209	2,641	2,444	5,085	28,993	26,873
Ramanathapuram ..	1,187	1,119	2,306	1,328	1,195	2,523	1,439	1,317	2,756	1,408	1,337	2,745	15,296	14,128
Tirunelveli ..	1,518	1,448	2,966	1,512	1,501	3,013	1,800	1,713	3,513	1,752	1,721	3,473	19,160	18,145
Salem ..	1,498	1,406	2,904	1,509	1,410	2,919	1,343	1,332	2,675	1,691	1,565	3,256	16,655	15,713
Dharmapuri ..	233	183	416	220	210	430	244	206	450	276	284	560	3,012	2,835
Coimbatore ..	2,633	2,432	5,065	2,385	2,446	4,831	2,706	2,689	5,395	2,542	2,765	5,307	32,065	29,843
Nilgiris ..	343	356	699	311	284	595	326	262	588	282	268	550	3,981	3,726
Kanyakumari ..	406	344	750	407	373	780	385	350	735	510	460	970	4,907	4,646
TOTAL ..	21,152	19,642	40,794	21,675	20,588	42,263	22,756	21,238	43,994	24,263	23,888	48,151	2,51,834	2,36,400

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BIRTHS STATE-1976.

Dist. int.	January.			February.			March.			April.		
	Male.		Total.	Female.		Total.	Male.		Total.	Male.		Total.
	(2)	(3)		(5)	(6)		(8)	(9)		(11)	(12)	(13)
(1)			(4)			(7)			(10)			
Madras ..	3,163	3,073	6,336	3,001	2,928	5,929	3,531	3,267	6,798	3,576	3,313	6,889
Chingleput ..	2,318	2,184	4,502	1,885	1,902	3,787	2,301	2,192	4,493	2,281	2,180	4,461
North Arcot ..	3,657	3,363	7,020	3,423	3,218	6,641	4,077	3,822	7,899	3,935	3,757	7,692
South Arcot ..	2,545	2,334	4,879	2,510	2,259	4,769	2,808	2,733	5,541	3,035	2,792	5,827
Thanjavur ..	3,281	3,043	6,324	3,458	3,194	6,652	4,087	3,714	7,801	3,638	3,681	7,319
Tiruchirappalli ..	2,431	2,361	4,792	2,421	2,215	4,636	2,950	2,718	5,668	2,927	2,717	5,644
Pudukkottai ..	781	708	1,489	758	579	1,337	779	763	1,542	655	621	1,276
Madurai ..	4,255	3,956	8,211	3,991	3,727	7,718	4,331	4,130	8,461	4,477	4,114	8,591
Ramanathapuram ..	2,276	2,144	4,420	2,331	2,187	4,518	2,677	2,495	5,172	2,759	2,597	5,356
Tirunelveli ..	3,378	3,303	6,681	3,576	3,173	6,749	3,902	3,519	7,421	3,721	3,557	7,278
Salem ..	2,496	2,227	4,723	2,346	2,193	4,539	2,673	2,347	5,110	2,822	2,553	5,375
Dharmapuri ..	1,255	1,141	2,396	1,355	1,202	2,557	1,505	1,300	2,805	1,654	1,486	3,140
Coimbatore ..	3,931	3,701	7,632	4,148	3,774	7,922	4,446	3,745	8,191	4,534	4,095	8,629
Nilgiris ..	553	495	1,048	585	504	1,089	578	546	1,124	572	565	1,137
Kanyakumari ..	1,527	1,524	3,051	1,579	1,576	3,155	1,480	1,407	2,887	1,729	1,621	3,350
Total ..	37,847	35,557	73,404	37,367	34,631	71,998	42,125	38,788	80,913	42,315	39,649	81,964

BIRTHS STATE-1976-cont.

District.	May.			June.			July.			August.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Madras	4,027	3,812	7,839	3,260	3,030	6,290	3,908	3,764	7,672	3,989	4,084	8,073
Chingleput .. .	2,433	2,222	4,655	2,780	2,473	5,253	3,181	2,959	6,140	3,135	2,898	6,033
North Arcot .. .	7,692	4,215	3,985	8,200	4,632	4,242	8,874	5,284	4,965	10,249	5,149	4,733
South Arcot .. .	3,467	3,020	6,487	3,826	3,560	7,386	4,491	3,921	8,412	4,283	3,801	8,084
Thanjavur .. .	3,590	3,477	7,067	3,646	3,412	7,058	3,518	3,195	6,713	3,469	3,244	6,713
Tiruchirappalli .. .	3,038	2,905	5,943	3,209	2,964	6,173	3,612	3,414	7,026	3,659	3,407	7,066
Pudukkottai .. .	700	637	1,337	879	772	1,651	859	805	1,664	836	830	1,666
Madurai	4,904	4,553	9,457	4,910	4,529	9,439	4,960	4,473	9,433	4,496	4,051	8,547
Ramanathapuram .. .	2,836	2,651	5,487	3,048	2,903	5,951	3,337	3,054	6,391	3,197	3,042	6,239
Tirunelveli .. .	3,621	3,449	7,070	3,588	3,415	7,003	3,912	3,689	7,601	3,602	3,455	7,051
Salem	3,054	2,689	5,743	3,088	2,738	5,826	3,409	3,103	6,512	3,322	3,034	6,356
Dharmapuri .. .	1,632	1,552	3,184	1,923	1,739	3,662	1,940	1,722	3,662	1,683	1,664	3,247
Coimbatore .. .	4,619	4,045	8,664	4,377	4,073	8,450	5,029	4,495	9,524	4,641	4,465	9,106
Nilgiris	618	528	1,146	589	546	1,135	561	598	1,159	666	616	1,282
Kanyakumari .. .	1,659	1,589	3,248	1,617	1,631	3,248	1,679	1,676	3,355	1,536	1,524	3,060
Total	44,413	41,114	85,527	45,372	42,027	87,399	49,680	45,833	95,513	47,663	44,748	92,411

BIRTHS—STATE—1976—cont.

District.	September.			October.			November.			December.			Total.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Madras ..	4,222	3,942	8,171	4,481	4,252	8,733	4,573	4,304	8,877	5,139	5,268	10,407	46,870	45,044	91,914
Chingalput ..	2,980	2,865	5,845	2,868	2,582	5,450	2,756	2,462	5,218	2,761	2,798	5,559	31,679	29,117	61,396
North Arcot ..	5,043	4,658	9,701	5,011	4,647	9,658	4,598	4,270	8,868	4,706	4,365	9,071	53,730	50,025	1,03,755
South Arcot ..	3,763	3,342	7,105	3,386	3,098	6,484	3,293	3,077	6,370	3,578	3,319	6,897	40,985	37,256	78,241
Thanjavur ..	3,442	3,241	6,683	3,355	3,202	6,557	3,478	3,121	6,599	4,077	3,812	7,889	43,039	40,336	83,375
Tiruchirappalli ..	3,630	3,404	7,034	3,527	3,415	6,942	3,206	3,120	6,326	3,546	3,682	7,228	38,156	36,002	74,178
Pudukkottai ..	802	715	1,517	756	729	1,485	695	561	1,256	621	600	1,221	9,121	8,320	17,441
Madurai ..	4,146	3,798	7,944	4,543	4,026	8,569	4,666	4,398	9,064	4,839	4,492	9,331	54,518	50,247	1,04,765
Ramanathapuram ..	2,770	2,593	5,363	2,822	2,696	5,518	2,931	2,669	5,600	2,994	2,783	5,777	33,978	31,814	65,792
Tirunelveli ..	3,421	3,176	6,597	3,387	3,202	6,589	3,600	3,421	7,021	3,585	3,455	7,041	43,294	40,814	84,108
Salem ..	3,390	3,038	6,428	3,118	2,913	6,031	2,744	2,537	5,281	3,063	2,772	5,835	35,525	32,234	67,759
Dharmapuri ..	1,831	1,697	3,528	1,816	1,706	3,522	1,697	1,546	3,243	1,476	1,405	2,881	19,767	18,060	37,827
Coimbatore ..	4,444	4,084	8,528	4,069	4,060	8,129	4,163	3,974	8,137	3,945	3,985	7,930	52,346	48,496	1,00,842
Nilgiris ..	604	593	1,197	440	408	848	452	398	850	410	333	793	6,628	6,180	12,808
Kanyakumari ..	1,628	1,565	3,193	1,615	1,545	3,160	1,296	1,251	2,547	1,416	1,392	2,808	18,761	18,301	37,062
Total ..	46,116	42,718	88,834	45,194	42,481	87,675	44,148	41,109	85,257	46,157	44,211	90,368	528,397	4,92,866	10,21,263

DEATHS—RURAL—1976.

District.	January.			February.			March.			April.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Chingleput ..	967	838	1,805	908	779	1,687	932	773	1,705	749	574	1,323
North Arcot ..	1,377	1,106	2,483	1,347	1,078	2,425	1,297	1,104	2,401	1,071	949	2,020
South Arcot ..	1,009	845	1,854	957	902	1,859	1,006	964	1,970	943	913	1,856
Thanjavur ..	1,218	1,143	2,361	1,211	1,217	2,428	1,145	1,164	2,309	1,031	907	1,938
Tiruchirappalli ..	1,213	1,133	2,346	1,170	1,052	2,222	1,127	1,021	2,148	958	900	1,858
Pudukkottai ..	249	267	516	235	208	443	237	193	430	240	198	438
Madurai ..	1,017	935	1,952	909	837	1,746	956	863	1,819	877	792	1,669
Ramanathapuram ..	648	571	1,219	690	630	1,320	696	645	1,341	763	653	1,416
Tirunelveli ..	953	928	1,881	911	839	1,750	838	771	1,609	721	713	1,434
Salem ..	740	622	1,362	610	556	1,166	698	612	1,310	672	636	1,308
Dharmapuri ..	556	478	1,034	458	387	845	440	459	899	447	420	867
Coimbatore ..	859	704	1,563	846	760	1,606	827	745	1,572	878	706	1,584
Nilgiris ..	107	97	204	66	71	137	54	39	93	60	53	113
Kanyakumari ..	497	480	977	478	448	926	364	340	704	397	378	775
Total ..	11,410	10,147	21,557	10,796	9,764	20,560	10,617	9,693	20,310	9,807	8,792	18,599



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DEATHS—RURAL—1976—cont.

District.	May.			June.			July.			August.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Chingleput ..	649	604	1,253	668	532	1,200	823	725	1,548	886	888	1,774
North Arcot ..	1,086	903	1,989	1,027	910	1,937	1,127	994	2,121	1,176	1,053	2,229
South Arcot ..	1,025	926	1,951	404	379	783	1,046	938	1,984	1,037	1,023	2,060
Thanjavur ..	37	937	1,874	826	826	1,652	870	855	1,725	907	891	1,798
Tiruchirappalli ..	945	868	1,813	932	938	1,870	933	1,027	1,960	959	1,050	2,009
Pudukkottai ..	192	173	365	205	182	387	226	190	416	229	199	428
Madurai ..	911	886	1,797	816	862	1,678	787	840	1,627	873	820	1,693
Ramanathapuram ..	719	641	1,360	612	600	1,212	673	610	1,283	727	684	1,411
Tirunelveli ..	750	725	1,475	730	667	1,397	700	686	1,386	865	776	1,641
Salem ..	731	669	1,400	694	679	1,373	687	758	1,445	742	753	1,495
Dharmapuri ..	483	412	895	426	417	843	383	378	761	420	394	814
Coimbatore ..	827	686	1,513	739	674	1,413	733	656	1,389	884	794	1,678
Nilgiris ..	72	54	126	73	60	133	69	39	108	67	32	99
Kanyakumari ..	408	401	809	379	398	777	340	366	706	326	327	653
Total	9,735	8,885	18,620	8,531	8,124	16,655	9,397	9,062	18,459	10,098	9,684	19,782

DEATHS—RURAL—1976—cont.

District.	September.			October.			November.			December.			Total.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Chingleput ..	974	872	1,846	841	788	1,629	894	750	1,644	938	815	1,753	10,229	8,938	19,167
North Arcot ..	1,222	1,154	2,376	1,269	1,147	2,416	1,414	1,242	2,656	1,505	1,363	2,868	14,918	13,003	27,921
South Arcot ..	1,049	972	2,021	1,136	993	2,129	1,251	1,214	2,465	1,322	1,258	2,580	12,185	11,327	23,512
Thanjavur ..	1,072	1,051	2,123	1,221	1,120	2,341	1,205	1,267	2,472	1,300	1,342	2,642	12,943	12,720	25,663
Tiruchirappalli ..	1,058	7,021	2,079	1,221	1,258	2,479	1,181	1,188	2,369	1,368	1,353	2,721	13,065	12,809	25,874
Pudukkottai ..	245	194	439	288	247	535	260	268	528	282	287	569	2,888	2,606	5,494
Madurai ..	965	939	1,904	1,054	943	1,997	987	930	1,917	1,263	1,269	2,532	11,415	10,916	22,331
Ramanathapuram ..	826	847	1,673	943	903	1,846	885	919	1,804	963	969	1,932	9,145	8,672	17,817
Tirunelveli ..	1,004	997	2,001	1,115	1,172	2,287	1,135	1,218	2,353	1,401	1,482	2,883	11,123	10,974	22,097
Salem ..	875	904	1,779	796	780	1,576	730	712	1,442	734	714	1,448	8,709	8,395	17,104
Dharmapuri ..	521	467	988	534	531	1,065	534	494	1,028	555	529	1,084	5,757	5,366	11,123
Coimbatore ..	925	931	1,856	858	958	1,816	840	809	1,649	928	859	1,827	10,144	9,322	19,466
Nilgiris ..	66	59	125	38	24	62	21	16	37	22	5	27	715	549	1,264
Kanyakumari ..	381	389	770	385	360	745	328	302	630	365	353	718	4,648	4,542	9,190
Total	11,183	10,797	21,980	11,699	11,224	22,923	11,665	11,329	22,994	12,946	12,638	25,584	1,27,884	1,20,139	2,48,02

DEATHS URBAN.

Districts.	January.			February.			March.			April.			May.		
	Male.		Total	Male.		Total	Male.		Total	Male.		Total	Male.		Total
	(2)	(3)		(5)	(6)		(8)	(9)		(11)	(12)		(14)	(15)	
(1) Madras ..	1,427	1,256	2,685	1,718	1,483	3,201	1,648	1,325	2,973	1,450	1,190	2,640	1,339	1,129	2,468
Bengalput ..	335	237	572	328	226	554	309	244	553	252	201	453	287	247	534
North Arcot..	79	341	820	443	320	763	433	317	750	379	273	652	390	321	711
South Arcot ..	158	107	265	151	143	294	172	125	297	141	141	282	162	159	321
Thanjavur ..	412	276	688	349	299	648	340	299	639	310	238	548	279	253	532
Tiruchirappalli ..	95	274	569	353	282	635	289	236	525	295	236	531	278	221	499
Pudukkottai ..	42	28	70	50	37	87	43	28	71	32	20	52	55	43	98
Madurai ..	612	493	1,105	542	441	983	543	466	1,009	515	397	912	536	460	996
Ramanathapuram ..	246	221	467	250	181	431	228	163	391	226	178	404	222	204	426
Tirunelveli ..	349	309	658	326	282	608	388	320	708	295	224	519	365	286	651
Salem ..	315	243	558	302	272	574	290	286	576	279	229	508	267	230	497
Dharmapuri ..	48	29	77	44	23	67	35	25	60	35	31	66	67	41	108
Coimbatore ..	606	445	1,051	594	455	1,049	515	451	966	571	476	1,047	539	405	944
Nilgiris ..	95	70	165	87	55	142	96	74	170	75	70	145	97	63	160
Kanyakumari ..	88	71	159	101	58	159	84	70	154	92	61	153	65	76	141
Total ..	5,509	4,400	9,909	5,638	4,557	10,195	5,413	4,429	9,842	4,947	3,965	8,912	4,948	4,138	9,086

Districts.	June.			July.			August.			September.		
	Male.		Total	Male.		Total	Male.		Total	Male.		Total.
	(17)	(18)		(20)	(21)		(23)	(24)		(26)	(27)	
Madras ..	1,325	1,115	2,440	1,406	1,100	2,506	1,527	1,255	2,782	1,680	1,470	3,150
Bengalput ..	254	194	448	279	217	496	276	212	488	294	243	537
North Arcot..	356	283	639	354	289	643	348	268	616	352	298	650
South Arcot ..	154	122	276	170	136	306	144	108	252	144	121	265
Thanjavur ..	296	228	524	260	251	511	251	222	473	317	272	589
Tiruchirappalli ..	266	196	462	218	211	429	238	171	409	258	192	450
Pudukkottai ..	27	32	59	30	22	52	22	23	45	29	19	48
Madurai ..	443	385	828	481	400	881	472	453	925	480	374	854
Ramanathapuram ..	206	182	388	217	201	418	201	161	362	242	178	420
Tirunelveli ..	318	228	546	304	278	582	308	265	573	375	252	627
Salem ..	277	250	527	242	223	465	282	250	532	333	329	662
Dharmapuri ..	55	24	79	45	28	73	33	26	59	41	30	71
Coimbatore ..	505	437	942	481	391	872	598	524	1,122	691	513	1,204
Nilgiris ..	101	88	189	84	82	166	107	91	198	109	87	196
Kanyakumari ..	70	5	128	93	54	147	81	69	150	77	62	139
Total ..	4,653	3,822	8,475	4,664	3,883	8,547	4,888	4,098	8,986	5,422	4,440	9,862

DEATHS—URBAN—1976—cont.

District.	October.			November.			December.			Total.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
Madras ..	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Chenglepuri ..	1,480	1,213	2,693	1,461	1,169	2,630	1,805	1,676	3,481	18,268	15,381	33,649
North Arcot ..	314	253	567	291	232	523	342	222	564	3,561	2,728	6,289
South Arcot ..	353	263	618	341	267	608	401	326	727	4,629	3,568	8,197
Thanjavur ..	167	135	302	175	123	298	198	136	334	1,936	1,556	3,492
Trichhappalli ..	333	253	586	305	281	586	445	302	747	3,897	3,174	7,071
Pudukottai ..	282	234	516	296	253	549	352	329	681	3,420	2,835	6,255
Madurai ..	40	30	70	47	43	90	19	20	39	436	345	781
Ramanathapuram ..	536	425	961	498	441	939	685	622	1,307	6,343	5,357	11,700
Tirunelveli ..	264	224	488	256	223	479	255	255	510	2,813	2,371	5,184
Salem ..	363	311	674	392	365	757	456	266	822	4,239	3,486	7,725
Dharmapuri ..	255	222	477	244	131	375	329	286	615	3,415	2,951	6,366
Coimbatore ..	42	33	75	56	41	97	55	36	91	556	367	923
Nilgiris ..	587	442	1,029	578	468	1,046	614	538	1,152	6,879	5,545	12,424
Kanyakumari ..	88	78	166	72	85	157	93	74	167	1,104	917	2,021
	87	77	164	61	51	112	119	96	215	1,018	803	1,821
Total ..	5,191	4,195	9,386	5,073	4,173	9,246	6,168	5,284	11,452	62,514	51,384	1,13,898

DEATHS—STATE 1976.

District.	January.			February.			March.			April.			May.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Madras ..	1,429	1,256	2,685	1,718	1,483	3,206	1,648	1,325	2,973	1,450	1,190	2,640	1,339	1,129	2,468
Chenglepuri ..	1,302	1,075	2,377	1,236	1,005	2,241	1,241	1,017	2,258	1,001	775	1,776	936	851	1,787
North Arcot ..	1,856	1,447	3,303	1,790	1,398	3,188	1,730	1,421	3,151	1,450	1,222	2,672	1,476	1,224	2,700
South Arcot ..	1,167	952	2,119	1,108	1,045	2,153	1,178	1,089	2,267	1,084	1,054	2,138	1,187	1,085	2,272
Thanjavur ..	1,630	1,419	3,049	1,560	1,516	3,076	1,485	1,463	2,948	1,341	1,145	2,486	1,216	1,190	2,406
Thiruchirappalli ..	1,508	1,407	2,915	1,523	1,334	2,857	1,416	1,257	2,673	1,253	1,136	2,389	1,223	1,089	2,312
Pudukottai ..	291	295	586	285	245	530	280	221	501	272	218	490	247	216	463
Madurai ..	1,629	1,428	3,057	1,451	1,278	2,729	1,499	1,329	2,828	1,392	1,189	2,581	1,447	1,346	2,793
Ramanathapuram ..	894	792	1,686	940	811	1,751	924	808	1,732	989	831	1,820	941	845	1,786
Tirunelveli ..	1,302	1,237	2,539	1,237	1,121	2,358	1,226	1,091	2,317	1,016	937	1,953	1,115	1,011	2,126
Salem ..	1,055	805	1,920	912	828	1,740	988	898	1,886	951	865	1,816	998	899	1,897
Dharmapuri ..	604	507	1,111	502	410	912	475	484	959	482	451	933	550	453	1,003
Coimbatore ..	1,465	1,149	2,614	1,440	1,215	2,655	1,342	1,196	2,538	1,449	1,182	2,631	1,366	1,091	2,457
Nilgiris ..	202	167	369	153	126	279	150	113	263	135	123	258	169	117	286
Kanyakumari ..	583	551	1,136	579	506	1,085	448	410	858	489	439	928	473	477	950
Total ..	16,919	14,547	31,466	16,434	14,321	30,755	16,030	14,122	30,152	14,754	12,757	27,511	14,683	13,023	27,706

DEATHS—STATE 1916—cont.

	June.			July.			August.			September.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
Madras ..	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
Chingleput ..	1,325	1,115	2,440	1,406	1,100	2,506	1,527	1,255	2,782	1,680	1,470	3,150
North Arcot ..	922	726	1,648	1,102	942	2,044	1,162	1,100	2,262	1,268	1,115	2,383
South Arcot ..	1,383	1,193	2,576	1,481	1,283	2,764	1,524	1,321	2,845	1,574	1,452	3,026
	558	501	1,059	1,216	1,074	2,290	1,181	1,131	2,312	1,193	1,093	2,286
Thanjavur ..	1,122	1,054	2,176	1,130	1,106	2,236	1,158	1,113	2,271	1,389	1,323	2,712
Tiruchirappalli ..	1,198	1,134	2,332	1,151	1,238	2,389	1,197	1,271	2,418	1,316	1,213	2,529
Pudukottai ..	232	214	446	256	212	468	251	222	473	274	213	487
Madurai ..	1,259	1,247	2,506	1,268	1,240	2,508	1,345	1,273	2,618	1,445	1,313	2,758
Ramanathapuram ..	818	782	1,600	890	811	1,701	928	845	1,773	1,068	1,025	2,093
Tirunelveli ..	1,048	895	1,943	1,004	964	1,968	1,173	1,041	2,214	1,379	1,249	2,628
Salem ..	971	929	1,900	929	981	1,910	1,024	1,003	2,027	1,208	1,233	2,441
Dharmapuri ..	481	441	922	428	406	834	453	420	873	562	497	1,059
Coimbatore ..	1,244	1,111	2,355	1,214	1,047	2,261	1,482	1,318	2,800	1,616	1,444	3,060
Nilgiris ..	174	148	322	153	121	274	174	123	297	175	146	321
Kanyakumari ..	449	456	905	433	420	853	407	396	803	458	451	909
Total ..	13,184	11,946	25,130	14,061	12,945	27,006	14,986	13,782	28,768	16,605	15,237	31,842

District.

	October.			November.			December.			Total.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
Madras ..	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Chingleput ..	1,480	1,213	2,693	1,461	1,169	2,630	1,865	1,676	3,481	8,268	15,381	33,649
North Arcot ..	1,155	1,041	2,196	1,185	982	2,167	1,280	1,037	2,317	13,790	11,666	25,456
South Arcot ..	1,622	1,422	3,034	1,755	1,509	3,264	1,906	1,689	3,595	19,547	16,571	36,118
Thanjavur ..	1,303	1,128	2,431	1,426	1,337	2,763	1,520	1,394	2,914	14,121	12,883	27,004
Tiruchirappalli ..	1,554	1,373	2,927	1,510	1,548	3,058	1,745	1,644	3,389	16,840	15,894	32,734
Pudukkottai ..	1,503	1,492	2,995	1,477	1,441	2,918	1,720	1,682	3,402	16,485	15,644	32,129
Madurai ..	328	277	605	307	311	618	301	307	608	3,324	2,951	6,275
Ramanathapuram ..	1,590	1,368	2,958	1,485	1,371	2,856	1,948	1,891	3,839	17,758	16,723	34,031
Tirunelveli ..	1,207	1,127	2,334	1,141	1,142	2,283	1,218	1,224	2,442	11,958	11,043	23,001
Salem ..	1,478	1,483	2,961	1,527	1,583	3,110	1,857	1,848	3,705	15,362	14,460	29,822
Dharmapuri ..	1,051	1,002	2,053	974	843	1,817	1,063	1,000	2,063	12,124	11,346	23,470
Coimbatore ..	576	564	1,140	590	535	1,125	610	565	1,175	6,313	5,733	12,046
Nilgiris ..	1,445	1,400	2,845	1,481	1,277	2,695	1,542	1,437	2,979	17,023	14,867	31,890
Kanyakumari ..	126	102	228	93	101	194	115	79	194	1,819	1,406	3,285
	472	437	909	389	353	742	484	449	933	5,666	5,345	11,011
Total ..	16,890	15,419	32,309	16,738	15,502	32,240	19,114	17,922	37,036	190,398	1,71,523	3,61,921

MATERNAL DEATH—RURAL 1976

Serial number and name of the District.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Madras ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chinglepet ..	..	1	..	5	4	9	13	11	..	..	8	12	6	74
North Arcot ..	..	9	11	10	13	20	18	14	18	20	13	16	12	174
South Arcot ..	..	5	12	26	15	24	23	39	20	23	13	13	18	231
Thanjavur ..	..	17	19	23	7	12	12	12	10	8	10	17	18	165
Thiruchirappalli ..	..	6	9	11	11	16	18	11	18	9	11	10	13	143
Pudukkottai ..	..	2	3	3	2	5	1	3	5	7	3	..	2	36
Madurai ..	..	6	4	6	2	9	8	16	5	9	9	5	5	84
Ramanathapuram ..	..	4	5	7	5	6	4	7	7	8	7	9	2	71
Salem ..	..	3	3	3	3	7	5	8	9	6	6	8	9	90
Tirunelveli ..	..	..	6	12	13	10	6	12	6	16	12	19	2	114
Dharmapuri ..	..	3	7	8	6	6	7	4	4	10	6	7	2	90
Coimbatore ..	..	1	5	6	11	6	5	13	8	5	10	12	7	89
Nilgiris ..	..	..	2	..	..	..	..	..	..	..	2	..	..	4
Kanniyakumari ..	..	1	..	3	5	5	5	..	8	3	6	6	6	48
Total ..	..	58	86	123	98	130	121	152	129	1	116	134	102	1373

MATERNAL DEATH—URBAN 1976

Serial number and name of the District.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Madras ..	..	8	7	6	9	8	10	6	8	5	4	8	10	89
Chinglepet ..	..	1	1	..	4	17	6	8	4	1	3	3	1	44
North Arcot ..	..	9	9	10	15	17	14	12	3	5	15	8	9	126
South Arcot ..	..	6	8	3	14	8	7	7	8	7	5	2	..	63
Thanjavur ..	..	6	8	13	4	6	10	11	7	5	12	10	2	94
Thiruchirappalli ..	..	1	8	9	4	7	4	5	5	2	1	3	4	53
Pudukkottai ..	..	..	..	3	4	3	3	3	2	1	1	4	3	27
Madurai ..	..	7	6	10	10	16	8	10	8	9	11	5	6	106
Ramanathapuram ..	..	3	6	4	5	10	1	5	6	6	4	1	6	57
Salem ..	..	10	5	3	5	9	10	10	8	12	8	5	5	90
Tirunelveli ..	..	2	2	6	11	16	11	13	16	6	4	10	10	107
Dharmapuri ..	..	..	2	2	..	5	..	..	2	1	1	2	2	17
Coimbatore ..	..	19	18	12	7	10	15	11	20	11	4	9	9	135
Nilgiris ..	..	1	3	..	..	1	3	3	1	1	..	2	2	17
Kanniyakumari ..	..	2	..	..	1	1	2	1	3	1	2	1	4	18
Total ..	..	65	83	86	83	124	104	105	101	73	75	73	73	1,045

MATERNAL DEATH—STATE 1976

Serial number and name of the District.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Madras	8	7	6	9	8	10	6	8	5	4	8	10	89
Chengalpattu	2	1	10	9	11	15	21	15	1	11	15	7	118
North Arcot	18	20	20	28	37	32	26	21	25	28	24	21	300
South Arcot	11	20	29	19	32	30	46	28	30	18	15	18	294
Thayavur	23	20	36	11	18	22	23	17	13	22	27	20	259
Tiruchirappalli	7	17	20	15	23	22	16	23	11	12	13	17	196
Pudukkottai	2	8	6	8	16	15	18	17	18	4	13	14	160
Madurai	13	3	6	6	8	4	6	7	8	4	4	5	63
Ramanathapuram	7	10	16	12	25	16	26	13	18	20	10	11	190
Salem	13	11	11	10	16	5	12	13	14	11	10	8	128
Tirunelveli	2	8	18	24	26	17	25	22	22	16	29	12	221
Dharmapuri	3	9	10	6	11	7	4	6	11	7	9	4	97
Coimbatore	10	23	18	18	16	20	24	28	16	14	21	16	224
Nilgiris	1	5	..	..	1	3	3	1	1	2	2	2	21
Kanniyakumari	3	..	3	6	6	7	1	11	4	8	7	10	66
Total	123	169	209	181	254	225	257	230	197	191	207	175	2,418

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INFANT DEATHS—RURAL.

Districts.	January.			February.			March.			April.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)												
Chengalpattu	92	110	202	87	84	171	97	90	187	66	69	135
North Arcot	176	149	325	156	140	296	150	123	273	126	107	233
South Arcot	117	116	233	95	102	197	110	63	173	112	94	206
Thanjavur	110	70	180	109	85	194	132	78	210	99	82	181
Tiruchirappalli	104	103	207	116	89	205	90	88	178	82	75	157
Pudukkottai	21	19	40	13	10	23	18	11	29	14	20	34
Madurai	104	123	227	116	125	241	121	91	212	116	96	212
Ramanathapuram	66	66	132	69	59	128	67	52	119	69	67	136
Tirunelveli	119	118	237	116	89	205	94	105	199	101	92	193
Salem	62	83	145	53	93	146	81	96	177	87	100	187
Dharmapuri	58	51	109	15	40	85	35	40	75	58	45	103
Coimbatore	78	76	154	11	70	161	94	82	176	97	70	167
Nilgiris	23	11	34	21	22	43	19	12	21	8	12	20
Kanyakumari	64	86	150	66	63	129	49	53	102	62	71	133
Total	1,194	1,181	2,575	1,153	1,071	2,224	1,147	984	2,131	1,097	1,000	2,097

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District.	May			June			July			August		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
(1)—cont.	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Chinglepattu ..	68	74	142	88	62	150	112	98	210	103	116	219
North Arcot ..	121	121	242	147	123	270	156	138	294	149	146	295
South Arcot ..	139	115	254	98	86	184	119	101	220	88	103	191
Thanjavur ..	88	72	160	71	76	147	81	68	149	84	83	167
Tiruchirappalli ..	89	76	165	82	94	176	101	80	181	111	96	207
Pudukkottai ..	11	10	21	10	12	22	18	13	31	11	13	24
Madurai ..	109	106	215	110	110	220	93	92	185	103	106	209
Ramanathapuram ..	94	61	155	70	57	127	73	56	129	89	77	166
Tirunelveli ..	110	96	206	107	69	176	90	92	182	90	105	195
Salem ..	54	86	140	98	99	197	59	94	153	97	112	209
Dharmapuri ..	45	42	87	50	56	106	37	41	78	47	30	77
Coimbatore ..	71	86	157	73	70	143	82	71	153	79	77	156
Nilgiris ..	18	14	32	12	13	25	16	11	27	10	4	14
Kanyakumari ..	77	75	152	60	70	130	71	84	155	83	79	162
Total ..	1,084	1,034	2,128	1,076	997	2,073	1,108	1,039	2,147	1,144	1,147	2,291

Districts.	September.			October.			November.			December.			Total.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)—cont.	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Chinglepattu ..	108	83	191	76	67	143	116	91	207	141	102	243	1,154	1,046	2,200
North Arcot ..	134	128	262	144	129	273	201	188	389	213	197	410	1,873	1,689	3,562
South Arcot ..	97	86	183	124	101	225	125	124	249	171	163	334	1,395	1,254	2,649
Thanjavur ..	98	99	197	85	75	160	90	70	160	134	132	266	1,181	990	2,171
Tiruchirappalli ..	104	91	195	112	111	223	106	117	223	229	219	448	1,326	1,239	2,565
Pudukkottai ..	12	14	26	20	11	31	15	7	22	19	19	38	182	159	341
Madurai ..	92	97	189	109	104	213	104	103	207	145	155	300	1,322	1,308	2,630
Ramanathapuram ..	94	76	170	88	83	171	98	79	177	131	88	219	1,008	821	1,829
Tirunelveli ..	124	97	221	128	122	250	137	138	275	152	147	299	1,368	1,270	2,638
Salem ..	72	76	148	80	97	177	84	87	171	83	98	181	910	1,121	2,031
Dharmapuri ..	64	48	112	52	40	92	56	50	106	60	67	127	607	550	1,157
Coimbatore ..	89	92	181	79	59	138	32	77	109	96	95	191	961	925	1,886
Nilgiris ..	17	14	31	7	6	13	9	12	21	3	2	5	153	133	286
Kanyakumari ..	85	77	162	91	78	169	75	69	144	83	62	145	866	867	1,733
Total ..	1,190	1,078	2,268	1,195	1,083	2,278	1,248	1,212	2,460	1,660	1,546	3,206	14,306	13,372	27,678

INFANTS DEATHS—URBAN.

Districts.	January.			February.			March.			April.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Madras ..	322	282	604	336	327	663	268	259	527	313	247	560
Chengalpattu ..	32	28	60	43	23	66	31	28	59	23	19	42
North Arcot ..	84	56	140	54	63	117	68	56	124	64	53	117
South Arcot ..	20	10	30	24	17	41	26	15	41	15	30	45
Thanjavur ..	53	37	90	47	36	83	36	17	53	36	22	58
Tiruchirappalli ..	46	40	86	48	34	82	43	29	74	52	41	93
Pudukkottai ..	8	6	14	12	9	21	5	3	8	9	4	13
Madurai ..	122	105	227	92	91	183	86	86	172	105	60	165
Ramanathapuram ..	37	27	64	34	23	57	30	16	46	42	22	64
Tirunelveli ..	50	60	110	48	38	86	50	47	97	43	36	79
Salem ..	53	35	88	60	52	112	46	39	85	56	44	100
Dharmapuri ..	15	3	18	10	7	17	1	2	3	5	5	10
Coimbatore ..	120	83	203	104	64	168	95	79	174	100	97	197
Nilgiris ..	26	17	43	15	15	30	22	19	41	11	11	22
Kanyakumari ..	15	10	25	14	16	30	12	10	22	15	12	27
Total ..	1,003	799	1,802	941	815	1,756	821	705	1,526	889	703	1,592

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Districts.	May.			June.			July.			August.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Madras ..	315	267	582	336	305	641	295	255	550	380	308	688
Chengalpattu ..	38	33	71	37	30	67	35	24	59	43	39	82
North Arcot ..	81	70	151	67	58	125	66	60	126	76	57	133
South Arcot ..	33	29	62	29	18	47	35	27	62	24	15	39
Thanjavur ..	31	30	61	35	32	67	27	31	58	35	27	62
Tiruchirappalli ..	37	18	55	38	34	72	31	48	79	31	30	61
Pudukkottai ..	11	4	15	2	1	3	2	3	5	5	4	9
Madurai ..	122	104	226	72	72	144	98	74	172	73	87	160
Ramanathapuram ..	45	40	85	30	27	57	46	34	80	34	16	50
Tirunelveli ..	47	41	88	46	39	85	65	64	129	34	40	74
Salem ..	47	55	102	50	37	87	41	33	74	64	60	124
Dharmapuri ..	9	6	15	8	3	11	7	7	14	5	3	8
Coimbatore ..	114	83	197	100	92	192	83	77	160	128	99	227
Nilgiris ..	17	13	30	29	21	50	16	16	32	23	25	48
Kanyakumari ..	15	14	29	16	10	26	13	7	20	9	13	22
Total ..	962	807	1,769	895	779	1,674	860	760	1,620	964	823	1,787

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Districts.	September.			October.			November.			December.			Total.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)—cont.	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Malitas	398	395	793	343	286	629	336	289	625	447	448	895	4,089	3,668	7,757
Chengalpet	44	34	78	50	40	90	48	42	90	50	24	74	474	364	838
North Arcot	59	42	101	56	38	94	61	48	109	58	59	117	794	660	1,454
South Arcot	24	15	39	20	12	32	18	16	34	30	24	54	298	228	526
Thanjavur	35	34	69	42	24	66	57	53	110	60	62	122	494	405	899
Tiruchirappalli	28	15	43	36	28	64	36	24	60	45	39	84	473	380	853
Pudukkottai	5	2	7	7	3	10	8	4	12	14	..	14	88	43	131
Madurai	80	61	141	88	64	152	105	88	193	122	116	238	1,165	1,008	2,173
Ramanathapuram	44	37	81	25	38	63	44	36	80	33	35	68	444	351	795
Tirunelveli	46	34	80	54	44	98	80	46	126	78	81	159	641	570	1,211
Salem	56	55	111	46	30	76	40	35	75	40	40	80	599	515	1,114
Dharmapuri	3	7	10	8	5	13	8	9	17	6	5	11	85	62	147
Coimbatore	103	100	203	117	78	195	104	76	180	108	88	196	1,276	1016	2,292
Nilgiris	19	27	46	20	26	46	20	19	39	22	21	43	240	230	470
Kanyakumari	11	11	22	12	10	22	7	8	15	14	18	32	153	139	292
Total	955	869	1,824	924	726	1,650	972	793	1,765	1,127	1,060	2,187	11,313	9,639	20,952

INFANTS DEATHS—STATE.

District.	January.			February.			March.			April.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Madras	322	282	604	336	327	663	268	259	527	313	247	560
Chengalput	124	138	262	130	107	237	128	118	246	89	88	177
North Arcot	260	205	465	210	203	413	218	179	397	190	160	350
South Arcot	137	126	263	119	119	238	136	78	214	127	124	251
Thanjavur	163	107	270	156	121	277	168	95	263	135	104	239
Tiruchirappalli	150	143	293	164	123	287	135	117	252	134	116	250
Pudukkottai	29	25	54	25	19	44	23	14	37	23	24	47
Madurai	226	228	454	208	216	424	207	177	384	221	156	377
Ramanathapuram	103	93	196	103	82	185	97	68	165	111	89	200
Tirunelveli	169	178	347	164	127	291	144	152	296	144	128	272
Salem	115	118	233	113	145	258	127	135	262	143	144	287
Dharmapuri	73	54	127	55	47	102	36	42	78	63	50	113
Coimbatore	198	159	357	195	134	329	189	161	350	197	167	364
Nilgiris	49	28	77	36	37	73	31	31	62	19	23	42
Kanyakumari	79	96	175	80	79	159	61	63	124	77	83	160
Total	2,197	1,980	4,177	2,094	1,886	3,980	1,968	1,689	3,657	1,986	1,703	3,689

INFANTS DEATH--STATE--contd.

District.	May.			June.			July.			August.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
Madras	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Chinglepet ..	315	267	582	336	305	641	295	255	550	380	308	688
North Arcot..	106	107	213	125	92	217	147	122	269	146	155	301
South Arcot ..	202	191	393	214	181	395	222	198	420	225	203	428
Thanjavur ..	172	144	316	127	104	231	154	128	282	112	118	230
Tiruchirappalli	119	102	221	106	108	214	108	99	207	119	110	229
Pudukkottai ..	126	94	220	120	128	248	132	128	260	142	126	268
Madurai	22	14	36	12	13	25	20	16	36	16	17	33
Ramanathapuram	231	210	441	182	182	364	191	166	357	176	193	369
Tirunelveli ..	139	101	240	100	184	284	119	90	209	123	93	216
Salem	157	137	294	153	108	261	155	156	311	124	145	269
Dharmapuri ..	101	141	242	148	136	284	100	127	227	161	172	333
Coimbatore ..	54	48	102	58	59	117	44	48	92	52	33	85
Nilgiris	185	169	354	173	162	335	165	148	313	207	176	383
Kanyakumari ..	35	27	62	41	34	75	32	27	59	33	29	62
	92	89	181	76	80	156	84	91	175	92	92	184
Total ..	2,056	1,841	3,897	1,971	1,776	3,747	1,968	1,799	3,767	2,108	1,970	4,078

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District.	September.			October.			November.			December.			Total.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
Madras	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)
Chinglepet ..	398	395	793	343	286	629	336	289	625	447	448	895	4,089	3,668	7,757
North Arcot ..	152	117	269	126	107	233	164	133	297	191	126	317	1,628	1,410	3,038
South Arcot ..	193	170	363	200	167	367	262	236	498	271	256	527	2,667	2,349	5,016
Thanjavur ..	121	101	222	144	113	257	143	140	283	201	187	388	1,693	1,482	3,175
Tiruchirappalli	133	133	266	127	98	226	147	123	270	194	194	388	1,675	1,395	3,070
Pudukkottai ..	132	106	238	148	139	287	142	141	283	274	258	532	1,759	1,619	3,418
Madurai	17	16	33	27	14	41	23	11	34	33	19	52	270	202	472
Ramanathapuram	172	158	330	197	168	365	209	191	400	267	271	538	2,487	2,316	4,803
Tirunelveli ..	138	113	251	113	121	234	142	115	257	164	123	287	1,452	1,172	2,624
Salem	170	131	301	182	166	348	217	184	401	230	228	458	2,009	1,840	3,849
Dharmapuri ..	128	131	259	126	127	253	124	122	246	123	138	261	1,509	1,636	3,145
Coimbatore ..	67	55	122	60	45	105	64	59	123	66	72	138	692	612	1,304
Nilgiris	192	192	384	196	137	333	136	153	289	204	183	387	2,237	1,941	4,178
Kanyakumari ..	36	41	77	27	32	59	29	31	60	25	23	48	393	363	756
	96	88	184	103	88	191	82	77	159	97	80	177	1,019	1,006	2,025
Total ..	2,145	1,947	4,092	2,119	1,809	3,928	2,220	2,005	4,225	2,787	2,606	5,393	25,619	23,011	48,630

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ORDER OF LIVE BIRTHS BY AGE MOTHER FOR THE YEAR 1976 (RURAL).

Age of Mother.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Below 15 years	290	5	3	..	..	..	..	..	..
15 to 19 years	47,858	5,782	249	55	30	7	..	..	..
20 to 24 years	60,987	69,160	5,792	7,350	1,680	589	223	68	16
25 to 29 years	15,760	26,958	50,498	34,340	17,569	5,623	1,985	678	298
30 to 34 years	3,850	10,870	18,369	23,478	24,323	15,290	7,050	2,460	965
35 to 39 years	765	1,490	3,290	5,125	6,680	7,985	6,798	4,680	3,420
40 to 44 years	120	198	340	425	788	815	1,246	1,236	1,350
45 and above	56	62	86	192	162	192	240	186	220
Not listed ..	1	1	1	..	..	..	..	..	..
Total ..	1,29,687	1,14,526	98,628	70,865	51,232	30,501	17,542	9,308	6,269

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Age of mother.

	(10)	(11)	(12)	(13)	(14)	(15)	Not stated.	Total.
Below 15 years	..	..	..	..	..	..	..	..
15 to 19 years	..	..	..	..	..	..	..	..
20 to 24 years	..	..	..	..	..	..	..	..
25 to 29 years	59	4	..	..	..	..	..	..
30 to 34 years	357	118	24	6	..	..	..	..
35 to 39 years	1,415	580	191	45	8	3	..	..
40 to 44 years	858	250	156	50	20	5	..	..
45 and above	168	75	40	17	5	6	..	..
Not stated ..	..	..	..	..	..	..	..	..
Total ..	2,857	1,027	411	118	33	14	11	5,33,029

ORDER OF LIVE BIRTHS BY AGE OF MOTHER FOR THE YEAR 1976 (URBAN).

Age of mother.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Below 15 years	790	55	2	..	..	..	..	..	..
15 to 19 years	50,042	131,188	4,516	764	69	42	12	17	29
20 to 24 years	67,713	58,380	34,199	12,603	4,178	589	232	91	81
25 to 29 years	12,998	38,610	35,402	26,969	14,019	7,131	2,440	872	222
30 to 34 years	1,640	1,929	6,239	11,406	12,440	11,210	7,802	3,820	1,783
35 to 39 years	695	1,407	3,058	5,170	7,120	6,288	6,502	2,976	1,848
40 to 44	94	200	376	639	767	1,100	923	719	176
45 and above	4	7	7	20	3	47	7	43	10
Not stated ..	1	..	..	..	..	..	..	..	..
Total ..	1,33,977	1,13,776	83,799	57,571	38,596	26,407	17,918	8,538	4,149

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ORDER OF LIVE BIRTHS BY AGE OF MOTHER FOR THE YEAR 1976 (URBAN).

Age of mother.	(10)	(11)	(12)	(13)	(14)	(15)	(16)	Not stated.	Total.
Below 15 years	..	..	..	..	..	..	..	6	853
15 to 19 years	20	..	..	..	..	..	..	20	68,719
20 to 24 years	43	44	20	..	..	..	..	70	1,78,243
25 to 29 years	51	29	15	4	..	..	..	66	1,38,828
30 to 34 years	556	161	68	11	..	..	..	75	59,140
35 to 39 years	1,153	389	147	33	7	2	..	20	36,815
40 to 44 years	131	210	51	44	15	11	..	7	5,463
45 and above	7	5	7	1	3	..	..	1	172
Not stated ..	..	..	..	..	..	..	..	..	1
Total ..	1,961	838	308	93	25	13	..	265	4,88,234

ORDER OF LIVE BIRTHS BY AGE OF MOTHER FOR THE YEAR 1976. (STATE).

Age of Mother	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Below 15 years	..	..	..	..	..	..	..	..	..
15 to 19 years	..	..	..	..	..	..	..	..	..
20 to 24 years	..	..	..	..	..	..	..	..	..
25 to 29 years	..	..	..	..	..	..	..	..	..
30 to 34 years	..	..	..	..	..	..	..	..	..
35 to 39 years	..	..	..	..	..	..	..	..	..
40 to 44 years	..	..	..	..	..	..	..	..	..
45 and above	..	..	..	..	..	..	..	..	..
Not Stated ..	..	..	..	..	..	..	..	..	..
Total	..	2,63,664	2,28,302	1,82,427	1,28,436	89,828	56,908	35,460	17,846
									10,418

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	(10)	(11)	(12)	(13)	(14)	(15)	(16)	NS	Total
Below 15 year	..	..	..	..	..	..	..	6	1,151
15 to 19 years	..	..	..	..	..	..	..	20	1,22,700
20 to 24 years	..	..	..	..	..	..	..	70	3,44,108
25 to 29 years	..	..	..	..	..	..	..	66	2,92,600
30 to 34 years	..	..	..	..	..	..	..	75	1,66,300
35 to 39 years	..	..	..	..	..	..	..	20	79,290
40 to 44 years	..	..	..	..	..	..	..	17	13,330
45 and above	..	..	..	..	..	..	..	2	1,780
Not Stated ..	..	..	..	..	..	..	..	..	..
Total	4,818	1,865	219	211	58	27	..	276	10,21,263

STILL BIRTHS -RURAL

Districts.	January.			February.			March.			April.		
(1)	M	F	T	M	F	T	M	F	T	M	F	T
Chengalpattu	..	..	..	..	..	..	..	..	..	..	..	..
North Arcot ..	..	..	..	..	..	..	..	..	..	..	..	..
South Arcot	..	..	..	..	..	..	..	..	..	..	..	..
Thanjavur ..	..	..	..	..	..	..	..	..	..	..	..	..
Tiruchirappalli	..	..	..	..	..	..	..	..	..	..	..	..
Pudukkottai	..	..	..	..	..	..	..	..	..	..	..	..
Madurai ..	..	..	..	..	..	..	..	..	..	..	..	..
Ramanathapuram	..	..	..	..	..	..	..	..	..	..	..	..
Tirunelveli ..	..	..	..	..	..	..	..	..	..	..	..	..
Salem ..	..	..	..	..	..	..	..	..	..	..	..	..
Dharmapuri	..	..	..	..	..	..	..	..	..	..	..	..
Coimbatore ..	..	..	..	..	..	..	..	..	..	..	..	..
Nilgiris ..	..	..	..	..	..	..	..	..	..	..	..	..
Kanyakumari	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	93	95	188	109	79	188	86	59	145	117	89	206

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	May			June			July			August		
	M	F	T	M	F	T	M	F	T	M	F	T
Chengalpattu ..	2	1	3	6	3	9	5	2	7	2	2	4
North Arcot..	4	5	9	2	3	5	7	8	15	4	7	11
South Arcot ..	5	4	9	7	6	13	2	2	4	3	2	5
Thanjavur ..	18	12	30	9	15	24	16	16	32	12	8	20
Tiruchirappalli ..	7	12	19	8	8	16	2	5	7	5	8	13
Pudukkottai ..	2	1	3	1	1	2	1	..	1	3	2	5
Madurai ..	9	8	17	8	7	15	8	7	15	11	10	21
Ramanathapuram ..	2	7	9	1	1	2	2	2	4	1	4	5
Tirunelveli ..	11	6	17	12	5	17	14	9	23	12	8	20
Salem ..	15	4	19	11	9	20	7	8	15	8	5	13
Dharmapuri ..	1	1	2	3	4	7	2	3	5	2	..	2
Coimbatore ..	19	18	37	8	10	18	13	4	17	12	13	25
Nilgiris ..	..	..	..	1	..	1	..	1	1	2	1	3
Kanyakumari ..	17	15	32	14	16	30	12	12	24	18	11	29
Total ..	112	94	206	91	88	179	91	79	170	95	81	176

Districts.	September.			October.			November.			December.			Total.		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
Chenglepct ..	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
North Arcot..	3	3	6	7	4	11	4	3	7	2	2	4	47	30	77
South Arcot ..	4	2	6	17	21	38	5	6	11	2	2	4	85	82	167
Thanjavur ..	4	5	9	3	2	5	4	3	7	5	5	10	55	48	103
Tiruchirappalli ..	16	7	23	9	9	18	4	5	9	21	9	30	153	122	275
Pudukkottai ..	6	9	15	7	9	16	8	12	20	9	10	19	72	109	181
Madurai ..	2	1	3	3	2	5	1	1	2	2	5	7	20	15	35
Ramanathapuram ..	8	7	15	14	10	24	12	6	18	14	5	19	120	86	206
Tirunelveli ..	4	2	6	2	4	6	2	2	4	5	6	11	38	41	79
Salem ..	11	7	18	15	9	24	12	9	21	11	9	20	152	93	245
Dharmapuri ..	9	10	19	2	6	8	6	5	11	8	14	22	95	72	167
Coimbatore ..	..	4	4	..	..	..	..	..	..	2	..	2	20	25	45
Nilgiris ..	5	..	5	9	5	14	10	5	15	10	6	16	129	85	214
Kanyakumari ..	2	3	5	2	1	3	1	2	3	3	3	6	17	17	34
	13	16	29	18	8	26	10	7	17	8	4	12	167	151	318
Total ..	87	76	163	108	90	198	79	66	145	102	80	182	1,170	976	2,146

Districts.	January.			February.			March.			April.		
	M	F	T	M	F	T	M	F	T	M	F	T
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Madras	69	63	132	66	58	124	53	60	113	85	68	153
Chinglepet	42	26	68	22	28	50	48	41	89	35	29	64
North Arcot .. .	70	43	113	56	62	118	78	69	147	78	96	174
South Arcot .. .	22	18	40	19	18	37	28	20	48	69	61	130
Thanjavur	83	68	151	95	72	167	104	68	172	92	79	171
Tiruchirappalli ..	75	56	131	38	52	90	61	46	107	64	37	101
Pudukkottai .. .	14	7	21	18	6	24	17	11	28	14	14	28
Madurai	112	72	184	96	89	185	99	87	186	97	78	175
Ramanathapuram ..	37	26	63	27	30	57	45	45	90	65	46	111
Tirunelveli	58	46	104	52	37	89	52	46	98	52	46	98
Salem	45	34	79	60	36	96	78	41	119	70	71	141
Dharmapuri	22	13	35	9	16	25	16	5	21	10	5	15
Coimbatore	125	100	225	109	98	207	142	113	255	128	111	239
Nilgiris	6	10	16	10	5	15	14	13	27	16	9	25
Kanyakumari .. .	20	8	28	16	9	25	9	10	19	19	14	33
Total	800	590	1,390	693	616	1,309	844	675	1,519	894	764	1,658

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Districts.	May.			June.			July.			August.		
	M	F	T	M	F	T	M	F	T	M	F	T
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
Madras	64	76	140	81	165	129	114	234	86	63	149	77
Chengalpattu .. .	18	25	43	34	61	47	32	79	47	30	77	77
North Arcot .. .	92	77	169	84	143	89	84	173	65	52	117	117
South Arcot .. .	36	29	65	30	59	33	34	67	27	24	51	51
Thanjavur	104	90	194	86	164	92	49	141	81	57	138	138
Tiruchirappalli ..	68	43	111	64	126	56	50	106	42	39	81	81
Pudukkottai	13	14	27	23	42	19	21	40	17	10	27	27
Madurai	102	95	197	108	203	88	97	185	118	98	216	216
Ramanathapuram ..	78	56	134	59	125	62	40	102	43	37	80	80
Tirunelveli	60	48	108	49	92	47	38	85	60	36	96	96
Salem	80	48	128	76	122	63	53	116	61	51	112	112
Dharmapuri	18	10	28	15	25	8	6	14	24	20	44	44
Coimbatore	122	100	222	108	214	131	90	221	125	121	246	246
Nilgiris	12	7	19	13	21	8	15	23	7	9	16	16
Kanyakumari .. .	10	9	19	12	23	24	10	34	14	10	24	24
Total	877	727	1,604	838	1,585	887	733	1,620	817	657	1,474	1,474

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Districts.	September.			October.			November.			December.			Total.		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
Madras ..	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Chingleputu ..	119	96	215	124	111	235	104	89	193	98	83	181	1,072	962	2,034
North Arcot ..	33	34	67	56	40	96	55	46	101	46	34	80	476	399	875
South Arcot ..	83	66	149	72	49	121	56	61	117	65	64	129	888	782	1,670
Thanjavur ..	33	31	64	69	63	132	71	65	136	69	57	126	506	449	955
Tiruchirappalli ..	95	62	157	94	67	161	83	63	146	88	95	183	1,097	848	1,945
Pudukkottai ..	67	45	112	75	91	166	49	38	87	47	57	104	706	616	1,322
Madurai ..	13	8	21	18	10	28	11	11	22	11	8	19	188	139	327
Ramanathapuram ..	81	73	154	68	54	122	132	96	228	109	72	181	1,210	1,006	2,216
Tirunelveli ..	53	33	86	47	48	95	53	55	108	70	35	105	639	517	1,156
Salem ..	45	32	77	58	39	97	57	49	106	76	58	134	666	518	1,184
Dharmapuri ..	55	40	95	59	42	101	48	50	98	55	52	107	750	564	1,314
Coimbatore ..	16	4	20	14	15	29	13	15	28	18	15	33	183	134	317
Nilgiris ..	92	81	173	105	82	187	103	81	184	99	97	196	1,389	1,180	2,569
Kanniyakumari ..	16	6	22	11	7	18	5	6	11	13	9	22	131	104	232
	23	17	40	7	13	20	3	11	14	11	12	23	168	134	305
Total ..	824	628	1,452	877	731	1,608	843	736	1,579	875	748	1,623	11,063	8,352	18,421

STILL BIRTHS—STATE—1976

Districts.	January.			February.			March.			April.		
	M	F	T	M	F	T	M	F	T	M	F	T
(1)	2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Madras ..	69	63	132	66	58	124	53	60	113	85	68	153
Chingleputu ..	46	29	75	27	31	58	51	43	94	39	31	70
North Arcot ..	72	48	120	69	66	135	88	74	162	93	110	203
South Arcot ..	28	23	51	24	22	46	33	24	57	75	67	142
Thanjavur ..	103	86	189	105	76	181	117	74	191	97	89	186
Tiruchirappalli ..	80	65	145	44	62	106	65	54	119	69	46	115
Pudukkottai ..	14	7	21	19	6	25	19	12	31	16	15	31
Madurai ..	124	79	203	104	95	199	108	94	202	104	84	188
Ramanathapuram ..	39	32	71	32	33	65	47	46	93	75	49	124
Tirunelveli ..	70	53	123	67	45	112	65	53	118	66	55	121
Salem ..	51	39	90	63	41	104	87	43	130	81	73	154
Dharmapuri ..	27	18	45	10	17	27	18	6	24	12	11	23
Coimbatore ..	138	104	242	124	108	232	144	115	259	141	119	260
Nilgiris ..	7	12	19	12	6	18	15	15	30	18	10	28
Kanniyakumari ..	25	27	52	36	29	65	20	21	41	40	26	66
Total ..	893	685	1,578	802	695	1,497	930	734	1,664	1,011	853	1,864

STILL BIRTHS—STATE—1976—cont.

Districts.	May.			June.			July.			August.		
	M	F	T	M	F	T	M	F	T	M	F	T
(1)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Madras ..	64	76	140	84	81	165	120	114	234	86	63	149
Chengalpattu ..	20	26	46	33	37	70	52	34	86	49	32	81
North Arcot ..	96	82	178	86	62	148	96	92	188	69	59	128
South Arcot ..	41	33	74	37	35	72	35	36	71	30	26	56
Tanjavur ..	122	102	224	95	93	188	108	65	173	93	65	158
Tiruchirappalli ..	75	55	130	72	70	142	58	55	113	47	47	94
Pudukkottai ..	15	15	30	24	20	4	20	21	41	20	12	32
Madurai ..	111	103	214	116	102	218	96	104	200	129	108	237
Ramanathapuram ..	80	63	143	60	67	127	64	42	106	44	41	85
Tirunelveli ..	71	54	125	61	48	109	61	47	108	72	44	116
Salem ..	95	52	147	87	55	142	70	61	131	69	56	125
harmapuri ..	19	11	30	18	14	32	10	19	19	26	20	46
Coimbatore ..	141	118	259	116	116	232	144	94	238	137	134	271
Nilgiris ..	12	7	19	14	8	22	8	16	24	9	10	19
Kanniyakumari ..	27	24	51	26	27	53	36	22	58	32	21	53
Total ..	989	821	1,810	929	835	1,764	978	812	1,790	912	738	1,650

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District	September.			October.			November.			December.			Total.		
	M	F	T	M	E	T	M	F	T	M	F	T	M	F	T
(1)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Madras ..	119	96	215	124	111	235	104	89	193	98	83	181	1,072	962	2,034
Chengalpattu ..	36	37	73	63	44	107	59	49	108	48	36	84	523	429	952
North Arcot ..	87	68	155	89	70	159	61	67	128	67	66	133	973	864	1,837
South Arcot ..	37	36	73	72	65	137	75	68	143	74	62	136	561	497	1,058
Tanjavur ..	111	69	180	103	76	179	87	68	155	109	104	213	1,250	970	2,220
Tiruchirappalli ..	73	54	127	82	100	182	57	50	107	56	67	123	778	725	1,503
Pudukkottai ..	15	9	24	21	12	33	12	12	24	13	13	26	208	154	362
Madurai ..	89	80	169	82	64	146	144	102	246	123	77	200	1,330	1,092	2,422
Ramanathapuram ..	57	35	92	49	52	101	55	57	112	75	41	116	677	558	1,235
Tirunelveli ..	56	39	95	73	48	121	69	58	127	87	67	154	818	611	1,429
Salem ..	64	50	114	61	48	109	54	55	109	63	66	129	845	636	1,481
Dharmapuri ..	16	8	24	14	15	29	13	15	28	20	15	35	203	159	362
Coimbatore ..	97	81	178	114	87	201	113	86	199	109	103	212	1,518	1,265	2,783
Nilgiris ..	18	9	27	13	8	21	6	8	14	16	12	28	148	121	269
Kanniyakumari ..	36	33	69	25	21	46	13	18	31	19	16	35	335	285	620
Total ..	911	704	1,615	785	821	1,806	922	802	1,724	977	828	1,805	11,239	9,328	20,567

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DISTRICT STATEMENT SHOWING NUMBER OF STILL BIRTHS BY AGE OF MOTHERS FOR 1976.

Districts.	Below 15 years.			16-19 years.			20-24 years.			25-29 years.		
	M		T	M		T	M		T	M		T
	M	F	T	M	F	T	M	F	T	M	F	T
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Madras ..	2	5	7	180	167	347	329	305	634	291	239	530
Chengalpattu ..	..	..	..	24	13	37	42	24	66	27	24	51
North Arcot ..	..	..	..	32	31	63	58	44	102	43	43	86
South Arcot ..	..	1	1	32	31	63	52	46	98	51	41	92
Thanjavur ..	..	..	..	27	30	57	129	71	200	87	69	156
Tiruchirappalli ..	..	1	1	29	22	51	60	45	105	42	34	76
Pudukkottai ..	1	..	1	7	6	13	24	11	35	23	8	31
Madurai ..	..	..	..	46	31	77	100	83	183	90	75	165
Ramanathapuram ..	..	..	..	12	13	25	44	46	90	41	46	81
Tirunelveli ..	1	..	1	36	18	54	102	75	177	98	67	165
Salem ..	..	..	..	32	19	51	39	43	82	43	38	81
Dharmapuri ..	1	..	1	10	8	18	8	19	27	17	6	23
Coimbatore ..	2	..	2	31	22	53	84	66	150	85	62	147
The Nilgiris ..	..	..	..	10	7	17	20	21	41	21	20	41
Kanyakumari ..	..	..	..	10	5	15	54	32	86	44	54	98
Total ..	7	7	14	518	423	941	1,145	931	2,076	1,003	826	1,829

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Districts.	30-34 years.			35-39 years.			40-44 years.		
	M		T	M		T	M		T
	M	F	T	M	F	T	M	F	T
(1) cont.	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(31)	(22)
Madras ..	161	155	316	98	83	181	11	6	17
Chengalpattu ..	18	25	43	13	5	18	..	1	1
North Arcot ..	35	28	63	20	12	32	5	4	9
South Arcot ..	48	33	81	18	9	27	8	..	8
Thanjavur ..	54	36	90	24	22	46	2	1	3
Tiruchirappalli ..	32	18	50	10	6	16	3	2	5
Pudukkottai ..	17	20	37	5	5	10	..	1	1
Madurai ..	53	39	92	22	17	39	1	5	6
Ramanathapuram ..	51	14	65	17	17	34	1	..	1
Tirunelveli ..	48	47	95	46	26	72	9	4	13
Salem ..	29	15	44	10	3	13	1	..	1
Dharmapuri ..	5	5	10	2	8	10	..	1	1
Coimbatore ..	33	29	62	22	15	37	3	2	5
The Nilgiris ..	18	13	31	9	6	15	2	2	4
Kanyakumari ..	32	32	64	23	19	42	2	5	7
Total ..	634	509	1,143	339	253	592	48	34	82

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DISTRICT STATEMENT SHOWING NUMBER OF STILL BIRTHS BY AGE OF MOTHERS FOR 1976—cont.

Districts.	45 and above			Age not stated.			Total.		
	M	F	T	M	F	T	M	F	T
(1) cont.	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)
Madras	..	1	1	..	1	1	1,072	962	2,034
Chengalpattu	..	..	..	..	..	..	124	92	216
North Arcot	1	..	1	3	3	6	197	165	362
South Arcot	1	5	6	..	..	..	210	166	376
Thanjavur	1	..	1	6	1	7	330	230	560
Tiruchirappalli	4	4	8	2	1	3	182	133	315
Pudukkottai	..	..	..	3	5	8	80	56	136
Madurai	..	1	1	4	3	7	316	254	570
Ramanathapuram	..	..	..	1	..	1	167	136	303
Tirunelveli	2	4	6	..	..	..	342	241	583
Salem	..	..	..	2	2	4	156	120	276
Dharmapuri	1	..	1	..	..	..	44	47	91
Coimbatore	..	4	4	..	..	..	260	200	460
The Nilgiris	1	..	1	1	2	3	82	71	153
Kanyakumari	2	4	6	..	..	..	167	151	318
Total	13	23	36	22	18	40	3,729	3,024	6,753

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STATEMENT SHOWING DEATH BY MONTH AND DISTRICT DUE TO MATERNAL DEATH IN 1976.

District.	January.	February.	March.	April.	May.	June.	July.	August.	September	October.	November.	December.	Males.	Females.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Madras	8	7	6	9	8	10	6	8	5	4	8	10	..	89	89
Chingleput	2	1	10	9	11	15	21	15	1	11	15	7	..	118	118
North Arcot... ..	18	20	20	28	37	32	26	21	25	28	24	21	..	300	300
South Arcot	11	20	29	19	32	30	46	28	30	18	15	18	..	296	296
Thanjavur	23	27	36	11	18	22	23	17	13	22	27	20	..	259	259
Tiruchy	7	17	20	15	23	22	16	23	11	12	13	17	..	196	196
Pudukkottai	2	3	6	6	8	4	6	7	8	4	4	5	..	63	63
Madurai	13	10	16	12	25	16	26	13	18	20	10	11	..	190	190
Ramanathapuram..	7	11	11	10	16	5	12	13	14	11	10	8	..	128	128
Salem	13	8	6	8	16	15	18	17	18	14	13	14	..	160	160
Tirunelveli	2	8	18	24	26	17	25	22	22	16	29	12	..	221	221
Dharmapuri	3	9	10	6	11	7	4	6	11	7	9	4	..	87	87
Coimbatore	10	23	18	18	16	20	24	28	16	14	21	16	..	224	224
Nilgiris	1	5	..	..	1	3	3	1	1	2	2	2	..	21	21
Kanyakumari	3	..	3	6	6	7	1	11	4	8	7	10	..	66	66
Total	123	169	209	181	254	225	257	230	197	191	207	175	..	2,418	2,418

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STATEMENT SHOWING DEATHS BY MONTH AND DISTRICT TO DIPHTHERIA IN 1976

Serial number and name of the District	January	February	March	April	May	June	July	August	September	October	November	December	Male	F male	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Madras ..	8	..	..	..	..	..	2	..	2	1	2	..	3	12	15
Chenglepet ..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1
North Arcot ..	..	..	..	..	..	..	2	..	2	1	1	..	2	4	6
South Arcot ..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	1
Thanjavur ..	..	..	1	..	1	..	..	..	1	..	..	1	2	2	4
Thiruchirappalli ..	..	1	..	..	..	1	..	..	..	..	..	..	2	..	2
Pudukkottai ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Madurai ..	..	1	..	..	..	..	2	..	..	1	..	..	1	3	4
Ramanathapuram ..	..	..	..	2	..	..	..	..	..	..	..	..	2	..	2
Salem ..	..	..	..	..	..	1	1	2	3	..	..	..	4	3	7
Tirunelveli ..	..	..	..	..	..	..	..	1	2	..	..	..	2	1	3
Dharmapuri ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Coimbatore ..	..	..	..	2	..	3	2	3	1	2	4	3	10	13	23
Nilgiris ..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1
Kanyakumari ..	..	..	..	1	1	..	..	1	..	..	..	..	1	2	3
Total ..	8	..	4	5	2	6	9	7	12	5	8	4	31	41	72

STATEMENT SHOWING CAUSES OF DEATHS BY MONTHS FOR THE YEAR 1976.

	January	February	March	April	May	June	July	August	September	October	November	December	Male	F male	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Cholera ..	27	29	31	6	5	..	..	..	..	..	..	..	..	..	..
Measles ..	21	8	27	7	12	..	..	..	1	..	..	..	..	1	1
Fevers ..	5,825	5,452	5,915	5,017	5,146	..	..	..	..	..	..	..	..	..	..
Dysentery ..	645	713	713	635	629	..	..	..	..	..	..	..	..	..	..
Diarrhoea ..	1,010	1,239	1,057	708	1,072	..	..	..	..	..	..	..	..	..	..
Respiratory diseases ..	2,661	2,814	3,175	2,683	2,844	..	..	..	..	..	..	..	..	..	..
Suicide ..	132	153	240	206	215	..	..	..	..	..	..	..	..	..	..
Wounds and accidents ..	347	349	404	480	474	..	..	..	..	..	..	..	..	..	..
Snake Bite ..	70	84	89	92	114	..	..	..	..	..	..	..	..	..	..
Killed by wild beast ..	8	8	8	3	5	..	..	..	..	..	..	..	..	..	..
Rabies ..	29	17	37	33	19	..	..	..	..	..	..	..	..	..	..
Diphtheria ..	8	2	4	5	2	..	..	..	..	..	..	..	..	..	..
Maternal deaths ..	123	169	209	181	254	..	..	..	..	..	..	..	..	..	..
All other causes ..	20,467	19,754	18,078	17,366	16,889	..	..	..	..	..	..	..	..	..	..
Total ..	31,373	30,794	29,987	27,422	27,680	..	..	..	..	..	..	..	..	..	..

STATEMENT SHOWING CASUSES OF DEATHS BY MONTHS FOR THE YEAR 1976.—cont.

	September.	October.	November.	December.	Males.	Females.	Total.
1)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Cholera	5	10	2	10	77	57	134
Measles	..	..	1	1	43	48	91
Fevers	6,294	6,798	6,606	7,096	33,927	35,174	69,101
Dysentery	747	660	791	1,068	4,282	4,487	8,769
Diarrhoea	1,110	1,172	1,128	1,420	6,592	6,519	13,111
Respiratory diseases	3,066	3,103	3,109	3,337	20,360	14,240	34,600
Suicide	232	191	181	211	1,488	948	2,436
Wounds and accidents	373	422	423	396	3,451	1,690	5,141
Snake Bite	118	93	91	81	701	461	1,162
Killed by wild beast	11	5	5	6	45	29	74
Rabies	21	28	24	22	229	92	321
Diphtheria	12	5	8	4	31	41	72
Maternal deaths	199	191	207	175	..	2,418	2,418
All other causes	19,578	19,501	19,673	23,075	1,19,172	1,05,319	2,24,491
Total	31,764	32,179	32,249	36,902	1,90,391	1,71,523	3,61,921

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STATEMENT SHOWING DEATH BY MONTHS AND DISTRICT DUE TO CHOLERA FOR 1976.

District.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Male.	Female.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Madras	..	1	2	..	..	..	..	..	3	2	..	2	6	4	10
Chingleput	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
North Arcot	10	3	3	1	1	..	..	..	1	..	..	..	12	7	19
South Arcot	..	1	6	1	2	..	..	..	..	..	..	..	9	6	15
Thanjavur	4	16	8	1	1	..	..	..	..	..	..	..	23	7	30
Thuruthirappalli	4	8	2	..	..	..	1	..	..	..	..	1	8	8	16
Pudukkottai	..	..	..	..	..	..	2	..	..	..	..	..	1	7	8
Madurai	..	..	3	..	..	2	..	1	..	5	..	..	7	4	11
Ramanathapuram	2	..	2	..	..	..	1	..	..	..	..	..	2	3	5
Salem	..	..	1	1	..	..	..	1	..	..	..	..	1	2	3
Tirunelveli	..	..	..	..	..	..	..	..	1	..	1	3	..	5	5
Dharmapuri	2	..	1	..	1	..	..	..	..	1	1	..	3	3	6
Coimbatore	..	..	1	2	..	..	..	..	..	1	..	4	3	5	8
The Nilgiris	..	..	6	..	..	..	..	1	..	1	..	..	2	1	3
Kanyakumari	..	..	1	..	..	..	..	..	..	..	..	..	..	1	1
Total	27	29	31	6	5	2	24	3	5	10	2	10	77	57	134

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STATEMENT SHOWING DEATH BY MONTH AND DISTRICT WAR DUE TO MEASURES FOR 1976.

Serial number and name of the District.	Month																Total
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Male	Female.	Total.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)		
Madras ..	11	4	6	1	..	1	..	..	..	..	..	1	15	9	24		
Chingleput ..	1	1	5	..	..	..	..	1	..	..	..	..	6	2	8		
North Arcot ..	4	..	4	..	1	..	..	..	..	..	..	..	2	7	9		
South Arcot ..	2	..	..	..	..	..	..	..	..	..	..	..	..	2	2		
Thanjavur ..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1		
Thiruchirappalli ..	..	..	..	1	..	..	..	1	..	..	..	..	1	1	2		
Pudukkottai ..	..	1	2	..	..	..	..	..	..	..	..	..	..	3	3		
Madurai ..	2	..	2	3	9	3	1	..	..	..	1	..	11	10	21		
Ramanathapuram ..	..	..	2	..	1	..	..	..	..	..	..	..	1	2	3		
Salem ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Tirunelveli ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Dharmapuri ..	..	..	3	1	..	1	..	..	..	..	..	..	2	3	5		
Coimbatore ..	..	1	..	1	2	..	1	..	..	..	..	..	1	4	5		
Nilgiris ..	..	..	3	..	..	3	..	1	..	..	..	..	4	3	7		
Kanniyakumari ..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	1		
Total ..	21	8	27	7	12	9	2	3	..	..	1	1	43	48	91		

STATEMENT SHOWING BY MONTH AND DISTRICT DUE TO DYSENTRY FOR 1976.

District.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Madras ..	81	102	76	50	75	211	69	66	81	77	75	94	507	550	1,057
Chinglepet ..	15	34	70	56	47	49	48	99	66	86	72	83	368	367	735
North Arcot..	96	104	92	65	57	79	109	104	107	105	134	166	595	623	1,228
South Arcot	47	66	84	98	109	74	82	65	72	67	106	127	469	528	997
Thanjavur ..	26	27	29	24	16	16	24	34	21	20	18	28	138	145	283
Tiruchirappalli ..	66	86	59	65	51	62	55	59	88	74	71	127	422	441	863
Pudukkottai ..	4	3	4	7	6	4	22	3	3	4	4	4	34	34	68
Madurai ..	89	72	99	90	81	73	68	72	80	46	73	131	466	508	974
Ramanathapuram ..	27	27	21	21	7	16	22	17	31	15	22	33	121	138	259
Salem ..	28	33	35	37	32	29	27	44	54	28	29	43	209	210	419
Tirunelveli ..	2	27	20	18	29	33	25	37	30	32	55	53	180	181	361
Dharmapuri ..	44	46	36	29	53	30	29	39	38	64	58	78	280	264	544
Coimbatore ..	75	41	52	37	29	38	32	51	34	27	42	61	267	252	519
The Nilgiris ..	..	..	4	9	7	7	2	5	2	4	2	..	23	20	43
Kanyakumari ..	45	44	82	29	30	41	39	38	40	21	30	40	203	226	429
Total ..	645	715	713	635	629	762	673	733	747	660	791	1,068	4,282	4,487	8,76

Statement showing death of by months and districts to Fevers on 1976.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Madras ..	88	156	371	1	43	83	64	43	81	41	6	85	553	509	1,062
2 Chingleput ..	434	440	470	307	329	290	384	421	504	451	391	439	2,483	2,377	4,860
3 North Arcot ..	1,114	978	1,000	809	852	804	831	921	1,030	964	1,038	1,147	5,931	5,647	11,578
4 South Arcot ..	509	599	704	617	657	626	587	653	654	834	931	872	4,068	4,175	8,243
5 Thanjavur ..	256	242	263	203	217	208	173	206	256	327	387	337	1,381	1,694	3,075
6 Trichy ..	676	592	535	506	484	478	518	464	512	717	659	746	3,244	3,643	6,887
7 Madurai ..	659	555	532	483	519	482	434	478	563	639	566	737	3,298	3,349	6,647
8 Pudukkottai ..	55	53	57	54	41	61	60	54	66	87	96	70	381	373	754
9 Ramanathapuram ..	363	356	391	450	419	352	409	443	568	646	631	608	2,693	2,943	5,636
10 Salem ..	560	432	463	441	473	487	493	482	648	544	512	493	2,974	3,054	6,028
11 Tirunelveli ..	388	371	392	333	376	309	303	360	542	672	602	736	2,573	2,811	5,384
12 Dharmapuri ..	360	258	314	301	333	326	239	270	360	370	345	352	1,899	1,930	3,828
13 Coimbatore ..	294	243	368	335	307	314	258	320	409	417	358	388	1,954	2,157	4,111
14 The Nilgiris ..	39	37	21	40	39	47	23	38	41	40	34	31	226	204	430
15 Kanyakumari ..	30	40	36	45	57	58	46	52	60	49	50	55	270	308	578
.. ..	5,825	5,452	5,915	5,017	5,146	4,926	4,822	5,205	6,294	6,798	6,606	7,096	33,927	35,174	69,101

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Statement showing deaths by Months and Districts was due to DIARRHOEA for 1976.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Madras ..	164	321	167	..	184	56	107	306	154	269	224	190	1,105	1,037	2,142
2 Chingleput ..	126	101	62	65	75	81	94	139	113	93	79	92	574	544	1,118
3 North Arcot ..	120	134	132	91	128	112	131	164	143	124	120	176	816	759	1,575
4 South Arcot ..	49	69	64	85	98	95	96	98	132	86	111	110	552	541	1,093
5 Thanjavur ..	173	194	155	81	86	74	115	98	103	109	99	135	687	735	1,422
6 Trichy ..	116	124	87	82	93	94	93	123	78	110	93	126	618	601	1,219
7 Pudukkottai ..	14	11	15	11	16	11	14	15	13	15	15	16	80	86	166
8 Madurai ..	56	50	50	59	85	78	65	72	48	34	59	77	381	352	733
9 Ramanathapuram ..	61	56	93	65	77	76	83	51	70	89	83	112	438	478	916
10 Salem ..	36	29	24	18	31	26	36	26	43	32	27	33	176	185	361
11 Tirunelveli ..	18	77	103	83	84	84	72	107	112	110	132	236	604	614	1,218
12 Dharmapuri ..	45	19	33	21	24	23	30	17	21	22	20	29	151	155	306
13 Coimbatore ..	28	45	60	39	74	57	62	71	69	63	53	69	343	347	690
14 The Nilgiris ..	4	4	5	5	8	6	6	9	7	8	3	3	32	36	68
15 Kanyakumari ..	..	5	..	3	9	12	14	6	4	8	10	16	35	49	84
Total ..	1,010	1,239	1,057	708	1,072	885	1,008	1,302	1,110	1,172	1,128	1,420	6,592	6,519	13,111

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STATEMENT SHOWING DEATHS BY MONTHS AND DISTRICT DUE TO RESPIRATORY DISEASES IN 1976.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	Septem-ber.	Oct-ber.	Novem-ber.	December.	Males.	Females.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Madras ..	505	577	703	456	513	484	373	489	477	453	508	505	3,353	2,690	6,043
2 Chengalpattu ..	139	177	217	162	158	134	142	179	212	206	172	177	1,305	770	2,075
3 North Arcot ..	313	279	309	263	225	224	238	212	254	284	261	271	1,979	1,154	3,133
4 South Arcot ..	99	129	169	144	175	132	175	131	156	157	199	209	1,124	751	1,875
5 Thanjavur ..	246	226	236	203	230	193	197	187	222	256	308	284	1,592	1,196	2,788
6 Tiruchirappalli ..	194	167	170	166	174	154	160	177	183	236	219	263	1,339	924	2,263
7 Pudukkottai ..	41	38	38	35	31	37	29	37	36	34	43	42	277	164	441
8 Madurai ..	251	243	285	268	288	218	206	247	274	259	276	379	1,913	1,281	3,194
9 Ramanathapuram ..	102	142	152	157	154	175	166	192	225	232	224	214	1,312	823	2,135
10 Salem ..	215	170	214	191	168	180	155	153	226	189	164	187	1,242	970	2,212
11 Tirunelveli ..	161	170	178	161	178	180	166	164	196	223	228	253	1,368	890	2,258
12 Dharmapuri ..	74	75	74	74	79	70	60	60	78	92	81	86	548	361	909
13 Coimbatore ..	216	269	234	220	237	222	202	252	296	260	243	265	1,761	1,155	2,916
14 The Nilgiris ..	65	54	75	61	66	93	69	73	82	57	55	53	443	360	803
15 Kanniyakumari ..	40	98	121	122	168	151	136	134	149	165	122	149	804	751	1,555
TOTAL ..	2,661	2,814	3,175	2,683	2,844	2,647	2,474	2,687	3,066	3,103	3,109	3,337	20,360	14,240	34,600

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STATEMENT SHOWING DEATHS BY MONTHS AND DISTRICT DUE TO WOUNDS AND ACCIDENTS IN 1976

District.	January.	February.	March.	April.	May.	June.	July.	August.	Septem-ber.	October.	Novem-ber.	Decem-ber.	Males.	Females.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Madras ..	35	55	91	106	66	184	16	88	91	118	117	72	760	479	1,239
2 Chengalpattu ..	32	22	19	38	36	29	36	27	24	41	38	29	269	102	371
3 North Arcot ..	34	36	37	21	37	43	38	22	19	24	25	30	242	114	356
4 South Arcot ..	31	23	24	28	32	28	42	27	22	31	47	44	257	122	379
5 Thanjavur ..	36	14	31	38	31	44	28	25	28	28	27	26	238	118	356
6 Tiruchirappalli ..	18	27	30	32	53	26	21	25	14	21	16	27	208	102	310
7 Pudukkottai ..	2	6	5	1	4	1	2	1	2	3	4	3	22	12	34
8 Madurai ..	41	19	1	29	37	40	1	36	29	35	25	62	306	125	431
9 Ram anathapuram ..	9	14	1	26	15	22	9	14	11	18	12	14	113	59	172
10 Salem ..	15	8	19	18	14	20	26	16	16	11	13	13	131	58	189
11 Tirunelveli ..	32	25	39	29	49	38	25	22	22	27	25	27	263	97	360
12 Dharmapuri ..	12	18	11	19	14	25	11	11	9	10	11	8	104	56	160
13 Coimbatore ..	34	60	42	79	75	39	49	51	66	44	54	39	426	206	632
14 The Nilgiris ..	4	3	6	1	2	1	1	6	5	1	..	6	21	12	33
15 Kanniyakumari ..	12	19	10	15	9	4	8	4	15	10	7	6	91	28	119
TOTAL	347	349	404	480	474	544	55	372	373	422	423	396	3,451	1,690	5,141

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STATEMENT SHOWING DEATH DUE TO SNAKE BITE BY MONTHS AND DISTRICTS FOR 1976.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Madras ..	1	1	..	..	..	..	..	..	..	..	..	..	1	1	2
2 Chengalpattu ..	4	7	12	9	12	15	9	10	19	10	6	10	78	45	123
3 North Arcot ..	2	14	18	9	6	12	14	8	16	10	9	12	72	58	130
4 South Arcot ..	6	18	8	10	9	14	12	15	12	15	14	9	92	50	142
5 Thanjavur ..	12	6	6	7	8	11	10	11	17	10	13	9	83	37	120
6 Tiruchirappalli ..	3	5	4	7	3	5	4	8	7	1	6	7	34	26	60
7 Pudukkottai ..	8	5	8	5	10	5	4	10	6	6	5	3	46	29	75
8 Madurai ..	8	2	4	3	10	12	5	11	6	6	12	8	53	34	87
9 Ramanathapuram	5	4	2	8	7	6	2	3	4	5	8	1	20	35	55
10 Salem ..	5	4	11	11	12	13	11	3	9	6	3	3	54	37	91
11 Tirunelveli ..	3	3	5	6	6	10	4	3	3	6	3	4	30	26	56
12 Dharmapuri ..	2	3	4	5	10	8	6	5	5	4	4	3	34	25	59
13 Coimbatore ..	9	12	7	11	16	14	13	14	13	12	8	7	87	51	138
14 The Nilgiris ..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1
15 Kanyakumari ..	1	..	..	1	5	6	3	1	1	2	..	3	16	7	23
Total ..	70	84	89	92	114	131	97	102	118	93	91	81	701	461	1,162

STATEMENT SHOWING DEATH BY MONTHS AND DISTRICT DUE TO SUICIDES IN 1976.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Madras ..	6	1	22	24	17	19	28	21	18	28	17	21	144	76	220
2 Chingalpattu ..	8	4	10	6	4	6	5	13	9	10	5	6	55	31	86
3 North Arcot ..	9	11	17	14	7	12	5	12	19	7	4	14	67	64	131
4 South Arcot ..	5	8	12	7	18	15	10	10	9	7	12	8	74	47	121
5 Thanjavur ..	27	23	20	23	34	45	26	31	25	35	26	15	219	111	330
6 Tiruchirappalli ..	14	20	27	20	18	20	16	14	18	13	11	14	112	93	205
7 Pudukottai ..	4	5	7	9	5	6	12	14	27	14	10	22	94	41	135
8 Madurai ..	10	17	20	15	16	6	18	21	31	16	18	30	138	80	218
9 Ramanathapuram	1	7	9	10	11	9	7	16	12	7	8	7	65	39	104
10 Salem ..	5	7	16	11	8	12	18	16	13	12	7	6	68	63	131
11 Tirunelveli ..	13	20	16	19	14	19	22	16	14	7	17	13	122	68	190
12 Dharmapuri ..	8	9	26	10	15	19	13	7	11	12	12	13	79	76	155
13 Coimbatore ..	11	15	29	35	41	29	32	27	20	17	32	33	190	131	321
14 The Nilgiris ..	4	..	8	..	6	5	4	2	3	..	6	5	26	12	38
15 Kanyakumari ..	7	9	1	3	1	4	8	2	3	6	3	4	35	16	51
Total ..	132	156	240	206	215	226	224	222	232	191	181	211	1,488	948	2,436

STATEMENT SHOWING DEATHS BY MONTHS AND DISTRICT DUE TO KILLED BY BEASTS IN 1976.

District.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Madras ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2 Chingleput ..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1
3 North Arcot ..	..	2	..	..	1	1	..	..	4	2	..	1	7	4	11
4 South Arcot ..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1
5 Thanjavur ..	1	1	..	1	1	..	..	1	..	..	..	..	3	2	5
6 Tiruchirappalli ..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	1
7 Pudukottai ..	..	..	1	1	..	..	..	..	..	..	..	1	1	2	3
8 Madurai ..	..	1	..	..	..	..	..	..	1	1	1	..	2	2	4
9 Ramanathapuram	1	..	4	..	..	..	1	..	3	..	..	..	7	2	9
10 Salem ..	1	..	..	..	..	..	..	..	..	1	..	..	1	1	2
11 Tirunelveli ..	3	..	1	..	..	..	..	..	1	1	..	..	4	2	6
12 Dharmapuri ..	..	..	1	..	1	1	1	..	..	..	..	..	4	..	4
13 Coimbatore ..	1	1	1	1	2	2	3	1	1	..	3	2	8	10	18
14 The Nilgiris ..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	1
15 Kanyakumari ..	..	2	..	..	..	2	1	..	1	..	1	1	5	3	8
Total ..	8	8	8	3	5	7	6	2	11	5	5	6	45	29	74

STATEMENT SHOWING DEATHS BY MONTHS AND DISTRICT DUE TO HYDROPHOBIA IN 1979.

District.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1 Madras ..	..	6	..	5	1	5	8	4	5	..	4	5	32	11	43
2 Chingleput ..	..	1	..	1	1	..	..	2	3	2	3	4	14	3	17
3 North Arcot ..	..	3	1	2	4	2	..	..	..	3	4	1	19	3	22
4 South Arcot ..	..	2	1	4	1	3	4	2	..	2	1	2	16	6	22
5 Thanjavur ..	..	8	3	3	6	4	3	6	5	10	4	..	37	15	52
6 Tiruchirappalli ..	..	2	4	6	3	4	4	2	5	3	1	..	27	10	37
7 Pudukottai ..	..	..	1	2	..	1	1	2	1	1	..	..	6	3	9
8 Madurai ..	3	2	3	3	2	4	2	5	..	3	3	2	30	9	39
9 Ramanathapuram	..	..	1	..	2	1	..	..	..	1	1	2	2	3	5
10 Salem ..	1	2	4	1	..	4	3	2	1	1	1	1	12	9	21
11 Tirunelveli ..	..	..	1	2	2	..	1	1	1	..	..	1	6	3	9
12 Dharmapuri ..	..	..	1	4	1	1	1	1	1	..	1	2	5	10	15
13 Coimbatore ..	3	..	1	1	..	2	2	1	2	3	1	2	14	4	18
14 The Nilgiris ..	..	1	..	..	..	2	..	..	1	..	..	..	3	1	4
15 Kanyakumari ..	..	..	1	..	1	1	..	1	1	..	..	2	6	2	8
Total ..	29	17	37	33	19	34	26	31	21	28	24	22	229	92	321

AGE GROUP—URBAN 1976.

Districts.	Under 1 week.		1 week to 1 month.		1 month to 6 months.		6—12 months.		Under 1 year.		1 year to 4 years.		5—9 years.		10—14 years.		15—24 years.	
	M F		M F		M F		M F		M F		M F		M F		M F		M F	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Madras	1,438	1,110	672	634	1,095	1,021	884	903	4,089	3,668	2,247	2,237	421	373	409	408	692	712
Chengalpattu	213	152	55	26	112	87	94	99	474	364	244	281	86	81	73	43	173	158
North Arcot	283	213	102	100	232	194	177	153	794	660	447	445	125	121	73	66	244	269
South Arcot	152	112	40	37	52	43	54	36	298	228	135	138	56	51	45	38	87	125
Thanjavur	308	241	48	36	75	61	63	67	494	405	209	236	70	66	94	49	198	210
Tiruchirappalli	266	193	82	57	61	62	64	68	473	380	217	269	80	80	65	54	164	212
Pudukkottai	76	36	4	3	5	4	3	..	88	43	18	19	9	8	13	8	28	29
Madurai	481	411	218	190	266	216	200	191	1165	1,008	644	706	153	148	97	103	280	321
Ramanathapuram	210	161	70	43	85	72	79	75	444	351	242	253	72	67	44	28	121	142
Salem	325	244	61	71	101	94	112	106	599	515	263	326	95	81	77	47	187	233
Tirunelveli	245	231	124	84	133	125	139	131	641	510	266	301	88	101	82	54	172	222
Dharmapuri	42	37	14	4	16	9	13	12	85	62	33	29	11	8	11	7	35	39
Coimbatore	741	528	159	143	219	176	157	169	1,276	1,016	443	464	144	126	118	104	292	356
The Nilgiris	135	109	37	38	38	54	30	29	240	230	111	118	42	50	14	18	54	58
Kanyakumari	64	56	26	26	32	31	31	26	153	139	81	88	32	22	13	13	56	55
Total	4,979	3,834	1,712	1,492	2,522	2,249	2,100	2,064	11,313	9,639	5,600	5,910	1,484	1,383	1,228	1,040	2,783	3,1

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AGE GROUP URBAN—cont.

Districts.	25—35 years.		35—44 years.		45—54 years.		55—64 years.		7 and above				Age not stated				Total.
	M F		M F		M F		M F		M F		M F		M F				
	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
(1)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
Madras	1,093	903	1,223	902	1,992	1,224	1,995	13,82	2,107	1,646	1,995	1,910	5	16	18,268	15,381	33,649
Chingalpet	214	06	276	214	430	252	563	337	510	347	518	455	..	..	3,561	2,728	6,289
North Arcot	291	279	412	267	610	276	642	298	556	375	435	512	..	..	4,629	3,568	8,197
South Arcot	108	116	171	110	232	130	263	185	293	197	248	238	..	..	1,936	1,556	3,492
Thanjavur	258	226	328	233	436	309	550	382	701	499	559	559	..	..	3,897	3,174	7,071
Tiruchirappalli	191	229	285	210	419	230	524	316	519	400	483	455	..	..	3,420	2,835	6,255
Pudukkottai	34	44	39	35	56	28	51	31	27	41	43	59	..	..	436	345	781
Madurai	383	406	426	343	727	363	902	513	793	637	773	309	..	..	6,343	5,357	11,700
Ramanathapuram	137	149	203	181	308	154	417	264	444	339	381	443	..	..	2,813	2,371	5,184
Salem	229	256	241	208	330	166	448	228	451	361	495	520	..	..	3,415	2,951	6,366
Tirunelveli	209	233	298	223	510	239	617	295	714	547	642	701	..	..	4,239	3,486	7,725
Dharmapuri	40	43	57	19	70	36	80	34	51	20	83	60	..	..	556	367	293
Coimbatore	435	476	539	397	755	409	951	500	980	699	946	998	..	..	6,879	5,545	12,424
The Nilgiris	56	71	71	37	125	168	137	78	147	84	107	115	..	..	1,104	917	2,021
Kanyakumari	51	47	69	51	107	61	169	87	155	116	132	124	..	..	1,018	803	1,821
Total	3,729	3,684	4,638	3,420	7,107	3,945	8,309	4,930	8,478	6,318	7,840	7,958	5	16	62,514	51,384	1,13,848

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AGE GROUP—1976—RURAL.

Districts.	Under 1 week.		1 week to 1 month.		1—6 months.		6—12 months.		under 1 year.		1—4 years.		5—9 years.		10—14 years.		15—24 years.	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1)																		
Chingleput	251	192	203	175	371	334	329	345	1,154	1,046	1,138	1,287	438	403	243	241	475	450
North Arcot	401	362	414	298	574	540	484	489	1,873	1,689	2,179	2,379	634	638	299	297	711	741
South Arcot	331	263	311	265	399	363	354	363	1,395	1,254	1,771	1,918	474	520	225	306	638	622
Thanjavur	293	219	285	221	302	271	301	279	1,181	990	1,152	1,361	471	471	248	261	608	646
Tiruchirappalli	241	243	328	270	401	381	356	345	1,326	1,239	1,653	1,997	516	539	212	258	620	713
Pudukkottai	45	42	55	30	41	46	41	41	182	159	303	292	84	100	60	58	93	98
Madurai	434	442	295	278	294	301	299	287	1,322	1,308	1,636	1,889	376	419	201	200	481	489
Ramanathapuram	261	201	273	186	242	207	232	227	1,008	821	1,419	1,588	347	351	155	166	306	318
Tirunelveli	370	295	332	274	350	345	316	356	1,368	1,270	1,563	1,872	330	379	177	189	359	486
Salem	369	516	161	246	218	191	162	168	910	1,121	696	710	209	184	153	159	451	538
Dharmapuri	172	136	119	112	166	160	150	142	607	550	773	872	234	203	107	123	270	314
Coimbatore	346	333	189	178	236	245	190	169	961	925	650	711	221	243	163	191	495	488
Nilgiris	65	51	30	43	37	17	21	22	153	133	79	62	25	27	11	5	21	23
Kanyakumari	248	203	196	184	271	329	151	151	866	867	445	707	110	145	55	65	155	152
	3,827	3,498	3,191	2,760	3,902	3,730	3,386	3,384	14,306	13,372	15,457	17,645	4,464	4,622	2,309	2,519	5,683	6,078

AGE GROUP 1976—cont.

Districts.	25—34 year.		35—44 years.		45—54 years.		55—64 years.		65—74 years.		75 and above		Total deaths.	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)
(1)														
Chingleput	434	482	718	502	1,018	657	1,307	983	1,554	1,299	1,785	1,588	10,229	8,938
North Arcot	672	710	973	789	1,381	958	1,856	1,219	1,961	1,529	2,379	1,984	14,918	13,003
South Arcot	561	808	809	747	1,178	1,035	1,681	1,422	1,799	1,409	1,654	1,286	12,185	11,327
Thanjavur	554	745	803	890	1,282	1,235	2,052	1,764	2,317	2,127	2,275	2,230	12,943	12,720
Tiruchirappalli	618	796	766	794	1,154	906	1,832	1,465	2,057	1,801	2,311	2,301	13,065	12,809
Pudukkottai	132	156	207	181	293	210	467	346	529	450	538	556	2,888	2,606
Madurai	492	577	749	663	1,135	753	1,471	1,203	1,706	1,528	1,846	1,887	11,415	10,916
Ramanathapuram	339	393	497	503	821	609	1,229	947	1,596	1,438	1,428	1,538	9,145	8,672
Tirunelveli	371	516	560	552	911	697	1,375	1,013	1,926	1,640	2,183	2,360	11,123	10,974
Salem	448	588	582	478	756	558	1,103	870	1,297	1,180	2,104	2,009	8,709	8,395
Dharmapuri	230	349	377	405	449	356	567	452	750	607	1,393	1,135	5,757	5,366
Coimbatore	515	570	581	571	821	608	1,292	879	1,412	1,196	3,033	2,940	10,144	9,322
Nilgiris	38	25	38	31	71	41	85	45	88	84	106	73	715	549
Kanyakumari	164	174	209	169	344	249	593	409	804	676	903	929	4,648	4,542
	5,538	6,959	7,869	7,275	11,614	8,872	16,910	13,017	19,796	16,964	23,938	22,816	1,27,884	1,20,139
														2,48,023

STATE AGE GROUP—1976—cont.

Districts.	Under 1 week.		1 week to 1 month.		1 to 6 months.		6 to 12 months.		Under 1 year.		1 to 4 years.		5 to 9 years.		10 to 14 years.		15 to 24 years.	
	Male. (2)	Female. (3)	Male. (4)	Female. (5)	Male. (6)	Female. (7)	Male. (8)	Female. (9)	Male. (10)	Female. (11)	Male. (12)	Female. (13)	Male. (14)	Female. (15)	Male. (16)	Female. (17)	Male. (18)	Female. (19)
(1)																		
Madras ..	1,438	1,110	672	634	1,095	1,021	884	903	4,089	3,668	2,247	2,237	421	373	409	408	692	712
Chingleput ..	464	344	258	201	483	421	423	444	1,628	1,410	1,382	1,568	519	484	316	284	648	608
North Arcot ..	684	575	516	398	806	734	661	642	2,667	2,349	2,626	2,824	759	759	372	363	955	1010
South Arcot ..	483	375	351	302	451	406	408	399	1,693	1,482	1,906	2,056	513	571	217	344	725	747
Thanjavur ..	601	416	333	257	377	332	364	346	1,675	1,395	1,361	1,597	541	537	342	310	806	8567
Tiruchirappalli ..	507	436	410	327	462	443	420	413	1,799	1,619	1,870	2,266	596	619	217	312	784	925
Pudukkottai ..	121	78	59	33	46	50	44	41	270	202	321	311	93	108	73	66	121	127
Madurai ..	915	853	513	468	560	517	499	478	2,487	2,316	2,280	2,595	529	567	298	303	761	810
Ramanathapuram ..	471	362	343	229	327	279	311	302	1,452	1,172	1,661	1,841	419	418	199	194	427	460
Tirunelveli ..	615	526	456	358	483	470	455	486	2,009	1,840	1,829	2,173	418	480	259	541	531	708
Salem ..	694	760	222	317	319	285	274	274	1,509	1,636	959	1,036	204	2,665	230	206	638	771
Dharmapuri ..	214	173	133	116	182	169	163	154	692	612	806	901	245	211	118	130	305	353
Coimbatore ..	1,087	861	348	321	455	421	347	338	2,237	1,941	1,093	1,176	365	369	281	295	787	844
Nilgiris ..	200	160	67	81	75	71	51	51	393	363	190	180	67	77	25	23	75	81
Kanniyakumari ..	312	259	222	210	303	360	182	177	1,019	1,006	526	795	142	167	68	78	211	207
TOTAL ..	8,806	7,332	4,903	4,252	6,424	5,979	5,486	5,448	25,619	23,011	21,057	23,555	5,948	6,005	3,537	3,559	8,466	9,219

Districts.	25 to 34 years.		35 to 44 years.		45 to 54 years.		55 to 64 years.		65 to 75 years.		75 and above.		Age not stated.		Total deaths.		
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Total.
(1)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
Madras	1,093	903	1,223	902	1,992	1,224	1,995	13'82	2,107	1,646	1,995	1,910	5	16	18,268	15,381	33'649
Chengalpattu ..	618	688	984	706	1,448	909	1,870	1,320	2,064	1,646	2,303	2,043	..	..	13,790	11'666	25,456
North Arcot ..	963	1,059	1,385	1,056	1,991	1,236	2,498	1,517	2,517	1,904	2,814	2,496	..	..	19,547	16,571	36,118
South Arcot ..	669	924	980	857	1,410	1,165	1,944	1,607	2,092	1,606	1,902	1,524	..	..	1,412	12,883	27,004
Thanjavur	812	971	1,131	1,123	1,718	1,544	2,602	2,146	3,018	2,626	2,834	2,789	..	..	16,840	15,894	32,734
Tiruchirappalli ..	809	1,025	1'051	1,004	1,573	1,136	2,356	1,781	2,576	2,201	2,794	2,756	..	..	16,485	15,644	32,129
Pudukkottai ..	166	200	246	216	349	238	518	377	586	491	581	615	..	..	3,324	2,951	6,275
Madurai	875	983	1,175	1,006	1,862	1,116	2,373	1,716	2,499	2,165	2,619	2,696	..	..	17,758	16,273	34,031
Ramanathapuram ..	476	542	700	684	1,129	763	1,646	1,211	2,040	1,777	1,809	1,981	..	..	11,958	11,043	23'001
Tirunelveli	580	749	858	775	1,421	936	1,992	1,308	2,640	2,187	2,825	3,061	..	..	15,362	14,460	29,822
Salem	677	844	823	686	1,086	724	1,551	1,098	1,748	1,541	2,599	2,539	..	..	12,124	11,346	23,470
Dharmapuri	270	392	434	424	519	392	647	486	801	637	1,476	1,195	..	..	6,313	5,733	12,046
Coimbatore	950	1,046	1,120	968	1,576	1,017	2,243	1,379	2,392	1,895	3,979	3,938	..	..	17,023	14,867	31,890
Nilgiris	94	96	109	68	196	109	222	123	235	168	213	178	..	..	1,819	1,466	3,285
Kanniyakumari ..	215	221	278	220	451	310	762	496	959	792	1,035	1,053	..	..	5,666	5,345	11,011
TOTAL	9,267	10,643	12,507	10,695	18,721	12,817	25,219	17,947	28,274	23,282	31,778	30,774	5	16	1,90,398	1,71,523	3,61,921

STATEMENT SHOWING DEATHS BY MONTHS AND DISTRICT DUE TO ALL OTHER CAUSES IN 1976.

District.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Male.	Female.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12).	(13)	(14)	(15)	(16)
Madras ..	1,778	1,996	1,524	1,992	1,558	1,384	1,637	1,755	2,257	1,700	1,672	2,450	11,789	9,914	21,703
Chingleput ..	1,611	1,457	1,382	1,123	1,117	1,029	1,283	1,357	1,431	1,307	1,386	1,460	8,637	7,306	15,943
North Arcot ..	1,580	1,607	1,517	1,276	1,346	1,259	1,369	1,378	1,406	1,482	1,644	1,766	9,803	7,827	17,630
South Arcot ..	1,353	1,219	1,063	1,038	1,150	1,019	1,136	1,082	1,050	1,014	1,287	1,406	7,458	6,359	13,817
Thanjavur ..	2,228	2,302	2,156	1,882	1,774	1,563	1,645	1,657	2,025	2,124	2,150	2,503	12,437	11,572	24,009
Tiruchirappalli ..	1,818	1,799	1,721	1,490	1,401	1,473	1,505	1,518	1,614	1,816	1,835	2,078	10,470	9,598	20,068
Pudukkottai ..	458	408	356	360	334	307	324	346	328	429	423	449	2,382	2,140	45,221
Madurai ..	1,924	1,757	1,781	1,611	1,721	1,570	1,637	1,662	1,709	1,890	1,814	2,402	11,152	10,326	21,478
Ramanathapuram ..	1,108	1,134	1,036	1,071	1,084	946	981	1,027	1,173	1,291	1,293	1,428	7,182	6,390	13,572
Salem ..	1,041	1,047	1,092	1,068	1,144	1,111	1,124	1,260	1,400	1,215	1,107	1,236	7,251	6,694	13,845
Tirunelveli ..	1,897	1,685	1,527	1,342	1,312	1,250	1,332	1,463	1,678	1,880	1,989	2,396	10,210	9,541	19,751
Dharmapuri ..	560	474	447	464	457	412	440	456	526	558	575	600	3,206	2,763	5,969
Coimbatore ..	1,940	1,826	1,692	1,807	1,671	1,614	1,607	1,896	2,161	2,031	1,875	2,147	11,959	10,308	22,267
Nilgiris ..	173	174	140	140	157	163	179	175	189	124	111	107	1,036	796	1,832
Kanayakumari ..	998	869	644	702	663	619	607	553	631	640	512	647	4,200	3,885	8,085
Total ..	20,467	19,754	18,078	17,366	16,889	15,719	16,806	17,585	19,578	19,501	19,673	23,075	1,19,172	1,05,319	2,24,491

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STATEMENT SHOWING PRIMARY VACCINATION AND RE-VACCINATION FOR THE YEAR 1976.

District.	Primary vaccination.	Re-vaccination.	Total.
(1)	(2)	(3)	(4)
Madra ..	95,698	315,159	410,857
Chingleput ..	95,340	318,700	4,14,040
North Arcot ..	1,31,339	6,01,760	7,33,099
South Arcot ..	129,869	357,229	487,098
Thanjavur ..	113,612	3,66,210	479,822
Tiruchirappalli ..	90,652	2,22,341	312,993
Pudukkottai ..	23,360	64,008	87,368
Madurai ..	124,618	392,817	517,435
Ramanathapuram ..	101,303	344,823	46,126
Tirunelveli ..	121,258	293,370	414,628
Salem ..	90,893	354,398	445,291
Dharmapuri ..	58,136	118,072	176,208
Coimbatore ..	139,440	466,029	605,469
The Nilgiris ..	4,752	96,224	100,976
Kanyakumari ..	36,986	217,405	254,391
Total ..	1,357,256	4,528,545	5,885,801

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