





# TWENTIETH ANNUAL REPORT

OF THE

## DEPARTMENT OF PUBLIC HEALTH OF MASSACHUSETTS

### REPORT OF THE PUBLIC HEALTH COUNCIL

At the end of the fiscal year closing November 30, 1934, the Department of Public Health was constituted as follows:

Commissioner of Public Health . . . . . HENRY D. CHADWICK, M.D.

#### PUBLIC HEALTH COUNCIL

GORDON HUTCHINS, 1937  
FRANCIS H. LALLY, M.D., 1936  
SYLVESTER E. RYAN, M.D., 1937

<sup>1</sup> RICHARD M. SMITH, M.D., 1936  
RICHARD P. STRONG, M.D., 1935  
JAMES L. TIGHE, B.A.Sc., C.E., 1935

Regular monthly meetings of the Department have been held throughout the year. An additional meeting was held on August 14 for the purpose of visiting Martha's Vineyard, at which time an inspection was made of the local hospital, water supplies were visited, and a conference was held with the Dukes County Commissioners relative to the care of cases of tuberculosis from Dukes County.

The Committee on Sanitary Engineering, composed of Mr. Tighe, Chairman, Mr. Hutchins and the Commissioner, has met each month prior to the regular meeting of the Council and submitted its recommendations on all matters of sanitary significance.

The Council has carried out duties imposed on it by various legislative acts, including the approval of regulations prepared by the Board of Registration of Barbers; approval of appointments at tuberculosis institutions; approval of contracts for the care of cases of tuberculosis between counties; and adoption of rules and regulations for the protection of water supplies of several communities. Nine hearings have been held as required by law on the approval by the Department of taking of land for the protection of water supplies, and for sewage disposal purposes. One hearing was held on the appeal of a milk dealer from the refusal of a board of health to grant a license to sell milk, and a second hearing of the same character was scheduled, but the appellant did not appear. Two informal hearings have been held because of the disapproval by the Department of local nominations of slaughtering inspectors.

Chapter 373 of the Acts of 1934 imposes certain duties on the Department relative to the supervision of the manufacture of frozen desserts and ice cream mix. A public hearing, as required by the law, was held on the proposed rules and regulations promulgated to cover this procedure, and later rules and regulations were adopted.

Advice has been given the Commissioner relative to administrative details within the Department, appointments have been approved, and rules and regulations governing the administration of the sanatoria under the control of the Department have been adopted.

Chapter 32 of the Resolves of 1934 directed a joint investigation by the Departments of Public Health and Public Works relative to the improvement of sanitary conditions in the vicinity of Lake Quinsigamond. Inspection trips were made, hearings held, and a report prepared and submitted to the Legislature.

Chapter 49 of the Resolves of 1934 provided for a joint investigation by the Departments of Public Health and Public Works of the sewage problem in the

<sup>1</sup> Appointed November 28, 1934.

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South Essex Sewerage District. With relation to this investigation also it has been necessary to make trips of inspection and to conduct hearings. A report containing recommendations has been prepared and filed with the Legislature, as directed.

At a meeting of the Department on January 15, 1935, the Commissioner of Public Health presented to the Council a report of the doings of the Department for the year 1934, and after discussion it was voted that this report, together with the foregoing brief summary of the activities of the Public Health Council, be approved and adopted as the report of the Department of Public Health for the year 1934.

## TWENTIETH ANNUAL REPORT OF THE COMMISSIONER OF PUBLIC HEALTH

*To the Public Health Council:*

GENTLEMEN: I have the honor to submit herewith my annual report for the fiscal year ending November 30, 1934, although, as in the past, all figures except those relating to the budget will be given for the calendar year.

It is with much regret that I report the resignation of Dr. Roger I. Lee as a member of the Public Health Council. Because of his interest and knowledge of public health problems and willingness at all times to be of service he had an important part in shaping the policy of the Department. To fill this vacancy the Governor appointed Dr. Richard M. Smith, who, because of his familiarity with medical problems and especially with pediatrics, will be very helpful. We welcome him to the Council.

### I. GENERAL MATTERS

The Department has carried on its work throughout the year without having to contend with any serious outbreaks or epidemics. This year, however, has seen the highest incidence of measles ever reported. The other and more serious communicable diseases have shown a gratifying decline in morbidity and mortality.

The pneumonia study and service financed largely by a grant from the Commonwealth Fund has completed its fourth year. The antipneumococcic serum produced and distributed by the Biologic Laboratory is now of greater concentration and potency. There are marked advantages in this as the volume of serum necessary for treatment is reduced and the unit cost lessened. This serum is now available to physicians in twenty-three areas of the State, comprising approximately two-thirds of the population. Before the serum could be made available, laboratory technicians in the forty-five leading hospitals were trained in the Neufeld method of typing so that specimens of sputum could be examined without delay. Physicians were instructed in the therapeutic use of the serum in Type I and Type II cases. This serum is furnished to the attending physicians for those cases who have not been ill more than four days. In the Department laboratory over 6,000 specimens of sputum have been typed during the period of study. An analysis of the records of the pneumonia patients treated with antipneumococcic serum shows that the proper use of the product has resulted in decreasing the expected case fatality rate of Type I by about two-thirds and of Type II cases by about one-half. Thus, definite evidence has been obtained that the lives of many patients ill with these types of pneumonia have been saved by the use of this serum. Antipneumococcic serum is available also for the use of the physicians caring for the 5,000 or more men located in the Civilian Conservation Corps camps of the State.

To the Rockefeller Foundation we are indebted for continued financial support in making a study started last year of deaths from cancer. This includes investigation into the etiology of the disease and cancer mortality records. From the same source funds were allotted to make possible a tabulation of the records of the 400,000 school children examined during the Ten Year Program for tuberculosis case finding. A study of the data thus made available will be of great value, particularly in the evidence that can be obtained on the controversial question as to whether an infection with the tubercle bacillus in childhood protects the individual or renders him more liable to contract tuberculosis later in life.

The Commonwealth Fund has made a grant to the Harvard Medical School to carry on through the Pediatrics Department of the Children's Hospital in cooperation with the Department of Public Health an investigation of the value of pla-

cental extract in the control of measles. Dr. McKhann of the Children's Hospital, and Dr. Robinson, Director of the Division of Biologic Laboratories, are working together on the project. In a series of over 1,000 children exposed to measles and treated with this extract, the attack was prevented or modified in all but about 5 per cent. When the extract is used within four days of exposure, the attack is usually prevented. If used after the fourth day and before the rash appears, the attack is modified. The modified disease appears to confer permanent immunity and is the desirable thing to bring about except in infants and debilitated children. In the latter, the disease can be prevented, thereby postponing measles until a later time when the course of the disease is much less serious and but very rarely fatal. We are very optimistic about this extract becoming a valuable agent in the control of measles.

The Milk Control Board, consisting of the Commissioner of Agriculture, the Attorney General, and the Commissioner of Public Health, has given much time to a revision of rules and regulations relating to the sanitary handling of milk. Standards have been established for several different grades which are now ready for submission to the Governor and Council for their approval.

The Department of Conservation, the Metropolitan District Commission, and the Department of Public Health, serving as a Joint Board, prepared a ten year plan for increasing the recreational facilities of the State. The recommendation was made that large tracts of waste or unproductive land be purchased each year which could be reforested, used for the propagation of game, and opened to the public for camping purposes; also that pollution of streams and ponds be prevented wherever possible and that these be stocked for the benefit of the fishermen; and that additional beaches should be purchased and made available to the public. This report has been submitted to the Legislature.

*Milk Regulations.*—The past year has been unusually free from the point of view of milk-borne disease. No cases of typhoid fever, scarlet fever, or septic sore throat have been directly traced to such a source. Fifteen cases of undulant fever have appeared in almost all of which there was a history of consumption of raw milk from a herd known to be infected with contagious abortion.

The most significant development during the year from the point of view of the protection of the milk supply was in the city of Attleboro, where a milk dealer went to court to challenge the validity of a regulation requiring pasteurization or certification of all milk. This case, which was heard in the Superior Court, resulted in a verdict upholding the regulation, but the case has now been appealed to the Supreme Court. Our latest information, however, is that the plaintiff in the case will withdraw his exceptions, and therefore no decision will be obtained from that court. This is unfortunate as we had hoped for a decision from the Massachusetts Supreme Court. Such regulations, however, have been upheld in the supreme courts of five other states.

The following cities and towns in the Commonwealth have regulations requiring pasteurization or certification of all milk: Ayer, Boston, Brookline, Chelsea, Dedham, Fall River, Framingham, Lexington, Newton, Salem, Swampscott, Waltham, Watertown, Winchester. Attleboro, Cambridge, Milton, Quincy, Stoneham and Wellesley have recently adopted such regulations but they have not yet become effective.

## II. DISTRICT HEALTH UNITS

*Cape Cod Health Bureau.*—The Cape Cod Health Bureau, comprising all of Barnstable County, with a population of about 32,000, continues to function in a manner satisfactory to the area. No new projects have been developed. It is to be hoped, however, that a milk laboratory will be included in its program in the near future. As dairy inspection service is being taken over by the State Department of Agriculture, the local health departments will be relieved of much of this routine work. They should, however, carry on a milk laboratory as frequent examinations of samples of milk provide the best evidence as to how the milk is handled on the farm. When milk is unclean or improperly cooled, the bacterial count is found to be high and the cause should be investigated at once. This serves as a much better method of control than an occasional visit to the farm for routine inspections.

*The Southern Berkshire Health District.*—The sixteen towns comprising the District, with a population of about 21,000, voted at their respective town meetings on an article in the warrant which would make them officially members of the Health District. Favorable action was obtained in seven towns, namely, Becket, Great Barrington, Monterey, Mount Washington, Richmond, Sheffield, and Tyringham. In the other towns the vote was unfavorable or for postponement. The seven towns have organized to form the legally constituted Southern Berkshire Union Health District, and Dr. Mortimer T. Cavanaugh is Chairman. At town meetings in 1935 the article will be re-submitted in Egremont, Sandisfield, New Marlboro, Alford, Lee, Lenox, Stockbridge, West Stockbridge, and Otis. It is expected that most, if not all of them, will vote to join the union. With this nucleus of towns organized to carry on a constructive health program, it is hoped that others will become interested and that eventually all the towns in Berkshire County will be united in one health district. In this way the cost of administration will be spread over a population of 60,000 which would make it possible to carry on a modern health program in this entire area at a minimum cost.

*The Nashoba Health District.*—Fourteen towns centering about Ayer, with a population of 21,894, make up this District. Much progress toward perfecting the organization and strengthening the program has been accomplished. The people in the area have become more interested in modern health procedures as a result of demonstrations and actual service performed. At the town meetings in 1935 each town will vote on the question of joining together and forming an official Health District. This plan will involve a complete take-over on January 1, 1936, of the work which has been carried on under the sponsorship of the Commonwealth Fund as a demonstration.

*Local Board of Health Records.*—Many boards of health have been very lax in keeping their records of communicable disease. This has made it difficult to develop future control programs, especially in regard to diphtheria immunization. Through the generosity of the Commonwealth Fund it has been possible to have a member of the Department staff visit boards of health to analyze their records and assist in establishing a better system. Besides the towns in the Southern Berkshire Health District and the Nashoba area, sixteen cities and towns have been given such assistance, and this has been much appreciated by the officials. We are fortunate to have funds available to continue this important service another year.

*State Health Districts.*—A re-alignment of areas has been made whereby an additional district has been created, increasing the number from six to seven. This was desirable because the Metropolitan District as it existed was too large for adequate supervision by one health officer. The southern section of this district and some of the adjoining towns to the south were made into a new district. The District Health Officers have carried on their work very efficiently. They meet with the Director of the Division of Communicable Diseases once in two months and talk over their problems. At these meetings men prominent in some special field of health work or who have discovered some new method of procedure relating to public health are invited to address them. Visits are also made to the South Department of the Boston City Hospital where Dr. Place kindly shows them unusual cases of communicable disease and discusses diagnosis and treatment. In this way they are kept informed of the latest developments in the field of public health.

### III. COMMUNICABLE DISEASE

The total number of cases of communicable disease reported was 113,559 as compared with 83,288 in 1933. This increase was due to the widespread prevalence of measles early in the year in the central and eastern sections of the State. The other diseases that showed an increase were chicken pox, bacillary dysentery, German measles, and whooping cough. The only one of these that contributed appreciably to the death rate was whooping cough. This disease has been the leading cause of death from communicable diseases in children under five for years. As such, it merits greater attention from public health authorities. Gratifying declines were registered in several of the more serious diseases. Diphtheria and typhoid reached the lowest levels ever recorded and there was a reduction of nearly 200 deaths from tuberculosis. For the first time deaths from pulmonary tuberculosis fell below the 2,000 mark, and the death rate from all forms of the disease

was below 50 per 100,000. Infantile paralysis in 1934 was at the third lowest level ever recorded. Scarlet fever reached the lowest level since 1922. No case of small-pox has appeared in the State since February, 1932.

*Outbreaks.*—No cases of typhoid, septic sore throat, or scarlet fever have been traced to milk during the year. Fifteen cases of undulant fever have been reported and in almost all there was a history of consumption of raw milk from a herd known to be infected with contagious abortion. More than the usual number of outbreaks of gastro-enteritis have been investigated. The most extensive and explosive outbreak of this disease was traced to a polluted water supply produced by unsupervised workmen who were clearing brush on the watershed.

*Anterior Poliomyelitis* (Infantile Paralysis).—This disease established a new low level for deaths and, with the exception of 1932, the lowest number of reported cases. Our supply of serum was ample without resorting to additional bleeding clinics. Consultants of the Department saw 36 cases with the attending physician.

*Diphtheria.*—This disease furnished the most striking example of the benefit of immunization. The incidence of diphtheria in 1934 was barely one-fifteenth of the incidence in 1923, when diphtheria immunization began on a large scale in Massachusetts. Only 629 cases were reported as contrasted with 1,041 the previous year. There was a reduction of about 40 per cent in cases, and 42 per cent in deaths. More and more boards of health are recognizing their responsibility in providing for diphtheria immunization. To aid them in getting appropriations for carrying on this work, letters were sent out near the end of the year to every municipality urging that an item be included in their budgets for this specific purpose. A survey was made by the Division of Child Hygiene of school health work and it was found that the average percentage of children immunized against diphtheria in 174 cities and towns was 48 per cent. This varied from 64 per cent in the larger cities to 41 per cent in the small towns. As two-thirds of the cases of diphtheria are in pre-school children, the greatest effort should be made to protect this group. For the use of boards of health cards are furnished by the Department with the suggestion that they be sent to the parents of all infants when six months old, calling attention to the advantages of immunization and requesting that they take their child to their physician to have it done. If this procedure could be made universal, public clinics would be unnecessary. The family physician would do the preventive work and diphtheria would cease to be a public health problem.

*Dysentery, Amebic.*—There were but 31 cases reported during the year, which is 8 more than in 1933. Of these, a few were traceable to an infection in Chicago during the previous summer but so far as is known there have been no secondary cases. The publicity attending the Chicago outbreak resulted in physicians studying their cases more closely and some laboratories doing routine stool examinations. For this reason perhaps some cases who were simply carriers were diagnosed as having amebic dysentery, with some associated condition which produced symptoms. The diagnostic service which was set up last year as an emergency in conjunction with the Department of Tropical Medicine in the Harvard Medical School has now been transferred to the Bacteriological Laboratory which is now prepared to examine specimens both for the vegetative form of the ameba and for cysts.

*Dysentery, Bacillary.*—The greatly increased number of cases of bacillary dysentery is due to the occurrence of several institutional outbreaks. In one of these institutions, several deaths occurred in previously debilitated patients. In some institutions the condition was recognized promptly and by active precautionary measures an extensive outbreak was averted. In all of these instances dysentery bacilli of the Hiss-Y strain were isolated. Although no figures as to the incidence of bacillary dysentery in the general population are available, there is very strong evidence that the disease occurs much more frequently than is suggested by the morbidity reports. In the healthy young adult an infection with the Hiss-Y strain apparently produces nothing more than a diarrhea of two or three days duration. Many of the idiopathic diarrheas which may occur from time to time are in reality bacillary dysentery which entirely escapes recognition unless it happens to attack a small child, in whom the classical symptoms are produced.

*Encephalitis Lethargica.*—In last year's report reference was made to the outbreak of encephalitis lethargica that occurred in and around St. Louis, the disease being somewhat different from the type of encephalitis usually encountered. The past

year has seen the appearance of sporadic cases in this State but there has been no evidence of localization.

*Epidemic Cerebrospinal Meningitis.*—Although the reported incidence of this disease was somewhat higher than for last year, the number of deaths reached the second lowest figure ever recorded. This record is probably due more to good fortune than to good management as there is nothing that can be done in our present state of knowledge to guard against this disease.

*Gastro-enteritis.*—During the past year there has come to the attention of the Department an increasing number of outbreaks of gastro-enteritis. Although two or three of these were of an explosive nature definitely associated with food, the majority presented themselves as nothing more than unusual incidence of gastro-intestinal disturbances in a community within a relatively short period of time. These were the type of cases that are frequently referred to as "intestinal grippe." Although there is no evidence that the etiologic agent is related to the organism that causes the usual type of grippe, there is increasing evidence that there is some sort of gastro-enteritis that is spread through the respiratory tract. It is popular to attribute these incidents to a water supply as was done in three different communities, yet examination of the water showed no evidence of pollution and the distribution of the cases over a period of one to two months would definitely suggest some other mode of spread. In Fitchburg an extensive and explosive outbreak of gastro-enteritis developed as a result of unquestioned pollution of the water supply. It occurred immediately after a heavy thaw with its attendant run-off and was unquestionably due to pollution of the watershed through C. W. A. workers who, in spite of warnings from this Department, had been permitted to work on the watershed without adequate precautions being taken as to the disposal of excreta. Several thousand persons were involved in this outbreak, which, however, was of but short duration. This illustrates the necessity of carefully supervising workmen on watersheds. If by any chance such a worker should be a typhoid carrier, a serious epidemic of that disease might result.

*Measles.*—The past year has seen the highest incidence of measles ever reported, reaching a total of 44,817. The disease began to appear around Worcester during the closing months of 1933, becoming widespread in that city and all surrounding towns. As the year closed it had appeared in the Metropolitan area and was increasing rapidly, reaching its peak in March, when almost 10,000 cases were reported. The final result was an epidemic that swept the eastern half of the State. The high incidence of measles brought with it a sharp increase in the death rate. On the other hand, there is considerable satisfaction in the thought that the case fatality rate was lower than in any previous year except 1933. During this epidemic it was possible for Dr. McKhann of the Children's Hospital to gather further data as to the efficacy of placental extract. The results obtained in the prevention or modification of measles among those definitely exposed to the disease were so encouraging as to warrant a more extensive study in future years.

*Pneumonia, Lobar.*—1934 has seen the end of the wave of lobar pneumonia which went through the winter of 1933-34. The latter part of the year has seen the disease back at a fairly normal figure.

*Rabies.*—The past year has seen a definite increase in the prevalence of rabies throughout the eastern part of the State. Two hundred and fifty-one positive heads were reported from the laboratory, as compared with 144 for the previous year. These have been very largely in the Metropolitan area, spreading northward into the eastern section of Middlesex County and the western border of Essex County. One human case of rabies developed, the victim being a five year old child, bitten on the face by a dog that was not located. The case was not officially reported as one of dog bite nor was antirabic treatment given. Another child, bitten by a proven rabid dog, died of a condition which was at first thought to be rabies but upon review was probably an encephalitis associated with the vaccine. This is one of the very rare complications which may occur as a result of such treatment. Although it occurs but once in several thousand instances, it constitutes but another reason why more active measures should be exercised to control the spread of rabies among dogs and thereby avoid the necessity of subjecting persons to the necessary inoculations.

Evidence is accumulating in this State that the annual one-dose injection confers protection on a dog for a year. It is certain that the bulk of those so treated are

actually protected even though an occasional failure may be recorded. Such work has been carried on in quite a number of communities. In some the conduct of a dog inoculation clinic has been coordinated with a restraint order, which has provided for exemption of those dogs recently vaccinated. This is probably the most effective type of restraint order as the ordinary ninety day restraint order is so irksome to dog owners as to be marked more by its violation than by its observance. There has been some agitation in favor of compulsory inoculation of all dogs. This, however, is difficult to carry out. It would probably be more practical to provide for free inoculation of dogs as partial return for the license fee. The 1934 Legislature completed an elaborate revision of the dog laws. Included in that was a provision whereby a city or town will be reimbursed by the county for both the cost of the vaccine and the treatment to a sum not to exceed \$50 per individual case. This change will be of considerable benefit to the medical profession as in many instances the physician was in the position in the past of having cared for several members of a family bitten or exposed to a dog without receiving any remuneration whatever for his services. The law also empowers counties to enter into contracts for vaccine to be furnished to their respective cities and towns. This may result in a considerable saving.

*Scarlet Fever.*—With only 8,391 cases reported, scarlet fever reached the lowest recorded level since 1922. At the same time the deaths have fallen to 76 which will constitute the second lowest death rate ever recorded for scarlet fever. Immunization studies which were begun in the fall of 1931 have been pursued even more actively during 1934, using as an immunizing agent a formalized toxin solution. Through the use of this solution, it has been possible to obtain in about 70 per cent of the children so treated a level of immunity sufficient to cause a negative Dick test. Immunization with this solution has been continued as a routine procedure in schools for the feeble-minded and in the Department's hospitals for childhood tuberculosis. In some orphanages and schools children have received this treatment, and the studies have been extended to certain groups of nurses. In Wellesley, East Bridgewater, and Framingham community programs have been begun, and as the year closed a limited community program is being carried on in the city of Worcester. The effect of this immunization as measured by the prevention of scarlet fever in those so treated has been extremely encouraging, no case having occurred in a child immunized to the point of a negative Dick test. This solution produces reactions which are so mild as compared with those following the usual scarlet fever immunizing agent that if its effectiveness can be demonstrated there seems little doubt as to its popular acceptance.

*Septic Sore Throat.*—Two hundred and one sporadic cases of septic sore throat have been reported. The year was characterized by an apparent absence of any milk-borne outbreaks of this disease.

*Smallpox.*—Nearly three years have elapsed since a case of smallpox has been reported in Massachusetts. The last one occurred in Fitchburg in February, 1932. From the point of view of the public health, this is extremely gratifying provided, however, it does not lull us into a sense of complacent assurance that this freedom from the disease can be maintained without resorting to continued vaccination. The history of smallpox is full of such remissions and it must not be used as an excuse for being deceived by the present situation.

*Tuberculosis.*—The last year has seen a decline in both pulmonary and extra-pulmonary deaths to figures lower than ever heretofore obtained. For the first time in the history of the State pulmonary deaths fell below 2,000, and the death rate from tuberculosis, all forms, below 50 per 100,000. At the same time there was a slight increase in the total cases reported which suggests a general improvement in diagnostic facilities throughout the State and their use by the practicing physicians. Through the out-patient departments and consultation clinics, the four State sanatoria examined 5,640 patients in 1934, an increase of 276 examinations over the previous year. The important role which thoracic surgery now plays in the treatment of pulmonary tuberculosis has made it necessary to provide for this essential service on a more permanent basis. The phrenic nerve surgery and bronchoscopic examinations are done in the institutions. Patients who require thoracoplasty have been sent to the Massachusetts General Hospital and in such cases the Board of Health has paid the Hospital at the same rate it had been paying the sanatorium. As this involves a loss to the Hospital of approximately \$3 per day for each patient

admitted and the present ward facilities are not sufficient to insure prompt admission of sanatorium cases, it has become necessary to make a more comprehensive plan for providing major thoracic surgery for each patient. A tentative arrangement has been worked out with the Hospital by which a sufficient number of beds will be made available at ward rates plus a very modest fee for the surgeon, and the Department is asking an appropriation sufficient to meet anticipated charges on such an arrangement.

In order to relieve the long waiting list at the Middlesex County Sanatorium and to make tuberculosis beds in the State sanatoria more freely available to patients in all parts of the Commonwealth, the statute fixing the rate at Rutland was amended by the last Legislature to permit a charge to cities and towns of less than the actual cost of maintenance. A rate of \$10.50 per week was subsequently set by the Department.

For some years it has been obvious that more adequate facilities will have to be provided for the treatment of tuberculosis in the western part of the State. The institutions in that territory have neither the capacity nor the equipment necessary for the modern treatment of tuberculosis and as a result patients are reluctant to accept hospitalization. To meet this need, the construction of a 250-bed unit for adult patients with pulmonary tuberculosis on the grounds of the Westfield State Sanatorium has been recommended and a bill providing for this will be introduced into the Legislature. By utilizing the existing facilities, a sanatorium could be constructed and maintained at a minimum cost and would be very acceptable to the territory served. When such provision is made, it would no longer be necessary to continue the small sanatoria at Springfield, Holyoke and Chicopee, and the Hampshire County Sanatorium at Haydenville would no longer be needed. As to whether or not it is continued would depend entirely upon the action of the Hampshire County Commissioners.

The other sections of the State with the exception of Middlesex and Bristol Counties appear to have sufficient beds for their needs. It is to be hoped that the additional buildings planned for the Middlesex County Sanatorium will be constructed in the near future.

The Ten Year Program came to an end this year and decentralization of the work has begun very satisfactorily. Most of the county sanatoria have started or are arranging to begin examinations soon and some of the larger cities have already taken over the work. The State sanatoria are dividing the work with the counties according to geographical location. Children who have been diagnosed during the past years as having tuberculosis or are suspects will be followed up with annual examinations by the State clinic group. A statistical summary of the ten years' work in the school clinics is covered in the report of the Director of the Division of Tuberculosis. Briefly, we may say that 400,000 school children have been examined. These clinics have been held in practically every city and town in the Commonwealth and in some of them twice. This extensive program has brought the subject of tuberculosis, its diagnosis and treatment to the attention of parents, teachers, nurses and doctors and has created, we believe, a consciousness of the problem of tuberculosis which is bound to be of the greatest value in the application of further control measures. It is practical health education.

*Typhoid Fever.*—The incidence of typhoid fever continued to decline during 1934, reaching a record low figure both for cases and deaths. There were but 134 cases reported as compared with 162 for last year. At the same time the deaths numbered only 13 as compared with 22 the previous year. No cases were recognized that were directly traceable to either water or milk. The largest local outbreak during the year occurred in Mansfield where four cases occurred simultaneously. Although it was virtually impossible to obtain accurate information, there is no question that these cases were related and directly traceable to a carrier.

The list of known typhoid carriers has grown from 91 at the beginning of the year to 98. Two carriers died from a condition having no relation to their carrier state; two underwent operations in the hopes of curing their condition; and four carriers were removed from the list as cured following gall bladder removal. Carriers found upon investigation of reported cases were 13, making a rate of 9.8 per 100 cases.

Of particular interest was an investigation carried out in Fall River of routine culturing of typhoid fever cases reported during recent years. Two new carriers

were found in this way. The cases of typhoid fever are now so few that it is perfectly feasible to carry out such a program in any community.

*Undulant Fever.*—Fifteen cases of undulant fever were reported as compared with 11 the previous year. In all instances the source of infection was apparently raw milk. Several of the victims during the past year have been sadly disillusioned as to raw milk, realizing for the first time apparently that milk from a model dairy might be a vehicle for the transmission of disease. The incidence of contagious abortion among the dairy cattle of the State is very high and the problem of eliminating this disease from the herds is one that is being given a great deal of study by the Department of Agriculture. The possibility of infection from this source is another argument for the general pasteurization of milk.

*Whooping Cough.*—With 12,659 cases of whooping cough reported for the year, this disease reached a higher incidence than ever previously recorded. The case fatality, however, was extremely low. Although the death rate shows some decline, whooping cough still causes more deaths in children under five than any one of the other communicable diseases. It is to be hoped that a vaccine may be developed that will prevent or modify this disease as it is now one of the most serious public health problems.

*Gonorrhoea and Syphilis.*—About 6,500 cases of gonorrhoea and 4,500 of syphilis have been reported this year, which is practically the same number as 1933. No special effort has been made to stimulate reporting or otherwise the number might have been considerably increased. Two hundred and seventy cities and towns have been represented in the reported cases. The total visits to the fourteen State-aided clinics have shown an increase of 2.6 per cent which indicates a tendency on the part of the patient to remain under treatment longer and visit the clinic more regularly. Some of the clinics have been reorganized and in one instance an assistant has been added to the staff. There is a gratifying tendency on the part of boards of health of the smaller communities to recognize their obligation to furnish treatment for patients with gonorrhoea and syphilis when they cannot employ a private physician. Apparently the established clinics are receiving considerable revenue from this source.

*Arsenicals.*—There has been an increase in the demand for arsenicals. About 5,400 grams have been distributed at a cost of approximately \$12,000.

Many lectures on the subject of gonorrhoea and syphilis have been given and a large amount of literature distributed.

*Division of Biologic Laboratories.*—The distribution of biologic products varies somewhat with the incidence of disease. With the decline in diphtheria there is a lessening demand for antitoxin and only about half of the amount is used now as compared with five years ago. Diphtheria toxoid is rapidly replacing toxin-antitoxin. In one month recently the amount of toxoid exceeded that of toxin-antitoxin being distributed. It is probable that in the near future the manufacture and distribution of toxin-antitoxin can be discontinued.

The use of scarlet fever convalescent serum has increased and more towns have availed themselves of the laboratory service in processing blood which they obtained from donors. Placental extract is now prepared at the laboratory for the study being carried on in cooperation with the Department of Pediatrics of the Harvard Medical School. The use of tuberculin for diagnostic purposes has materially increased. Scarlet fever toxoid is prepared for the experimental work being carried on to determine its value as an immunizing agent. Work is being continued on the production of a satisfactory alum precipitated diphtheria toxoid, but as yet none of this material from our laboratory is available for use. A distinct improvement has been made in the antipneumococcal serum. The product is more concentrated and shows less chill-producing qualities.

The Wassermann Laboratory reports an increase in the total number of specimens examined for syphilis, the complement fixation tests for gonorrhoea, examination of dogs' heads for rabies, and agglutination tests for the bacillus abortus. On April 1st the routine use of the Wassermann tests was discontinued and the Hinton test made the standard method for the examination of blood for syphilis. This change in method permitted the examination of an increased number of specimens with the same personnel and the number of positive diagnoses was increased.

*Bacteriological Laboratory.*—The demands on the laboratory have been getting heavier each year. More use is made of it by physicians notwithstanding the decline

in the incidence of diphtheria and typhoid. The outbreaks of dysentery in the institutions during the last year and the more thorough search for typhoid carriers greatly increased the number of stool specimens sent in for examination. The studies of the different methods of pneumococcus typing continue and it has been shown conclusively that the Neufeld method can be substituted for other methods without sacrificing accuracy. This is of great importance as the type of pneumococcus in a specimen can be determined in a very few minutes. Delay is thus avoided and the administration of serum restricted to Types I and II cases.

#### IV. NON-COMMUNICABLE DISEASE

*Division of Child Hygiene.*—The educational work carried on by this Division is varied but it all has an important bearing on some phase of child health. Beginning with pre-natal and post-natal advice to parents it follows on through the pre-school period with Well Child Conferences and mothers' classes. Then come the Summer Round-Ups to see that the children are ready to enter school without physical handicaps and that they are vaccinated against smallpox and immunized against diphtheria. Then health education is carried on with the child through teaching hygiene in the schools. The examination by the physician is practical health education if properly and adequately carried out. The supervision of school lunches to see that suitable foods are provided and that the child is taught how to make proper selection is an opportunity to teach nutrition which should not be overlooked. Then examination of the teeth should be used to convey to the child the information that cavities and unclean teeth are an unhealthy condition of one of the most important organs of the body which may interfere with growth and development and possibly cause serious disease. An interesting project in the field of school hygiene was carried out in giving 2,000 sixth grade children in different types of communities in the State a "Health Awareness" test prepared by the American Child Health Association. The purpose of this is to determine the value of methods and materials used in health education. A bulletin called "Contact" for distribution to school superintendents and school physicians is being issued four or five times a year, and serves as a medium for bringing to the attention of these officials the newer developments in school medical service.

*Nutrition Service.*—The services of the nutritionists have been much in demand by school officials to give advice in regard to school lunches and by welfare departments to supervise food budgets. Early in the year a school lunch committee was appointed made up of the Chairman of the Child Welfare Division of the Massachusetts Federation of Women's Clubs, representatives of the Department of Education, and of the Extension Service of the Massachusetts State College, with the Consultant in Nutrition of the Department as Secretary. Surveys were made by responsible women in the local communities for the purpose of finding the needs and to share the responsibility in meeting them. This investigation was made in about 170 cities and towns. When the figures were studied from the returns of the first 47,000 children either bringing their lunches or buying them at school, it was found that only one child out of four had milk, only one out of five had fruits and vegetables, only one out of seven had dark bread, only one out of five had as long as twenty minutes for eating lunch, and only one out of nine was getting a hot dish. This indicated that children were eating unbalanced lunches, even though nineteen types of organizations were giving assistance. A report was sent to each superintendent of schools concerned, noting the needs found and suggesting his appointing a committee to work with him to meet these needs. The results thus far have been that more needy children have been supplied with lunches, more responsible local organizations are working toward improving the school lunches, and more nutrition education of children, parents and teachers is being carried on.

Courses and lectures were given on nutrition to home economics teachers and nurses. The summer camps for children affiliated with the Massachusetts Tuberculosis League were given more adequate supervision this year than ever before. On request from the camp director, a nutritionist would spend two or three days observing and assisting in the preparation of meals. On the basis of our observations recommendations were then made for such changes and improvements as seemed desirable.

Early in the year the Consultant in Nutrition was appointed as an adviser to the State F. E. R. A. She has been called upon many times for advice as to the

best way to utilize foods sent in to the State for distribution and as to suitable food budgets to be supplied to recipients of welfare relief. A Buying Guide for families on welfare aid and for persons with much reduced food allowances was prepared and distributed. Much assistance has been rendered to many welfare departments in different sections of the State in planning food allowances and methods of distribution.

*Dental Nutrition Study.*—This is the third year that a dental nutrition study has been carried on in cooperation with Doctors Howe and Eliot of the Forsyth Infirmary on the children patients in the State Sanatoria. Groups of children have been followed over long periods to observe the effects of adding tomato juice with and without the addition of Vitamins A and D obtained from haliver oil. In several communities where nutritionists are available there has been an effort made to consider cases of active caries as needing the aid of nutritional follow-up but the problem is so large that only the worst cases can be covered.

An important service has been contributed by the Committee on Public Relations of the Massachusetts Dental Society who have asked local dentists to furnish free examinations and consultations to members of 4-H clubs. The use of the dental certificate plan in schools is being urged and is meeting with favor in many communities. Splendid service is being given by the dental clinics and eleven new traveling clinics were established during the year. The dental health education and dental clinic service have developed rapidly in the rural sections. There is evidence of a steady growth in all phases of dental hygiene.

*Health Education.*—More time was spent in consultation with visiting nursing associations in the development of local publicity programs. Lectures were given to many groups; pamphlets, posters and exhibits were prepared and widely used in the State. Four special numbers of the *Commonwealth* were published, the subjects covered being "The Handicapped," "Adult Hygiene," "Diabetes," and "Health Education." The inclusion of many important papers in these issues greatly increased the demand and made it necessary to print much larger editions.

*Public Health Nursing.*—A series of lectures was given in nurses' training schools covering subjects pertaining to the control of communicable disease and other phases of public health. Tuberculosis nursing service has been featured in several communities and aid given to local nurses in the development of their programs for case finding and systematizing their work. Assistance has been given in the scarlet fever immunization clinics. Public health nursing institutes were held in six different areas in the State. The general subjects discussed were child health, and school and general public health nursing. The attendance and interest shown were very gratifying.

Only the high lights of the many interesting things done by this Division can be mentioned in an abstract. A detailed account of the work will be published in the complete report.

*Division of Adult Hygiene.*—The Division of Adult Hygiene, although devoting most of its time to the cancer program, has given some study and has issued pamphlets on diabetes, rheumatism, heart disease, and other chronic diseases. Over 25,000 pieces of literature have been distributed. One issue of "The Commonwealth" was devoted to "Adult Hygiene." The Health Forum, which combines newspaper and radio activities, has been changed during the year; no answers to questions requesting medical advice are given. Instead, two medical topics are discussed each week over the radio. Both of these articles are printed weekly in the *Boston Globe* and one is sent to 74 newspapers throughout the State. A new series of radio programs entitled "The Health Review" was started in January. Broadcasts sponsored by the Massachusetts Medical Society continued throughout the year. Altogether, 143 broadcasts have been given.

*Cancer.*—The Division of Adult Hygiene has devoted the greater part of the time to the cancer program. One issue of "The Commonwealth" was devoted entirely to "Cancer" and another to "Diabetes." Both of these were prepared for general distribution to all physicians in the State as well as to the regular mailing list. A *Cancer Clinic Bulletin*, designed primarily for physicians working in the cancer clinics is now mailed to about one-fourth of the physicians in the State. It contains abstracts of articles on cancer and items of interest regarding the cancer program. Experience in the cancer clinics has indicated that the publicity methods used have not accomplished the desired results and therefore the program has been changed

to lessened activity through the newspapers and to effect a more concerted drive for education of the laity through the medical profession. The study started last year of the death records being collected on cancer and tuberculosis has been continued. The investigation into the etiology of cancer and the evaluation of cancer mortality records, aided by a grant from the Rockefeller Foundation, is progressing. A study of cancer patients from admission to death is being carried on. A survey of the cancer clinics indicates that the bulk of cancer patients are being referred to the clinics by physicians. There has been a steady increase in this trend since the inception of the program. State-aided clinics are being maintained in Pittsfield, North Adams, Boston, Brockton, Lawrence, Lowell, Lynn, New Bedford, Newton, Springfield, Worcester, Fitchburg, Gardner, and Greenfield.

*Pondville Hospital.*—Through the Emergency Public Works Commission funds have been made available for a much needed service and surgical building and a 25-bed addition at Pondville. It is expected that these buildings will be ready for occupancy by August, 1935. This will furnish a thoroughly modern operating unit, increase the capacity of the hospital by 25 beds, and relieve the present congestion in the out-patient department. Although there has been a continued growth in all services at Pondville during the year, it is evident that additional service to cancer patients must wait for the completion of the new buildings now under construction. There were 1,222 admissions, 19 more than last year. The out-patient visits rose to a new total of 4,619. The average length of hospitalization was further reduced from 37.1 to 33.8 days in an attempt to shorten the waiting list for admission, but we believe that any further reduction in the average period of hospital treatment for cancer patients is not desirable from the standpoint of the patients. The increase in all branches of medical work has been assisted by the addition of one physician and three nurses to the resident staff. Operations increased 14 per cent and autopsies 12 per cent during the year. The need for additional employees' quarters was recognized by the engineers of the Emergency Planning Board who recommended a separate dormitory building. The request for a 100-bed dormitory has accordingly been included in the 1935 budget.

## V. ENVIRONMENTAL CONTROL

The Division of Sanitary Engineering has received more requests for advice than ever before. The subjects covered related to municipal water supplies, private water supplies through local boards of health, water supplies of schools and camps, sources of ice supply, bathing and swimming pools, shellfish, pollution of streams, sewerage and sewage disposal, Civilian Conservation Corps camps, and miscellaneous matters. This number is about 37 per cent in excess of the number of applications received during the corresponding period last year. All of these applications required field investigations by engineers and chemical analyses, or bacterial examinations, or both, by the Water and Sewage Laboratories or the Lawrence Experiment Station.

The rainfall for the year 1934 as recorded at seven rainfall stations throughout the State, which are under the supervision of this Division, was 44.05 inches, which is only 0.57 inches less than normal.

An examination of the records submitted by the Metropolitan Water District shows that the water consumption of this district during the year increased about 6.8 per cent over that for the same period of 1933. There were no shortages in any of the sources of water supply in the State during the year and it was not necessary for the Metropolitan District Water Supply Commission to divert water through its tunnel from the Ware River to the Wachusett Reservoir, the yield of this reservoir and the other sources of supply of the district being sufficient to meet all requirements and allow a wastage over the dam at Clinton from March 31 to about July 1. The progress in the construction of the new sources of water supply for the Metropolitan Water District in connection with the diversion of the waters of the Swift and Ware rivers has been satisfactory during the year and at the present time the tunnel that will convey these waters to the Wachusett Reservoir is complete except for about 1,000 feet of lining.

During the year public water supplies were introduced in the towns of Paxton and Townsend and in the Barnstable Village section of Barnstable. Consequently, the number of cities and towns having public water supplies is now 241. There

have been a number of important improvements in some of the water supplies and others are being contemplated.

As a result of the reasonably normal rainfall, the flow of streams has not been sufficiently low to cause much complaint from pollution, and in general the streams throughout the State, with the exception of the North River in Salem and Peabody, have not been as seriously polluted as in certain past years. The Department has been much concerned over the pollution of the Charles River from the disposal of the sewage of the town of Milford, and as a result of communications and numerous conferences the local officials agreed to the construction of additional sewage disposal works in accordance with plans approved by the Department. In the report of the Department for 1933, mention was made of the pollution of the Nashua River and the Superior Court filed a decree requiring the city of Leominster to establish sewage disposal works. Plans also were approved during the year for a trunk sewer and sewage treatment works in North Adams, and construction is now well under way.

Much of the time of this Division has been taken up with the investigation of various projects for construction through Federal agencies, viz.: the Public Works Administration, the Civil Works Administration, and the Federal Emergency Relief Administration. Water and sewerage works have been approved for construction by the Federal authorities in accordance with their program. Eleven of these were in State institutions, the total estimated cost of which was \$308,300. Eighteen of these projects were for cities and towns, the total estimated cost being \$1,830,000. There were also twelve C.W.A. or F.E.R.A. projects with an estimated cost of \$1,389,600.

In connection with the institutions under the supervision of this Department, the Engineering Division prepared plans and supervised the construction of additional sewage filters at the Lakeville State Sanatorium and at the Westfield State Sanatorium. At the Rutland State Sanatorium sewers and drains were constructed to eliminate surface water from the sanitary sewer discharging into the new Rutland-Holden-Worcester sewer which has recently been completed by the Metropolitan District Water Supply Commission to prevent pollution of the water of the Metropolitan Water District. Sprinklers for fire protection purposes were installed at the Rutland, Lakeville and North Reading State Sanatoria.

During the past year this Division has carried out two investigations jointly with the Department of Public Works. One of these investigations was in connection with the condition of Lake Quinsigamond and the other related to the South Essex Sewerage District. Reports required under these resolves have been signed jointly by this Department and the Department of Public Works and submitted to the Legislature.

Throughout the year a large number of samples of water have been collected for bacterial examination from sources of water supply used at the Civilian Conservation Corps camps, and in addition the Department has assisted by advising in matters of sewage and refuse disposal.

The Division has carried on the usual activities relating to shellfish and drainage matters. In connection with the former, there has been much activity relative to the shipment of shellfish into the State. Under the new law enacted in 1933, all persons dealing in shellfish commercially are required to have certificates issued by the Supervisor of Marine Fisheries in connection with which inspections are now made by the Division of Sanitary Engineering before certificates for shucked stock are issued. Under this agreement between the Supervisor and this Division, nearly 600 inspections have been made of shucking plants, and the Supervisor has been notified when the shucking plants are in proper sanitary condition in order that the necessary certificates might be issued. This has been the first full year when the Department has had the opportunity to supervise shellfish shucking establishments, and this is believed to be one of the most important steps thus far taken in cleaning up insanitary shucking establishments.

The drainage problems have been under the direction of the State Reclamation Board, the chairman of which is a member of the staff of the Engineering Division. Much drainage work has been carried out in the salt marsh areas for the purpose of mosquito control. Most of this work has been financed under funds appropriated for the relief of unemployment.

The Division has also caused examinations to be made of sources of water supply

at many schoolhouses, especially in the Berkshire section of the State. Many of them visited were found to have sources of water supply of questionable quality.

During the period from January 1 to November 30, inclusive, the Water and Sewage Laboratories made 8,003 chemical and 2,634 microscopical analyses, and in carrying on the routine and research work 2,721 additional examinations. At the Lawrence Experiment Station 2,566 chemical analyses were made and 8,215 bacterial, including 474 shellfish examinations and 319 analyses of sand. Much of the time of the Chief of the Laboratory at the Lawrence Experiment Station was used in the supervision of experiments made in connection with the treatment of sewage and trade wastes of the South Essex Sewerage District. Certain studies were made during the year relative to the disposal of distillery wastes in Clinton. As a result of the work of the Lawrence Experiment Station and the investigations by the engineers, the Attorney General on application by the Department instituted court action against the Clinton Distillery and as a result an agreement was made between the Distillery and the courts to prevent the further discharge of these objectionable wastes into the sewerage system of the town of Clinton.

Close supervision has been maintained by the Lawrence Experiment Station in connection with the plants operated in Newburyport, Scituate and Plymouth for the treatment of shellfish by chlorination. The experimental work of the Station has been continued and many new studies are under way, the details of which will be given in the complete report of the Division.

*Division of Food and Drugs.*—During the fiscal year there were collected and examined 5,164 samples of milk chemically and 4,104 bacteriologically. There were also 266 samples of ice cream examined for bacteria. There were 2,674 samples of food examined and 347 samples of drugs, and the police departments submitted 1,300 samples of liquor. The liquor samples are considerably less than the number submitted during prohibition.

There was an unusual amount of oleomargarine sold as butter. This material was shipped in interstate commerce in compliance with the law and was stored in a warehouse in Boston. It was then transferred to a place located outside of Boston, was colored, and sold in retail stores as butter. After much investigation in cooperation with Federal officers, the cases were traced and brought to court.

With the passage of the new frozen dessert law, a new duty was placed upon the Department, namely, the supervision of the manufacture of this type of food, together with the granting of permits to manufacturers of such food located without the Commonwealth. Rules and regulations were drawn up a short time after the law became effective, and these were adopted by the Council. Investigation of the sanitary condition of these plants showed that they were far from being as clean as the pasteurizing plants at the time the milk pasteurization law went into effect. Apparently very little inspection as to sanitary conditions in the ice cream making plants had been made by the local boards of health.

There was considerable increase in the mattress inspection work, probably due in some measure to the introduction of a bill requesting the transfer of mattress inspection from this Department to the Department of Labor and Industries. This bill was vetoed by the Governor but it is probable that the mattress manufacturers, anticipating the transfer, thought that it would take considerable time to develop an organization to enforce the law and make ready to take advantage of this condition. Several manufacturers were prosecuted and convictions obtained.

Pasteurization plants have been inspected as usual, and violations have not been so extensive as they have been in the past. On the whole, this work is carried on in accordance with law and with reasonably good sanitary practice.

## VI. PERSONNEL

For the first time in many years there has been a change in the membership of the Public Health Council. Because of his many other obligations Dr. Roger I. Lee felt it necessary to resign, in November. Dr. Richard M. Smith of Boston was appointed by the Governor to fill this vacancy. Dr. Smith is a pediatrician well-known throughout the country, and his advice and guidance will be of inestimable value in the formulation of program and policies, especially of the Division of Child Hygiene of the Department.

In May the District Health Officer districts were increased in number from six

to seven by a division of the Metropolitan Area. Dr. George M. Sullivan, formerly Superintendent of the Pondville Hospital, who was District Health Officer in the Northeastern District at one time, was appointed as District Health Officer of the newly created South Metropolitan District.

On June 1 Miss Ada Boone Coffey, Chief Consultant in Public Health Nursing, was granted a leave of absence because of illness, and had been unable to return at the end of the fiscal year. This vacancy was not filled temporarily because of the difficulty in obtaining a suitably qualified person and the hope that Miss Coffey might be able to resume the work in which she was so much interested.

Dr. Samuel B. Kirkwood was appointed on June 1 to fill the vacancy in the position of Epidemiologist in the Division of Tuberculosis caused by the resignation of Dr. Raymond Johnson.

There have been many changes in the staff of the Chadwick Clinics during the year, most of these due to the termination on June 30 of the ten-year period for which the work was undertaken and the resulting curtailment of the State's activity in this work. On December 31, 1933, Miss Sallie Bohl, Supervising Tuberculosis Field Nurse, resigned and Miss Katherine F. Mullane was promoted to this position. Miss Mildred Givan was appointed temporarily as Tuberculosis Field Nurse until June 30 to fill the vacancy caused by Miss Mullane's promotion, as this position was one of those to be abolished with the termination of the Chadwick Clinics. The positions of Dr. Charles E. Gill, Supervisor of Tuberculosis Clinics, Dr. Francis H. MacCarthy, Child Welfare Physician, and Miss Katherine B. O'Connor, Supervising Tuberculosis Field Nurse, were also abolished. Miss Catherine Leamy's position as Public Health Nutrition Worker was another to terminate with the ending of the clinics, but Miss Leamy was transferred to the Division of Child Hygiene as a much needed additional nutritionist on the staff of that Division. Miss Leamy is now on leave of absence for a year (from September, 1934, to September, 1935) for purposes of study and her work is being covered by Miss Helen E. Inman.

Dr. William R. Martin, Child Welfare Physician, who had been retained on the follow-up work of the Chadwick Clinics, resigned on October 31 and Dr. Harry C. Low was appointed to fill his position.

Dr. Gail Edwards was appointed to the newly created position of Laboratory Coordinator in the Division of Sanitary Engineering on August 1.

On June 1 Mr. George Adams was promoted to the rating of Chief of Laboratory and Mr. Joseph A. McCarthy was promoted to Senior Chemist at the Lawrence Experiment Station of the Division of Sanitary Engineering.

On June 6 Dr. Chester S. Stirrett, Veterinary Food Inspector in the Division of Food and Drugs, resigned. With a slight reassignment of the duties of the Inspectors of this Division it was possible to have the requirement of veterinary training for this position eliminated. On July 1 Mr. Thomas L. Boland, who has been employed by the Department for a number of years and who had successfully passed the Food Inspectors' examination, was promoted to this vacancy.

An additional position of Food Inspector was created in the Division of Food and Drugs to cover the work required of the Department by legislation passed in 1934 relative to licensing places manufacturing frozen desserts, and also to the licensing of dealers in wood or methyl alcohol. Mr. Oscar Peterson was provisionally appointed to this position on October 31.

Dr. Leo Rane was appointed on July 2 as Senior Bacteriologist in the Antitoxin and Vaccine Laboratory of the Division of Biologic Laboratories, to fill the vacancy caused by the resignation on February 28 of Dr. Wilbur G. Malcolm.

## VII. ORGANIZATION

The organization of the Department is as follows:

Commissioner of Public Health . . . . .	1
Public Health Council . . . . .	6
Division of Administration:	
Secretary (1), Epidemiological Consultant (1), Clerks and Stenographers (11) . . . . .	13
Division of Adult Hygiene:	
Herbert L. Lombard, M.D., Director.	
Epidemiologists (3), Social Workers (2), Public Health Education Workers (2), Clerks and Stenographers (15) . . . . .	23

Division of Biologic Laboratories:

Elliott S. Robinson, M.D., Director.

Assistant Director (1), Chemists and Bacteriologists (8), Laboratory Assistants (3), Laboratory Helpers (9), Stable Foreman (1), Laborers (14), Janitors (2), Clerks and Stenographers (6)

(Wassermann Laboratory):

Chief of Laboratory (1), Bacteriologist (1), Laboratory Technician (1), Laboratory Assistant (1), Laboratory Helpers (5), Clerks and Stenographers (3)

57

Division of Communicable Diseases:

Gaylord W. Anderson, M.D., Director and Deputy Commissioner.

Assistant Director (1), District Health Officers (7), Epidemiologists (3), Clerks and Stenographers (8).

(Diagnostic Laboratory):

Bacteriologists (4), Laboratory Assistant (1), Laboratory Helper (1), Laborer (1), Clerks (2).

(Venereal Diseases):

Assistant Director (1), Epidemiologist (1), Public Health Social Hygiene Supervisor (1), Public Health Education Worker (1), Clerks and Stenographers (2)

35

Division of Food and Drugs:

Hermann C. Lythgoe, Director.

Chief of Laboratory (1), Chemists and Bacteriologist (5), Veterinary Food Inspectors (2), Food Inspectors (9), Laboratory Helpers (2), Laborer (1), Clerks and Stenographers (7)

28

Division of Child Hygiene:

M. Luise Diez, M.D., Director.

Child Welfare Physician (1), Epidemiologist (1), Public Health Dental Hygiene Supervisor (1), Public Health Nutrition Workers (4), Public Health Education Workers (2), Clerks and Stenographers (8).

(Maternal and Child Hygiene):

Child Welfare Physician (1), Public Health Nursing Supervisors (5), Clerks and Stenographers (6)

30

Division of Sanitary Engineering:

Arthur D. Weston, Chief Sanitary Engineer.

Engineers and Engineering Assistants (15), Clerks and Stenographers (12).

(Water and Sewage Laboratories):

Laboratory Coordinator (1), Chiefs of Laboratory (2), Chemists and Bacteriologist (10), Laboratory Assistant (1), Mechanical Handyman (1), Laborer (1), Watchman (1), Clerks and Stenographers (3)

48

Division of Tuberculosis:

Alton S. Pope, M.D., Director.

Assistant Director (1), Epidemiologist (1), Superintendent of Sanatoria Construction (1), Inspector of Settlements and Support Claims (1), Social Workers (2), Field Nurse (1), Clerks and Stenographers (9).

(Tuberculosis Clinics):

Supervisor of Tuberculosis Clinics (1), Child Welfare Physicians (3), Field Nurses (2), Public Health Nutrition Workers (2), X-ray Clinic Field Agents (2), Clerks and Stenographers (6)

33

Total . . . . . 274

The average number of employees at each of the institutions under the supervision of the Department is as follows:

Lakeville State Sanatorium . . . . .	180
North Reading State Sanatorium . . . . .	130
Rutland State Sanatorium . . . . .	203
Westfield State Sanatorium . . . . .	145
Pondville Hospital . . . . .	134

792

Grand Total for the Department . . . . . 1,066

## VIII. PUBLICATIONS

The following articles by members of the staff have been published:

*Division of Administration*

- Tuberculosis as It Affects the General Hospital—  
Henry D. Chadwick, M.D.  
Bulletin of the American Hospital Association, April, 1934.  
The Massachusetts Program for School Tuberculosis Control—  
Henry D. Chadwick, M.D.  
School Physicians' Bulletin, IV, 8, October, 1934.  
Tuberculosis as It Affects the Physician's Practice—  
Henry D. Chadwick, M.D.  
New England Journal of Medicine, 211: 204-209, August 2, 1934.  
The Health Forum—  
Henry D. Chadwick, M.D. and Herbert L. Lombard, M.D.  
New England Journal of Medicine, 211: 767-769, October 25, 1934.

*Division of Adult Hygiene*

- Change in the Massachusetts Cancer Trend—  
George H. Bigelow, M.D. and Herbert L. Lombard, M.D.  
New England Journal of Medicine, 210: 526-529, March 8, 1934.  
Chronic Rheumatism—  
Herbert L. Lombard, M.D.  
Public Health Nursing, May, 1934.

*Division of Child Hygiene*

- Preparation for School—  
Susan M. Coffin, M.D.  
The Massachusetts Teacher, 13: 16, February, 1934.  
The Charm School—  
Albertine Parker McKellar.  
Hygeia, 12, April, 1934.  
Traveling Dental Service in Massachusetts—  
Eleanor Gallinger McCarthy, D.H.  
Journal of the American Dental Association, 21: 1104, June, 1934.  
School Lunches in Massachusetts—  
Mary Spalding and Angeline Hamblen.  
Practical Home Economics, 12: 259, September, 1934.  
Reprinted in Trained Nurse and Hospital Review, 93: 477, November, 1934.  
Public Education—  
Eleanor Gallinger McCarthy, D.H.  
International Journal of Orthodontia and Dentistry for Children, 20: 913,  
September, 1934.  
A Few Reminders for the Winter's Health Program—  
Fredrika Moore, M.D.  
The Massachusetts Teacher, 14: 32, October, 1934.

*Division of Communicable Diseases*

- The Role of the Public Health Nurse in Communicable Disease Control—  
Gaylord W. Anderson, M.D.  
Public Health Nursing, 26: 66-75, February, 1934.  
I Haven't Seen a Case in Thirty Years—  
Nels A. Nelson, M.D.  
Medical Economics, 12: 53-54, November, 1934.  
The Neufeld Method of Pneumococcus Type Determination as Carried On in a  
Public Health Laboratory: A Study of 760 Typings—  
Edith Beckler and Patricia MacLeod.  
The Journal of Clinical Investigation, 13, November, 1934.  
Epidemiological Value of Isolating Bacteriophage in Outbreaks of Intestinal In-  
fection—  
Roy F. Feemster, M.D., Dr. P. H.  
American Journal of Public Health, 24: 1109-1115, November, 1934.

*Division of Tuberculosis*

- Observations on Pulmonary Tuberculosis Among Members of the Same Families—  
Paul Dufault, M.D.  
American Review of Tuberculosis, 29, January, 1934.
- Broncho-pulmonary Suppuration—  
Ernest B. Emerson, M.D.  
New England Journal of Medicine, 210: 365, February 15, 1934.
- Sanatorium Treatment versus Home Treatment—  
Paul Dufault, M.D.  
Journal of the Outdoor Life, March, 1934.
- Operative Surgery in Pulmonary Tuberculosis—  
Frank H. Washburn, M.D.  
New England Journal of Medicine, 210: 1006, May 10, 1934.
- Bronchoscopy in the Sanatorium—  
G. Arnold Rice, M.D.  
New England Journal of Medicine, 210: 1008, May 10, 1934.
- Bilateral Pneumothorax—  
Gabriel Nadeau, M.D.  
New England Journal of Medicine, 210: 1012, May 10, 1934.
- Evolution of Pneumothorax Therapy—  
Armand Laroche, M.D.  
New England Journal of Medicine, 210: 1013, May 10, 1934.
- Certain Aspects of Pulmonary Tuberculosis in Children with Special Reference to  
Prognosis—  
Roy Morgan, M.D.  
American Review of Tuberculosis, 29, May, 1934.
- Cancer of the Mouth in Women—  
Grantley W. Taylor, M.D.  
New England Journal of Medicine, 210: 1102, May 24, 1934.
- Bone Metastases from Carcinoma of the Urinary Bladder—  
Roger Graves, M.D. and Raymond E. Militzer, M.D.  
Journal of Urology, 31: 769, May, 1934.
- Certain Factors Influencing the Mortality of Sanatorium Treated Cases of Pul-  
monary Tuberculosis—  
Alexander D. Langmuir, A.B., Seiriol L. Williams, M.D. and Alton S. Pope,  
M.D.  
New England Journal of Medicine, 211: 26, July 5, 1934.
- A Further Report on the Cases Admitted to the Pondville Hospital during its First  
Two Years—  
Staff of the Pondville Hospital.  
American Journal of Cancer, 21: 648, July, 1934.
- The Monocyte-Lymphocyte Ratio as a Measurement of Activity in Pulmonary  
Tuberculosis—  
Gulli Lindh Muller, M.D.  
New England Journal of Medicine, 211: 248, August 9, 1934.
- Arsenical Keratoses and Carcinomas—  
Clifford C. Franseen, M.D. and Grantley W. Taylor, M.D.  
American Journal of Cancer, 22, October, 1934.
- Report of a Case of Psoas Abscess Resulting from Tuberculosis of the Cervical  
Spine—  
Louis Alpert, M.D.  
New England Journal of Medicine, 211: 15, October 11, 1934.
- The Carbohydrate Tolerance in Cancer Patients and the Effect of Roentgen Ray  
Radiation—  
F. H. L. Taylor, Ph.D. and Henry Jackson, Jr., M.D.  
American Journal of Cancer, 22, November, 1934.
- The Treatment of Malignant Diseases of the Penis—  
Roger C. Graves, M.D.  
Journal of Urology, 32, November, 1934.
- Mistaken Diagnoses of Cancer—  
Dudley Merrill, M.D.  
New England Journal of Medicine, 211: 801, November 1, 1934.

Sanitation of Watersheds—

Arthur D. Weston.

Journal of the New England Water Works Association, 48, 3, September, 1934.

#### IX. LEGISLATION

The Department is submitting the following proposed legislation:

##### *1. Relative to Requiring Vaccination of Children in Private Schools*

The General Laws at present require smallpox vaccination of children as a prerequisite to public school attendance. While this has been effective in keeping the incidence of the disease at a figure lower than that of any other state in the Union, this protection to the community has come from the enforcement of this provision upon those who could not afford to go to a private school. This means, then, that those financially able to attend a private school can purchase their protection at the expense of those less favorably situated. The proposed amendment in extending the compulsory vaccination to include private schools would provide for equal participation on the part of all, thus avoiding any suggestion of what may well be called at present class legislation. In addition, it would prevent the occasional case of smallpox that occurs from time to time among children who have evaded or escaped vaccination through private school attendance.

##### *2. Relative to the Treatment of Gonorrhoea and Syphilis and to Records of Cases of Gonorrhoea and Syphilis*

The wisdom of the following modifications of existing statutes pertaining to gonorrhoea or syphilis is self-evident. They aim:

(1) To remove any doubt as to local responsibility for furnishing treatment to infected indigents for the good of the individuals and the protection of the public;

(2) To remove any possible restraint from a physician who believes it advisable to give information necessary for self-protection to the husband or wife of an infected person under his care.

The words "gonorrhoea or syphilis" are substituted for the words "venereal diseases" for the sake of conformity with the statutes. Gonorrhoea and syphilis have been declared diseases dangerous to the public health but venereal diseases have not been defined either by the legislature or the State Department of Public Health.

## X. FINANCIAL STATEMENT

*Appropriations and Expenditures for the Year ended November 30, 1934*

	Appropriations Plus Amounts Brought Forward	Expenditures to November 30
Division of Administration . . . . .	\$33,563.90	\$32,991.21
Division of Adult Hygiene . . . . .	74,774.27	74,433.99
Division of Child Hygiene . . . . .	50,961.58	47,221.97
Maternal and Child Hygiene . . . . .	32,198.54	29,898.60
Division of Communicable Diseases . . . . .	81,752.83	78,123.76
Venereal Diseases . . . . .	41,102.86	40,998.73
Division of Food and Drugs . . . . .	60,970.98	59,681.37
Frozen Desserts . . . . .	700.00	699.88
Administration of Shellfish Law . . . . .	2,744.00	2,741.26
Division of Biologic Laboratories:		
Antitoxin and Vaccine . . . . .	101,765.09	95,896.33
Wassermann Laboratory . . . . .	20,919.45	20,641.47
Division of Sanitary Engineering . . . . .	84,152.62	81,955.40
Water and Sewage Laboratories . . . . .	46,565.26	45,225.96
Division of Tuberculosis . . . . .	39,611.32	39,295.34
Subsidies to Cities and Towns . . . . .	451,000.00	450,995.53
Tuberculosis Clinic Units . . . . .	71,328.38	65,834.52
	<b>\$1,194,111.08</b>	<b>\$1,166,635.32</b>

*Legislative Investigations for the Year ended November 30, 1934*

	Appropriation to	Expenditures to Nov. 30, '34
Investigation of Sanitary Condition of Lake Quinsigamond, Chap. 32, Res. 1934 . . . . .	\$4,500.00	\$4,330.52
South Essex Sewerage Investigation, Chap. 49, Res. 1934 . . . . .	3,000.00	2,978.09
	<b>\$7,500.00</b>	<b>\$7,308.61</b>

*Receipts for Year ended November 30, 1934*

Licenses, Etc. . . . .	\$3,076.88
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*State Sanatoria and Pondville Hospital  
Appropriations and Expenditures for the Year ended November 30, 1934*

	Appropriations	Expenditures
Lakeville State Sanatorium . . . . .	\$268,138.94	\$258,515.55
North Reading State Sanatorium . . . . .	227,639.84	216,055.37
Rutland State Sanatorium . . . . .	283,796.45	272,713.98
Westfield State Sanatorium . . . . .	240,606.26	228,376.76
Pondville Hospital . . . . .	237,602.56	230,445.63
<i>Lakeville:</i>		
Acts 1934, Chap. 162, Item 533, "Men's Lamp Rm and Equipment" . . . . .	6,700.00	6,638.98
Acts 1934, Chap. 162, Item 534, "Women's Lamp Rm and Equipment" . . . . .	6,700.00	6,665.18
Acts 1934, Chap. 162, Item 535, "X-Ray Machine and Flourescope" . . . . .	4,000.00	58.35
Mass. State Project H-1 "Sewage Filters" . . . . .	5,000.00	3,627.48
<i>Rutland:</i>		
Acts 1934, Chap. 162, Item 538 "Sewer Connections" . . . . .	60,790.00	-
Acts 1934, Chap. 162, Item 539 "Sprinklers" . . . . .	3,600.00	5.55
Mass. State Project H-3 "New Boilers at Power Plant" . . . . .	37,000.00	21,140.55
Mass. State Project H-2 "Sewage Disposal" . . . . .	7,500.00	6,471.12
<i>Westfield:</i>		
Mass. State Project H-4 "Sewage Filters" . . . . .	8,000.00	6,767.57
<i>Pondville:</i>		
Acts 1934, Chap. 162, Item 542 "X-Ray Machine and Equipment" . . . . .	5,000.00	4,953.57
Mass. State Project, H-6 "Addition to Hospital Building" . . . . .	87,425.00	20,839.95
Mass. State Project, H-5 "Medical and Service Building" . . . . .	197,400.00	44,148.63

*Receipts*

Lakeville State Sanatorium . . . . .	\$135,910.99
North Reading State Sanatorium . . . . .	80,729.68
Rutland State Sanatorium . . . . .	192,270.83
Westfield State Sanatorium . . . . .	77,611.17
Pondville Hospital . . . . .	100,175.55

Respectfully submitted,

HENRY D. CHADWICK, M.D.,  
*Commissioner of Public Health.*

## REPORT OF DIVISION OF ADULT HYGIENE

HERBERT L. LOMBARD, M.D., *Director*

During the present year the Division of Adult Hygiene has devoted the greater part of the time to the cancer program and the remainder to other chronic diseases. In February, the Division moved from the Ford Building to the Public Works Building on Nashua Street. In the new building there is room for a small library, and all literature owned by the Division has been placed here. The many pamphlets and monographs are being catalogued.

The average monthly incoming mail amounted to 320 pieces and outgoing mail 1,530 pieces. Over 25,000 pieces of literature have been distributed. These included pamphlets on cancer, diabetes, rheumatism, heart disease, and other chronic diseases. Approximately thirty visitors per month came to the office for advice on various problems.

Three issues of The Commonwealth have been assembled by the Division—one on adult hygiene, one on diabetes, and the third on cancer. The latter two were prepared for general distribution to all physicians in the State as well as to the regular mailing list.

### THE CANCER CLINIC BULLETIN

This monthly bulletin which was primarily designed for the physicians working in the cancer clinics is now mailed to about one fourth of the physicians in the State. It contains abstracts of articles on cancer and items of interest regarding the clinic program. One issue was mailed to all physicians in the State, asking those who desired to receive the Bulletin regularly to notify us. The response of the physicians increased the issue by fourfold.

### HEALTH FORUM

The Health Forum with combined newspaper and radio activities has been changed during the year. As a result of a study of the type of questions received, it was found that too many individuals were requesting definite medical advice rather than answers to public health questions. The Forum has ceased to answer such questions and in its stead various medical topics are discussed. Two such topics are discussed each week over the radio. Both of these articles are printed weekly in the Boston Globe and one is sent to seventy-four newspapers throughout the State.

### HEALTH REVIEW

A new series of radio programs entitled "The Health Review" was started in January. In these broadcasts the various trends of public health history are discussed. The series began with early health measures common among the ancient Hebrews and has continued down through the Greek, Roman, and Medieval Ages to modern times. When completed, it will cover a comprehensive review of the history of public health.

### HEALTH MESSAGES

The broadcasts sponsored by the Massachusetts Medical Society have continued throughout the year and a special broadcast on insulin was given on the anniversary of its discovery. During the year, 143 broadcasts have been given.

### LECTURES AND EXHIBITS

Lectures have been given to various groups in the State and one before the Connecticut State Nurses' Association in Hartford. The average attendance at these lectures was seventy-five. Among the groups reached were several of the colleges which had a talk on cancer included in the biology course.

Exhibits were prepared for the annual meetings of the Massachusetts Medical Society, American College of Surgeons, American Public Health Association, and the State Nurses.

### TUMOR DIAGNOSIS SERVICE

The increase in specimens sent to the laboratory in 1933 was balanced by a decrease of 258 specimens this year, making a total of 2,528 specimens received in 1934. The Huntington Hospital showed a slight increase in the number of surgicals

to 738. The smaller hospitals and individual surgeons outside the metropolitan area continued to send in the majority of the material. Quite a little material has been received from various State cancer clinics. This year 513 surgeons and 88 hospitals, a list of which is attached (Table XIX) utilized the service. A number of conferences with surgeons regarding specimens in which they were particularly interested have been held.

Owing to the marked interest in skin cancer, particularly in relation to its radio sensitivity, the study of epidermoid carcinoma concluded last year has been extended to consider in detail the pathology of the basal cell carcinoma.

Dr. Arthur M. Cloudman resigned as resident September 1, 1934, to join the research staff of the Jackson Laboratory at Bar Harbor. Dr. Olive Gates, formerly assistant pathologist at the New England Deaconess Hospital, was appointed assistant pathologist in this laboratory. Dr. John Fallon, Littauer Fellow in Pathology, made a detailed study of precancerous lesions of the breast during his appointment. His place was taken September 1 by Dr. J. R. E. Morgan, Instructor in Pathology at the University of Toronto. Dr. Morgan is working particularly on functioning tumors of endocrine glands. Dr. Wyatt C. Simpson served as interne from January until March 1, and Dr. Richard Peterson served as interne from July 1 to December 31.

#### SOCIAL SERVICE

Social service has been continued in the clinics as in former years. In June a meeting of the cancer clinic social workers was held at Pondville Hospital.

#### ASSISTANCE

Statistical assistance has been given to a number of physicians both in and out of Massachusetts. There has also been interdepartmental statistical assistance rendered. The Massachusetts Federation of Women's Clubs was assisted in securing speakers for several of its meetings.

#### PONDVILLE CODE

A large amount of work has been devoted to perfecting a punch-card code for the Pondville Hospital cancer patients. This has been attempted in previous years but could not be accomplished because of lack of space on the card. With the new eighty-line card it has been possible to prepare a code satisfactory to the surgeons at Pondville.

#### EDUCATION COMMITTEES

The education committees of the cancer committees were contacted at frequent intervals throughout the year and a general meeting for all of them was held at Pondville on November 7. During the greater part of the year these committees were furnished with material on cancer for newspaper publicity. This was discontinued in October with the advent of the new type of publicity. The experience in the cancer clinics has indicated that the publicity methods used have not accomplished the desired results and, as a result, the program has been changed to lessen activity through the newspapers and to effect a more concerted drive for education of the laity through the medical profession.

#### STUDIES

*Cancer and Tuberculosis:* The death records are being collected as a continuation of the study started last year.

*Rockefeller Study:* Work on this study has been progressing. This includes investigation into the etiology of cancer and the evaluation of the cancer mortality records.

*Weight and Morbidity:* The chronic disease survey cards were studied in more detail to determine what relation existed between weight and morbidity. The analysis is progressing.

*Changing Vital Statistics:* An analysis of the changes in the Massachusetts vital statistics between 1850 and 1930 is being made.

*Cancer Clinic Social Service Follow-Up:* A study of the cancer patients from admission to death is being continued.

*Cancer in Boston:* The records of the tumor clinic of the Massachusetts General Hospital were studied and a paper prepared on this subject.

*Diabetes:* An intensive study of diabetes was made and a paper prepared.

#### STATE-AIDED CANCER CLINICS

A study of the cancer clinics indicates that the bulk of cancer patients are being referred to the clinics by physicians. There has been a steady increase in this trend since the inception of the program. Plans are under way for strengthening the individual clinics so that the medical profession will use them more in the future than it has in the past. A meeting of the cancer clinic chiefs was held on October 31 and at this meeting proposed changes in clinic management were discussed. In April the Massachusetts Medical Society Cancer Committee held a teaching clinic at the Massachusetts General Hospital for physicians working in the cancer clinics.

During the year the clinics were graded by a score card prepared for this purpose. This has greatly helped in pointing out the weak aspects of individual clinics.

In November the Franklin County Medical Society voted to reopen the Franklin County Clinic.

The Fitchburg Clinic held a special session on November 14 to which all the physicians in the district were invited. The Lawrence Clinic has conducted a similar undertaking several times during the year.

The American College of Surgeons has approved the state-aided cancer clinics in seven hospitals:

Pondville Hospital, Norfolk  
 City Hospital, Worcester  
 Memorial Hospital, Worcester  
 Boston Dispensary  
 Lawrence General Hospital  
 Lowell General Hospital  
 Lynn Hospital

Table I. The attendance at the state-aided cancer clinics in 1934 was 4,255—an increase of 8.5 per cent over the preceding year. More females attended the clinics than males. Cancer cases comprised 23.3 per cent of the total admissions. Nine hundred and ninety-two individuals with cancer were seen. These individuals had 1,041 cancers and appeared 1,058 times at different clinics. There is very little change in the percentage of individuals having cancer throughout the years in which the cancer clinics have been in operation. The highest rate in any year was 25.4 in 1930 and the lowest rate 21.0 in 1928. The percentage of individuals with precancerous lesions has increased from 11.6 in 1933 to 13.8 in 1934. This is gratifying, as the removal of precancerous lesions is probably the best attack upon the disease at the present time. This year showed the highest percentage of precancerous lesions of any of the years. Only about 4 per cent of the individuals who came to the clinics had no pathology. This figure is about the same as that for previous years. The median age of both the cancer patients and the total clinic attendance has remained practically constant throughout the eight years of clinic operation.

Table II. The number of cities and towns from which individuals came to the cancer clinics increased slightly in 1934 over 1933.

Table III. In 1934 the Pondville clinic had about three times as many patients as the next largest clinic and comprised about one third of the total clinic attendance. Brockton, Lowell, Lynn, New Bedford, and Springfield had over 300 patients each; the Boston Dispensary and Worcester over 200; and Lawrence and Worcester North over 100. Newton and the Berkshire clinics had less than 100 cases. The percentage of cancers varied considerably in the different clinics. Berkshire, Brockton, Lowell, New Bedford, Springfield, and Worcester North had rates of less than 20 per cent; while Newton, Lawrence, and Pondville had rates of over 30 per cent. The percentage of individuals with cancer has decreased in all clinics save Newton, Lynn, and Pondville. On the other hand, the percentage of individuals with precancerous lesions has increased in all clinics save New Bedford, Worcester, and Newton. The highest percentages of precancerous lesions were found in the Boston Dispensary, Pondville, and Lynn clinics.

Table IV. The percentage of cancer subdivided by whether or not the patients were referred by a physician is shown in this table. In every clinic with the exception of Newton, in which the number of cases is too small to be significant, the cancer rate among those referred by physicians greatly exceeded the rate among those not referred.

Table V. The median duration before the first visit by the patient to a physician showed little change between the years 1933 and 1934. A similar situation exists for duration before first visit to a cancer clinic. Evidently, further efforts are needed to reduce the period of delay.

Table VI. The duration before coming to a clinic subdivided by contact with physician showed little change between this year and the preceding one with the exception of the group that consulted no physician. Here there has been an increase. The group that came earliest to the clinics is that which consulted one physician and was referred by him to the clinic. Even in this group the interval is too long.

Table VII. The percentage of cancer patients who came to the clinics referred by physicians has continued to increase, while the percentage referred by newspapers has decreased. In 1927 physicians referred 47.3 per cent of the cancer patients, while in 1934 this figure had increased to 70.5. About half of the individuals with precancerous lesions were referred by physicians and one fifth by newspapers.

Table VIII. The percentage of individuals who came to the clinics at the advice of physicians has remained about the same in 1934 as in 1933, while the percentage who came because of newspaper publicity has increased. Inasmuch as the cancer cases referred by physicians showed an increase and those referred by newspapers a decrease, the indication is clear that the newspapers are increasing the attendance of individuals not having cancer.

Table IX. Cancer patients who came to the clinics referred by physicians comprised 70.5 per cent of all cancer cases in 1934, compared with 68.3 in 1933 and 64.0 in 1932. The newspapers were responsible for only 9.3 per cent of the cancer cases in 1934.

Table X. The distribution of cancers coming to the clinics in 1934 showed a decrease in cancer of the buccal cavity and uterus and an increase in cancer of the breast and skin. Inasmuch as cancer of the uterus and cancer of the breast have nearly the same number of deaths, it seems unfortunate that the number of individuals with cancer of the uterus coming to the clinics has declined.

Table XI. The diagnoses of previous years were changed in 1934 in 211 cases, and 95 diagnoses made in previous years which inadvertently had been omitted were recorded.

Table XII. The contact of the patients with physicians is shown in this table. Of the total cancer patients coming to the clinics, 11.6 per cent had never consulted a physician, 14.1 per cent had consulted one or more physicians but had come of their own volition, 38.4 per cent had consulted one physician and were referred by him, and 30.6 per cent had consulted more than one physician and had been referred by the last one consulted. These figures differed little from those of the preceding year.

Table XIII. The distribution of the cancer cases in the group that came directly to the clinics without consulting a physician differed radically from the other three groups. This group showed a larger percentage of skin and breast cancers, and a much smaller percentage of all other types. Apparently educational activities are not being felt as well in cancer of the uterus as in cancer of the mouth, breast, and skin.

Table XIV. The percentage of individuals who had never seen a physician prior to their clinic visit was less in 1934 than in 1933, which in turn was less than in 1932. There appears to be a steady increase in the percentage of cases coming to the clinics who have seen physicians.

Table XV. The symptoms that first brought patients to the clinics closely resembled those of previous years. It is disappointing to note that so large a percentage of the cancer patients come because of pain. For the last three years the percentage of individuals with cancer who came with pain as a symptom has remained practically constant.

Table XVI. Both males and females showed an increase in operable cancer with a chance for probable cure. This indicates that patients are arriving at the clinics at an earlier period in the disease. Buccal cavity and skin were the two types that showed the greatest improvement. The breast cases showed a decrease, which is discouraging. While there was a slight improvement in the percentage of operable cancer with probable cure for cancer of the uterus over the preceding year, the fact that only 7 per cent of individuals with cancer of the uterus comes sufficiently early to be classified as probable cure is most discouraging.

Table XVII. Nearly half the males were classified as operable cancer with probable cure and slightly over one third of the females. There was considerable variation between the various clinics. This great discrepancy is probably due largely to different interpretations in the clinics, as it does not seem reasonable to believe that such great differences actually occurred as appear in this table.

Table XVIII. The diagnoses of various conditions found in the clinics are shown in this table. As some individuals had more than one condition, there were more diagnoses given than the total number of patients. Cancers comprised the largest percentage with benign tumors second, and precancerous lesions third. Of the nonmalignant conditions, diseases of the digestive system were the most common.

TABLE I. — Attendance at State-Aided Cancer Clinics, 1934

Total individuals attending clinics . . . . .	4,255.
Total individuals having cancer . . . . .	992.
Total individuals having precancerous lesions . . . . .	586.
Total individuals having post-operative cancer, no evidence of recurrence . . . . .	105.
Total attendance at clinics . . . . .	4,443.
Total cancer attendance at clinics . . . . .	1,058.
Total precancer attendance at clinics . . . . .	607.
Total post-operative cancer, no evidence of recurrence, attendance at clinics . . . . .	121.
Total diagnoses . . . . .	4,435.
Total cancer diagnoses . . . . .	1,041.
Total precancer diagnoses . . . . .	638.
Total post-operative cancer, no evidence of recurrence, diagnoses . . . . .	112.
Percentage of individuals with cancer . . . . .	23.3.
Percentage of individuals with precancerous lesions . . . . .	13.8.
Median age of total clinic patients . . . . .	50.3.
Median age of cancer patients . . . . .	62.4.

TABLE II. — Residents of Massachusetts Cities and Towns Attending State-Aided Cancer Clinics

	1933	1934
Number of places with 1 patient . . . . .	63	56
Number of places with 2-5 patients . . . . .	70	79
Number of places with 6-9 patients . . . . .	38	35
Number of places with 10 patients and over . . . . .	74	78
Total number of places . . . . .	245	248

TABLE III. — Attendance at State-Aided Cancer Clinics, by Individual Clinic

CLINIC	1934			PERCENTAGE PRECANCER		PERCENTAGE CANCER	
	ADMISSIONS*			1933	1934	1933	1934
	MALES	FEMALES	TOTAL				
Berkshire . . . . .	20	47	67	5.3	11.9	13.2	7.5
Boston Dispensary . . . . .	100	154	254	17.1	18.1	30.4	26.4
Brockton . . . . .	103	267	370	9.1	13.5	19.9	15.9
Lawrence . . . . .	44	83	127	8.0	11.0	38.4	34.6
Lowell . . . . .	123	197	320	11.6	12.2	16.6	16.2
Lynn . . . . .	139	273	412	7.7	15.1	19.8	20.4
New Bedford . . . . .	191	361	552	7.7	7.1	15.3	12.3
Newton . . . . .	1	4	5	20.0	0.0	0.0	80.0
Pondville . . . . .	633	871	1,504	18.0	18.1	33.8	35.8
Springfield . . . . .	116	224	340	6.4	10.6	20.7	13.2
Worcester . . . . .	100	194	294	7.1	4.4	25.1	24.1
Worcester North . . . . .	61	137	198	11.9	14.1	18.7	10.1

\*Some individuals went to more than one clinic.

TABLE IV. — Cancer Rate Subdivided by Whether or Not Patients Were Referred by Physician, by Individual Clinic

Rate per 100

CLINIC	1934		
	REFERRED BY PHYSICIAN	NOT REFERRED BY PHYSICIAN	TOTAL
Berkshire . . . . .	27.3	3.6	7.5
Boston Dispensary . . . . .	28.4	20.3	26.4
Brockton . . . . .	30.1	11.2	15.9
Lawrence . . . . .	50.0	14.5	34.6
Lowell . . . . .	32.5	11.1	16.2
Lynn . . . . .	33.9	15.5	20.4
New Bedford . . . . .	28.8	5.4	12.3
Newton . . . . .	75.0	100.0	80.0
Pondville . . . . .	39.9	23.5	35.8
Springfield . . . . .	24.0	8.8	13.2
Worcester . . . . .	37.5	17.7	24.1
Worcester North . . . . .	19.4	5.3	10.1

TABLE V. — Median Duration in Months Between First Symptom and First Visit to Physician and First Visit to Clinic, by Location of Cancer

LOCATION OF CANCER	Median Duration Before First Visit to Physician		Median Duration Before First Visit to Clinic	
	1933	1934	1933	1934
Buccal Cavity . . . . .	6.0	5.0	7.1	7.4
Digestive Tract . . . . .	4.1	4.0	6.9	6.1
Respiratory System . . . . .	4.0*	2.7*	8.5*	7.0
Uterus . . . . .	4.3	3.3	6.9	6.8
Other Female Genital Organs . . . . .	5.5*	6.3*	6.8*	7.5*
Breast . . . . .	3.4	5.6	6.0	6.6
Male Genito-Urinary Organs . . . . .	6.1*	4.0*	8.8	12.5*
Skin . . . . .	12.5	12.4	18.5	12.8
Other and Unspecified Organs . . . . .	4.8	3.5	9.0	7.0
Total . . . . .	6.2	6.3	9.4	9.2

\*Based on less than 25 cases.

TABLE VI. — *Median Duration in Months of Cancer Symptoms before First Visit to Clinic, by Contact with Physician and by Location of Cancer*

LOCATION OF CANCER	1934			
	REFERRED BY PHYSICIAN		NOT REFERRED BY PHYSICIAN	
	One Physician Consulted	More Than One Physician Consulted	One or More Physicians Consulted	No Physicians Consulted
Buccal Cavity . . . . .	5.0	10.0	11.0	8.8
Digestive Tract . . . . .	4.5	6.6	*	*
Respiratory System . . . . .	*	7.3	*	*
Uterus . . . . .	4.8	12.6	6.8	*
Other Female Genital Organs . . . . .	*	10.0	*	*
Breast . . . . .	5.3	12.4	12.3	5.5
Male Genito-Urinary Organs . . . . .	*	10.0	*	*
Skin . . . . .	12.8	24.1	12.8	12.8
Other and Unspecified Organs . . . . .	6.4	13.0	9.0	*
Total . . . . .	7.0	12.0	12.2	10.5
Total 1933 . . . . .	6.9	12.0	12.6	8.0

\*Median not well established.

TABLE VII. — *Reason for Coming to Clinic, by Diagnosis*

Rate per 100\*

REASON	CANCER		PRECANCEROUS LESIONS		ALL OTHERS		TOTAL	
	1933	1934	1933	1934	1933	1934	1933	1934
	Physician . . . . .	68.3	70.5	52.9	46.1	38.3	38.6	47.4
Friends or Relatives . . . . .	8.6	6.1	8.4	9.7	16.5	10.7	13.6	9.5
Newspapers . . . . .	10.4	9.3	19.2	20.6	29.5	35.3	23.6	27.0
All Others . . . . .	22.3	24.7	26.0	33.8	20.0	20.6	21.3	23.4

\*Does not total to 100 per cent, as some individuals gave more than one reason.

TABLE VIII. — *Reason for Coming to Clinic, by Individual Clinic, for Total Admissions*

Rate per 100\*

CLINIC	PHYSICIAN		FRIENDS OR RELATIVES		NEWSPAPERS		ALL OTHERS	
	1933	1934	1933	1934	1933	1934	1933	1934
	Berkshire . . . . .	15.8	16.4	10.5	1.5	57.9	80.6	15.8
Boston Dispensary . . . . .	60.5	75.1	17.5	10.1	1.4	3.5	20.6	12.5
Brockton . . . . .	20.5	25.1	14.7	12.9	58.7	56.0	7.5	12.9
Lawrence . . . . .	43.2	56.7	17.6	14.2	28.8	15.7	11.2	14.2
Lowell . . . . .	25.6	24.0	24.8	24.6	41.2	39.6	10.0	15.9
Lynn . . . . .	28.6	26.7	7.9	16.3	41.0	37.3	24.1	20.6
New Bedford . . . . .	38.4	29.5	12.6	9.2	38.1	52.3	11.5	9.4
Newton . . . . .	40.0	80.0	20.0	0.0	20.0	0.0	20.0	20.0
Pondville . . . . .	72.9	75.0	10.1	3.6	0.3	0.0	33.2**	39.3**
Springfield . . . . .	25.5	29.8	29.3	12.6	30.3	45.6	14.9	12.0
Worcester . . . . .	35.2	33.0	3.0	5.7	35.9	27.6	27.7	33.7
Worcester North . . . . .	34.3	33.8	14.2	7.6	32.8	49.0	18.7	9.6
Total . . . . .	47.4	47.1	13.6	9.5	23.6	27.0	21.3	23.4

\*Does not total to 100 per cent, as some individuals gave more than one reason.

\*\*This increase is due to the large number of former patients returning to the clinic for new conditions

TABLE IX. — Reason for Coming to Clinic, by Location of Cancer  
Rate per 100\*

LOCATION OF CANCER	Physician		Social Worker		Nurse		Friends or Relatives		Clergy, Radio, Pamphlets		News-papers		Lectures		Past Experience or Former Patient		Dentist		Others	
	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934	1933	1934
	Buccal Cavity . . . . .	64.9	66.0	4.6	5.3	1.2	1.3	9.2	8.7	0.0	0.7	12.7	12.7	0.0	0.0	15.5	12.7	0.6	2.0	2.3
Digestive Tract . . . . .	75.2	83.6	3.8	3.8	1.9	1.9	6.7	3.8	0.0	1.0	6.7	3.8	0.0	0.0	11.4	9.6	0.0	0.0	2.9	0.0
Respiratory System . . . . .	88.2	79.3	5.9	3.4	0.0	3.4	0.0	3.4	0.0	0.0	0.0	10.4	0.0	0.0	17.3	0.0	0.0	0.0	0.0	3.4
Uterus . . . . .	85.6	82.8	2.4	7.6	0.8	1.9	3.2	1.9	0.0	0.0	3.2	4.8	0.0	0.0	23.2	15.2	0.0	0.0	2.4	0.0
Other Female Genital Organs . . . . .	87.5	100.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	6.3	0.0	0.0	0.0	25.0	25.0	0.0	0.0	0.0	0.0
Breast . . . . .	61.9	70.3	3.2	3.1	4.0	1.9	13.5	8.6	0.8	0.0	13.5	11.1	0.0	0.0	7.1	15.4	0.0	0.0	0.0	1.2
Male Genito-Urinary Organs . . . . .	79.4	94.0	2.9	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.5	18.2	0.0	0.0	0.0	3.0
Skin . . . . .	57.0	60.8	4.2	8.4	3.3	2.9	10.7	6.5	0.3	0.3	15.6	11.7	0.0	0.3	11.7	14.6	0.0	0.0	2.3	2.1
Other and Unspecified Organs . . . . .	84.8	78.6	1.7	4.8	1.7	0.0	6.8	9.5	0.0	0.0	3.4	2.4	0.0	0.0	13.6	7.1	0.0	0.0	0.0	4.8
Hodgkin's Disease and Leukemia . . . . .	84.2	71.4	5.3	4.8	0.0	0.0	10.5	0.0	0.0	0.0	0.0	9.5	0.0	0.0	15.8	19.0	0.0	0.0	0.0	9.5
Total . . . . .	68.3	70.5	3.7	6.0	2.2	2.0	8.6	6.1	0.2	0.3	10.4	9.3	0.0	0.1	14.4	14.1	0.1	0.3	1.7	1.9

\*Does not total to 100 per cent, as some individuals gave more than one reason.

TABLE X. — *Location of Cancer*

Rate per 100

LOCATION OF CANCER	1933	1934
Buccal Cavity . . . . .	18.0	14.7
Digestive Tract . . . . .	10.9	10.2
Respiratory System . . . . .	1.8	2.8
Uterus . . . . .	13.0	10.3
Other Female Genital Organs . . . . .	1.7	1.2
Breast . . . . .	13.1	15.9
Male Genito-Urinary Organs . . . . .	3.5	3.2
Skin . . . . .	32.0	37.6
Other and Unspecified Organs . . . . .	6.1	4.1

TABLE XI. — *Correction in 1934 of Previous Years*

	Changed to Cancer	Changed from Cancer	Pondville Clinic Cases of Previous Years Recorded in 1934	Other Clinic Cases of Previous Years Recorded in 1934
Buccal Cavity . . . . .	13	24	—	—
Digestive Tract . . . . .	13	9	—	1
Respiratory System . . . . .	1	1	—	—
Uterus . . . . .	15	8	—	—
Other Female Genital Organs . . . . .	8	5	—	—
Breast . . . . .	15	11	—	1
Male Genito-Urinary Organs . . . . .	6	—	—	—
Skin . . . . .	53	9	7	1
Other and Unspecified Organs . . . . .	9	8	—	—
Hodgkin's Disease and Leukemia . . . . .	2	1	—	—
Precancerous Lesions . . . . .	—	—	79	—
Benign Tumors . . . . .	—	—	4	—
Diseases of the Genito-Urinary System . . . . .	—	—	1	—
Gastric Ulcer . . . . .	—	—	1	—
Total . . . . .	135	76	92	3

TABLE XII. — *Contact of Cancer Patients with Physician*

Rate per 100

	1933	1934
Referred by physician:		
One physician consulted . . . . .	38.6	38.4
More than one physician consulted . . . . .	28.6	30.6
Unknown . . . . .	1.4	1.5
Not referred by physician:		
One or more physicians consulted . . . . .	15.9	14.1
No physicians consulted . . . . .	14.7	11.6
Unknown . . . . .	0.8	3.8

TABLE XIII. — *Reason for Coming to Clinic, by Location of Cancer and Contact with Physician*

Rate per 100

LOCATION OF CANCER	1934					
	REFERRED BY PHYSICIAN			NOT REFERRED BY PHYSICIAN		
	One Physician Consulted	More Than One Physician Consulted	Total	One or More Physicians Consulted	No Physicians Consulted	Total
Buccal Cavity . . . . .	14.2	13.3	13.8	20.4	16.5	16.9
Digestive Tract . . . . .	9.1	16.5	12.1	9.2	3.3	5.7
Respiratory System . . . . .	0.5	6.8	3.2	2.1	1.7	2.0
Uterus . . . . .	13.5	10.7	12.1	9.9	1.7	6.0
Other Female Genital Organs . . . . .	1.0	2.6	1.7	0.0	0.0	0.0
Breast . . . . .	16.3	15.5	15.8	13.4	23.1	15.9
Male Genito-Urinary Organs . . . . .	3.3	5.8	4.3	1.4	0.0	0.7
Skin . . . . .	38.3	23.3	32.4	38.0	52.9	49.8
Other and Unspecified Organs . . . . .	3.8	5.5	4.6	5.6	0.8	3.0

TABLE XIV. — *Contact of Cancer Patients with Physician, by Location of Cancer*

Rate per 100

LOCATION OF CANCER	NO PHYSICIAN		ONE PHYSICIAN		TWO OR MORE PHYSICIANS	
	1933	1934	1933	1934	1933	1934
Buccal Cavity . . . . .	19.3	13.7	47.9	47.9	32.8	38.4
Digestive Tract . . . . .	2.9	3.8	51.4	40.4	45.7	55.8
Respiratory System . . . . .	6.3	7.1	37.5	10.7	56.2	82.2
Uterus . . . . .	3.2	2.0	46.4	54.9	50.4	43.1
Other Female Genital Organs . . . . .	12.5	0.0	43.7	33.3	43.7	66.7
Breast . . . . .	22.4	17.6	54.4	46.5	23.2	35.9
Male Genito-Urinary Organs . . . . .	3.0	0.0	30.3	39.4	66.7	60.6
Skin . . . . .	23.9	18.8	55.3	54.5	20.8	26.7
Other and Unspecified Organs . . . . .	3.5	2.4	38.6	46.3	57.9	51.3
Hodgkin's Disease and Leukemia . . . . .	0.0	0.0	36.8	40.0	63.2	60.0
Total . . . . .	15.1	12.3	49.5	48.1	35.4	39.6

TABLE XV. — *Symptoms that First Brought Patient to Clinic, by Diagnosis*

Rate per 100\*

SYMPTOMS	1934		
	Cancer	Precancerous Lesions	Total
Swelling . . . . .	35.9	25.1	36.2
Ulceration . . . . .	38.7	21.0	17.8
Discharge and Bleeding . . . . .	19.8	16.1	18.9
Pain . . . . .	28.7	22.2	36.5
Deformity . . . . .	8.7	35.4	13.2
Loss of Weight . . . . .	12.3	5.8	10.7
Malaise . . . . .	2.5	2.4	5.5
Observation . . . . .	2.7	0.9	2.6
Itching . . . . .	3.2	4.2	3.3
Scaly Skin . . . . .	1.5	2.8	1.3
Others . . . . .	11.3	5.0	9.5
Unknown . . . . .	0.2	0.6	0.4

\*Does not total to 100 per cent, as multiple symptoms were given by some patients.

TABLE XVI. — *Type of Cancer, by Location of Cancer and Sex*

Rate per 100

LOCATION OF CANCER	Operable Cancer Probable Cure		Operable Cancer Possible Cure		Operable Cancer Palliative Measures Only		Inoperable Cancer	
	1933	1934	1933	1934	1933	1934	1933	1934
MALES								
Buccal Cavity . . . . .	33.5	40.7	35.5	29.6	21.3	17.8	9.7	11.9
Digestive Tract . . . . .	1.4	3.0	25.7	31.3	31.1	31.3	41.8	34.4
Respiratory System . . . . .	0.0	0.0	23.1	13.0	69.2	43.5	7.7	43.5
Breast . . . . .	0.0	25.0	100.0	50.0	0.0	25.0	0.0	0.0
Other Female Genital Organs . . . . .	18.8	9.7	18.8	22.6	31.2	41.9	31.2	25.8
Skin . . . . .	72.8	82.2	25.7	14.7	1.0	2.2	0.5	0.9
Other and Unspecified Organs . . . . .	19.1	10.0	14.3	25.0	47.6	10.0	19.1	55.0
Total . . . . .	41.3	49.1	27.7	22.0	18.0	15.0	13.0	13.9
FEMALES								
Buccal Cavity . . . . .	50.0	54.5	35.7	27.3	7.1	9.1	7.1	9.1
Digestive Tract . . . . .	7.1	8.8	21.4	44.1	25.0	20.6	46.4	26.5
Respiratory System . . . . .	0.0	25.0	0.0	0.0	50.0	0.0	50.0	75.0
Uterus . . . . .	6.6	7.0	36.4	42.0	34.7	26.0	22.3	25.0
Other Female Genital Organs . . . . .	15.4	16.7	30.8	25.0	23.1	25.0	30.8	33.3
Breast . . . . .	23.1	19.5	49.6	41.6	12.4	18.8	14.9	20.1
Skin . . . . .	76.8	85.6	14.3	13.0	6.3	0.7	2.7	0.7
Other and Unspecified Organs . . . . .	25.0	10.0	16.7	30.0	25.0	20.0	33.3	40.0
Total . . . . .	32.0	37.4	32.0	31.3	18.9	14.5	17.2	16.8

TABLE XVII. — *Type of Cancer, by Individual Clinic and by Sex*

Rate per 100

CLINIC	MALES				FEMALES			
	Operable Cancer Probable Cure	Operable Cancer Possible Cure	Operable Cancer Palliative Measures Only	In- operable Cancer	Operable Cancer Probable Cure	Operable Cancer Possible Cure	Operable Cancer Palliative Measures Only	In- operable Cancer
Berkshire . . . . .	66.7	0.0	0.0	33.3	0.0	0.0	50.0	50.0
Boston Dispensary . . . . .	52.9	14.7	5.9	26.5	45.2	25.8	3.2	25.8
Brockton . . . . .	70.4	11.1	3.7	14.8	36.7	40.0	10.0	13.3
Lawrence . . . . .	41.7	37.5	8.3	12.5	45.0	30.0	15.0	10.0
Lowell . . . . .	66.7	16.7	13.3	3.3	33.3	33.3	22.2	11.1
Lynn . . . . .	60.0	17.8	20.0	2.2	51.3	25.6	23.1	0.0
New Bedford . . . . .	33.3	29.6	14.8	22.2	32.4	43.3	8.1	16.2
Newton . . . . .	0.0	0.0	0.0	0.0	66.7	0.0	0.0	33.3
Pondville . . . . .	44.7	20.8	16.5	18.0	32.9	30.3	16.5	20.3
Springfield . . . . .	65.0	10.0	20.0	5.0	40.9	36.4	9.1	13.6
Worcester . . . . .	35.2	37.8	24.3	2.7	33.3	41.7	16.7	8.3
Worcester North . . . . .	57.2	42.8	0.0	0.0	20.0	50.0	10.0	20.0
Total . . . . .	48.7	21.6	15.2	14.5	36.0	32.4	14.9	16.7

TABLE XVIII. — *Diagnosis\**

Rate per 100

DIAGNOSIS	1933	1934
Cancer primary . . . . .	16.0	16.1
Cancer with metastases . . . . .	4.6	4.7
Cancer recurrent following operation . . . . .	2.8	2.3
Original diagnosis non-cancer, changed to cancer . . . . .	0.6	0.4
Cancer recurrent, formerly post-operative cancer . . . . .	0.1	0.07
Precancerous lesions changed to cancer . . . . .	0.5	0.3
Diagnosed cancer at death . . . . .	0.1	0.07
Original diagnosis no recurrence, diagnosed recurrent cancer of same site at death . . . . .	0.1	0.0
Original diagnosis non-cancer, diagnosed cancer of same site at death . . . . .	0.03	0.05
Hodgkin's disease, changed to cancer . . . . .	0.0	0.02
Original diagnosis non-cancer, changed to Hodgkin's disease . . . . .	0.0	0.02
Hodgkin's disease and leukemia . . . . .	0.5	0.5
Post-operative cancer, no evidence of recurrence . . . . .	2.8	2.6
Benign tumors . . . . .	16.5	16.7
Precancerous lesions . . . . .	12.8	15.0
Original diagnosis cancer, changed to non-cancer . . . . .	1.1	0.7
Original diagnosis cancer recurrent, changed to post-operative cancer . . . . .	0.03	0.0
Original diagnosis Hodgkin's disease, changed to non-cancer . . . . .	0.1	0.0
Diseases of the digestive system . . . . .	9.2	9.1
Diseases of the circulatory system . . . . .	1.8	1.2
Diseases of the genito-urinary system . . . . .	6.4	6.9
Diseases of the respiratory system . . . . .	0.5	0.7
Diseases of the nervous system . . . . .	1.0	1.4
Diseases of the skin . . . . .	5.5	5.8
Mouth lesions . . . . .	1.7	2.4
Diseases of the bone . . . . .	0.7	0.6
Diseases of the eye and ear . . . . .	0.3	0.4
Tuberculosis . . . . .	0.5	0.4
Diabetes . . . . .	0.03	0.2
Pernicious anemia . . . . .	0.2	0.1
Rheumatism . . . . .	0.7	0.2
Goitre . . . . .	0.2	0.3
Syphilis . . . . .	0.4	0.4
Apoplexy . . . . .	0.03	0.0
Endocrine dysfunction . . . . .	0.0	0.05
Undiagnosed . . . . .	0.7	0.3
Deferred . . . . .	2.9	4.3
No pathology . . . . .	4.4	4.1
Non-cancer, diagnosis not established . . . . .	0.4	1.1
All others . . . . .	6.3	5.2

\*Does not total to 100 per cent, as some individuals had more than one diagnosis.

TABLE XIX.—*Tumor Diagnosis Service, 1934*

Specimens were received from hospitals listed below:

Acushnet Sanitarium and Hospital, New Bedford  
 Audubon Hospital, Boston  
 Ayer Memorial Hospital, Ayer

TABLE IX—*Continued.*

Baker Clinic, Boston  
 Barr Sanitarium, Lawrence  
 Bay State Hospital, Boston  
 Benson Hospital, Haverhill  
 Board of Health Hospital, Salem  
 Bridgewater State Hospital, State Farm  
 Brockton Hospital, Brockton  
 Burbank Hospital, Fitchburg

Cable Hospital, Ipswich  
 Cambridge Relief Hospital, Cambridge  
 Cape Cod Hospital, Hyannis  
 Central Hospital, Somerville  
 Chester Hospital, Cambridge  
 Chicopee Hospital, Aldenville  
 Clinton Hospital, Clinton  
 Clover Hill Hospital, Lawrence  
 Commonwealth Avenue Hospital, Boston

Danvers State Hospital, Danvers  
 Dover Street Clinic, Boston  
 Ducey Hospital, Brockton

East Cambridge Emergency Hospital, Cambridge  
 Eaton Hospital, Brockton  
 Elmhurst Hospital, Holbrook  
 Evangeline Booth Hospital, Boston

Fairlawn Hospital, Worcester  
 Fairview Hospital, Great Barrington  
 Forest Hills Hospital, Jamaica Plain

Gale Hospital, Haverhill  
 Gardner State Colony, Gardner  
 Glynn Hospital, Dorchester

Harley Hospital, Boston  
 Haverhill Municipal Hospital, Haverhill  
 Henry Heywood Memorial Hospital, Gardner  
 Hillcrest Hospital, Pittsfield  
 Hingham Private Hospital, Hingham  
 Holyoke Hospital, Holyoke  
 House of Mercy, Pittsfield

Jordan Hospital, Plymouth

Lakeville State Sanatorium, Lakeville  
 Lawrence City Hospital, Lawrence  
 Lawrence General Hospital, Lawrence  
 Leominster Hospital, Leominster  
 Louis Pasteur Hospital, Worcester  
 Lowell General Hospital, Lowell  
 Ludlow Hospital, Ludlow  
 Lynn Hospital, Lynn

MacLeod Hospital, Boston  
 Mary A. Alley Hospital, Marblehead  
 Mary Lane Hospital, Ware

TABLE XIX. *Tumor Diagnosis Service, 1934—Continued.*

Massachusetts Hospital School, Canton  
 Massachusetts Osteopathic Hospital, Jamaica Plain  
 Memorial Clinic, Inc., Holyoke  
 Middlesex Hospital, Cambridge  
 Milford Hospital, Milford  
 Millers River Hospital, Winchendon  
 Milton Hospital, Milton  
 Moore Hospital, Brockton  
 Morton Hospital, Taunton  
 Murdock Hospital, Brockton

Nantucket Cottage Hospital, Nantucket  
 New England Sanitarium, Melrose  
 Noble Hospital, Westfield  
 Norfolk County Hospital, Norfolk  
 Norfolk Medical Center, Stoughton  
 Norfolk Prison Colony, Norfolk  
 Norwood Hospital, Norwood

Providence Hospital, Holyoke

Riverbank Hospital, Boston

St. John's Hospital, Lowell  
 St. Joseph's Hospital, Lowell  
 St. Luke's Hospital, Middleboro  
 Somerville Hospital, Somerville  
 Springfield Infirmary, Springfield  
 Springfield Hospital, Springfield  
 Sturdy Memorial Hospital, Attleboro  
 Sullivan Memorial Hospital, Worcester  
 Sunnyside Hospital, Somerville

Trumbull Hospital, Brookline

Union Hospital, Lynn  
 Union Hospital, New Bedford  
 United States Naval Hospital, Chelsea

Wesson Memorial Hospital, Springfield  
 Winchester Hospital, Winchester  
 Wing Memorial Hospital, Palmer  
 Worcester Memorial Hospital, Worcester



services in preparing this serum for preventing the disease in persons in contact with scarlet fever.

(c) *Placental Extract*.—A study of this product designed for the prevention of measles has been undertaken in conjunction with the Department of Pediatrics, Harvard Medical School.

(d) *Diphtheria Toxin-Antitoxin Mixture*.—The decreased amount of this product is slightly more than offset by the increased demand for diphtheria toxoid.

(e) *Diphtheria Toxoid*.—This is being increasingly employed for immunization. In November for the first time there was more toxoid than toxin-antitoxin mixture distributed.

(f) *Scarlet Fever Streptococcus Toxoid*.—This product is used entirely in connection with the Department's study of its immunizing value.

(g) *Tuberculin*.—The use of tuberculin continues to increase rapidly. When its production was undertaken some years back, it was felt that approximately 800 cc. per year would be sufficient, but for the current year we are distributing something over six times this amount.

(h) *Diagnostic Serum. Pneumococcus*.—The increased use of the Neufeld method of typing has resulted in an increase in the amount of rabbit serum distributed and a decrease in the amount of horse serum. It is expected that eventually the use of horse serum will be very largely abandoned.

## 2. Expenses

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1930 . . . .	\$67,700 00	\$67,698 66	\$42,412 45	\$42,253 09	\$110,112 45	\$109,941 75
1931 . . . .	71,000 00	70,984 35	42,556 90	42,504 57	113,556 90	113,488 92
1932 . . . .	71,500 00	71,481 70	37,314 70	35,528 06	108,814 70	107,009 76
1933 . . . .	66,860 00	65,699 94	34,768 41	31,945 31	101,628 41	97,645 25
1934 . . . .	63,530 00	62,478 89	38,234 98	33,417 44	101,764 98	95,896 33

The increased appropriation for expenses for 1934 was to cover the cost of installing a sprinkler system in certain parts of the laboratory and stables. Apart from this the total expenditures for personal services and expenses are somewhat below those of last year. Because of increase in prices for forage and the restoration of salary rates at the beginning of the fiscal year 1935, it is certain that this downward trend of expenditures will not continue.

## 3. Improvements

The major improvement in the plant has been the installation of a sprinkler system, referred to above. This takes care of the most likely sources of fire and should reduce our fire hazard very largely. No other improvements have been undertaken beyond the usual maintenance of the buildings and equipment.

## 4. Personnel

During the year Dr. Wilbur G. Malcolm, Senior Bacteriologist, was offered and accepted a better paid position with one of the large commercial biologic-products laboratories. His place was filled by the appointment of Dr. Leo Rane. Two vacancies in positions of the Laboratory-Helper grade, caused by resignations, were also filled. The number and grades of positions remain unchanged from last year.

## 5. Education

The demonstrations for medical and public health students and public health nurses held at the laboratory were attended by 362. The usual course in Applied Immunology was also given. Three students of the Simmons College course in Public Health Laboratory Methods took this course, and two of them received extra instruction by working in the laboratory. The laboratory has also had visitors from various parts of this country and from Australia, Cuba, Germany, Greece, India, and Mexico.

### 6. Lectures and Addresses

The Assistant Director and Director gave lectures and demonstrations in the course on Immunology at the Harvard Medical School and in the courses for graduates of the same school. There were also four other talks by the Director and Assistant Director outside the laboratory, attended by about 337 people.

### 7. Investigations

(a) The study of the preparation of scarlet fever streptococcus toxoid has been continued and also its use in active immunization. A large number of individuals have been immunized and many of them rendered negative to the Dick test. It is too soon to determine how effective the immunity so produced will prove to be.

(b) The preparation of diphtheria toxoid, alum-precipitated, has been continued. None of it has been made available for human use. The work will be continued during the coming year.

(c) The work of the Pneumonia Study and Service has gone on and some of the experimental work is showing results. The routine methods of serum production have been reasonably well standardized. Sufficient serum has been produced to take care of the demand for it. From a standpoint of freedom from chill-producing activity, the serum produced recently appears to be much better than some of the earlier lots.

(d) An investigation somewhat similar to the Pneumonia Study has been undertaken on placental extract for the prevention of measles. This is being done in association with the Department of Pediatrics of the Harvard Medical School. As yet the study is still in its preliminary stages; but the extract appears to offer considerable promise of being a useful agent in the control of measles.

### 8. Publications

The following papers were accepted for publication but appeared after the close of the year:

1. Malcolm, Wilbur G. and Wyman, Louise: Hemolytic Streptococcus Toxins and Antitoxins. I. A medium for toxin production. *Jour. Immunol.*, Vol. XXVIII, No. 1, January, 1935, p. 31.
2. Malcolm, Wilbur G. and Wyman, Louise: Hemolytic Streptococcus Toxins and Antitoxins. II. Titration by Rabbit Intradermal and Ear Tests. *Jour. Immunol.*, Vol. XXVIII, No. 1, January, 1935, p. 33.
3. Malcolm, Wilbur G. and Wyman, Louise: Hemolytic Streptococcus Toxins and Antitoxins. III. Toxicogenic Variation in a Hemolytic Streptococcus Strain of Scarlet Fever Origin. *Jour. Immunol.*, Vol. XXVIII, No. 1, January, 1935, p. 41.
4. Cianciarulo, Joseph and Malcolm, Wilbur G.: Hemolytic Streptococcus Toxins and Antitoxins. IV. The Concentration of Scarlet Fever Streptococcus Antitoxin. *Jour. Immunol.*, Vol. XXVIII, No. 1, January, 1935, p. 47.
5. Barnes, L. A. and White, Benjamin, with the assistance of Clarke, Charlotte M.: The Antibody Response of Rabbits during Prolonged Immunization with Type I Pneumococcus Vaccines. *Amer. Journ. Hyg.*, Vol. XXI, No. 1, January, 1935, p. 35.

### 9. Inspection

Dr. R. E. Dyer made his annual inspection on February 19, 1934. He also made an inspection on July 18 and the U. S. Treasury Department license to manufacture and sell biologic products was continued.

## II. WASSERMANN LABORATORY

WILLIAM A. HINTON, M.D., *Chief of Laboratory*

### 1. Tests and Examinations

The following table shows the tests done by the Wassermann Laboratory for the last five years. All figures are for calendar years. The total number of tests performed shows a decrease, owing to the fact that in previous years Wassermann tests have been done on all blood samples submitted and Kahn tests as well as

Hinton tests on a large proportion of them. On April 1 the routine use of the Wassermann test was discontinued, the Hinton test becoming the routine method for the examination of blood for syphilis. The total number of specimens examined for syphilis for 1934 is 119,819, an increase of thirteen per cent over the figure of 106,211 for 1933. The use of the Hinton test in place of the Wassermann has proved to be more economical. It has also increased the accuracy of the detection of syphilis, the Hinton test showing about twice as many cases of syphilis as did the Wassermann test.

	1930	1931	1932	1933	1934
Wassermann Tests . . . . .	89,864	97,444	100,948	106,211	40,125
Kahn Tests . . . . .	3,822	12,735	15,059	18,541	4,260
Hinton Tests . . . . .	13,060	15,412	22,167	30,371	95,036
Modified Hinton Tests . . . . .	12,025	-	-	-	-
Gonococcus Fixation Tests . . . . .	2,790	2,560	3,195	3,657	4,343
Lange's Colloidal Gold Tests . . . . .	50	79	107	106	178
Complement Fixation Tests for Glanders . . . . .	30	32	27	74	37
Specimens of Milk Examined for Tuberculosis . . . . .	-	1	-	-	-
Agglutination Tests for Brucella Abortus . . . . .	-	-	258	-	-
Diagnostic Examinations for Division of Animal Industry:					
(a) Complement Fixation Tests for Glanders . . . . .	78	13	5	11	17
(b) Examinations for Rabies . . . . .	460	515	265	301	496
(c) Pathologic and Bacteriologic Examinations . . . . .	35	32	22	21	14
(d) Agglutination Tests for Brucella Abortus . . . . .	8,643	8,966	10,077	11,921	14,653
(e) Specimens of Milk Examined for Tuberculosis . . . . .	52	-	-	-	-
	130,909	137,789	152,130	171,214	159,159

The other tests carried out by this laboratory show in general an increase over last year, particularly the gonococcus complement fixation test, the examinations for rabies, and the agglutination tests for Brucella abortus.

The average cost per test was 13.1 cents, a figure lower than any previous year excepting 1933, when it was 12.3 cents per test.

### 2. Expenses

YEAR	PERSONAL SERVICES		EXPENSES		TOTAL	
	Appropriation	Spent	Appropriation	Spent	Appropriation	Spent
1930 . . . . .	\$16,500 00	\$15,935 42	\$5,704 75	\$5,688 54	\$22,204 75	\$21,623 96
1931 . . . . .	16,600 00	16,591 76	5,213 34	5,213 34	21,813 34	21,805 10
1932 . . . . .	17,000 00	16,409 86	5,200 80	5,144 12	22,200 80	21,553 98
1933 . . . . .	15,990 00	15,654 38	5,000 00	4,916 27	20,990 00	20,570 66
1934 . . . . .	15,700 00	15,498 99	5,219 45	5,142 48	20,919 45	20,641 47

The expenses for 1934 are about the same as for 1933. The change in method of testing blood for syphilis permitted examination of the increased number of specimens with the same personnel as formerly and in addition the number of positive diagnoses was increased by the change in method.

### 3. Education

In addition to these routine activities, the Wassermann Laboratory has furnished instruction to men in the second year class of the Harvard Medical School; to a special class of twenty senior students from Simmons College; and to one special student in the graduate department of Simmons College.

## REPORT OF DIVISION OF CHILD HYGIENE

M. LUISE DIEZ, M.D., *Director*

The chief activities of the Division of Child Hygiene for the year ending December 31, 1934, are reported as follows:

### 1. ACTIVITIES OF THE VARIOUS SECTIONS

#### 1. *Maternal, Infant and Preschool Hygiene:*

- (a) Maternity Service
- (b) Mothers' Classes
- (c) Well Child Conferences
- (d) Summer Round-Up

#### 2. *School Hygiene:*

- (a) Health Awareness Tests
- (b) Health Education Courses
- (c) Health Education in Secondary Schools
- (d) High School Health Councils
- (e) School Lunch Projects
- (f) School Hygiene Surveys
- (g) Superintendents' Clubs
- (h) Heart Lesions in School Children
- (i) School Hygiene Statistics
- (j) "Contact"
- (k) School Hygiene Handbook

#### 3. *Public Health Nursing:*

- (a) Tuberculosis Nursing
- (b) Communicable Disease Nursing
- (c) School Nursing
- (d) Hospital Training Schools
- (e) Home Hygiene Classes
- (f) Continuation Courses
- (g) Public Health Nursing Institutes
- (h) Scholarships for Nurses
- (i) School Lunch Survey
- (j) Nursing Club Activities
- (k) General Nursing Service

#### 4. *Nutrition:*

- (a) Nutrition Advisory Committee
- (b) School Lunch Survey and Follow-Up
  - 1. New School Lunch Service—Nutritionist for Communities
  - 2. Examples of Other Services—Williamsburg—Boston
- (c) Well Child Conferences
- (d) Chadwick Clinics
- (e) Summer Camps
- (f) Nutrition Courses:
  - 1. Fitchburg State Teachers' College
  - 2. University Extension Courses for Teachers
  - 3. Courses for Mothers
  - 4. Courses for Nurses in Training
- (g) Group Talks
- (h) Consumers' Council
- (i) Food Customs from Abroad
- (j) Dental Nutrition Studies
- (k) Other Nutrition Studies
- (l) Federal Emergency Relief and Public Welfare Food Plans
- (m) Better Nutrition Picture

5. *Dental Hygiene:*

- (a) Dental Nutrition Program
- (b) Dental Studies
- (c) Dental Certificates
- (d) Preschool Dental Clinics
- (e) School Dental Clinics
- (f) "Protect Your Smile"
- (g) Well Child Conference Program
- (h) General

6. *Health Education:*

- (a) In the Schools
- (b) Outside the Schools
- (c) Publicity
- (d) Exhibits, Posters, Pamphlets
- (e) Library
- (f) Lectures, Motion Pictures, etc.
- (g) Prenatal and Postnatal Letters and Fathers' Letter

## II. SPECIAL PROJECTS

1. Federal Emergency Relief Administration  
Civil Works Administration  
Civil Works Service
2. Staff Education

## III. PERSONNEL OF THE DIVISION

## I. ACTIVITIES OF THE VARIOUS SECTIONS

1. **Maternal, Infant and Preschool Hygiene:**(a) *Maternity Service:*

At the close of the calendar year there were on the registry for the monthly prenatal letters, and letters to fathers, approximately 858 names; for the first year postnatal letter service, 13,344 names, and for the second year postnatal service, a total of 13,229 names. This makes a total for all 27,431 names, as compared with 23,000 registered for the previous year.

The Division Staff cooperated with the Division of Child Guardianship of the State Department of Public Welfare, assisting in the revision of "Rules and Regulations Governing Maternity Hospitals and Homes." These are to be included in the next issue of the Department Manual of Laws Relating to Public Health.

(b) *Mothers' Classes:*

The Public Health Nursing Consultants assisted, as in previous years, in the formation of Mothers' Classes in the local communities. Four such classes were conducted for the mothers in Worcester, with an average attendance of fifty. Since the classes were organized over 200 mothers have been enrolled.

Classes for mothers of preschool children were organized in Amherst, in connection with the local well baby weighing conference.

(c) *Well Child Conferences:*

Well Child Conferences were held in 31 towns, including those held at the Reformatory for Women, at Framingham. A new procedure this year was the inclusion of vision tests at a number of the conferences, these being given by Dr. Anne Stewart, a volunteer worker.

Of the 212 communities in which the State Demonstration Well Child Conferences were held during the years—1924 to 1934 inclusive—48 are now conducting local Well Child Conferences, with a physician in attendance, and 20 have local weighing and measuring conferences with a nurse in charge.

A summary of Well Child Conference examinations for the years 1931, 1932, 1933 and 1934 gives the following information:

TABLE I.—*Summary of Examinations*

	1931		1932		1933		1934	
	Pre-School	Entering School						
Number examined	973	192	1,243	627	1,100	549	989	510
Number with defects	631	176	888	607	900	518	835	493
Percentage with defects	65%	92%	71%	97%	82%	94%	85%	97%

TABLE II.—*Defects Found*

	1931		1932		1933		1934	
	Pre-School	Entering School						
Teeth	159	93	273	454	332	391	391	377
Nutrition	129	23	203	421	366	322	342	283
All other defects	614	305	1,020	982	1,374	1,087	1,267	1,026

The Well Child Conference figures for the year 1934 are as follows:

Number of Well Child Conferences held during 1934 (31 towns)	37
Number of children examined	1,795
Number of examinations	1,923

In Wayland, 11 Well Child Conferences were carried on during 1933 and 1934 where 129 children were given 207 examinations. A total of 277 defects were found: 27 were reported corrected at the last meeting. Of the children attending once or more, 59 entered school in the Fall of 1933 or the Fall of 1934.

At the conferences for the Preschool Centers in Chicopee, under the Federal Emergency Relief Administration, in January, June and December, 174 children were given 233 examinations.

At Framingham State Reformatory for Women, 68 babies were given 107 examinations. The "repeats" in this group examined in December showed a very great improvement since the previous conference.

In Nantucket the fourth demonstration Well Child Conference was held during the early summer, organization for this activity being carried on by the public health nursing consultant covering that district. Through the cooperation of the Nantucket Public School Association a physician was employed to assist the department pediatrician in the examinations of the children. It is hoped that the coming year will see this conference conducted by the local organizations as regards medical service, this Department cooperating by providing the services of a nurse, a nutritionist and a dental hygienist.

Similar organization service was rendered by the consultant nurse for the sixth annual Well Child Conference for Martha's Vineyard. From this project a series of nutrition classes was developed for the mothers attending the conference. These classes were conducted by the nutritionist attending the conference, and were well attended and much appreciated.

On Cuttyhunk Island the Well Child Conference was held for the fourth time. As is the usual custom for the Island, the examinations included the school children as well as those of preschool age. An event for those who live on Cuttyhunk Island was the showing of health moving pictures, with two additional films loaned by the State Department of Education.

The conduct of the local Well Child Conference at Falmouth has been reorganized to include the employment of volunteer workers to assist in the weighing and measuring of children and recording, thus permitting the nurses to spend more time in health teaching at the conferences. This change was brought about through the efforts of the nursing consultant of the Department.

The Department unit carried on Well Child Conferences also in Ashburnham, Avon, Clinton, Ipswich, Lakeville, North Easton, Rowley and Seekonk, in the

eastern section of the State, and in Worcester County. The following communities in the western district were given the services of a demonstration Well Child Conference during the year: Chester, Deerfield, Hinsdale, Montague City, Northampton, Peru, Southampton, Washington, Westhampton and Williamsburg. Of these, there were only two towns in Franklin County where the Department conducted the conference during the year—Deerfield and Montague City. These conferences stimulated particular interest in the preschool age group for whom no work had been done in several of the communities.

The nursing consultants assisted in the plans for the conduct of local Well Child Conferences in Huntington, Northbridge, Saugus and Uxbridge. In Saugus a permanent Well Child Conference was established in accordance with plans outlined by the nursing consultant of the Department, for the use of the local physician, and in Hamilton a permanent conference was established also as a result of the demonstration conference held previously by the Department. Organization for a Well Child Conference was carried out by the consultant nurse also for the Topsfield Fair, to take the place of the usual "baby show" held there in previous years.

In the western district the town of Monroe conducted its own conference at which the nursing consultant assisted. In Rowe a permanent conference was organized as an activity of the Community Health Committee, with a physician, dental hygienist, nurse and nutritionist attending.

In Conway the local Parent-Teacher Association sponsored the Well Child Conference for the second consecutive year. Other towns in Franklin County carrying on their own conferences locally were Erving, Leverett, New Salem, Shutesbury and Wendell.

Throughout the year considerable time was spent in organizing for a Well Child Conference demonstration which will be sponsored by the Women's Club in Amherst, and held early in the coming year, the Welfare Committee of the Club to act as a Well Child Conference Committee to concentrate on this activity.

(d) *Summer Round-Up:*

The Division of Child Hygiene cooperated with the Parent-Teacher Associations and local organizations and nurses in providing printed matter and advice for the conduct of a Summer Round-Up locally. We have received information from 135 communities where Summer Round-Up was carried on during the year. In Ashland the Visiting Nursing Association took definite steps to provide a physician to assist in carrying on the Summer Round-Up locally, as a result of activity on the part of the consultant nurse for that district.

## 2. School Hygiene:

(a) *Health Awareness Tests:*

An interesting project in the field of school hygiene during the year was the giving of the Health Awareness Test, prepared by the American Child Health Association, to 2,000 sixth-grade children in different types of communities in different sections of the State. The test showed that Massachusetts children are approximately on a level with groups of children in different parts of the country to whom the same test has been given. Detailed studies will be made of the material provided by these tests with relation to methods of health teaching in particular.

(b) *Health Education Courses:*

Courses in health education, for teachers, were given in eleven towns to seven groups, reaching in this manner 331 teachers. Six periods comprised the course. Through single talks in other communities sixty-five additional teachers were reached.

(c) *Health Education in Secondary Schools:*

The Director of the Division of Child Hygiene served as a member of the Committee of the State Department of Education, to formulate a Course of Study in Health Education for Secondary Schools. The Director participated also in a meeting of school physicians held in Saratoga, New York, for the discussion of problems relating to school health work.

Steps were taken toward the improvement of health education work in the secondary schools in three towns—Athol, Rockport and Winchester. In Athol and Rockport impetus came from a course in health education. In Winchester through contact with the superintendent of schools on several occasions, particular interest followed a health education conference held in the high school in the spring.

In Athol the faculty of the junior high school became active in developing a program, the health education worker of the Department doing the detailed work required. A Charm School was held for the girls in the senior high school, and the teacher of English initiated health education work in the same high school.

In Rockport the high school teachers, cooperating with the superintendent of schools and the physician from the Department, made a contribution to the State in the form of a standardized examination in health awareness for high school students.

In Winchester the high school faculty outlined for this particular course the correlation with health education.

In Amherst Junior High School a health council was organized and functioned around a "Save Your Smile" campaign and a Health Club, with health instruction given by physical education, home economics and science teachers and the school nurse.

A four-lesson course in Charm was given in Chelmsford, Charlemont, Amherst, Greenfield, Shelburne Falls, Westford and Williamsburg.

*(d) High School Health Councils:*

The High School Health Council was continued in South Hadley. A check-up of defective hearing cases and first-year students was made through the use of an audiometer early in the year. A later student activity was a survey of light intensity by means of a sight meter, the outcome of which was that recommendations were made to the school committee for more adequate lighting which the survey showed was much needed.

*(e) School Lunch Projects:*

Following a course of lectures for teachers in the town of Williamsburg, that community was selected for the purpose of experiment to see what could be done to improve the school lunch situation, through cooperative effort on the part of all those involved in such a project. A central committee was formed including representatives of the following organizations: Superintendent of Schools, President of the Woman's Club, Principal of Williamsburg High School, Principal of Haydensville School, school nurses and teachers of the town, Amherst State College, Hampshire County Extension Service, a physician, a parent, Public Health Nursing Consultant of this Division, as well as the Nutrition Consultant and another nutritionist of the Department, the detailed work being done by the nutritionist. A complete report of this project will appear later in this report.

*(f) School Hygiene Surveys:*

School hygiene surveys were made in Athol and Uxbridge, and recommendations made for improvement in the service.

*(g) Superintendents' Clubs:*

The school health conferences which had been conducted for a number of years were discontinued last year because it seemed that they had outlived their usefulness. In order that the contact with the superintendents of schools might not be lost, the Superintendents' Clubs were approached to see if they would be willing to devote one meeting a year as a health meeting at which new developments in the school health program might be discussed. Through these meetings 76 superintendents of schools were contacted in 1934.

*(h) Heart Lesions in School Children:*

In response to a request from Lawrence, arrangements were made for the examination of certain students in one of the larger school buildings where the incidence of heart lesions was reported to be very high. Dr. T. Duckett Jones rendered valuable assistance in these examinations and determined that the percentage of heart lesions found was no higher than the average for the State.

*(i) School Hygiene Statistics:*

With the assistance of Miss Angeline Hamblen, statistician of the Department, figures were compiled on school hygiene in Massachusetts for 1932-1933. Most gratifying is the fact that the average time spent on the examination of school children by the physician is five minutes per child. There is still much to be desired in the matter of health education in high schools.

*(j) "Contact":*

"Contact"—a bulletin for school superintendents and school physicians, was started upon its career and has been very favorably received. It is to be issued four or five times yearly.

*(k) School Hygiene Handbook:*

A new edition of the School Hygiene Handbook was prepared during the year. This required considerable time and effort on the part of the staff and numerous conferences with the nursing consultants for the discussion of school nursing technique and policy in that branch of the school service. This included also a revision of the Daily and Monthly Report of the School Nurse form.

**3. Public Health Nursing:***(a) Tuberculosis Nursing:*

Of special interest is the tuberculosis program for Nantucket and Martha's Vineyard. Considerable time was spent assisting the local nurses in plans for better organization for the use of the clinics established the previous year. In Nantucket, clinics are held once in two months, and in Martha's Vineyard clinics are held monthly. In the latter clinics 108 patients were examined.

Considerable improvement is noted in the conduct of the tuberculosis program in the Cape Cod towns, following conferences with representatives of the Cape Cod Union Health District, the local sanatorium, the Massachusetts Tuberculosis League, the boards of health, visiting nursing associations and public health nurses in the district, and members of the Tuberculosis Division of the Department. In furthering this program the consultant nurse secured the services of Dr. Philip Jacobs of the National Tuberculosis Association as speaker for the Cape Cod Public Health Club meeting. The new organization of school tuberculosis clinics makes for continued improvement in all the towns.

At Worcester County Sanatorium, Boylston, a diagnostic clinic was organized for the towns surrounding Boylston, the consultant nurse of this Division cooperating with the Tuberculosis Division Consultant in this project. Many conferences were held with local physicians, nurses, boards of health, the superintendent of the sanatorium and the State District Health Officer to further the progress of this clinic, which is held monthly.

In Uxbridge special attention was focussed on the tuberculosis situation. Advice and assistance were given by the consultant nurse to the representative of the Emergency Relief Administration with regard to a program of tuberculosis case finding. Some time was spent in contacting patients recommended for sanatorium care, while awaiting entrance to sanatoria.

In Grafton, concentrated assistance was given the community nurses individually on their tuberculosis programs. A system of record-keeping was installed and plans made for better follow-up of old cases, as well as better case finding.

Arrangements were made with Dr. Sumner Remick, Superintendent of Middlesex County Sanatorium, for a post-mortem meeting at the sanatorium for full-time tuberculosis workers. Plans were made with the Superintendent of Lawrence Memorial Hospital for a tuberculosis consultation clinic from the County Sanatorium. Special studies were made of nursing follow-up of reported tuberculosis cases.

Children recommended by the Chadwick Clinic for sanatorium care were followed up and in most instances admitted to the sanatorium or were under the care of a private physician. The consultant nurses visited tuberculosis camps and assisted in their camp programs.

(b) *Communicable Disease Nursing:*

Successful toxin-antitoxin clinics were held in Duxbury, Foxboro and Holbrook, the nursing consultant for the district assisting in the organization of these clinics and rendering active service in the two latter clinics. Through a talk before the Visiting Nursing Association and the showing of a diphtheria prevention moving picture film in Hanover, a large number of preschool children were immunized last spring, and special effort was made to increase the number of immunizations carried on in several towns of the district. A demonstration clinic was carried on in Hingham, the consultant nurse assisting the district health officer in this project. Similar activities were carried on in Deerfield.

In Framingham assistance was given with Dick testing and in Arlington a conference was held with the board of health concerning the responsibility of the local nurse with regard to venereal disease work. At a meeting of the Essex County branch of the Massachusetts Organization for Public Health Nursing, exhibits were displayed showing biologic products of the Department and nursing technique in communicable disease.

(c) *School Nursing:*

In Somerset, at the request of a member of the school committee, the nursing consultant formulated a tentative nursing policy, standing orders for the school nursing service in the town and assisted the nurse in field visits in the town. Supervisory visits were made with school nurses in other communities at their request.

The school daily and monthly report forms issued by the Department, and revised recently for inclusion in the School Hygiene Handbook, are being used in a number of towns throughout the State.

The usual contacts were made with the local school nurses by the nursing consultants of the Department, and other members of the staff.

(d) *Hospital Training Schools:*

The following subjects were included in the series of lectures for hospital training schools for nurses: The History of Public Health and Public Health Nursing; Communicable Disease Control; Tuberculosis; Syphilis and Gonorrhoea; Maternity Hygiene; Child Hygiene; Nutrition; Dental Hygiene; School Hygiene; Organization; Publicity; and Social Service in Relation to Public Health.

In the spring, this course of lectures was completed at Burbank Hospital, Fitchburg; State Hospital, Westborough; City Hospital, Worcester; State Sanatorium for Tuberculosis, Rutland; Leominster Hospital; Clinton Hospital; and Lawrence Memorial Hospital, Medford. Later in the year similar courses were given at Hahnemann Hospital, Worcester; Leominster Hospital; Memorial Hospital, Worcester; St. Elizabeth's Hospital, Boston; and Chelsea Hospital. Through this series of lectures more than 400 student nurses were reached.

A course of nine lectures was given at Faulkner Hospital, Boston, to a class of sixteen nurses.

A series of four lectures was given to post-graduate students at Essex and Middlesex County Sanatoria, nineteen nurses being reached in this manner.

To senior nurses in Cooley Dickinson Hospital, Northampton, and Farren Hospital, Greenfield, a sixteen-lecture course was given, followed by two sessions at which moving picture films were shown furthering health education.

For the second time a series of twenty-one lectures was given at Hillcrest Hospital, House of Mercy Hospital and St. Luke's Hospital, all in Pittsfield; also in North Adams Hospital.

(e) *Home Hygiene Classes:*

The consultant nurse for Worcester County District assisted the Extension Service of Amherst State College in the preparation of material on home hygiene and care of the sick.

In the schools in many of the towns the Unit in Home Nursing and Child Care, issued by the State Department of Education, has been given either by the school nurse or by a qualified teacher. In Provincetown this course was given in both the eighth and ninth grades, three classes being held regularly. The Unit was given in Ashby and was included in the regular curriculum, and in Adams, Barre, North-

field, Orange and South Hadley interest was sufficient for the desire to include this Unit in the curriculum for the coming year. This project required many conferences with school nurses and others to stimulate interest and organization for the furtherance of this type of education.

(f) *Continuation Courses:*

In May the continuation courses on the subject of "The Psychological Approach to Child Health" were held in Boston, Holyoke and Worcester.

The subject for the fall courses was "Mental Health," and the courses were held at Worcester State Hospital, Northampton State Hospital, and the Metropolitan State Hospital, Boston. Previous to the establishment of this series of courses the Director of the Division and the Public Health Nursing Consultant giving the courses, attended a two-day conference on the subject, held at the Medical Center, New York City. With Dr. Barrett, Dr. Whitney, Dr. Halloran and Dr. Bryan of the State Department of Mental Diseases, plans were completed for giving the courses in Massachusetts, based on the course given in New York State.

(g) *Public Health Nursing Institutes.*

An outstanding activity in the field of public health nursing during the year was the planning and holding of four Public Health Nursing Institutes in the Southern Berkshire District, the Nashoba District, the Cape Cod District and in Northampton. These were sponsored by the Commonwealth Fund and the State Department of Public Health, and the general topics discussed were Child Health, School Nursing, and General Public Health Nursing.

The Department itself held two Regional Institutes in Boston and Springfield, the program of which was under the direction of Miss Ada Boone Coffey, Chief Consultant in Public Health Nursing. Unusual interest was noted in both Institutes and the attendance surpassed our expectations.

We participated also in a local Institute for the Town of Holden primarily, and assisted the Massachusetts Tuberculosis League in the program of their Institutes on Tuberculosis, held in Brockton, Salem and Winchester.

(h) *Scholarships for Nurses:*

During the year scholarships at East Harlem Nursing and Health Center, New York, were awarded to the following nurses, by the Commonwealth Fund: Southern Berkshire District—Miss Pease and Miss Kezer; Nashoba District—Mrs. Genevieve Creeley; Cape Cod District—Miss Batt; Southeastern District—Mrs. Gooch; Worcester County District—Miss LeMay.

There is certainly no question as to the value of these two-months' scholarships at East Harlem. In every instance following these scholarships, marked interest in the development of nursing programs, better nursing technique and greater stress on teaching have been evident.

Through the Commonwealth Fund a four-weeks' travel scholarship was awarded Miss Woodbury, Director of the nursing service of the Southern Berkshire District.

With the assistance of the nursing consultants, questionnaires were filled out for the Commonwealth Fund concerning the value of these scholarships, following a field visit with the nurses having been awarded this privilege. Two other definite requests were filed from nurses in the Cape Cod district for scholarships at East Harlem, and it is hoped that the Commonwealth Fund will continue to offer this valuable service to the nurses of this State.

Miss Nelson, school nurse of Provincetown, took a two-weeks' course at Fitchburg State Teachers College during the summer.

(i) *School Lunch Survey:*

The School Lunch Survey required considerable time on the part of the Public Health Nursing Consultants organizing for this important study which will be reported in greater detail later in this report.

For the schools of Worcester County, a hot lunch program was established through the efforts of the consultant nurses of that district. Conferences were held with representatives of Southern Worcester County Public Health Association, Northern Worcester County Public Health Association, and Worcester County

Extension Service, concerning this activity. In Middlesex County a similar meeting was held with the Extension Service, at which the nutrition consultant presented the needs of the school lunch survey. The following towns were thus contacted: Hopedale, Lincoln, Milford, Millbury, New Braintree, Uxbridge, West Brookfield, and all towns included in the districts covered by the representatives attending these conferences.

*(j) Nursing Club Activities:*

It was most stimulating to note the increased interest in the Health Clubs for Public Health Nurses and other health workers. In the Cape Cod district where the Club has been carrying on for several years, more local responsibility and participation in health activities were evident. An event of note was the fact that the newly formed Barnstable County Health Council, organized by the Barnstable County Medical Society, asked the Cape Cod Health Club to appoint two of its members as delegates to the Council. The public health nursing consultant was chosen as one representative.

The Southern Berkshire Health Workers' Club continued its activities for the second year and served a very useful purpose for that section of the State.

Northern Worcester County Public Health Association was most active during the year and the consultant nurse for the district assisted in arranging the excellent programs sponsored by the Club.

Blackstone Valley Public Health Club continued to hold the interest of its members and served the district to good advantage.

*(k) General Nursing Service:*

In several of the nursing districts interest was centered upon the formation of community health committees for the furtherance of health activities locally, including public health nursing and the disposition of social problems.

The board members of local visiting nursing organizations were contacted frequently concerning resources for their development, the writing of annual reports, publicity suggestions and program planning.

Record-keeping systems were recommended to a number of communities and installed in some of them, and record supervision was afforded the nurses in these communities. Reading courses were planned for the nurses in various communities and frequent conferences held on current problems. In Hyannis a book exhibit was shown.

Contacting the industrial nurses was another activity in one of the nursing districts, thus bringing about better cooperation and closer relationship of these nurses in the public health nursing program.

In the western district the nursing consultant reported that she had contacted every nurse in the district during the year, and reported much better work being carried on since the local nurses attended the Public Health Nursing Institutes held in the district. This was evident particularly with regard to record keeping by the nurses and greater interest on the part of the board members of the visiting nursing associations.

In Cohasset the nursing service was reorganized and the nursing consultant met with the nursing committee of the town several times, outlined a nursing policy, recommended qualification standards for applicants for the nursing position, and was asked to give supervision to the nurse appointed. In Needham new nursing service was established and a part-time nurse appointed under the Board of Health. In Seekonk new service was also initiated and a nurse appointed.

Cooperation was effected with the Red Cross chapters in the three counties of the western section of the State—Franklin County, Hampshire County and Berkshire County—in matters pertaining to health programs.

In Martha's Vineyard a public health nursing exhibit stimulated interest generally when displayed at Martha's Vineyard Fair.

In the Nashoba area the nursing consultant was successful in carrying on a health education project in the towns of Stow and Harvard, through an exhibit and lecture to mothers. Following this a "Parents' Shelf" was installed in the local library for reference books of special interest to parents. In their contacts with local nurses the value of adequate prenatal care for prospective mothers was stressed, bringing

to their attention the prenatal and postnatal letters of the Department as an important aid in this respect. The facilities of the Department were offered by the consultant nurses in their contact with local nurses at exhibits, local fairs, classes and lectures.

Frequently during the year talks were given to groups of high school students on "Nursing as a Profession." Stress was laid upon the educational requirements for entrance to accredited training schools for nurses, to impress the students with the importance of the knowledge of certain required subjects. All high schools in Southern Worcester County and three in Middlesex County were thus contacted, as well as several in the western section of the State.

In cooperation with another nurse member of the Zonta Club in the western district of the State, interest of the Club was secured in the matter of correction of defects found in children of the Northampton area, preferably those examined at the Well Child Conference in Northampton. To cover necessary expenses \$100 was raised and this service will become the chief activity of the Club during the coming year.

All the consultant nurses attended the district meetings of the Massachusetts Organization for Public Health Nursing. One consultant served as district chairman and was instrumental in having selected for the district committee a representative of the board of health, a physician and a school superintendent. Another served as vice-chairman of the organization for the Southeastern district and included in its spring meeting as part of the program an exhibit on public health nursing.

The district meetings of the National Organization for Public Health Nursing were attended also by the consultant nurses, one consultant attending the Annual Meeting held in Washington, D.C. Another nursing consultant was appointed as vice-chairman of the Membership Committee of this Organization.

The consultant nurse for the Connecticut Valley District attended the annual meeting of the American Public Health Association held in Pasadena, California.

#### 4. Nutrition:

##### (a) *Nutrition Advisory Committee:*

A meeting of the Nutrition Advisory Committee was called by the Commissioner of Public Health, to meet with organizations concerned with the School Lunch Survey. They rendered their usual valuable assistance in the discussion of nutrition problems incident to this program.

##### (b) *School Lunch Survey and Follow-Up:*

Because of the children's need this year Massachusetts woke up to the ever-present problem of the school lunch—one of the three necessary meals in the day for the school child. In order to combine all forces advantageously a working school lunch committee was appointed by the Commissioner of Public Health, made up of the Chairman of the Child Welfare Division of the Massachusetts Federation of Women's Clubs, representatives from the State Department of Education and the Extension Service of Amherst State College, with the Consultant in Nutrition of this Department acting as secretary.

The committee decided that first a survey should be made by responsible women in the local communities to find the need and share the responsibility in meeting it. The survey has been made in 163 cities and towns. With the assistance of our statistician, the figures were studied and from the returns of the first 46,000 children either bringing their lunches or buying them at school, it was found that:

- Only 1 child out of 4 had milk.
- Only 1 child out of 5 had fruits and vegetables.
- Only 1 child out of 7 had dark bread.
- Only 1 child out of 5 had as long as 20 minutes for eating lunch.
- Only 1 child out of 9 was getting a hot dish.

This indicated that children were eating unbalanced lunches, even though nineteen types of organizations were giving assistance.

The Commissioner of Public Health reported to each superintendent of the school concerned, noting the needs found, and suggesting the appointment of a local committee to work with him to meet these needs. Results thus far have been that *more needy children* are being supplied with lunches, more responsible local organizations are working toward improving the school lunches, and more nutrition education of children, parents and teachers is being carried on.

For this survey a school lunch survey card was prepared and issued by the Department of Public Health. After finding the needs, a "Measuring Stick for a Good School Lunch" was prepared and sent, by the thousands, to children to use in the school and take home to their parents. A child silhouette exhibit, illustrating the findings in the survey, was made and used extensively over the State at meetings of superintendents of schools, school nurses, and club meetings of various kinds.

A report of the School Lunch Survey was sent to the State Commissioner of Education and to the Federal Emergency Relief Administrator at Washington, as well as to the State Federation of Women's Clubs, the Red Cross, Parent-Teacher Associations and various other organizations interested in the study.

A paper was written on the subject by the Consultant in Nutrition and the Statistician and sent to the Nutrition Advisor of the Federal Emergency Relief Administration in Washington. This was later printed in the September issue of "Practical Home Economics," and permission was granted for its reprinting in "The Trained Nurse and Hospital Review."

The section devoted to school lunches in the "School Hygiene Handbook" was rewritten during the year.

### 1. *New School Lunch Service—Nutritionist for Communities:*

In the fall one nutritionist was assigned definitely to the project of contacting school lunch committees and managers in the local communities, so as to stay long enough to advise with them regarding their plans and problems pertaining to the school lunch. The plan also included reaching the children themselves to secure a good lunch whether it be provided at home or at the school. An interesting table of statistics follows:

Conferences with:	School Lunch Committees . . . . .	7
	Parent-Teacher Associations . . . . .	5
	Well Child Conference . . . . .	1
Talks given:	In schoolrooms . . . . .	7
	To teachers—Holden . . . . .	1
	To mothers' groups . . . . .	3

In contacting school lunch committees in eight towns, stress was laid upon the necessity for a hot dish at the noon lunch for children; low cost menus; economical buying; efficient and attractive serving of food; ways to introduce more fruit and vegetables in the school lunch.

In the Parent-Teacher Associations, 118 members were contacted, and advice given on the hot dish in the school lunch, good nutrition and the means of providing adequate lunches for the children.

The schoolroom talks covered lunchbox suggestions and the "School Lunch Measuring Stick," and for the Mothers' Groups and the Well Child Conference stress was laid upon protective foods for children, economical buying of food, lunchbox suggestions and children's diets and habits.

As a result of these meetings a need was felt for definite aid to untrained lunchroom managers, so the Department prepared a series of menus and recipes in quantity, consisting of three weeks' menus for autumn, for winter, and for spring, printed on cards for distribution.

The towns covered so far in these contacts were Becket, Carlisle, Haverhill, Holden, Housatonic, Lenox, Monterey, Otis, Richmond, Seekonk, Sheffield, Tyringham, West Springfield and West Stockbridge.

### 2. *Examples of Other Services:*

#### *Williamsburg—School Lunch:*

One outstanding project in school lunches was that carried on in Williamsburg, at the request of Dr. Moore, the Consultant in School Hygiene of the Department.

A nutritionist spent four weeks in that community, carrying on a school lunch survey in all the schools, giving talks in every grade in the schools. An interested committee of school department representatives, state organization representatives, and the local community generally, was formed. The school committee was approached with a request for tables and benches in the school lunchrooms; high school pupils were assigned to their classrooms to eat their lunches, relieving the overcrowding in the lunchrooms, suggestions for lunch menus were sent home with the children to interest the mothers in preparing this important meal.

#### *Boston—School Lunch.*

A study was made of the school lunch procedure in the schools of the City of Boston, through the Child Welfare Committee of the Boston City Federation of Women's Clubs, the Nutrition Consultant of the Department conferring with those carrying on the survey. A report of the findings was submitted to the School Department of Boston, after which the Superintendent of Schools directed that a platoon system of lunch periods be arranged with the school principals, and that candy should not be sold between periods in the schools. A "Measuring Stick for a Good School Lunch" will be distributed to the school children.

#### *(c) Well Child Conferences:*

Included in the Well Child Conference unit of the Department is a nutritionist from the Division. An interesting summary of the nutrition conferences held at these Well Child Conferences for the past three years gives the following statistical information, for all the conferences, and for a particular series of conferences held in the city of Northampton.

#### *Summary of Nutrition Conferences on All Well Child Conferences for the Past Three Years*

NUMBER	1932	1933	1934	
Children . . . . .	1,830	1,801	1,619	
Families . . . . .	1,219	1,406	1,393	
	%		%	
Showing good nutrition . . . . .	1,209 (66)	1,049 (58)	958 (59)	
Showing slight defect . . . . .	406 (22)	494 (27)	453 (28)	
Showing moderate defect . . . . .	169 (9)	170 (10)	137 (9)	
Needing immediate attention . . . . .	46 (3)	78 (5)	71 (4)	
Needing more milk . . . . .	326 (18)	473 (26)	466 (29)	
Needing more fruit . . . . .	737 (40)	646 (36)	557 (35)	
Needing more vegetables . . . . .	878 (48)	810 (45)	763 (47)	
Needing budget advice . . . . .	303 (17)	276 (15)	336 (21)	
On welfare aid . . . . .			168 (10)	
Needing more whole grains . . . . .			563 (35)	

#### *Summary of Nutrition Conferences Held at Northampton—Two Years*

NUMBER	1933	1934
Showing good nutrition . . . . .	54	53
Showing slight defect . . . . .	31	32
Showing moderate defect . . . . .	13	11
Needing immediate attention . . . . .	2	4
Needing more milk . . . . .	18	33
Needing more fruit . . . . .	30	40
Needing more vegetables . . . . .	39	65
Needing more whole grains . . . . .	—	43
Needing budget advice . . . . .	21	29
On welfare aid . . . . .	—	14

In the above the figure given for those on welfare aid includes also those on "work relief." The close comparison between the figures for 1933 and 1934 for all the conferences is of interest.

Another interesting summary was made of recommendations advised at the Well Child Conferences held in the Southern Berkshire district, as follows:

Number of children seen in conference . . . . .	139
Needing more milk . . . . .	30%
Needing more fruit . . . . .	27%
Needing more vegetables . . . . .	47%
Needing more whole grains . . . . .	20%
Needing budget advice . . . . .	16%

A well-organized Well Child Conference was substituted in place of the usual "baby show" at the Topsfield Fair, where 90 nutrition conferences were held with the mothers of the children. Two such conferences were held in Boston, at the New England Drug Show, to replace the usual "baby show," a total of 40 conferences on child nutrition being held with the mothers.

Following the Well Child Conference in Seekonk, at the request of the local public health nurse and the Consultant Nurse of the Department for that district, home visits were made by one of the nutritionists to those families whose children showed nutrition defects at the Conference. Twenty-four families were visited in the interest of 33 children. Great value was received from these home visits and future recommendations will be much tempered by the understanding of the homes from which these children come.

(d) *Chadwick Clinics:*

The Division of Tuberculosis, through Dr. Zacks, sent out a questionnaire to nurses, at the suggestion of the Consultant in Nutrition, with regard to the value of nutrition service at the Chadwick Clinics. From 171 unsigned returns it was evident that the nurses felt that the work of the nutritionist on the Chadwick Clinic was of great value and importance.

Needy cases reported from the Chadwick Clinics have been a problem for the nutritionists to solve. Such cases cannot be cared for by local welfare departments unless they are actually on relief. An attempt was made to have them followed up by the State District Health Officers, and the plan at the close of the year was to have them followed up through local organizations.

(e) *Summer Camps:*

A new departure this year was the plan whereby the nutritionist spent several days at the summer camps rather than the usual one-day visit of former years. Because of this plan more constructive advice was afforded the camp directors. Parent education follow-up was the point emphasized by the nutritionists in this year's camp work. Reports of all camp visits were sent to the Massachusetts Tuberculosis League for their use. To meet the need for recreation material, at our request the Director and Assistant Director of Physical Education in the State Department of Education prepared such material for the use of the camps. Not all of the recommendations made to the camp directors have been carried out but progress is being made in this direction.

(f) *Nutrition Courses:*

1. Fitchburg State Teachers College for Teachers and Nurses
2. University Extension Course for Teachers
3. Courses for Mothers
4. Courses for Nurses in Training

1. *Fitchburg State Teachers College:*

The Consultant in Nutrition cooperated with the State Department of Education during the summer by giving two lectures in the course for home economics teachers and nurses.

One of the nutritionists conducted a ten-lesson course on "Methods of Teaching" and "Nutrition" for Practical Arts teachers; also a course of five lessons on "Newer

Developments in Nutrition" for Home Economics teachers, and a course of four lessons for nurses, on "Nutrition Backgrounds" and "Methods of Teaching."

### 2. *University Extension Courses for Teachers:*

A nutritionist participated in a University Extension Course for teachers, in the Great Barrington district, giving two lectures on "Backgrounds in Nutrition" and "Nutrition and the School Child."

### 3. *Courses for Mothers:*

For the mothers at the Florence Crittenton League a series of six lessons was given on "Feeding the Small Child", combined with a cooking demonstration. In Worcester County, for the Mothers' Classes, a lesson in budgeting the family income was given as a part of the course of lectures. For the mothers on Martha's Vineyard Island a series of three talks was arranged for each town on the Island. A total attendance of 140 mothers listened with interest to talks on unusual economies, marketing hints, low-cost meal planning, sweets for the children, school lunches, foods for good teeth, and feeding the fussy, finicky child.

### 4. *Courses for Nurses in Training.*

In the courses planned for the hospital training schools for nurses, seven talks on "The Nutritionist in Public Health" were given, reaching 137 nurses in training.

#### (g) *Group Talks:*

One nutritionist on the staff gave a total of 120 talks during the year, reaching over 3,800 people. "Feeding the Preschool Child" and "The Food Budget" were given before the Amherst Mothers' Club and the Cohasset Mothers' Club, respectively. In Lincoln and Rehoboth two talks were given to children in grades five to nine inclusive, on "The School Lunch", reaching about 275 children. "The Melrose Plan", "School Lunch Survey", "Foods for Summer", "Safe Dieting", and "Nutrition Follow-up of Well Child Conferences" were given by one nutritionist, reaching approximately 395 people.

#### (h) *Consumers' Council:*

We cooperated with the Middlesex Consumers' Council and others in their efforts to protect the consumer and encourage better education in the matter of selection and purchase of goods, lending advice and assistance on several occasions.

#### (i) *Food Customs from Abroad:*

A need was felt for some publication on adequate nutrition for the foreign born in the State, and this was met by the printing of "Food Customs from Abroad." In this publication are "Good Points" and "Points to be Encouraged" relating to food habits of the seven nationalities existing in greatest numbers in this State. The nutritionist under the Red Cross in the City of Newton assisted in the preparation of this pamphlet. The cover design was a contribution of one of the Civil Works Service artists assigned for work in the Department early in the year. The Federal Emergency Relief Administration requested copies of this pamphlet for distribution to the Nutrition Advisors of the forty-eight states, and in the State of Michigan through the efforts of Miss Leila McGuire, an authority on foreign diets herself, portions of the pamphlet have been mimeographed for the use of the welfare workers there. In Massachusetts it is being used by the Division of Adult Alien Education in the State Department of Education, by nutritionists and home economics teachers, and also by social workers.

#### (j) *Dental Nutrition Studies:*

This is the third year for the dental-nutrition study in the State sanatoria for tuberculosis. Occasional visits were made by the nutritionist to Westfield State Sanatorium to check the meals served and the progress of the addition of tomato juice to the food. Tomato juice was added to the evening meal for the girls and in the fall vitamins A and D were added in the form of haliver oil and cod liver oil capsules daily.

Three new community demonstrations along this line were carried on during the year. The one in Reading was under the direction of the school nurse, the selection of nutrition cases being made by local dentists, the home contacts being made by a nutritionist. Similar plans were started in Orange and Wellesley but through local nutritionists.

Plans for the nutrition aspect of the dental-nutrition program in local communities were made with two objectives in mind—(1) remedial service for children found to have dental defects due to malnutrition, and (2) preventive nutrition education work.

The dental-nutrition study has been stressed as most important in the health of both children and adults, in every Charm School program, in the preschool nursery centers under the Federal Emergency Relief Administration, in courses for mothers, teachers, and nurses, and in all contacts made throughout the year by the members of the Division staff. The subject has been incorporated into our "Protect Your Smile" exhibit also, which carries the message simply and forcibly to an audience.

*(k) Other Nutrition Studies:*

In Baldwinsville, at the request of the Director of the Hospital Cottages for Children, suggestions were made to help with their nutrition problem. As a result of our report, a trained dietitian has been employed to supervise the planning and serving of food for the children.

At the request of the Governor's office, to determine the qualifications of those responsible for the planning and serving of meals, a questionnaire was sent to fifty-two state institutions. In 32 of these, dietitians assist, though many of them do not meet the requirements of the American Dietetic Association. This would indicate the necessity of interesting State institutions in Massachusetts in securing well-trained dietitians to be responsible for such an important duty as the selection of adequate food and serving of meals for those in the institutions.

*(l) Federal Emergency Relief and Public Welfare Food Plans:*

Since a large proportion of the time of the Consultant in Nutrition and her assistants was spent in the preparation of material for, and assistance in, the projects approved by the Federal Emergency Relief Administration, such activities are being reported as a separate activity in a later section of this report. The Nutrition Consultant was chosen as State Nutrition Supervisor for all Federal Emergency Relief Administration nutrition projects and was asked to pass approval upon all such projects as they are planned.

Of all the struggles of the year, from the point of view of the nutritionists of the Division, the most exciting proved to be that of planning and producing the pamphlet "Your Guide for Buying, Preparing and Serving Good Meals at Low Cost," for use with families receiving welfare aid, and for those with lean pocketbooks. This guide was based on the budget leaflet issued previously, with necessary changes to meet the needs of the families most concerned, and it was printed and ready for distribution before the close of the year.

In Great Barrington, at the request of the local agent of the Board of Public Welfare, a nutritionist visited that community to assist in revising the system of welfare food relief and to aid in the adoption of the so-called Melrose Plan by the town. A meeting of the local grocers was called and the plan presented for their consideration, and it was put into practice early in February. At the end of the year we find it being used only in part since most of the cases on relief are now requiring only supplementary aid.

In the City of Boston material assistance was given to the Department of Public Welfare in the preparation of their budget as it relates to those on relief. A similar type of consultant service has been given in other communities.

The "Melrose Public Welfare Plan of Food Relief" which the Department printed, is being used in Arlington and Great Barrington, as well as in Oneonta, New York.

The Nutrition Consultant was chosen as delegate for social work for the study group of the State Conference of Social Work. This gave her an opportunity to discuss common problems of nutritionists and social workers.

*(m) Better Nutrition Picture:*

This year, for the first time since 1929, there seem to be indications that the steady increase in malnutrition and causes of malnutrition among the children have been checked. This has been seen in our Well Child Conferences and in the Chadwick Clinics. The Chadwick Clinic figures showed a steady increase in the number of children not following recommendations because of economic conditions from 8 per cent in 1929 to 34 per cent in 1932-1933, with a decrease to 31 per cent in 1933-1934. A similar picture appears in the Well Child Conference reports of malnourished children.

More breakfasts for children, more noonday meals for children, more adequate allowances by local welfare departments, and more employment are all probable factors affecting this curb. Our dental-nutrition programs, our Well Child Conferences and our Chadwick Clinics have all contributed to this better picture.

It is a pleasure to quote from the report of the Consultant in Nutrition, Miss Mary Spalding, with regard to the nutritionists under her direct supervision, as follows: "In my opinion the nutritionists of the Department have been able to adapt their work quickly to varying types of practical demonstrations in communities, and they have also shown generous team-play."

**5. Dental Hygiene:***(a) Dental-Nutrition Program:*

Progress has been made this year in the plan for community dental-nutrition programs. It is felt that in the future we may well consider every case of active decay as in need of nutritional follow-up, but at present the problem is so extensive that we are beginning, as we did with school dentistry ten years ago, with the "worst cases."

A new step was taken along this line in Wellesley where they were fortunate enough to have a nutritionist available and interested; also in Reading where we assisted the school nurse in carrying out a complete program. In both communities the school dentists were sufficiently interested to plan for a complete mouth examination for the cases "screened" by the inspection, and for subsequent re-examinations to determine the presence of fewer new cavities or secondary dentine.

*(b) Dental Studies:*

Studies of the dental program were made in Southern Berkshire District to determine what has been accomplished through the dental clinic and dental hygienist; also in the Nashoba area, to find out the needs in the way of a dental program; and in Barnstable County for the purpose of presenting the dental picture of the district to the County Health Bureau.

In the Southern Berkshire District the full-time dental hygienist gave preschool and school inspections and carried on the general educational program and administrative work connected with the traveling dental clinic and local dental clinic service. In school work she spent 42 per cent of her time; in clinic organization and assistance, 29 per cent; and in the preschool program, 13 per cent, the balance of the time spent on office records, reports, etc.

In the Nashoba area 17 per cent of the school children received dental certificates for completed dental work. No information is available for the preschool age group.

*(c) Dental Certificates:*

The number of communities reporting dental certificate cases is lower than last year because we purposely refrained from intensive follow-up of late reports. The number of reports received by September, without follow-up (173 in 1933, and 209 in 1934), showed such a good increase that we have sufficient evidence that the program is growing.

We reported towns showing the greatest improvement for the first time this year in the "Bulletin of School Dental Workers"; 36 showed a 10 per cent or more increase over their 1933 records. A study of the 199 towns sending in complete reports for 1933 and 1934 shows an increase in the number of children receiving certificates in 107, or 54 per cent of the towns reporting both years.

	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34
Number of cities and towns reporting	78	126	178	226	243	299	261
Elementary school membership for Mass. (grades 1-8)	535,551	533,545	529,764	530,818	525,853	542,108	518,227
Dental Certificates awarded by:							
School dentist	Not reported	Not rep.	Not rep.	14,839	25,431	28,679	29,117
Clinic dentist	23,052	23,052	45,989	51,624	64,106	68,901	78,898
Family dentist	separately	27,296	44,774	64,052	38,260	48,474	41,688
Total number of children receiving certificates	25,949	50,348	90,763	130,515	127,797	146,054	149,703
Percentage of elementary school population receiving certificates	5%	9%	17%	25%	24%	27%	29%

(d) *Preschool Dental Clinics:*

Pittsfield and Quincy established dental clinics for preschool children. The Pittsfield clinic represents unusually good community organization, the cooperating agencies including the local Dental Society, the Junior League, the Board of Health, and welfare agencies.

(e) *School Dental Clinics:*

Reports of activities of the school dental clinics throughout the State were received from 48 per cent of those in operation. The following figures summarize the splendid service rendered to under-privileged children in the communities served:

65,291 children received dental care  
 51,548 children had dental work completed  
 290,952 operations were performed  
 71,952 cleanings were done  
 121,189 fillings were done  
 95,171 teeth were extracted

A study of the individual reports revealed that the number of tooth extractions is decreasing in some of the clinics and more children were cared for with no increase in time required—both results that we have expected to get from our preventive policy which the clinics adopted.

In Medford, Framingham and Westport dental clinics were re-established during the year.

Eleven new traveling dental clinics were established during the year in the following communities: Essex, Hamilton, Millville, Peru, Plympton, Provincetown, Raynham, Washington, Wenham, Windsor and West Bridgewater. In Millville the keeping of adequate records helped to arouse the interest of the people locally and the dental program was stressed in the schools through poster-making, drawings, a moving picture on dental hygiene, and classroom demonstrations on the care of the teeth. A complete list of traveling dental clinics in operation during the year follows:

<i>Hampshire County</i>	<i>Hampshire County</i>	<i>Franklin County</i>
Belchertown	Pelham	Deerfield
Blandford	Peru	Erving
Chester	Russell	Gill
Chesterfield	Southampton	Hawley
Cumington	Washington	Heath
Dana	Westhampton	Leyden
Enfield	Williamsburg	Leverett
Goshen	Windsor	Monroe
Granby	Worthington	New Salem
Greenwich		Plainfield
Hadley	<i>Franklin County</i>	Rowe
Hatfield	Ashfield	Shutesbury
Hinsdale	Bernardston	Warwick
Middlefield	Charlemont	Wendell
Millville	Colrain	Whately
Montgomery	Conway	

<i>Barnstable County</i>	<i>Southern Berkshire</i>	<i>Southern Berkshire</i>
Provincetown	Agawam	Tyringham
Truro	Becket	Wenham
Wellfleet	Essex	West Bridgewater
	Hamilton	West Stockbridge
<i>Worcester County</i>	Monterey	
Auburn	New Marlboro	<i>Plymouth County</i>
Charlton	Otis	Plympton
Petersham	Raynham	
Princeton	Richmond	
Rutland	Sandisfield	
Westminster	Sheffield	

(f) "Protect Your Smile":

The "Protect Your Smile" program for 4-H Clubs is the most interesting new project for the year. The idea and slogan suggested by the Department were developed into a Club program with the leaders at Amherst State Teachers' College, and enlarged to include dentists through the cooperation of the Massachusetts Dental Society. The plan is to teach 4-H Club members to protect their smiles through good nutrition, daily care and dental care. A booklet of source material for leaders was prepared by the Department and distributed through the State Club Leader.

"The thing that will count more than anything else" (quoting Mr. Eastman, a County Club Agent) is the plan for free dental consultations that has been the contribution of the Committee on Public Relations of the Massachusetts Dental Society. This Committee sent a letter to all dentists exclusive of those in the larger cities, approximately 1,000 being included, asking them to take part in the program by "granting each 4-H Club member in his community an appointment for consultation, examination and advice as to personal care and needed dentistry."

(g) *Well Child Conference Program:*

The Dental Hygiene Consultant spent a great deal of time during the year with the demonstration Well Child Conference unit of the Division. The Unit visited 26 towns, 4 for the first time and 22 towns for a return visit. It is in these Conferences that we have had an opportunity to study conditions "Not from the hub but from the rim of the wheel."

The nutritionists of the Unit give special help to every mother whose child is reported to have any evident dental caries. The Well Child Conferences also afforded opportunity to consult with the local public health nurses regarding school dental programs. From these Conferences we have been able to secure better returns of dental certificate reports, notably higher in the western part of the State where the majority of Conferences were held during the past year.

(h) *General:*

Looking back over the year, we found that dental health education and dental clinic service developed most rapidly in the rural sections of the State; the school dental program reached out to include the smaller children through the Well Child Conferences, and to the adolescent group through the 4-H Clubs; evidence of a slow, steady growth in all phases of dental hygiene, closer cooperation with outside organizations, and a strong tendency to preserve the patient-family-dentist relationship.

The dental hygiene service in Southern Berkshire Health District, in the establishment of which we assisted two years ago, is still the outstanding example of a generalized program for a dental hygienist. A total of 52 dental hygienists were employed locally throughout the State, serving 50 communities.

## 6. Health Education:

(a) *In the Schools:*

The Health Education Worker has kept in contact with the High School Health Councils which are still functioning in Norwood and in Yarmouth. In the section

on Health Education in Secondary Schools there is a detailed report of the communities where the Health Education Worker of the Department cooperated, namely: Amherst, Athol, Charlemont, Chelmsford, Greenfield, Rockport, Shelburne Falls, Westford, Williamsburg and Winchester.

(b) *Outside the Schools:*

4-H Clubs were contacted in twelve communities when older members in the service clubs requested some form of health education instruction. Charm Schools were carried on in six towns with their usual interest and success. Considerable time was spent in the organization and explanation of the "Protect Your Smile" program.

A series of four talks was planned for a group of unemployed girls coming to the Lowell Tuberculosis Association. Two of these talks were given by the Health Education Worker and the other two by a nutritionist of the Department.

At the East Boston Social Center four talks were given to a group of girls and a Charm School was held at the vacation school during the summer.

Through single talks 22 other organizations were contacted and some phase of the health education program stressed. These included a commencement program and a summer Sunday school group.

(c) *Publicity:*

The Health Education Worker spent considerable time in consultation with visiting nursing associations concerning the development of detailed local publicity programs, including suggestions for campaigns for funds, window displays and annual reports.

Forty-seven newspaper releases were prepared and sent out for Well Child Conferences or for diphtheria immunization campaigns; three state-wide newspaper releases were issued, and five local communities were given assistance in the preparation of publicity publications. Much time was spent in the discussion of preparation of annual reports with representatives of local visiting nursing organizations and "Suggestions for Writing Annual Reports" was prepared and distributed at the annual meeting of the Massachusetts Organization for Public Health Nursing.

Six lectures were given on "Publicity in the Public Health Program."

(d) *Exhibits, Posters, Pamphlets:*

The Health Education Worker helped to plan twenty-eight separate exhibits and was in attendance upon twenty-two of these. A series of monthly exhibits was worked out for the Walpole Visiting Nurse Association as a part of its publicity plan.

The Department exhibits were displayed in Boston, at the Drug Show; at the Young Women's Christian Association; and a special exhibit on dental hygiene at the Massachusetts Dental Society annual meeting—this exhibit being sent later to St. Paul, Minnesota, for the annual meeting of the American Dental Association; for visiting nursing associations in Holyoke, Lexington, Pepperell, Scituate and Walpole; at Swampscott for the annual meeting of the State Federation of Women's Clubs; at the New England Health Education Association meeting and the annual meeting of the Massachusetts Organization for Public Health Nursing; at the Eastern States Exposition; in Medford for the Boy Scouts; in twelve towns in the Southern Berkshire district; at Martha's Vineyard Fair; and in Somerville. In the two latter communities a series of exhibits were used with Mothers' groups. At Framingham and Fitchburg State Teachers Colleges a number of exhibits were used with teachers in training and teachers in service. The School Lunch exhibit was used by one of the nutritionists at Haverhill, Carlisle, Lenox, Otis, Sandisfield, Seekonk, Tyringham, West Springfield, and Westport. Exhibits were used also at 33 Well Child Conferences.

The activities of the Health Education Worker-Artist this year were confined chiefly to the making of posters, charts, graphs, etc., a total of 232 being completed during the year, 52 of which were for Divisions of the Department other than Child Hygiene. Some of these were prepared for the health days and exhibits at Chester, Plymouth and Sheffield, and for the annual meeting of the Massachusetts Medical Society in Worcester; for Eastern States Exposition, Springfield; State Nurses'

Association meeting in Boston; and the towns in the western district of the State for their annual health days under the direction of Dr. Miner, State District Health Officer.

Because of the press of work incident to the above needs, very little time of this worker was devoted to the program of correlating art work in the schools with health subjects, through poster-making, etc. Only 4 public schools were visited and 22 parochial schools, regarding this program during the year, the former in Provincetown, Truro and Wellfleet, and the latter in the Brighton, Charlestown and East Boston sections of Boston proper, and in Cambridge and Lowell. Slogan sheets for health poster-making were requested by parochial schools to the number of 23,700, and by public schools, a total of 2,000. Concerning this program 39 school officials were visited, 36 in parochial schools and 3 in public schools. Following these visits printed material for school use was ordered from the Department to the number of 346,317 pieces as compared with 780,586 pieces ordered in 1933—a decrease of 56 per cent due to the inability of the Health Education Worker to cover this field because of necessary art work for the Department.

Printed material distributed during the year totalled as follows:

	Pieces
Child Health Day material . . . . .	117,021
Summer Round-Up material . . . . .	84,673
Other publications . . . . .	804,600
	<hr/>
	1,006,294

The demand for printed material has been constant throughout the year and there have been more requests along various lines than previously. Ten new reprints of articles written by members of the Department staff were received for distribution during the year.

The following pamphlets were reprinted with little change in their content:

Attention! Stand Tall  
 A Child Entering School Should Know  
 Care of the Child in Cold Weather  
 Care of the Child in Hot Weather  
 Dental Certificates  
 Dental Honor Roll  
 Foodways to Health  
 How to Judge Nutrition of Children  
 Keeping Well  
 Normal Gain in Height and Weight  
 Notification of Dental Defects  
 Registration Chart—Mothers' Classes  
 Supplies Necessary at Time of Confinement  
 Ten Rules for Healthful Living  
 The Strategic Position of the Classroom Teacher.

Revision was necessary during the year to bring the following publications up to date: The Baby and You; One to Six; School Hygiene Handbook; For Your Teeth and Gums; Your Baby's First Teeth; Your Second Teeth; Suggestions for Care During Pregnancy; Aids to Bowel Movement; Diet for Children from Birth to Two Years; and the Well Child Conference Record Form.

New Department publications issued during the year include the following: a Circulation of Publications form; Daily and Monthly Report of School Physician; Food Customs from Abroad; Your Guide for Buying, Preparing and Serving Good Meals at Low Cost; and One Week's Grocery Orders.

It is of interest to note the increased demand for our pamphlets created at health shows, county fairs and annual meetings of the various organizations. Two and one-half times as many orders for printed material were received from these sources as were received the previous year.

From other states we received 710 requests for printed material. Many requested the new pamphlet Food Customs from Abroad, which seems to meet a great need,

and which was given notice in the "Journal of the American Dietetic Association" in the fall. Out-of-state requests came from the following states, through the exhibition at Eastern States Exposition at Springfield: Connecticut, New York, Vermont, Rhode Island, New Hampshire, Kentucky, Georgia, Florida and New Jersey, a total of 185 from all.

From other countries there were received requests for our printed material during the year, as follows: Canada, England, China, Hungary, Australia, South America, Czechoslovakia, India, Ireland, Italy, Mexico, Puerto Rico, South Africa, Spain, Switzerland, Syria, United States Soviet Russia and the Island of Hawaii.

Four special issues of "The Commonwealth" were devoted to The Handicapped, Adult Hygiene, Diabetes, and Health Education. The demand for these special numbers and the inclusion of so many important papers on timely subjects has almost doubled the work of preparing the material for printing and distribution.

(e) *Library:*

The Library Committee met several times during the year for the consideration of purchase of new books and subscriptions and regulations for the use of the library. The library work has been unusually heavy, due to the increase in accessions and a greater demand for reference material from members of the Department staff, the cataloguing of material not previously listed, as well as new books, and the circulation of journals and printed matter throughout the staff.

(f) *Lectures, Motion Pictures, etc.*

There were given during the year 952 lectures and 138 radio broadcasts. This service was given in 164 communities of the State, and 5 talks were given outside the State, one by a public health nursing consultant who addressed the Rhode Island State Nurses' Association. Aside from radio listeners, 48,845 persons were reached with the lecture service afforded by the Department.

Motion pictures were loaned to 99 communities and delineascope filmslides loaned to 35 communities of the State.

Department posters were used in 58 communities and the animal and nutrition posters were issued for permanent use to several communities. Through a Civil Works Administration Project, 11 artists were assigned to make posters and murals for exhibit backgrounds for the Department. Some of these have been in almost constant use throughout the year.

Exhibits were loaned to 83 communities, 25 of these in connection with the Well Child Conferences conducted by the Division staff.

(g) *Prenatal and Postnatal Letters and Fathers' Letter:*

At the close of the year there were on the registry for the monthly letter service to prospective mothers and to mothers of children under two years of age 27,431 names, as compared with 23,000 recorded during the previous year. New requests for prenatal letters in 1934 totalled to 7,654, as compared with 6,100 for the year 1933; for the first year postnatal letters to 7,157 for 1934, as compared with 6,200 in 1933. The letter to fathers was sent to all families requesting prenatal letters, a total of 7,654 during the year.

## II. SPECIAL PROJECTS

### 1. Federal Emergency Relief Administration Civil Works Administration Civil Works Service.

Early in the year a great deal of the time of the Chief Consultant in Public Health Nursing was spent in preparation for possible Civil Works Projects that might be approved for this State for the employment of nurses, physicians, etc. Questionnaires were sent out for information from unemployed nurses and nearly one thousand replies were received. This information is classified and on file in the Division. However, no projects were approved.

Under the Federal Emergency Relief Administration projects for the conduct of Preschool Centers were approved, and these were placed under the supervision of the State Department of Education. At the request of the Department of Education the staff of the Division of Child Hygiene was called upon frequently for advice and assistance. Special meetings were arranged for the workers in the Preschool Centers in Boston, Greenfield and Taunton. These meetings were conducted by the nutritionist of the Department of Public Health, and in addition to general talks to the workers, special talks on nutrition were given to the mothers of the children in attendance.

Early in the year the State Department of Education requested assistance from the nutritionists to work with 36 nutrition teachers appointed to the Preschool Centers by the Federal Emergency Relief Administration. These teachers met in Institutes and in small groups for the discussion of their problems, in Boston, Northampton and Springfield. They were given advice and assistance with individual case problems and provided with printed material for their use in feeding small children and in teaching good health habits, as well as for their parents' classes. Decided improvement in the children's eating habits was observed through these projects.

Again we cooperated with the Emergency Relief Administration by passing opinion upon food budgets, at their request, taking into consideration the make-up of the families as to age, sex and activity. The Consultant in Nutrition was also asked to pass upon local work projects in nutrition as they are granted by the Emergency Relief Administration.

In local work projects, when 28 nutritionists and visiting housekeepers were appointed under the Emergency Relief Administration in Brockton, Fitchburg, Franklin County, Methuen, Pittsfield and Worcester, we advised with them regarding their work plans and provided printed material for their use. Through these workers those in financial straits were assisted in getting the best returns for their food money and welfare recipients were aided also in this respect. The head of the Women's Division in Worcester reported that because of our advice and assistance their nutritionists have been able to keep down the expenses as well as to maintain the health of those referred to them from both health and welfare departments.

In the northeastern section of the State, Preschool Centers were established in Amesbury, Hamilton, Haverhill, Ipswich, Maynard, Melrose, Natick, Newburyport, Newton, Rockport, Reading, Salem and Wenham, in all of which communities the nursing consultant for the district assisted the local nurses with the problems arising through these activities.

In Chicopee, special interest was focused upon the Preschool Centers established under Federal Emergency Relief Administration. Dr. Susan Coffin, Pediatrician of the Division, for preschool activities, was asked to assist with the physical examinations of the children of preschool age attending these centers. Following the examinations a conference was held with the dental hygienist, nutritionist and nurses in attendance upon the Preschool Centers, relative to coordinated plans for the correction of defects found, through stimulation of the parents themselves, the provision of funds, and other resources in the community. Efforts were made to stimulate the organization of a more representative visiting nursing association. There has been some growth noted during the year. In December a new group of 64 children were examined in the Chicopee Preschool Centers.

Under the Civil Works Administration the eleven artists assigned to the Department executed posters on Nutrition, School Hygiene, Child Hygiene, Infant Hygiene, and educational murals for use in Preschool Centers as exhibit backgrounds and wall decoration.

Under the Civil Works Service two statistical clerks and three typist-clerks were assigned to the Department for a short time, to assist in special studies.

From the Transient Camps early in the year came requests for advice and assistance, and ration lists and menus were planned by one of the nutritionists. A nutritionist visited each camp and transient shelter to sample the meals served and confer with the mess officers. Many of the suggestions made have since been carried out in these camps and shelters.

The State Department of Public Welfare has conferred with the Department nutritionists frequently with regard to revision of their calorie card for welfare

visitors, in order to provide adequate allowance for babies and a less expensive allowance for adolescents. Because of this the allowance for families with "teen age" children and families with small children will be better adjusted.

This year we are glad to report the endorsement of the State Department of Public Welfare for our pamphlet, "Your Guide for Buying, Preparing and Serving Good Meals at Low Cost." This material was planned directly as an educational aid to county and city welfare recipients and indirectly to welfare representatives, nurses, nutritionists, as well as the nutritionists of this Department for use in their contacts. Four community nutritionists, as well as the nutritionists of the Department, gave practical advice and assistance in the preparation of this material. It is hoped, through these plans for food at low cost, that more communities may raise their standards to meet its adequacy, as the period of emergency rations must not be carried on too long. Up to the present time large families have been the ones to suffer most.

## 2. Staff Education:

All the consultant nurses of the Division attended a week's course on Home Hygiene and Care of the Sick, given by Miss Helen Dunn of the American Red Cross, at Fitchburg State Teachers' College.

Likewise, all attended the New York University Extension Course on The Psychological Approach to Child Health, led by Helen Hackett, Nursing Consultant for Worcester County District.

### III. PERSONNEL OF THE DIVISION.

We record, with regret, that the illness of Miss Ada Boone Coffey, Chief Consultant in Public Health Nursing for the Department, prevented her return to duty. Miss Coffey was given leave of absence for several months in the hope that she would recover sufficiently to resume her duties, but she was unable to do so at the close of the year.

During the summer, with the reorganization of the Chadwick Clinic program, Miss Catherine Leamy was transferred from the Division of Tuberculosis to the Division of Child Hygiene, as Public Health Nutrition Worker. For the purpose of further study, Miss Leamy was granted leave of absence in October, at which time Miss Helen Inman was appointed as substitute nutritionist for the year.

Miss Mary Whalen resigned her position as junior stenographer, to be married, and Miss Florence Mahoney was appointed as her successor.

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### MASSACHUSETTS STATISTICS FOR 1934

Population (Estimated as of July 1, 1934 . . . . .	4,339,210
Death rate per 1,000 population . . . . .	11.7
Infant mortality (per 1,000 live births) . . . . .	49.2

## REPORT OF THE DIVISION OF COMMUNICABLE DISEASES

GAYLORD W. ANDERSON, M.D., *Director*  
 N. A. NELSON, M.D., *Assistant Director*  
 JOHN J. POUTAS, M.D., *Assistant Director*

### GENERAL STATEMENT

Of recent years it has become fashionable among epidemiologists to speculate about an irreducible minimum for typhoid fever and diphtheria. During the past year the decline in these two diseases has been so striking as to raise serious questions as to the soundness of the doctrine of irreducible minimum. Both of these diseases have now reached a level lower than our fondest hopes several years ago could have foreseen and the end is not yet in sight. Elsewhere in the field of communicable disease, as shown by our experience during the past year, progress has been less striking. In some instances the improvements have been due to increasing good management through public health education; in other instances the favorable results have been due solely to good fortune.

### PREVALENCE OF SPECIAL DISEASES

*Anterior Poliomyelitis.* The past year has seen this disease at the third lowest level that Massachusetts has experienced since the disease was made reportable, only 1932 and 1919 having reached a lower level. The number of deaths, however, was lower than in 1932 and 1919, thus establishing a new record. This probably does not mean, however, that the disease was any milder, but is due to the fact that in the first few months of 1932 there were several deaths of victims of the 1931 epidemic whose ultimate demise had been delayed.

Although the past year has seen an outbreak of considerable proportions in California, there was at no time any evidence that the disease was going to spread across the country in epidemic proportions into New England. Along the northern tier of states through the midwest there was, however, a definitely higher incidence than was experienced in New England. This slight wave came eastward, being felt as far east as New York. Whether or not its absence in New England was due to the fact that it arrived too late to manifest itself as recognizable, infantile paralysis can only be surmised. In support of such a theory is the fact that in the southern half of Worcester County, of seven cases that occurred during the year, six were during October and November. Likewise, the Lawrence area was free until October, when three cases appeared. What may be the significance of this as affecting next year's experience is entirely problematical. It seems unlikely, however, that we can expect another year at so low a level.

With the low incidence of the disease, the supply of convalescent serum which was on hand at the end of 1933 was sufficient for the current needs, thus obviating the necessity of additional bleeding clinics. All of the serum was re-filtered and re-distributed to selected hospitals on the same plan as during the two preceding years. One or two hospitals were dropped from the distributing list as they were apparently superfluous and might be discontinued without impairing the availability of serum in their locality. Consultants of the Department saw 36 cases in consultation with physicians.

*Diphtheria.* Diphtheria furnished the most striking reduction in the field of communicable diseases, the number of cases falling to 629 as contrasted with 1,041 for last year. At the same time the deaths fell to 50 as contrasted with 86. This means a reduction of 40 per cent in cases and 42 per cent in deaths. Thus the current incidence of the disease is barely one-fifteenth the incidence in 1923, when diphtheria immunization began on a large scale in Massachusetts. Even more encouraging than this actual reduction is the thought that there is no evidence as yet of reaching a stationary so-called irreducible minimum. The year closes with diphtheria constantly declining, as compared with its incidence in corresponding months in previous years, so that we have reason for anticipating that 1935 will show a substantial reduction under the low 1934 figures.

In the midst of these encouraging reports it is disheartening to record that there are still certain communities where diphtheria continues at a disgracefully high level. Lowell presents the spectacle of a community which conducted at one time the most

extensive and active immunization program ever held in Massachusetts. The work was then allowed to lapse, 1932 showing a substantial increase of diphtheria over the low figures of 1930 and 1931. The year 1933 saw Lowell with the unenviable distinction of the highest diphtheria death rate in any city over 100,000 population in the United States, as well as the highest diphtheria incidence of any large Massachusetts community. For 1934 it again had the highest rate in Massachusetts, and although the figures for other parts of the country are not yet available, it will certainly have an unenviable ranking as the number of deaths increased over the already high 1933 level. Throughout 1933 this Department had repeatedly urged that a more active immunization program be undertaken and had repeatedly made offers of assistance. Finally, during the past summer, the city of Lowell obtained a large sum of money from the Emergency Relief Administration, immunizing a large number of children. The sum expended, however, made it one of the most expensive immunizing programs ever carried on in Massachusetts. This work has already shown its effect in that diphtheria has been materially lessened during the past two months, but too late to save the city from a very discreditable 1934 record. The coming year should see a great improvement. Somerville presents an even sadder picture from the point of view of the protection of its children, the Board of Health having failed to carry on any immunization work since 1931. Although fortune has smiled more kindly, sparing the city as extensive an outbreak as occurred in Lowell, the record for the year shows diphtheria at a figure markedly above that which has been attained by comparable cities that are making use of modern public health practices. Only during the closing months of the year has any local plan been evolved for the conduct of this work, and it is questionable whether such a plan can be definitely pursued. The cities of Somerville and Lowell together will have contributed almost one-half of all the diphtheria deaths in the State and in each city the number of deaths has increased over the 1933 level. Another community which is outstanding in its neglect of diphtheria immunization is Haverhill, where through good fortune diphtheria has been surprisingly low, in spite of a large susceptible population. Experience shows, however, that such a remarkable freedom from the disease cannot be maintained, so that unless active work is begun the city is merely postponing the evil day.

There are still a few communities that have completely failed to ever provide for any such immunization work. The towns of Charlton and Sutton furnish outstanding examples, both of which felt that because of a freedom from diphtheria for ten years there was no need for active immunization work. Within two months during the fall Charlton experienced 10 cases and one death and Sutton 15 cases and one death. In the former community nothing has yet been done to avert repetition of this tragedy. Sutton, however, with the assistance of the Department, instituted an immunization program which in reaching a high proportion of the children has never been surpassed. This will prevent a repetition of the tragedy but cannot bring the victims back to life. There are still, however, a number of communities that have failed to take any action. These communities are Berlin, Charlton, Cohasset, Florida, Hubbardston, Hull, Marblehead, Marshfield, Mendon, Millville, North Brookfield, Pelham, Phillipston and Savoy. The Department has repeatedly urged such action upon all of these and it is possible that some of them may undertake such work during the forthcoming year. The others prefer to ignore their responsibilities and unfortunately, the children, who are the potential victims, have no choice in this matter. And yet we adults speak with condescension of the baby whose intelligence is so poorly developed that it must burn its fingers before learning that the stove is hot.

During the year a number of communities have obtained funds for diphtheria immunization through the Emergency Relief Administration. It is possible that such practice is to some extent a two-edged sword. Undoubtedly, such funds if properly expended will definitely contribute to the promotion of diphtheria immunization. On the other hand, unless they are used with considerable discrimination there is a possibility that they may tend to take away from the community that sense of local responsibility, which is essential for the continuation of such work in future years when federal funds for this purpose may not be available. The most worth-while type of a program of this sort was that such as was conducted in Beverly, Peabody and a number of other communities, whereby the federal funds

were used to employ nurses to make house-to-house canvasses to interest mothers in diphtheria immunization. Under such a plan the local community took full responsibility for the actual immunization of all children, the State, through this Department, furnishing as usual the material for such immunization. Such a plan would appear to be a very suitable division of financial responsibility. In those communities, as in Lowell, where the entire expense was borne by the ERA, the local community making no contribution, it will be inevitable that difficulty will be experienced in future years in the continuation of this work. Among the communities obtaining ERA assistance for diphtheria work were Beverly, Brockton, Clinton, Fall River, Lowell, Lynn, Newburyport, Peabody and Quincy.

One of the outstanding advances in diphtheria immunization of recent years has been the development of a one-dose method. This is being extensively tried in certain sections of the country, and if the early reports are confirmed, bids well to ultimately supplant all other methods. On the other hand, there have been in the early reports too frequent complications to warrant this Department's hasty adoption of it. Already much work has been done which will prevent such complications so that ultimately it may be that this one-dose toxoid can be extensively recommended. In the meantime, it seems the part of wisdom in a community where such striking progress in diphtheria control is being made to await the perfection of the method rather than to jeopardize the success of the program through risking unfortunate, even though not dangerous, complications.

*Dysentery, Amebic.* The prediction made in last year's report that the Chicago outbreak of amebic dysentery would not constitute a widespread menace to the country through the development of secondary cases appears to have been justified. During 1934 there have come to light a few additional cases traceable to an infection in Chicago during the summer of 1933, but so far as is known there have been no secondary cases. The attention given to this disease, however, has resulted in a slightly better recognition of the endemic cases that have probably always occurred but have escaped detection, largely because no thought was given to the possibility of this condition. The largest number of cases reported during the year have been from Worcester. This probably does not mean a local epidemic, but is due solely to the fact that the laboratory of one of the hospitals has been making a rather intensive study of all patients. In some of these cases, however, there is reason for suspecting that certain of the patients may have been carriers rather than active cases of the disease.

The diagnostic service, which was set up as an emergency in conjunction with the Department of Tropical Medicine in the Harvard Medical School has been transferred to the Bacteriological Laboratory, which is now prepared to examine specimens both for the vegetative form of the ameba and for cysts. The Chicago outbreak had the effect of prompting the introduction into the Legislature of two bills for compulsory examination of food handlers aimed primarily at the detection of amebic dysentery carriers. Owing to the utter impracticability of these bills and the fact that the money required for the carrying out of such examinations could be spent to far better advantage in some other field of public health, the Department opposed these bills, which were ultimately granted leave to withdraw. There is at present no evidence to indicate that the routine examination of all food handlers for amebic dysentery carriers is a practical or worth-while public health enterprise.

*Dysentery, Bacillary.* The greatly increased number of cases of bacillary dysentery is due to the occurrence of several institutional outbreaks. The two largest of these were in Northampton State Hospital and the Fernald School for the Feeble-Minded, the number of cases in each instance being indeterminable. In the former, several deaths occurred in previously debilitated patients. The infection has continued at the Danvers State Hospital and three cases appeared in the Belchertown State School, where, however, the condition was recognized promptly and through active precautionary measures an extensive outbreak averted. In all of these instances dysentery bacilli of the Hiss-Y strain were isolated.

Although no figures as to the incidence of bacillary dysentery in the general population are available, there is very strong evidence that the disease occurs much more frequently than is suggested by the morbidity reports. In the healthy young adult an infection with the Hiss-Y strain apparently produces nothing more

than a diarrhea of two or three days duration. The disease as seen in institutions is such that this type of patient would rarely consult a physician were he in civil life. There is thus reason for believing that many of the idiopathic diarrheas which may occur from time to time are in reality bacillary dysentery which escapes recognition unless it happens to attack a small child, in whom the classical symptoms are produced. Although the situation may be disturbing, it is apparently of minor consequence, except as it may effect an infant or an elderly debilitated patient.

*Encephalitis Lethargica.* In last year's report reference was made to the outbreak of encephalitis lethargica that occurred in and around St. Louis, the disease being somewhat different from the type of encephalitis usually encountered. The past year has seen the appearance of sporadic cases both in this State and elsewhere that in their manifestations were strangely suggestive of this St. Louis type. In Massachusetts, however, there has been no evidence of localization.

*Epidemic Cerebrospinal Meningitis.* Although the reported incidence of this disease was somewhat higher than for last year, the number of deaths reached the second lowest figure ever recorded. This record is probably due more to good fortune than to good management, as there is nothing that can be done in our present state of knowledge to guard against this disease. During the early part of the year several cases appeared which were entirely refractory to the serum produced at the Antitoxin and Vaccine Laboratory, suggesting the possible introduction of a new strain into the State. There has been no evidence during the latter part of the year, however, that any such strain has gained a foothold in Massachusetts.

*Gastro-Enteritis.* During the past year there has come to the attention of the Department an increasing number of "outbreaks" of gastro-enteritis. Although two or three of these were of an explosive nature definitely associated with food, the majority presented themselves as nothing more than an unusual incidence of gastro-intestinal disturbances in a community within a relatively short period of time. These were the type of cases that are frequently referred to as "intestinal gripe." Although there is no evidence that the etiologic agent is related to the organism that causes the usual type of gripe, there is increasing evidence that there is some sort of gastro-enteritis that is spread through the respiratory tract. It is popular to attribute these incidents to a water supply. Such occurred in Collinsville and Bedford, yet examination of the water showed no evidence of pollution, and the distribution of the cases over a period of one to two months would definitely suggest some other mode of spread. In one instance in a summer camp the epidemiological findings very strongly pointed toward a respiratory spread.

In Fitchburg an extensive and explosive outbreak of gastro-enteritis developed as a result of pollution of the water supply. These cases were all in the northern half of the city and were served by the northern high pressure system. They occurred immediately after a heavy thaw with its attendant run-off and were unquestionably due to pollution of the watershed through CWA workers, who in spite of the warnings of this Department had been permitted to work on the watershed without adequate precautions being taken as to the disposal of excreta. Several thousand persons were involved in this outbreak, which however was of but short duration.

*Influenza.* As was noted last year, the term influenza has been used to cover such a wide variety of conditions that the disease itself is no longer reportable in Massachusetts, it being felt that the reporting of so indefinite a condition added merely to the confusion. During the year the Department has, however, kept in close touch with the incidence of upper respiratory conditions throughout different sections of the State. This has been effected through weekly reports of absenteeism from certain schools, weekly reports of case load in different visiting nursing associations, and through weekly reports of broncho-pneumonia deaths in certain communities. This gives, apparently, a relatively sensitive index of upper respiratory conditions. During the past year there has been no evidence at any time of any undue prevalence of such conditions which might be included under the heading of either influenza or gripe.

*Malaria.* Twenty-seven cases were reported, all but one or two of which were in all probability infected outside of Massachusetts.

*Measles.* The past year has seen the highest incidence of measles ever reported.

The disease began to appear around Worcester during the closing months of 1933, becoming widespread in that city and in all surrounding towns. As the year closed it had appeared in the Metropolitan area and was increasing rapidly, reaching its peak in March of 1934, when almost 10,000 cases were reported. The entire Metropolitan area was involved, spreading outward along the north and south shores. The final result was an epidemic wave that had swept the entire eastern half of the State, exclusive of the Merrimac Valley, and the extreme southeastern corner of the State. The high incidence of measles brought with it a sharp increase in the death rate. On the other hand, there is considerable satisfaction in the thought that the case fatality rate was lower than any previous year, except 1933. This probably means a greater appreciation on the part of the public of the seriousness of measles, with better facilities for the protection and care of small children, among whom the majority of the deaths occur. It does not seem reasonable to attribute this low case fatality rate solely to improved reporting, as there is no evidence that the improvement in the completeness of reporting has been commensurate with the decline in case fatality.

During this epidemic it was possible for Dr. McKhann at the Children's hospital to gather further data as to the efficacy of the placental extract, to which reference was made in last year's report. The results obtained in the prevention or modification of measles among those definitely exposed to the disease were so encouraging as to warrant a more extensive study in future years. A grant has been made by the Commonwealth Fund of New York City for a continuation of this work by Dr. McKhann in conjunction with the Division of Biologic Laboratories. This means that in the near future placental extract will be available for distribution throughout the commonwealth under such conditions as will furnish more complete data as to efficacy, reactions and proper dosage.

*Pneumonia, Lobar.* The past fifteen years have seen a progressive decline in lobar pneumonia, interrupted periodically by slight recrudescences, followed by a period during which the disease, as measured both by reported cases and by deaths, has been at a lower level than ever previously recorded. The winter of 1933-1934 saw such a pneumonia wave, which, however, ended with the end of the "pneumonia season." Thus the final figures for the year showed the lowest lobar pneumonia death rate ever experienced in this State, 1,601 deaths occurring as compared with the previous record figure of 1,688 in 1933.

*Psittacosis.* One questionable case of psittacosis appeared in the person of the wife of the proprietor of an aviary. If this was actually psittacosis, it must be concluded that it was contracted from a bird that was a healthy carrier of the disease.

During the year certain changes have been made by the United States Public Health Service with regard to interstate shipment of birds of the psittacine family, these regulations being designed to limit the further spread of the infection from the infected aviaries in California. The result has been a virtual embargo upon shipment of such birds, though toward the end of the year certain of the aviaries have been able to satisfy the necessary requirements for shipment. Time alone will tell how effective these regulations will be. They have, however, definitely upheld the hand of the California State Health Department, enabling them to exercise jurisdiction over the aviaries, which was formerly not possible. In the meantime, however, certain states have prohibited the importation or sale of all such birds, these regulations being defended on the ground that in spite of the precautions ordinarily observed there is apparently a definite illicit trade in such birds. The rareness of the disease and the evidence that the present supervision in California may rectify the situation make it questionable whether or not such drastic measures are necessary. Nine birds were shipped out of Massachusetts during the year, certificates being granted in each instance.

*Rabies.* The past year has seen a definite increase in the prevalence of rabies throughout the eastern half of the State, 251 positive heads being reported from the laboratory, as compared with 144 for the previous year. These have been very largely in the Metropolitan area, spreading northward into the eastern section of Middlesex County and the western border of Essex County. A small focus developed in the communities to the east of Brockton. During the summer a few cases ap-

peared in the northern part of Worcester County, though this focus seems to have definitely died out. Late in the year the disease began to spread from the southeastern corner of Middlesex County into the southern part of Worcester County so that it is likely that 1935 will see more of the disease in that section of the State. Boston, because of its size, had the largest individual number of cases. Other communities with a particularly unhappy experience were Lexington, Melrose, Quincy, Waltham and Winchester. As the year ends there is a definite active focus in the Somerville-Medford-Malden section as well as another active focus around Lexington.

One human case of rabies developed, the victim being a five year old child from Lynn bitten on the face by a dog that was not located. The whole case was a tragedy of errors, as there were several places in the course of events where steps might have been taken to avert such a tragedy. The case was not officially reported as one of dog bite, nor was antirabic treatment given. In Winthrop a child bitten by a proven rabid dog died of a condition which was at first thought to be rabies but on review was probably an encephalitis associated with the vaccine. This is one of the rare complications which may occur as a result of such treatment. Although it occurs but once in several thousand instances, it constitutes but another reason why more active measures should be exercised to control the spread of rabies among the dogs and thereby avoid the necessity of subjecting persons to the necessary inoculations.

During the past year there has been manifest an increasing interest in the possibilities of rabies control through dog inoculations. Evidence is accumulating in this State that the annual one dose injection method confers a protection for a period of a year, which is quite comparable to that conferred in the human against diphtheria through toxin-antitoxin injections. In other words, the bulk of those so treated are actually protected, even though an occasional failure may be recorded. Such work has been carried on in previous years in several communities including Belmont, Billerica, Framingham, Natick, Newton, Watertown and Wellesley. During the past year such work was begun in a number of other communities including Brookline, Concord, Lowell, Melrose, Middleton, Milton, Saugus, Swampscott, Waltham and Winthrop. In some of these communities the conduct of a dog inoculation clinic has been coordinated with a restraint order, which has provided for exemption of those dogs recently vaccinated. This is probably the most effective type of restraint order, as the ordinary ninety-day restraint is so irksome to the dog owners as to be marked more by its violation than by its observance. There has been some agitation in favor of compulsory inoculation of all dogs. Whether or not such is ever desirable, it seems clear that the time for this has not as yet arrived. Far better than a compulsory inoculation, however, would be a provision for free inoculation of dogs as a partial return for the license fee. Such a provision would reach a substantial proportion of the licensed dogs and would make unnecessary any consideration of compulsion. When more definite data as to the effectiveness of such inoculations are available, it would probably be advisable to attempt to obtain the necessary legislation to make available free inoculation in return for the license fee.

The 1934 Legislature completed an elaborate revision of the dog laws, certain parts of which should very definitely contribute to the further control of the stray unlicensed animal and thus indirectly contribute towards rabies control. In addition the law, which at present requires a board of health to furnish free of charge antirabic vaccine for the treatment of those persons as to whom this Department recommends such treatment, was amended to provide further that expenses of giving such treatment should be borne by the board of health. The city and town will be reimbursed by the county for cost of both vaccine and treatment to a sum not to exceed \$50 per individual case. This addition to the law will meet a long-felt want. The 1932 law furnishing the vaccine free of charge went a long way to rectify a bad situation, as the cost of antirabic vaccine was often an overwhelming burden upon a family. This new provision for the cost of the treatment eliminates the last part of the financial burden. It is also of considerable benefit to the medical profession, as in many instances the physician was in the position of having cared for several members of a family bitten by or exposed to a dog without receiving any remuneration whatsoever for his services. The law has also empowered the counties

to enter into contracts for vaccine to be furnished to their respective cities and towns. This does not prevent any town from purchasing vaccine from any independent source, but it does limit their reimbursement to the cost obtainable through such a contract. This provision was greatly needed to eliminate the confusion that was resulting under the old system, whereby the community bought the vaccine at whatever price it could obtain it and was reimbursed by the county for this cost. Under this system there was the widest diversity of prices, the system also being open to the possibility of considerable abuse. This law, which becomes effective January 1st, 1935, will be of definite assistance in future rabies control.

*Scarlet Fever.* Scarlet fever, with only 8,391 cases reported, reached the lowest recorded level since 1922. At the same time the deaths fell to about 76, the second lowest number ever recorded for scarlet fever. The explanation for this surprisingly low figure is to be found in the fact that during the past three years scarlet fever has rather thoroughly "burned over" the more populous sections of the State. It is now more prevalent in the more sparsely settled sections, with the inevitable result that the reported incidence is low. Unfortunately, it is not possible to claim for public health work any credit for the present situation.

The immunization studies which were begun in the fall of 1931 have been pursued even more actively during 1934, using as an immunizing agent a formalized toxin solution. Whether the immunizing effect so obtained is due to a true toxoid or to the residual free toxin may be open to dispute. Suffice it to say here, however, that through the use of such a solution it has been possible to obtain in about 70 per cent of the children so treated a level of immunity sufficient to cause a negative Dick test. Immunization with this solution has been continued as a routine procedure in the schools for the feeble-minded and in the Department's hospitals for childhood tuberculosis. The children in many orphanages and schools have likewise been so treated, and the studies have been extended to certain groups of nurses. In Wellesley, East Bridgewater and Framingham community programs have been begun, and as the year closes a limited community program is being carried on in the city of Worcester. The effect of this immunization as measured by the prevention of scarlet fever in those so treated has been extremely encouraging, no case having occurred in a child immunized to the point of a negative Dick test. Furthermore, the results have shown a very high degree of specificity for the Dick test. This solution produces reactions which are so mild as compared with those following the usual scarlet fever immunizing agent that if its effectiveness can be demonstrated there seems little doubt as to its popular acceptance.

The Department has continued to assist boards of health in the collection of convalescent scarlet fever serum for passive immunization of family contacts of such cases. Among the boards of health which have obtained a supply for this purpose are Arlington, Brockton, Hingham, Lynn, Malden, Natick, Newton, Norwood, Peabody and Watertown.

*Septic Sore Throat.* Two hundred one sporadic cases of septic sore throat have been reported. The year was characterized by an apparent absence of any milk-borne outbreaks of this disease. It is questionable as to the exact significance of this reported incidence of sporadic cases, as the diagnosis of septic sore throat is based on very indefinite criteria. There are unquestionably many more cases of a severe and somewhat malignant throat infection than are indicated by the above figures. In the majority of these, cultural work would show the presence of hemolytic streptococci and probably many of these would in turn be of the epidemicus type. Unquestionably these cases are spread through the upper respiratory tract. The factors underlying the spread and contributing toward the development of clinical symptoms are, however, far from clear. As a public health problem these cases appear of importance solely because of the possible spread of an infection to a person who because of his occupation can in turn infect a cow. This in turn may mean an explosive widespread milk-borne outbreak if the milk is used raw. There is no evidence, however, to suggest that these sporadic cases are due to infected milk.

*Smallpox.* For the second consecutive calendar year Massachusetts has been free of smallpox, the last cases reported having occurred in Fitchburg in February, 1932. Throughout the United States the disease has been at an abnormally low

level, irrespective of the vaccination status of the community. From the point of view of the public health this is extremely gratifying, provided, however, it does not lull us into a sense of complacent assurance that this freedom from the disease can be maintained forever without resorting to continued vaccination. The history of smallpox is so full of such remissions that there is no excuse for being deceived by the present situation.

*Tuberculosis.* The past year has seen a decline in both pulmonary and extra-pulmonary deaths to figures lower than ever heretofore attained. For the first time in the history of the State the pulmonary tuberculosis deaths fell below 2,000. Coincidental with this decline in tuberculosis deaths was a slight increase in the reported incidence of the disease. Whether this is the result of better recognition and reporting or is the first sign of a deleterious effect of the recent economic conditions may be open to dispute. The former explanation is, however, the more plausible inasmuch as the death rate has declined so strikingly.

*Typhoid Fever.* The incidence of typhoid fever continued to decline during 1934, reaching a record low figure both for cases and deaths. One hundred thirty-four cases were reported as compared with 162 for last year. At the same time the deaths declined to 13, as compared with 22 for 1933. The incidence of this disease is now so low that a relatively small epidemic in a single year might spoil an otherwise enviable record. The largest local outbreak during the year occurred in Mansfield, where four cases occurred simultaneously. Although it was virtually impossible to obtain accurate information, there is no question but that these cases were related and directly traceable to a carrier. Of the cases reported, the source of infection was found in 28 instances, 21 of which were traced to recognizable carriers. No cases were recognized that were directly traceable to either public water supplies or milk. The following table shows the typhoid carrier discovery rate for the past six years:

YEAR	Cases of Typhoid	Carriers Added to List	Rate per 100 Cases	Carriers Found in Investigation of Cases	Rate per 100 Cases
1929	307	6	2.0	4	1.3
1930	318	9	2.8	5	1.6
1931	250	6	2.4	4	1.6
1932	214	13	6.1	10	4.7
1933	162	19	11.7	14	8.6
1934	134	18	13.4	13	9.7

Of particular note in the above tabulation was the discovery in Fall River of two carriers through routine culturing of those who had had typhoid fever during recent years. This work was carried on jointly by the Fall River Board of Health and this Department, with some assistance for the former by the ERA. It demonstrates the essential soundness of a program of carrier discovery through selective culturing of those who have had typhoid fever in recent years. It also shows that such a program could be carried on by any board of health, utilizing for the field work the normal nursing staff, though under such circumstances the work would have to be spread out over a period of many months so as not to interfere with the other nursing duties.

The list of active typhoid carriers has grown from 91 at the beginning of the year to 98. Two carriers died from a condition having no relation to their carrier state. Two carriers underwent operation in the hopes of curing their carrier condition. Four carriers were removed from the list as cured following gall bladder removal. One of these was the ten year old Milford boy whose operation was referred to in last year's report, this case being of considerable interest in that through this operation this boy has been able to resume his normal place in the community without any further menace to his associates. The carrier referred to last year who had apparently failed of establishing a cure through the operation has been continued under supervision and as the year closes there is very definite evidence that the biliary passages have now cleared themselves of typhoid organisms and that a permanent cure will have been established. Only the collection of a bile specimen and diarrheal specimens remain before her name can be removed from the carrier list. This brings the number of operations to twenty-three, and in no case is there as yet any evidence of failure to establish a cure thereby.

It is gratifying to note that during the past few years there has been increasing attention to the collection of release cultures from all patients ill with typhoid fever.

As shown by the following table, 98 per cent of those having typhoid were kept under observation until at least two negative cultures had been obtained during the convalescence. Only three patients were released from observation without this precaution, these patients being in New Bedford, Taunton and Tewksbury. Of those recovering from typhoid, six are still under observation as probable carriers, though they will not be considered as permanent carriers until a year from the date of their onset. This careful supervision of the current cases inevitably means that fewer unrecognized carriers will be released into the community to cause infections among their associates.

Year	Reported Cases	Deaths	Living Cases	Number Having Release Cultures	Per Cent Release Cultures
1928	310	36	274	178	65
1929	307	42	265	191	72
1930	318	38	280	236	84
1931	250	30	220	192	87
1932	214	25	189	172	91
1933	162	22	140	132	94
1934	134	13	121	118	98

*Undulant Fever.* Fifteen cases of undulant fever were reported. In all instances the source of infection was apparently raw milk. So long as certain persons insist upon using such milk, cases of this disease will occasionally appear. Several of the victims during the past year have been sadly disillusioned as to raw milk, realizing for the first time apparently that the milk from a model dairy boasting a fancy herd might still be the vehicle for the transmission of human disease.

*Whooping Cough.* With 12,659 cases of whooping cough reported for the year, this disease reached a higher incidence than ever previously recorded. Although the deaths reached the highest level since 1930, the case fatality rate was the same as for 1933, which was the lowest on record. Because of the decline in other diseases whooping cough is rapidly coming to the point where it may be thought of as the communicable disease, exclusive of tuberculosis and pneumonia, which causes the greatest number of human deaths. Encouraging work is being reported from other parts of the country indicating that we may ultimately look forward to a fairly satisfactory immunizing agent against this disease.

#### OUTBREAKS

*March.* Gastro-enteritis; Cohasset. Several hundred cases of gastro-enteritis spread apparently through water. Probably due to temporary use of wells, the last use of which in 1931 was followed by a similar disturbance.

*March.* Gastro-enteritis; Fitchburg. Gastro-enteritis affected some two or three thousand people in one section of the city. The disturbance was apparently water-borne, confined to one section of the high pressure system and an adjoining part of the low pressure system where the two systems are cross connected. Although exact proof as to etiology is lacking, it is known that CWA workers had been employed on the watershed; there had been no facilities for the disposal of their excreta; and that the outbreak followed closely upon the thaw with consequent rapid run-off on the watershed.

*June.* Gastro-enteritis; Natick. Following a church supper attended by over seventy people, about fifty persons became acutely ill with onsets varying from less than one hour to three or four hours. Chicken salad was unquestionably responsible for the illness, the chicken of which was the responsible vehicle. Although symptoms strongly suggested staphylococcal infection, no etiological agent was found in the laboratory.

*June.* Gastro-enteritis; Dedham. Following a supper at a private school, about twenty-five out of forty persons became ill with a somewhat milder condition than occurred in Natick. Infection apparently spread through chicken salad.

*June.* Gastro-enteritis; Maynard. For three or four weeks sporadic cases of gastro-enteritis occurred in Maynard, culminating in an outbreak of some two or three hundred cases. Examination of the water supply showed demonstrable contamination, though the epidemiological facts would not warrant the conclusion that the cases were of necessity water-borne. Widal's obtained from some of the cases showed a negative reaction.

*July.* Bacillary dysentery; Waverley. Beginning about the middle of May there had been intestinal disturbances among attendants and patients in the Fernald School, reaching a total of something over one hundred cases. Stool specimens revealed bacillary dysentery of the Hiss-Y or Flexner type.

*August.* Bacillary dysentery; Northampton. An extensive outbreak of bacillary dysentery of the Hiss-Y type at the State Hospital, apparently spread through contact infection.

*August.* Gastro-enteritis; Dracut. The occurrence of a small outbreak in the Collinsville section suggested a contact infection spread through the upper respiratory tract.

*August.* Gastro-enteritis; Norfolk. An explosive outbreak of gastro-enteritis at the Norfolk Prison Colony beginning in the farm colony outside the prison walls about twelve to twenty-four hours before appearing inside the walls. The source of infection was not found, though it was rather definitely proven that food was not the cause.

*August.* Gastro-enteritis; Marshfield. An outbreak affecting about thirty boys and girls at a Green Harbor camp. On August 1, three of the boys at the camp started out on a hike and were picked up by a clergyman and taken to lunch at the house that he was visiting. The next evening the three boys became ill. A boy at the home they had visited became ill at the same time. The remainder of the cases developed within the next few days. The epidemiological findings pointed strongly toward a respiratory spread.

*September.* Bacillary dysentery; Warren. Bacillary dysentery of the Hiss-Y type in three related families in West Warren. In each family what was considered a gastro-enteritis had gone progressively through the members of the household. From a single member of two different families organisms of the Hiss-Y strain were isolated. A well used in common by the three families was found to be grossly polluted. In each family the infection was apparently spread by contact.

*September.* Typhoid Fever; Watertown. Investigation of three cases of typhoid fever with one death in a Watertown family brought to light a typhoid carrier in Ontario, at whose home the patients had visited shortly before their illness.

*October.* Scarlet fever; Agawam. About twenty-five cases of scarlet fever and many cases of sore throat developed among one hundred and fifty persons attending a wedding breakfast. The majority of these cases occurred in and around Springfield. The probable vehicle of infection was the chicken salad and the possible source of the infection was the bride's mother, who, with a guest from Brooklyn prepared the salad.

*October.* Gastro-enteritis; Salem. About forty cases of gastro-enteritis appeared among hospital employees and patients, apparently due to contact and food infection. The first known case was in a maid who apparently infected employees of the diet kitchen. The infection of the latter was followed by an explosive outbreak throughout the hospital.

*October.* Typhoid fever; Mansfield. Investigation of four cases of typhoid fever occurring almost simultaneously in a particular social group brought to light typhoid carrier in the person of the mother of one of the patients. There is good reason to presume that the other cases were infected through this same source.

*October.* Gastro-enteritis; Pittsfield. An explosive outbreak of about thirty cases occurred in a CCC camp. These were probably due to drinking from a brook which was open to pollution.

*December.* Gastro-enteritis; Monroe. Investigation of gastro-enteritis showed that the only common factor was a water that was chlorinated during the summer and not during the winter. All of the cases appeared during the spring months before chlorination began and in the fall after chlorination ended. There were no cases reported during the period when the ground and surface coverings were frozen.

#### GNORRHEA AND SYPHILIS

During 1934 reports of gonorrhoea or syphilis were received from 1,057 physicians, as compared to 1,067 in 1933. Thus 17.6 per cent of the 6,019 physicians known to the Department reported one or the other or both of these diseases during 1934. Gonorrhoea was reported by 845 (14 per cent) and syphilis by 360 (6 per cent), an

increase of 21 in those reporting gonorrhea and a decrease of 68 in those reporting syphilis as compared to 1933. Of the 1,057 reporting, 200 had not reported either disease previously (18.9 per cent of those reporting). Since the first of 1930, when reports were first made directly to this Department, 2,203 different physicians have reported either disease or both at one time or another, approximately 36.6 per cent of all physicians in the State. This is to be compared with the evidence which the Department has that slightly over 50 per cent of the physicians in the State treat either gonorrhea or syphilis or both.

There was a decrease of 53 cases of gonorrhea from 6,591 in 1933 to 6,538 in 1934, and an increase of 5 cases of syphilis from 4,466 in 1933 to 4,471 in 1934 (Table IV and Table IX). Physicians reported 48.4 per cent of the gonorrhea (exactly the same as in 1933); clinics reported 43.2 per cent as compared to 43.6 per cent last year; and institutions reported 8.4 per cent as compared to 8.0 per cent in 1933. Physicians reported 20.6 per cent of the syphilis as compared to 20.4 per cent last year; clinics reported 65.8 per cent as compared to 64.2 per cent last year; and institutions reported 13.6 per cent as compared to 15.4 per cent in 1933. Thus there was relatively little change either in the total number of cases of either disease reported or in the distribution of source of report.

Of the 355 communities in the State, only 72 reported no cases of either gonorrhea or syphilis, as compared to 101 last year.

There were 159 deaths from syphilis at a death rate of 3.7 per 100,000 population. If deaths from general paralysis of the insane and tabes dorsalis are included, the total deaths from syphilis was 367 at a rate of 8.5 per 100,000 population (Table XIV).

There is reasonably good evidence of a decline in syphilis in Massachusetts. This evidence has five sources:

First, the death rate from syphilis in all forms has declined from a rate of 15.5 per 100,000 population in 1918 to 8.5 per 100,000 in 1934.

Secondly, admissions for general paralysis of the insane to mental disease hospitals in Massachusetts have declined since 1917 from a rate of 8.7 per 100,000 population to just over 5 per 100,000 in 1934.

Thirdly, although the total number of cases of syphilis reported during each of the last five years has remained fairly constant for each year (between 4,200 and 4,500 cases), the rate per 100,000 population of early syphilis (primary and secondary) has declined steadily among males from 43.2 to 30.8 and among females from 27.8 to 18.7. Thus the maintenance during the last five years of total cases at an approximate level is to be accounted for by the progressively more frequent discovery of late syphilis.

Fourthly, 17 prenatal clinics in the State have reported for some 15,000 pregnant women examined for syphilis during the past five years that only 2.79 per cent had positive or doubtful Wassermanns as compared to 80.3 per cent in a series of more than 10,000 pregnant women reported by Hinton for the five years, 1915-1919.

Fifthly, new admissions to the 14 State-aided clinics for syphilis have declined since 1925 from 3,519 to 2,321 in 1934. This is a decline in new admissions of 34.1 per cent and has taken place in face of the fact that the present economic situation should tend to force more patients into the clinics and also in spite of the fact that other clinics in the same out-patient departments are more and more adopting serological examination of their patients as a routine procedure.

It is regrettable, but in a sense confirmative of this apparent decline in syphilis, that there has been no evidence whatsoever of a decline in the prevalence of gonorrhea, although there has been some apparent shifting of the reported infections out of the earlier and into the older age groups.

*Clinics.* The Taunton Board of Health has opened and is maintaining a small clinic for the treatment of gonorrhoea and syphilis in that city, and a clinic for the treatment of these diseases at the Beverly Hospital has come to light. Neither of these new clinics sends monthly reports to this Department so that our clinic statistics are still based upon reports from the twenty-six clinics which have been in existence for many years.

The Lynn Clinic now has a full-time social worker and thus becomes the fourth clinic to add this service during the past four or five years. The clinic has been taken over administratively by the Lynn Hospital, and the Lynn Health Department contributes to its maintenance by paying at least in part for the treatment at the clinic of Lynn residents.

The fourteen clinics aided by this Department admitted 2,740 new cases of gonorrhoea and 2,321 new cases of syphilis, a total of 5,061 for this year as compared to 5,150 in 1933. These patients made 232,865 visits, an increase of 4,425 over 1933. The total attendance at these fourteen clinics was 13,585 different individuals, an increase over 1933 of 104. Thus the decline in new admissions, the increase in visits and the increase in individuals attending the clinics indicate that more regular and substantial treatment is being given to the patients attending these clinics.

There is good evidence that clinics are not using the Department's "Information for the Patient" to the greatest advantage. Clinics report more than 65 per cent of the cases of syphilis but have used barely 4,000 pamphlets on syphilis as compared to nearly 12,000 used by physicians during the last four years. At least 18,000 patients with syphilis have passed through the clinics during that period, which would indicate that only one out of every six patients has received this literature. There is evidence also that of the 17,000 patients with gonorrhoea, only two out of every three have been given the Department's literature. It would be assumed, naturally, that since the clinic physicians and personnel in general are pushed to the extreme to handle the large number of clinic patients, they would welcome informative material to supplement what little may have been said in a personal way in the extremely short time available to each patient.

The experiment has been tried of publishing "now and then" a bulletin entitled "This and That" for the purpose of calling to the attention of clinics certain facts of importance. Three such bulletins have been published to date, the first discussing the importance of time factors in the clinic, the second discussing delinquencies from treatment, and the third, the use of informative literature.

*Boards of Health.* In the fall of 1933 all of the clinics in the State were advised to charge local boards of health for services rendered in treating patients who have gonorrhoea or syphilis and who are unable to pay the relatively small clinic fee. For the year 1934, reports from six clinics disclose that of bills totaling \$3,516.26, there have been collected from boards of health \$2,476.27. This is excellent evidence that the various boards of health are beginning to assume their legal responsibilities. These six clinics collected from forty-nine different boards of health.

One hundred and fifty-three boards of health followed 3,578 persons reported by name for having prematurely discontinued treatment or as having been exposed to or responsible for the infections of others. Forty-five and eight-tenths per cent of these persons were found as compared to 44.9 per cent of 3,989 persons so reported last year. No final reports of the results of their investigations could be obtained from fifty cities and towns in 4.9 per cent of the cases.

*Arsenicals.* The total distribution of arsenicals increased from 49,403 grams in 1933 to 54,896 grams in 1934. Physicians received 19.2 per cent of the arsenicals distributed as compared to 16 per cent last year, and 418 different physicians applied for it as compared to 354 last year. Only 65.2 per cent of these 418 physicians have reported syphilis since the distribution of arsenicals was begun, and only 62.7 per cent of the 1,071 physicians who have ever used State arsenicals have reported syphilis since the distribution of arsenicals to physicians was begun.

*Laboratory.* The Wassermann Laboratory reported 119,819 blood and spinal fluid examinations for syphilis, and the Bacteriological Laboratory reported 9,683 smears examined for gonorrhoea.

In April of this year the Hinton test became the routine serological test for syphilis at the State Laboratory, following conferences with the State's outstanding syphilologists and serologists.

*Education and Information.* During the year the medical staff of the Subdivision lectured to 51 different groups, chiefly professional, such as, nurses, medical students and physicians. In addition, many thousands of persons were reached by our Public Health Education Worker, who, as full-time lecturer jointly for this Department and the Massachusetts Society for Social Hygiene, is constantly in the field.

One ten-minute broadcast on gonorrhea and syphilis was given over WEEI and was the eighth in a series of such broadcasts over the last four years. The Division of Adult Hygiene, through which the Department's broadcasting service is arranged, sends similar material to some seventy newspapers throughout the State. It is impossible to learn how many of these newspapers use this material because relatively few of them contribute to the Clipping Bureau Service. The Division of Adult Hygiene reports that it has record of seven papers having used the material on gonorrhea. During the Social Hygiene Institute in Springfield, the Springfield newspapers contributed liberally of their space, and when Dr. Parran, Commissioner of Health of New York State, was refused permission to mention syphilis over the Columbia network, several Massachusetts newspapers gave publicity to the incidence and some of them commented editorially upon the "prudish attitude" of that broadcasting system.

The Department has cooperated with the Massachusetts Society for Social Hygiene in conducting two institutes during the year—one for the Massachusetts State League of Nursing Education and the other for the City of Springfield. Both of these institutes were well attended and should contribute materially to the better understanding of these two diseases. It is hoped that out of the institute for the Massachusetts State League of Nursing Education there will come the development of social hygiene as an integrated part of courses in the nurses' training schools.

During the year some 90,000 pieces of literature have been distributed by the Subdivision.

*The Medical Profession.* As a direct result of a meeting called by the Department in 1930 the Massachusetts Neisserian Medical Society was organized and for four years has been making a critical study of the management of gonorrhea, both for the enlightenment of its own members and for that of the medical profession as a whole. The Society has already published two papers and the third is in the hands of the printers. This local Society has attracted such national attention that in June, during the sessions of the annual meeting of the American Medical Association, the American Neisserian Medical Society was organized. It has 115 charter members from 24 different states. This is good evidence of increasing interest on the part of the medical profession in a disease which has been well characterized by Pelouze as "the stepchild of medicine."

Progress was also indicated by the formation in the Massachusetts Medical Society of a section on Dermatology and Syphilology.

#### LOBAR PNEUMONIA STUDY

The fourth year of the pneumonia study, made possible by the Commonwealth Fund of New York, has been completed. Serum has been made available in additional areas so as to now serve about two-thirds of the population of the State. Use of the serum has continued to give striking results in certain cases, the fatality rate of Type I pneumonia being reduced approximately two-thirds and Type II about one-half, these figures being based on the treatment of over 500 patients. The acceptance by the National Institute of Health of a standard unit for the serum (pneumococcus antibody solution) has made possible the evaluation of the result in terms of unitage. These figures show that since the beginning of the study the potency of the serum produced has increased over 100 per cent. As dosage has been heretofore based upon volume, these studies indicate that it may be possible to reduce the amount of serum used on a patient without lessening its effectiveness. Consequently, it is planned during the coming pneumonia season to base the dosage upon units. If this is successful it will make possible a considerable saving in serum which will be of great importance in the problem of the ultimate take-over of serum production and distribution at State expense.

In the diagnostic laboratory the work on the Neufeld method of typing has been continued, a report being published on the basis of 760 specimens examined. The

results through this method have been so successful that when the period of study is concluded, it will probably, where applicable, supplant all other methods of typing. This will be of great importance from both the clinical and laboratory standpoint.

Studies in the improvement of the serum have been continued at the Antitoxin and Vaccine Laboratory. Reference has already been made to the increased potency in terms of units. There are still many problems in the elimination of reaction-producing substances, though, since the development of methods for testing on monkeys, chill reactions have been materially reduced.

The principal problem during the year, aside from the ever-present problem of serum improvement, has been the formulation of plans for the continued distribution of the pneumonia serum under State auspices after the withdrawal of outside financial assistance. The cost of the serum is too great to permit of the same unlimited distribution as for other biologic products. Yet for the serum to be effective it must be made promptly available for those patients who may profit from it. During the past year a plan has been tried in certain areas whereby the serum is entrusted to hospital laboratories prepared to do pneumococcus typing, the serum to be released only if the sputum yields a Type I or II pneumococcus, and the patient has been ill less than ninety-six hours. The development of rapid typing through the Neufeld method eliminates delay through waiting for the laboratory findings. Such a plan of distribution makes the serum available to every licensed practitioner, yet reduces wastage of serum on patients to whom it can be of no possible benefit. This plan is being tried in the Boston, Newton, Cambridge, Quincy, Norwood, Greenfield, North Adams and Worcester areas, and appears to be successful. The problem that presents itself during the coming year is that of extension of serum so that by the end of 1935 it will be available in all sections of the State. This means development of typing services in many additional hospitals, as well as educational work among the physicians to make them better acquainted with the details of serum therapy.

#### MILK

The past year has been unusually free from the point of view of milk-borne disease, no cases of typhoid, scarlet fever or septic sore throat being directly traceable to such a source. Fifteen cases of undulant fever have appeared, in almost all of which there was a history of consumption of raw milk from a herd known to be infected with contagious abortion.

The most significant development during the year from the point of view of the protection of the milk supply was in the city of Attleboro, where a milk dealer went to court to challenge the validity of a regulation requiring pasteurization or certification of all milk. This case, which was heard in the Superior Court, resulted in a verdict upholding the regulation, but the case has now been appealed to the Supreme Court. This case is of more importance than merely its bearing on the Attleboro situation, as similar regulations are being enforced in some dozen other Massachusetts cities and towns. The Department lent its support to the Attleboro Board of Health in this case and assisted in obtaining a large number of expert witnesses for the hearing. The Board of Health of Quincy has adopted the same regulation, but has withheld its enforcement pending the outcome of the appeal to the Supreme Court. In the meantime, however, similar regulations have been adopted in Cambridge, Framingham, Stoneham and Wellesley, and are under consideration in a number of other communities. Such regulations, which have been upheld in the Supreme Courts of five other states, present the only protection against the continued spread of communicable disease through milk.

#### DISTRICT HEALTH UNITS

(1) *Cape Cod Health Bureau.* There has been no outstanding event or development in the activities of this county health unit during the past year. The routine work has been carried on efficiently, but little or no effort made to extend the scope of the program. A survey of the program was made by one member of the County Medical Society, but brought to light no new worth-while suggestions.

(2) *Southern Berkshire Health Unit.* The outstanding event of the past year has been the first expression of public opinion through vote of town meeting. In

the annual spring meeting of the sixteen towns an article was inserted as to the entry of the town in a formal union, under the provisions of Chapter 209 of the Acts of 1932. Favorable votes were obtained in Becket, Great Barrington, Monterey, Mount Washington, Richmond, Sheffield and Tyringham. Adverse votes were passed in Egremont and Sandisfield. New Marlboro failed to take any action, while in the towns of Alford, Lee, Lenox, Otis, Stockbridge and West Stockbridge the article was laid on the table. During the summer the seven towns accepting the article have organized to form the legally constituted Southern Berkshire Health District, with Dr. Mortimer T. Cavanaugh as Chairman. At the meeting of 1935 the article will be resubmitted to the towns which have not yet joined the union and it is anticipated that favorable action will be taken in at least some of them.

As a means of disseminating knowledge as to the aims and accomplishments of public health work, a series of "Health Days" was conducted in many of the Berkshire towns. Such "Health Days" were held in the spring in Alford, Chester, Egremont, Sheffield and West Stockbridge. During the fall similar "Health Days" have been conducted in Monterey, Mount Washington, New Marlboro, Otis and Sandisfield.

The ultimate future of this union is, of course, problematical. There is unquestionably a nucleus of towns that are interested in the conduct of a modern public health program such as is obtainable only through inter-town cooperation. Unquestionably there are many people in other towns who are sympathetic to the union, but the financial difficulties of these towns and an aggravated sense of town independence constitute serious stumbling blocks. Only time will tell whether or not a sufficiently large number of towns will be interested to make such a unit a feasible proposition.

(3) *Nashoba Health District.* This district has seen few outstanding developments during the past year. The energies of the personnel have been devoted to strengthening the program of work and to the dissemination of knowledge as to the work of the union. The first vote at town meeting will be taken this coming spring, when an article will be inserted in each town meeting aimed at the creation of a legal health union. It has been felt advisable by the local representatives of the towns in this district to provide in this warrant for complete take-over as of January 1, 1936. It is, of course, too early to predict what action will be taken, though there are reasons for believing that a substantial number of towns are already sufficiently appreciative of the union so that favorable action will be taken in them.

#### LOCAL BOARD OF HEALTH RECORDS

It has long been realized by this Department that in many communities the board of health records pertaining to communicable diseases were in such an unsatisfactory state that much of their value was thereby lost. In many instances owing to this condition the maximum use was not being made of the records in directing future control programs. Particularly has this been true with respect to the diphtheria immunization records.

During the past year, through the generosity of the Commonwealth Fund, it has been possible to have a member of the divisional staff visit many boards of health to analyze their records and assist in the establishment of permanent improvements. Miss Helen M. Smith, statistical clerk in the Division, was delegated to this work. Much of her time has, of course, been spent with the Southern Berkshire and Nashoba Units, inasmuch as these being likewise supported by the Commonwealth Fund had a prior claim on her time. Other communities visited during the year have been Braintree, Brockton, Everett, Framingham, Lawrence, Ludlow, Lynn, Malden, Medford, Natick, New Bedford, Newburyport, Norwood, Southbridge, Watertown and Wellesley. In some of these several separate visits have been made. In all instances this service has apparently been greatly appreciated and it is therefore a source of considerable satisfaction that funds are now available for the continuation of it for another year.

#### DISTRICT HEALTH OFFICERS

During the formative stages of the Southern Berkshire and Nashoba Units it was deemed advisable to delegate one District Health Officer whose duties should be largely in connection with these areas. Toward the end of 1933 an adjustment was

made whereby the contacts with these should be made by Dr. Miner and Dr. Dudley, respectively. This change in policy was followed shortly by the resignation of Dr. Knowlton, who assumed the position as Assistant Superintendent of the Peter Bent Brigham Hospital. His position was filled by the transfer of Dr. Sullivan from the Pondville Hospital, whereupon a rearrangement of the districts was made so as to provide for seven rather than six districts. This was effected through an enlargement of the Metropolitan area, following which this area was divided into two parts, Dr. Sullivan taking charge of the southern portion. This has made it possible to give a much more adequate service to a group of the towns in this section of the State.

The District Health Officers have carried on efficiently the usual duties assigned to them. With the increasing sense of local responsibility for diphtheria immunization clinics less of their time is at present devoted to this. Whatever time has been thus released has been more than demanded during the past year with the change of the tuberculosis clinics from a State to a local basis. During the next few years more of their time will therefore be taken over for the problem of childhood tuberculosis clinics.

#### BACTERIOLOGICAL LABORATORY

As shown by the accompanying table, the demand on the Bacteriological Laboratory has been heavier during the past year than in 1933, more specimens being examined than in any previous year. This increase in load is particularly significant in the face of a marked decline in both diphtheria and typhoid. In the case of the latter it has meant more intensive work on the residual cases. Much of the increase in stool cultures was due to the outbreaks of dysentery in several institutions under the Department of Mental Diseases, as well as to the follow-up of former cases of typhoid under ERA auspices.

The most significant work in the laboratory during the past year has been the continuation of the studies on pneumococcus typing. These studies have shown very conclusively that the Neufeld method can apparently be substituted for other methods without sacrificing accuracy. This is of considerable importance in view of the fact that it reduces the time required for typing from a minimum of four or five hours to only a few minutes. This shortened time makes it therefore possible to delay serum treatment until the type can be determined, thus avoiding the unnecessary use of serum on patients who could not be expected to benefit from it.

Studies have likewise been conducted as to the comparative results of guinea pig inoculation and cultural methods with specimens to be examined for tubercle bacilli. No definite conclusions have as yet been drawn from these studies.

#### PUBLIC HEALTH EDUCATION

During the past year speakers in the Division gave 77 talks, exclusive of those referred to under Gonorrhoea and Syphilis. Over 5,400 people were reached. In addition, three radio talks were given.

TABLE I. — *Anterior Poliomyelitis*

YEAR	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1930	503	11.8	35	.8	7.0
1931	1,428	33.4	114	2.7	8.0
1932	61	1.4	13	.3	21.3
1933	353	8.2	32	.7	9.1
1934	76	1.8	9	.2	11.8

TABLE II. — *Diphtheria*

1930	3,322	78.1	182	4.3	5.5
1931	2,381	55.7	130	3.0	5.4
1932	1,811	42.1	107	2.5	5.9
1933	1,041	24.1	86	2.0	8.3
1934	629	14.5	50	1.2	7.9

TABLE III. — *Epidemic Cerebrospinal Meningitis*

YEAR	Cases	Case Rate per 100,000	Deaths	Death Rate per 100,000	Fatality Rate (Per Cent)
1930	174	4.1	59	1.4	33.9
1931	101	2.4	30	.7	29.7
1932	83	1.9	34	.8	41.0
1933	50	1.2	25	.6	50.0
1934	66	1.5	28	.6	42.4

TABLE IV. — *Gonorrhoea*

1930	6,974	163.9	7	.2
1931	7,201	168.4	5	.1
1932	6,738	156.8	4	.1
1933	6,591	152.6	7	.2
1934	6,538	150.7	11	.3

TABLE V. — *Lobar Pneumonia*

1930	4,333	101.8	1,883	44.3	43.5
1931	3,873	90.6	1,718	40.2	44.4
1932	4,028	93.7	1,688	39.3	41.9
1933	4,277	99.0	1,825	42.3	42.7
1934	3,976	91.6	1,601	36.9	40.3

TABLE VI. — *Measles*

1930	27,137	637.8	137	3.2	.5
1931	16,581	387.8	64	1.5	.4
1932	19,763	459.9	64	1.5	.3
1933	15,067	348.9	27	.6	.2
1934	44,817	1,032.8	91	2.1	.2

TABLE VII. — *Scarlet Fever*

1930	9,408	221.1	98	2.3	1.0
1931	12,782	298.9	101	2.4	.8
1932	16,580	385.8	145	3.4	.9
1933	12,284	284.5	108	2.5	.9
1934	8,391	193.4	76	1.8	.9

TABLE VIII. — *Smallpox*

1930	2	-
1931	6	-
1932	43	-
1933	-	-
1934	-	-

TABLE IX. — *Syphilis*

1930	4,197	98.6	149	3.5
1931	4,447	104.0	168	3.9
1932	4,530	105.4	162	3.8
1933	4,466	103.4	154	3.6
1934	4,471	103.0	159	3.7

TABLE X. — *Tuberculosis, Pulmonary*

1930	4,696	110.4	2,423	56.9
1931	4,421	103.4	2,306	53.9
1932	3,994	92.9	2,041	47.5
1933	3,541	82.0	2,059	47.7
1934	3,585	82.6	1,902	43.8

TABLE XI. — *Tuberculosis, Non-Pulmonary*

1930	.	.	.	.	587	13.8	311	7.3
1931	.	.	.	.	555	13.0	248	5.8
1932	.	.	.	.	466	10.8	260	6.1
1933	.	.	.	.	466	10.8	222	5.1
1934	.	.	.	.	448	10.3	214	4.9

TABLE XII. — *Typhoid Fever*

1930	.	.	.	.	318	7.5	38	.89	11.9
1931	.	.	.	.	250	5.8	30	.70	12.0
1932	.	.	.	.	214	5.0	25	.58	11.7
1933	.	.	.	.	162	3.8	22	.50	13.6
1934	.	.	.	.	135	3.1	13	.3	9.6

TABLE XIII. — *Whooping Cough*

1930	.	.	.	.	10,750	252.6	182	4.3	1.7
1931	.	.	.	.	7,174	167.8	88	2.1	1.2
1932	.	.	.	.	7,881	183.4	107	2.5	1.4
1933	.	.	.	.	9,834	227.7	97	2.2	1.0
1934	.	.	.	.	12,659	291.7	125	2.9	1.0

TABLE XIV. — *General Paralysis of the Insane*

YEAR	DEATHS		FIRST ADMISSIONS TO STATE INSTITUTIONS FOR MENTAL DISEASES		
	Deaths	Death Rate per 100,000	First Admissions	Rate per 100,000	Per Cent of All First Admissions
1930	168	3.9	227	5.3	7.2
1931	166	3.9	203	4.8	6.4
1932	166	3.9	206	4.8	6.6
1933	147	3.4	209	4.8	6.5
1934	161	3.7	226	5.2	6.9

TABLE XV. — *Gonorrhoea and Syphilis Treated in Clinics and Institutions*

YEAR	NEW CASES		Visits	Number of Clinics
	Gonorrhoea	Syphilis		
1930	2,747	2,968	217,452	25
1931	3,040	2,631	206,433	25
1932	2,978	2,876	249,263	26
1933	3,117	3,063	261,867	26
1934	3,003	2,998	268,520	26

*Institutions*

YEAR	NEW CASES		Visits	Number of Clinics
	Gonorrhoea	Syphilis		
1930	356	723	-	25
1931	436	823	-	24
1932	522	987	-	24
1933	464	946	-	24
1934	435	803	-	24

TABLE XVI. — *Grams of Arsphenamine, Sulpharsphenamine and Neosarsphenamine Distributed*

YEAR	Arsphenamine	Sulpharsphenamine	Neosarsphenamine	Total
1930	9,802	12,915	22,284	45,001
1931	9,235	13,676	26,987	49,898
1932	8,681	8,394	27,815	44,890
1933	7,984	4,339	37,080	49,403
1934	8,037	4,453	42,407	54,897

TABLE XVII.—*Grams of Arsenicals Distributed to Clinics, Institutions and Physicians*

YEAR	Clinics and Institutions	Physicians
1930	36,103	8,898
1931	40,714	9,183
1932	36,903	6,987
1933	41,549	7,854
1934	44,284	10,613

TABLE XVIII.—*Laboratory Examinations—1934*

	Positive	Negative	Total for 1934	Total for 1933
Diphtheria:				
Diagnosis	191	6,401	6,592	7,263
Release	512	2,483	2,995	1,559
Tuberculosis:				
Sputum	805	4,438	5,243	5,037
Animal Inoculations	20	203	223	196
Typhoid Fever:				
Widal	109	1,942	2,142*	2,237**
Culture (blood, feces, urine, etc.)	144	5,903	6,047	3,860
Gonorrhoea	1,955	7,728	9,683	9,019
Malaria	1	51	52	53
Pneumococcus type determinations	—	—	1,257	1,314
Hemolytic streptococci	—	—	1,906	1,353
Spinal fluid for meningococci	—	—	15	4
Undulant fever	62	395	457	374
Miscellaneous	—	—	1,187	1,213
Total			37,799	33,482

Includes 91 atypical.

\*\*Includes 94 atypical.

TABLE XIX. — *Laboratory Examinations for Rabies\**

YEARS	Positive		Negative	Total Animals Examined
	Dogs	Other Animals		
1930	292	18	161	471
1931	290	14	211	515
1932	125	6	130	265
1933	139	5	153	301
1934	242	9	234	497

\*Wassermann Laboratory

*Cases and Deaths, with Case and Death Rates per 100,000 Population\* for Reportable Diseases During the Year 1934*

DISEASES	Cases	Case Rate per 100,000 Population	Deaths	Death Rate per 100,000 Population	Fatality Rate (PerCent)
Actinomycosis . . . . .	1	.02	1	.02	
Anterior Poliomyelitis . . . . .	76	1.8	9	.2	11.8
Anthrax . . . . .	5	.1	0	—	
Chicken Pox . . . . .	10,990	253.3	12	.3	.1
Diphtheria . . . . .	629	14.5	50	1.2	7.9
Dog Bite . . . . .	8,863	204.3	—	—	
Dysentery, Amebic . . . . .	31	.7	3	.07	9.7
Dysentery, Bacillary . . . . .	238	5.5	17	.4	7.1
Encephalitis Lethargica . . . . .	35	.8	25	.6	
Epidemic Cerebrospinal Meningitis . . . . .	66	1.5	28	.6	42.4
German Measles . . . . .	1,005	23.2	—	—	
Gonorrhoea . . . . .	6,538	150.7	11	.3	
Leprosy . . . . .	3	.07	—	—	
Lobar Pneumonia . . . . .	3,976	91.6	1,601	36.9	40.3
Malaria . . . . .	27	.6	2	.05	7.4
Measles . . . . .	44,817	1,032.8	91	2.1	.2
Mumps . . . . .	4,310	99.3	2	.05	.05
Ophthalmia Neonatorum . . . . .	1,072**	24.7	—	—	
Paratyphoid Fever . . . . .	6	.1	1	.02	16.7
Pellagra . . . . .	9	***	13	.3	
Rabies . . . . .	1	.02	1	.02	100.0
Scarlet Fever . . . . .	8,391	193.4	76	1.8	.9
Septic Sore Throat . . . . .	201	4.6	60	1.4	29.9
Smallpox . . . . .	—	—	—	—	
Syphilis . . . . .	4,471	103.0	159	3.7	
Tetanus . . . . .	20	.5	20	.5	100.0
Trachoma . . . . .	33	.8	—	—	
Trichinosis . . . . .	46	1.1	4	.09	8.7
Tuberculosis, Pulmonary . . . . .	3,585	82.6	1,902	43.8	53.1
Tuberculosis, Other Forms . . . . .	448	10.3	214	4.9	47.8
Tuberculosis, Hilum . . . . .	855	19.7	—	—	
Typhoid Fever . . . . .	134	3.1	13	.3	9.7
Typhus Fever . . . . .	2	.05	—	—	
Undulant Fever . . . . .	15	.3	—	—	
Whooping Cough . . . . .	12,659	291.7	125	2.9	1.0
	113,559	2,617.1	4,440	102.3	

\*Population — 4,339,210

\*\*35 of these were gonorrhoeal ophthalmia.

\*\*\*Incompletely reported.



## Cases and Deaths for all Reportable Diseases by Months—1934

	JAN.		FEB.		MARCH		APRIL		MAY		JUNE		JULY		AUGUST		SEP-TEMBER		OCTOBER		NO-VEMBER		DE-CEMBER		TOTAL				
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths															
Actinomycosis	2																												
Anterior Poliomyelitis	1		1		2		1		4		2		1		16		1		8		1		1		7		76	9	
Anthrax	1649		1157		1004		2		4		5		2		87		101		101		374		1780		5		10990	12	
Chicken Pox	72	4	27	3	63	3	7	2	993	4	1149	4	1	4	51	2	37	3	70	6	68	6	68	4	629	50			
Dog Bite	340		356		498		654		843		1262		1405		1031		756		701		463		554		463		8863	3	
Dysentery, Amebic	1		2		3		2		3		2		2		1		1		1		1		2		2		31	3	
Dysentery, Bacillary	1		2		3		1		2		12		6		146		45		4		11		9		4		238	17	
Encephalitis Lethargica	7	6	3	3	4	4	7	1	3	2	2	2	2	2	2	10	4	4	1	1	2	3	1	4	4	35	25		
Epidemic Cerebrospinal Meningitis	6	4	6		7	2	8	6	4	1	5	1	6	3	2	2	5	2	5	2	5	2	2	10	4	66	28		
German Measles	47		57		57		70		148		92		25		15		19		19		45		102		1005		6338	11	
Gonorrhea	516		416		487		431		535		566		559		680		556		556		626		596		570		3		
Leprosy	710	255	550	242	551	237	532	191	329	126	241	68	155	45	90	38	90	49	181	80	262	140	285	130	285	3976	1601		
Lobar Pneumonia	5		8635	24	9891	20	9138	17	5724	11	3380	5	1	2	2	2	2	2	2	2	2	7	2	2	2	27	27		
Malaria	6069		487		644		549		576		467		207		131		75		98		91		326		650		44817	91	
Mumps	651		46		177		96		90		65		51		142		44		44		117		89		242		4310	2	
Ophthalmia Neonatorum	123														2		2		2		2		1		1		1072	1	
Paratyphoid Fever															2		1		1		2		2		2		6	1	
Pellagra															2		1		1		2		2		2		9	13	
Rabies															2		1		1		2		2		2		1	1	
Scarlet Fever	1028	10	971	5	1208	11	1000	14	1005	11	731	4	270	3	179	4	273	3	479	4	509	6	648	3	891	76			
Septic Sore Throat	16	8	21	5	24	11	18	11	31	4	22	5	16	3	15	4	7	3	17	2	9	1	5	3	201	60			
Smallpox	372	15	350	12	376	21	389	17	405	10	426	14	291	13	401	9	284	11	404	8	390	17	383	12	4471	159			
Syphilis	2				2		2		2		2		2		6		4		4		4		3		3		20	20	
Tetanus	12		1		3		2		2		5		2		1		1		1		2		2		2		33	33	
Trachoma	1		1		1		1		2		2		1		1		3		3		2		2		2		46	4	
Trichinosis	297	167	104	157	411	179	258	182	342	207	333	129	280	168	340	148	276	123	319	160	281	133	254	149	3585	1902	3585	1902	
Tuberculosis, Pulmonary	42	17	51	17	43	28	33	19	38	16	41	19	40	20	40	15	38	15	39	15	33	18	30	15	30	448	214		
Tuberculosis, Other Forms	132		27		130		27		69		42		109		78		35		47		108		51		51		855		
Typhoid Fever	4		9		3		1		8		4		1		24		22		2		15		10		1		134	13	
Typhus Fever																													
Undulant Fever																													
Whooping Cough	1759	18	1273	9	1969	15	1634	15	1318	10	970	9	930	13	596	8	506	9	411	7	642	3	651	9	12659	125			
Total	13866	518	14631	483	17568	536	15921	490	12528	409	9876	274	5588	280	4173	251	3225	230	4073	295	411	333	6546	341	113558	4440	113558	4440	



*Index to Line Numbers in the Table of Cases of Diseases Dangerous to the Public Health, 1934*

Abington . . . . .	115	East Bridgewater . . . . .	127	Ludlow . . . . .	80
Acton . . . . .	179	East Brookfield . . . . .	283	Lunenburg . . . . .	207
Acushnet . . . . .	138	East Longmeadow . . . . .	153	Lynn . . . . .	9
Adams . . . . .	67	Eastham . . . . .	304	Lynnfield . . . . .	215
Agawam . . . . .	92	Easthampton . . . . .	71		
Alford . . . . .	345	Easton . . . . .	123	Malden . . . . .	15
Amesbury . . . . .	65	Edgartown . . . . .	254	Manchester . . . . .	174
Amherst . . . . .	116	Egremont . . . . .	307	Mansfield . . . . .	111
Andover . . . . .	77	Enfield . . . . .	332	Marblehead . . . . .	79
Arlington . . . . .	23	Erving . . . . .	260	Marion . . . . .	209
Ashburnham . . . . .	203	Essex . . . . .	239	Marlborough . . . . .	55
Ashby . . . . .	272	Everett . . . . .	17	Marshfield . . . . .	241
Ashfield . . . . .	289			Mashpæ . . . . .	313
Ashland . . . . .	189	Fairhaven . . . . .	72	Mattapoisett . . . . .	244
Athol . . . . .	69	Fall River . . . . .	8	Maynard . . . . .	106
Attleboro . . . . .	38	Falmouth . . . . .	126	Medfield . . . . .	135
Auburn . . . . .	98	Fitchburg . . . . .	28	Medford . . . . .	14
Avon . . . . .	184	Florida . . . . .	335	Medway . . . . .	161
Ayer . . . . .	164	Foxborough . . . . .	119	Melrose . . . . .	33
		Frammingham . . . . .	37	Mendon . . . . .	264
Barnstable . . . . .	84	Franklin . . . . .	103	Merrimac . . . . .	188
Barre . . . . .	146	Freetown . . . . .	226	Methuen . . . . .	41
Becket . . . . .	303			Middleborough . . . . .	88
Bedford . . . . .	151	Gardner . . . . .	45	Middlefield . . . . .	346
Belchertown . . . . .	158	Gay Head . . . . .	347	Middleton . . . . .	217
Bellingham . . . . .	155	Georgetown . . . . .	214	Milford . . . . .	56
Belmont . . . . .	31	Gill . . . . .	274	Millbury . . . . .	95
Berkley . . . . .	265	Gloucester . . . . .	34	Millis . . . . .	222
Berlin . . . . .	268	Goshen . . . . .	338	Millville . . . . .	212
Bernardston . . . . .	282	Gosnold . . . . .	351	Milton . . . . .	46
Beverly . . . . .	32	Grafton . . . . .	100	Monroe . . . . .	334
Billerica . . . . .	105	Granby . . . . .	279	Monson . . . . .	127
Blackstone . . . . .	150	Granville . . . . .	293	Montague . . . . .	87
Blandford . . . . .	301	Great Barrington . . . . .	121	Monterey . . . . .	328
Bolton . . . . .	292	Greenfield . . . . .	54	Montgomery . . . . .	353
Boston . . . . .	2	Greenwich . . . . .	352	Mount Washington . . . . .	355
Bourne . . . . .	172	Groton . . . . .	186		
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Boxford . . . . .	295			Nantucket . . . . .	136
Boylston . . . . .	261	Hadley . . . . .	182	Natick . . . . .	58
Braintree . . . . .	47	Halifax . . . . .	287	Needham . . . . .	66
Brewster . . . . .	290	Hamilton . . . . .	199	New Ashford . . . . .	354
Bridgewater . . . . .	82	Hampden . . . . .	294	New Bedford . . . . .	7
Brimfield . . . . .	284	Hancock . . . . .	340	New Braintree . . . . .	317
Brockton . . . . .	16	Hanover . . . . .	168	New Marlborough . . . . .	291
Brookfield . . . . .	253	Hanson . . . . .	194	New Salem . . . . .	324
Brookline . . . . .	20	Hardwick . . . . .	206	Newbury . . . . .	233
Buckland . . . . .	245	Harvard . . . . .	277	Newburyport . . . . .	57
Burlington . . . . .	205	Harwich . . . . .	181	Newton . . . . .	13
		Hatfield . . . . .	190	Norfolk . . . . .	232
Cambridge . . . . .	5	Haverhill . . . . .	21	North Adams . . . . .	42
Canton . . . . .	118	Hawley . . . . .	333	North Andover . . . . .	102
Carlisle . . . . .	302	Heath . . . . .	322	North Attleborough . . . . .	76
Carver . . . . .	246	Hingham . . . . .	101	North Brookfield . . . . .	166
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Charlton . . . . .	202	Holbrook . . . . .	156	Northampton . . . . .	35
Chatham . . . . .	198	Holden . . . . .	134	Northborough . . . . .	211
Chelmsford . . . . .	94	Holland . . . . .	348	Northbridge . . . . .	78
Chelsea . . . . .	24	Holliston . . . . .	167	Northfield . . . . .	210
Cheshire . . . . .	234	Holyoke . . . . .	18	Norton . . . . .	175
Chester . . . . .	247	Hopedale . . . . .	171	Norwell . . . . .	236
Chesterfield . . . . .	315	Hopkinton . . . . .	180	Norwood . . . . .	53
Chicopee . . . . .	22	Hubbardston . . . . .	278		
Chilmark . . . . .	336	Hudson . . . . .	81	Oak Bluffs . . . . .	250
Clarksburg . . . . .	249	Hull . . . . .	238	Oakham . . . . .	311
Clinton . . . . .	68	Huntington . . . . .	276	Orange . . . . .	120
Cohasset . . . . .	160			Orleans . . . . .	255
Colran . . . . .	256	Ipswich . . . . .	125	Otis . . . . .	323
Concord . . . . .	90			Oxford . . . . .	142
Conway . . . . .	285	Kingston . . . . .	173		
Cummington . . . . .	306			Palmer . . . . .	86
		Lakeville . . . . .	224	Paxton . . . . .	296
Dalton . . . . .	133	Lancaster . . . . .	163	Peabody . . . . .	39
Dana . . . . .	319	Lanesborough . . . . .	263	Pelham . . . . .	314
Danvers . . . . .	59	Lawrence . . . . .	12	Pembroke . . . . .	240
Dartmouth . . . . .	83	Lee . . . . .	137	Pepperell . . . . .	165
Dedham . . . . .	52	Leicester . . . . .	128	Peru . . . . .	350
Deerfield . . . . .	170	Lenox . . . . .	177	Petersham . . . . .	300
Dennis . . . . .	213	Leominster . . . . .	40	Phillipston . . . . .	325
Dighton . . . . .	162	Leverett . . . . .	299	Pittsfield . . . . .	19
Douglas . . . . .	201	Lexington . . . . .	73	Plainfield . . . . .	326
Dover . . . . .	251	Leyden . . . . .	337	Plainville . . . . .	228
Dracut . . . . .	96	Lincoln . . . . .	227	Plymouth . . . . .	63
Dudley . . . . .	139	Littleton . . . . .	243	Plympton . . . . .	310
Dunstable . . . . .	312	Longmeadow . . . . .	123	Princeton . . . . .	297
Duxbury . . . . .	221	Lowell . . . . .	10	Provincetown . . . . .	143

Quincy . . . . .	11	Springfield . . . . .	4	Wellfleet . . . . .	286
Randolph . . . . .	97	Sterling . . . . .	242	Wendell . . . . .	327
Raynham . . . . .	196	Stockbridge . . . . .	220	Wenham . . . . .	258
Reading . . . . .	75	Stoneham . . . . .	74	West Boylston . . . . .	191
Rehoboth . . . . .	169	Stoughton . . . . .	85	West Bridgewater . . . . .	159
Revere . . . . .	29	Stow . . . . .	266	West Brookfield . . . . .	259
Richmond . . . . .	305	Sturbridge . . . . .	219	West Newbury . . . . .	218
Rochester . . . . .	262	Sudbury . . . . .	275	West Springfield . . . . .	48
Rockland . . . . .	99	Sunderland . . . . .	271	West Stockbridge . . . . .	270
Rockport . . . . .	157	Sutton . . . . .	197	West Tisbury . . . . .	343
Rowe . . . . .	329	Swampscott . . . . .	70	Westborough . . . . .	107
Rowley . . . . .	252	Swansea . . . . .	131	Westfield . . . . .	44
Royalston . . . . .	298	Taunton . . . . .	30	Westford . . . . .	148
Russell . . . . .	267	Templeton . . . . .	140	Westhampton . . . . .	316
Rutland . . . . .	178	Tewksbury . . . . .	112	Westminster . . . . .	208
Salem . . . . .	25	Tisbury . . . . .	112	Weston . . . . .	145
Salisbury . . . . .	183	Tolland . . . . .	330	Westport . . . . .	129
Sandisfield . . . . .	321	Topsfield . . . . .	273	Westwood . . . . .	187
Sandwich . . . . .	248	Townsend . . . . .	229	Weymouth . . . . .	36
Saugus . . . . .	51	Truro . . . . .	309	Whately . . . . .	269
Savoy . . . . .	339	Tyngsborough . . . . .	235	Whitman . . . . .	93
Scituate . . . . .	154	Tyringham . . . . .	342	Wilbraham . . . . .	176
Seekonk . . . . .	124	Upton . . . . .	200	Williamsburg . . . . .	216
Sharon . . . . .	150	Uxbridge . . . . .	108	Williamstown . . . . .	144
Sheffield . . . . .	223	Wakefield . . . . .	50	Wilmington . . . . .	132
Shelburne . . . . .	237	Wales . . . . .	330	Winchendon . . . . .	110
Sherborn . . . . .	280	Walpole . . . . .	89	Winchester . . . . .	60
Shirley . . . . .	185	Waltham . . . . .	26	Windsor . . . . .	318
Shrewsbury . . . . .	91	Ware . . . . .	109	Winthrop . . . . .	49
Shutesbury . . . . .	341	Wareham . . . . .	117	Woburn . . . . .	43
Somerset . . . . .	114	Warren . . . . .	149	Worcester . . . . .	3
Somerville . . . . .	6	Warwick . . . . .	320	Worthington . . . . .	308
South Hadley . . . . .	104	Washington . . . . .	344	Wrentham . . . . .	141
Southampton . . . . .	281	Watertown . . . . .	27	Yarmouth . . . . .	204
Southborough . . . . .	192	Wayland . . . . .	152	Tewksbury State Infirmary	356
Southbridge . . . . .	62	Webster . . . . .	64	Out of State . . . . .	357
Southwick . . . . .	231	Wellesley . . . . .	61		
Spencer . . . . .	113				

## Cases of Diseases Dangerous

Line No.	CITIES AND TOWNS IN ORDER OF POPULATION	Population estimated as of July 1, 1934	Actinomyosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amoebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhoea
1	Massachusetts . . . . .	4,339,210	1	76	5	10990	629	8863	31	238	35	66	1005	6538
	CITIES OF OVER 500,000													
2	Boston . . . . .	782,518	1	8	-	2997	114	3027	4	10	6	13	103	2380
	CITIES OF OVER 150,000													
3	Worcester . . . . .	355,715	-	5	-	1066	26	640	11	-	2	8	411	494
4	Springfield . . . . .	199,180	-	3	-	299	23	331	11	-	-	2	11	190
	CITIES OF 100,000-150,000													
5	Cambridge . . . . .	156,535	-	2	-	767	3	309	-	-	2	6	400	304
6	Somerville . . . . .	528,619	-	3	1	1693	156	1135	4	1	2	8	207	907
7	New Bedford . . . . .	108,523	-	8	-	720	14	412	1	-	-	2	16	232
8	Fall River . . . . .	108,040	-	3	-	147	54	154	-	1	-	3	7	171
9	Lynn . . . . .	106,732	-	3	-	99	27	80	1	-	1	-	168	194
	CITIES OF 50,000-100,000													
10	Lowell . . . . .	103,646	-	1	1	228	29	157	2	-	1	3	6	190
11	Quincy . . . . .	101,678	-	1	1	499	32	332	-	-	-	-	10	120
12	Lawrence . . . . .	733,910	-	18	-	1516	136	1208	3	10	11	10	62	969
13	Newton . . . . .	91,729	-	1	-	92	76	174	-	-	1	1	3	223
14	Medford . . . . .	82,115	-	1	-	275	13	158	-	2	5	1	11	88
15	Malden . . . . .	77,934	-	1	-	72	4	122	-	2	3	2	-	157
16	Brockton . . . . .	75,660	-	3	-	466	2	83	-	-	-	-	17	61
17	Everett . . . . .	69,960	-	1	-	115	20	189	1	-	-	-	9	49
18	Holyoke . . . . .	63,320	-	2	-	82	12	181	1	1	-	2	1	113
19	Pittsfield . . . . .	62,488	-	3	-	176	1	67	1	-	1	1	10	53
20	Brookline . . . . .	53,775	-	3	-	42	4	77	-	4	-	-	6	78
	CITIES AND TOWNS OF 25,000-50,000													
21	Haverhill . . . . .	53,310	-	3	-	19	-	71	-	-	1	2	3	28
22	Chicopee . . . . .	52,045	-	1	-	14	3	36	-	-	-	-	1	50
23	Arlington . . . . .	51,574	-	3	-	163	1	50	-	1	-	1	2	55
24	Chelsea . . . . .	505,674	-	8	2	939	78	932	1	4	1	4	47	611
25	Salem . . . . .	48,268	-	2	1	41	3	90	-	-	-	-	2	128
26	Waltham . . . . .	45,664	-	-	-	23	7	33	-	-	-	-	-	44
27	Watertown . . . . .	45,564	-	-	-	286	10	114	-	1	-	-	16	36
28	Fitchburg . . . . .	44,804	-	-	-	43	14	102	-	1	-	-	1	76
29	Revere . . . . .	43,800	-	-	1	10	5	18	1	-	-	3	6	60
30	Taunton . . . . .	43,065	-	-	-	80	3	90	-	-	-	-	-	32
31	Belmont . . . . .	42,921	-	1	-	225	4	125	-	-	-	-	5	34
32	Beverly . . . . .	38,215	-	-	-	22	3	29	-	-	-	1	2	14
33	Melrose . . . . .	37,733	-	1	-	57	15	100	-	-	-	-	2	53
	CITIES AND TOWNS OF 10,000-25,000													
34	Gloucester . . . . .	35,744	-	-	-	9	3	7	-	1	-	-	-	44
35	Northampton . . . . .	27,251	-	-	-	122	3	83	-	-	-	-	9	31
36	Weymouth . . . . .	27,125	-	1	-	2	6	66	-	-	-	-	1	50
37	Framingham . . . . .	25,720	-	2	-	19	2	75	-	1	1	-	-	9
38	Attleboro . . . . .	694,848	-	15	2	1519	52	1100	2	189	9	15	100	585
39	Peabody . . . . .	24,899	-	-	-	4	6	50	-	-	-	-	1	26
40	Leominster . . . . .	24,580	-	-	-	34	-	28	-	165	-	-	2	34
41	Methuen . . . . .	23,960	-	-	-	6	2	36	-	-	-	-	1	16
42	North Adams . . . . .	23,160	-	2	-	131	4	84	-	-	-	1	-	16
43	Woburn . . . . .	22,738	-	-	-	34	3	65	-	-	-	-	-	15
44	Westfield . . . . .	22,592	-	1	2	13	8	37	-	-	-	3	-	30
45	Gardner . . . . .	21,550	-	3	-	27	-	12	-	-	-	1	3	6
46	Milford . . . . .	21,455	-	1	-	50	1	27	-	-	-	1	-	9
47	Braintree . . . . .	20,695	-	1	-	2	-	12	-	-	-	1	2	8
48	West Springfield . . . . .	20,332	-	-	-	9	2	15	-	-	-	-	-	10
49	Winthrop . . . . .	20,140	-	-	-	57	-	24	-	3	-	-	-	8
50	Wakefield . . . . .	19,964	-	-	-	15	-	38	-	-	-	-	3	19
51	Saugus . . . . .	19,460	-	-	-	41	1	37	-	-	-	-	7	13
52	Dedham . . . . .	17,841	-	-	-	40	2	39	-	-	-	-	2	19
53	Norwood . . . . .	17,831	-	-	-	-	-	2	-	-	-	-	-	16
54	Greenfield . . . . .	17,433	-	-	-	36	1	88	-	-	-	-	4	21
55	Marlboro . . . . .	16,910	-	1	-	13	4	23	-	-	-	-	-	14
56	Milford . . . . .	16,361	-	1	-	12	-	-	-	-	-	-	2	20
57	Newburyport . . . . .	15,807	-	-	-	11	-	6	1	-	-	-	-	12
58	Natick . . . . .	15,710	-	2	-	70	-	21	-	-	1	-	2	30
59	Danvers . . . . .	15,037	-	-	-	41	-	14	-	-	2	-	-	6
60	Winchester . . . . .	14,711	-	-	-	3	-	24	-	1	-	-	10	12
61	Wellesley . . . . .	14,623	-	-	-	59	-	20	-	-	-	-	4	27
62	Southbridge . . . . .	14,190	-	-	-	66	1	-	-	-	-	-	-	18
63	Plymouth . . . . .	13,935	-	-	-	13	2	24	-	19	-	-	3	20
64	Webster . . . . .	13,695	-	-	-	29	-	80	-	-	-	1	3	6
65	Amesbury . . . . .	13,463	-	-	-	237	2	67	-	-	-	-	3	15
66	Needham . . . . .	13,227	-	3	-	11	3	4	1	-	-	1	1	8
		12,934	-	-	-	26	1	8	-	-	-	-	1	8
		12,656	-	-	-	55	-	1	-	-	-	-	14	9
		12,463	-	-	-	13	-	23	-	-	-	-	-	19
		12,420	-	-	-	188	2	63	-	-	-	-	10	9

to the Public Health, 1934—Continued

	Leprosy	Lobar Pneumonia	Malaria	Measles	Mumps	Ophthalmia Neonatorum*	Paratyphoid Fever	Pellagra	Rabies	Scarlet Fever	Septic Sore Throat	Syphilis	Tetanus	Trachoma	Trichinosis	Tuberculosis, Pulmonary	Tuberculosis, Other Forms	Tuberculosis, Hilarum	Typhoid Fever	Typhus Fever	Undulant Fever	Whooping Cough	Line No.
3	3976	27	44817	4310	1072	6	9	1	8391	201	4471	20	33	46	3585	448	855	134	2	15	12659	1	
-	1292	7	7690	952	561	2	2	-	1594	72	1984	-	8	25	1046	146	123	25	1	2	2477	2	
-	347	1	1236	56	104	-	-	-	722	5	330	-	1	2	258	24	10	6	-	-	1007	3	
-	242	-	1101	38	35	-	-	-	559	4	156	-	1	1	155	14	-	1	-	1	632	4	
-	105	1	135	18	69	-	-	-	163	1	174	-	-	1	103	10	10	5	-	-	375	5	
-	502	1	5109	619	120	2	1	1	866	7	603	4	2	-	560	70	72	26	-	-	1940	6	
-	133	1	2097	286	17	2	-	-	221	3	182	3	-	-	154	12	13	10	-	-	541	7	
-	105	-	827	36	5	-	-	-	158	3	114	1	1	-	91	14	8	-	-	-	161	8	
-	65	-	709	6	46	-	-	-	197	1	118	1	1	-	113	24	44	9	-	-	190	7	
-	101	-	296	13	49	-	-	-	74	1	106	2	-	-	102	13	4	6	-	-	197	8	
-	98	-	1180	278	3	-	-	-	216	-	83	-	-	-	90	7	3	-	-	-	851	9	
-	487	2	7001	459	213	-	-	-	1133	42	541	5	8	5	516	82	226	12	-	-	1939	10	
-	62	-	807	13	9	-	-	-	79	16	93	6	-	-	76	14	6	3	-	-	34	11	
-	36	1	1971	23	3	-	-	-	217	3	37	2	1	-	78	7	99	3	-	-	209	12	
-	20	-	299	7	5	-	-	-	61	-	89	2	2	-	61	13	6	-	-	-	33	11	
-	53	-	840	238	3	-	-	-	142	-	35	1	1	-	26	4	3	-	-	-	671	13	
-	47	-	720	79	11	-	-	-	158	9	42	1	-	-	43	9	1	-	-	-	249	14	
-	57	-	576	6	4	-	-	-	206	7	41	1	3	-	41	10	4	-	-	-	73	15	
-	49	-	139	39	172	-	-	-	71	2	75	-	-	2	44	7	43	1	-	-	319	16	
-	55	-	280	8	4	-	-	-	63	3	57	-	1	-	52	5	36	2	-	-	52	17	
-	59	-	159	14	1	-	-	-	33	-	18	-	-	-	53	2	16	2	-	-	63	18	
-	17	-	559	-	1	-	-	-	49	-	26	-	-	-	14	6	12	-	-	-	19	19	
-	32	1	651	32	3	-	-	-	54	2	28	1	-	3	28	5	-	1	-	-	217	20	
-	452	9	6375	409	35	1	1	-	1744	22	304	2	3	2	347	47	116	19	-	-	1307	21	
-	51	-	936	181	2	-	-	-	499	2	36	-	2	-	38	3	4	1	-	-	97	22	
-	21	-	29	15	2	-	-	-	29	-	14	-	-	-	23	1	2	1	-	-	9	23	
-	35	-	831	94	3	-	-	-	75	1	24	-	-	1	23	1	2	1	-	-	371	22	
-	46	6	269	5	3	-	-	-	72	1	49	1	-	-	26	9	82	4	-	-	57	24	
-	32	-	156	1	3	-	-	-	276	1	16	1	-	-	29	6	1	-	-	-	25	25	
-	35	-	305	24	4	-	-	-	144	-	31	-	-	-	37	3	-	1	-	-	79	26	
-	40	-	816	32	4	-	-	-	125	6	24	-	-	-	43	6	11	6	-	-	202	27	
-	41	-	853	4	5	1	-	-	233	1	8	-	-	-	25	-	7	1	-	-	83	28	
-	47	-	304	2	-	-	-	-	51	1	35	-	1	1	27	2	6	1	-	-	43	29	
-	8	2	30	8	2	-	-	-	8	3	15	-	-	-	24	6	1	2	-	-	9	30	
-	20	1	1095	19	-	-	-	-	59	1	25	-	-	-	8	-	-	-	-	-	242	31	
-	44	-	183	-	-	-	-	-	92	5	16	-	-	-	8	3	-	1	-	-	67	32	
-	32	-	568	24	14	-	-	-	81	-	11	-	-	-	18	4	-	-	-	-	23	33	
3	492	3	8442	1514	22	-	-	-	1293	32	350	4	10	6	441	40	252	17	-	-	2138	34	
-	7	-	8	-	2	-	-	-	16	-	15	-	-	1	12	-	45	2	-	-	1	35	
-	22	1	5	136	2	-	-	-	49	4	10	-	-	-	25	1	-	-	-	-	75	36	
-	3	-	202	11	-	-	-	-	62	1	9	-	-	-	13	1	-	-	-	-	25	35	
-	15	1	841	4	-	-	-	-	53	1	9	-	-	-	14	2	34	-	-	-	103	37	
-	18	-	162	-	1	-	-	-	9	-	13	1	-	-	20	1	-	-	-	-	97	38	
-	20	-	137	16	1	-	-	-	234	-	19	-	-	-	17	4	23	-	-	-	35	39	
-	37	-	731	-	-	-	-	-	92	-	10	-	-	-	11	1	2	-	-	-	21	40	
-	6	-	401	4	-	-	-	-	10	-	5	-	-	-	9	2	-	-	-	-	65	41	
-	17	-	9	-	-	-	-	-	17	-	10	-	-	1	6	1	2	-	-	-	-	42	42
-	9	1	67	16	-	-	-	-	11	1	16	1	1	-	8	1	-	1	-	-	-	43	43
-	14	-	51	3	-	-	-	-	6	12	5	-	-	-	10	1	-	1	-	-	-	36	44
-	15	-	222	34	-	-	-	-	39	-	7	-	-	-	16	3	5	1	-	-	-	13	45
-	10	-	763	12	-	-	-	-	43	2	14	-	-	1	8	1	-	-	-	-	-	129	46
-	7	-	291	58	-	-	-	-	45	1	10	-	-	-	14	-	-	-	-	-	-	49	47
-	5	-	1	-	-	-	-	-	13	-	13	-	-	-	4	1	1	-	-	-	-	48	48
-	7	-	525	3	2	-	-	-	16	-	9	-	-	-	10	1	23	2	-	-	-	40	49
-	9	-	78	9	1	-	-	-	10	-	15	-	-	-	5	1	2	-	-	-	5	50	
-	9	-	97	4	-	-	-	-	29	-	2	1	-	-	5	1	1	-	-	-	42	51	
-	4	-	10	5	2	-	-	-	9	-	9	-	-	-	1	6	1	-	-	-	18	52	
-	12	-	2	2	1	-	-	-	29	-	11	-	-	-	4	1	-	2	-	-	-	18	53
-	12	-	21	30	-	-	-	-	8	2	13	-	-	-	4	-	-	-	-	-	175	54	
-	5	-	35	1	-	-	-	-	13	-	9	-	-	-	7	-	-	-	-	-	1	14	55
-	11	-	85	-	-	-	-	-	36	1	4	-	-	-	15	1	28	1	-	-	1	10	56
-	6	-	861	123	-	-	-	-	9	-	7	-	-	-	7	-	2	1	-	-	33	57	
-	8	-	397	5	-	-	-	-	37	1	15	-	-	-	11	1	25	-	-	-	151	58	
-	17	-	56	11	1	-	-	-	87	1	7	-	-	-	18	1	16	-	-	-	16	56	
-	9	-	94	22	-	-	-	-	7	-	7	-	-	-	8	1	1	1	-	-	-	139	60
-	5	-	110	137	-	-	-	-	42	1	8	-	-	-	12	1	4	-	-	-	240	61	
-	22	-	222	-	2	-	-	-	34	-	4	-	-	-	8	-	-	-	-	-	1	32	62
-	13	-	436	4	-	-	-	-	12	-	4	-	-	-	4	1	-	-	-	-	-	54	63
-	6	-	69	2	2	-	-	-	12	-	2	1	-	-	1	1	2	-	-	-	-	38	64
-	15	-	378	48	-	-	-	-	16	1	4	-	-	-	13	-	-	-	-	-	-	8	65
-	18	-	183	363	1	-	-	-	40	-	8	-	-	-	16	1	-	-	-	-	-	117	66





## Cases of Diseases Dangerous

Line No.	CITIES AND TOWNS IN ORDER OF POPULATION	Population estimated as of July 1, 1934	Diseases												
			Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhoea	
140	Templeton	3,988	-	-	-	-	-	-	-	-	-	-	-	-	2
141	Wrentham	3,893	-	-	-	-	-	-	-	-	-	-	-	-	3
142	Oxford	3,878	-	-	-	-	-	-	-	-	-	-	-	-	1
143	Provincetown	3,822	-	1	-	52	-	-	-	10	-	-	-	-	3
144	Williamstown	3,815	-	-	-	-	-	-	-	-	-	-	-	-	1
145	Weston	3,693	-	-	-	11	-	-	-	17	-	-	-	-	1
146	Barre	3,663	-	-	-	19	-	-	-	-	-	-	-	-	2
147	East Bridgewater	3,629	-	-	-	-	-	-	-	3	-	-	-	-	3
148	Westford	3,619	-	-	-	-	-	-	-	3	-	-	-	-	4
149	Warren	3,612	-	-	-	-	-	-	-	-	20	-	-	-	4
150	Sharon	3,544	-	-	-	18	-	-	-	-	-	-	-	-	4
151	Bedford	3,525	-	-	-	-	1	16	1	-	-	-	-	-	4
152	Wayland	3,512	-	-	-	11	-	4	-	4	-	-	-	-	1
153	East Longmeadow	3,488	-	-	-	6	-	9	-	-	-	-	-	-	5
154	Scituate	3,455	-	-	-	2	-	5	-	5	-	-	-	-	1
155	Bellingham	3,452	-	1	-	1	-	1	-	3	-	-	-	-	5
156	Holbrook	3,414	-	-	-	-	-	6	-	-	-	-	-	-	2
157	Rockport	3,364	-	-	-	5	-	6	-	6	-	-	-	-	8
158	Belchertown	3,332	-	-	-	-	-	-	-	-	3	-	-	-	3
159	West Bridgewater	3,277	-	-	-	1	-	-	-	-	-	-	1	-	1
160	Cohasset	3,223	-	-	-	8	-	18	-	-	-	-	-	-	2
161	Medway	3,157	-	-	-	-	-	-	-	-	-	-	-	-	2
162	Dighton	3,096	-	-	-	-	-	-	-	-	-	-	-	-	1
163	Lancaster	3,079	-	-	-	-	-	8	1	-	1	-	-	-	3
164	Ayer	3,078	-	-	-	15	-	2	-	-	-	-	-	9	1
165	Pepperell	3,040	-	-	-	1	-	-	-	-	-	-	-	-	2
166	North Brookfield	2,988	-	-	-	-	-	-	-	-	-	-	-	-	-
167	Holliston	2,903	-	-	-	-	-	2	-	-	-	-	-	-	-
168	Hanover	2,847	-	-	-	2	-	4	-	-	-	-	1	-	1
169	Rehoboth	2,843	-	-	-	-	-	-	-	-	-	-	-	-	1
170	Deerfield	2,814	-	-	-	1	-	-	-	-	1	-	1	-	4
171	Hopedale	2,812	-	-	-	1	-	2	-	-	-	-	1	-	2
172	Bourne	2,793	-	-	-	-	-	-	-	-	-	-	-	-	4
173	Kingston	2,792	-	-	-	-	-	-	-	-	-	-	-	-	2
174	Manchester	2,746	-	-	-	-	-	-	-	-	-	-	-	-	2
175	Norton	2,712	-	-	-	-	-	2	-	-	-	-	-	-	2
176	Wilbraham	2,624	-	-	-	-	-	1	-	-	-	-	-	-	2
177	Lenox	2,615	-	-	-	1	-	5	-	-	-	-	-	-	6
178	Rutland	2,614	-	-	-	9	-	1	-	-	-	1	-	-	2
179	Acton	2,558	-	-	-	6	-	5	-	-	-	-	-	-	-
180	Hopkinton	2,555	-	-	-	4	-	4	-	-	-	-	1	-	1
181	Harwich	2,541	-	-	-	-	-	-	-	-	-	-	-	-	18
182	Hadley	2,511	-	-	-	-	-	2	-	-	-	-	-	-	2
183	Salisbury	2,509	-	1	-	-	-	-	-	-	-	-	-	-	10
TOWNS OF 1,000-2,500		151,962	-	1	-	186	36	140	-	-	-	1	21	125	-
184	Avon	2,454	-	-	-	1	-	3	-	-	-	-	-	-	-
185	Shirley	2,453	-	-	-	-	-	2	-	-	-	-	1	-	-
186	Groton	2,438	-	-	-	12	-	-	-	-	-	-	-	-	-
187	Westwood	2,428	-	-	-	3	-	-	-	-	-	-	-	-	-
188	Merrimac	2,426	-	-	-	2	-	7	-	-	-	-	1	-	2
189	Ashland	2,295	-	-	-	-	-	-	-	-	-	-	-	-	1
190	Hatfield	2,289	-	-	-	-	-	2	-	-	-	-	-	-	3
191	West Boylston	2,281	-	-	-	15	1	2	-	-	-	-	-	-	-
192	Southboro	2,257	-	-	-	-	-	7	-	-	-	-	-	-	-
193	Groveland	2,216	-	-	-	4	-	-	-	-	-	-	-	-	-
194	Hanson	2,198	-	1	-	5	-	-	-	-	-	-	1	-	5
195	North Reading	2,157	-	-	-	-	-	-	-	-	-	-	-	-	-
196	Raynham	2,140	-	-	-	-	-	-	-	-	-	-	-	-	1
197	Sutton	2,130	-	-	-	3	15	5	-	-	-	-	-	-	1
198	Chatham	2,088	-	-	-	-	-	4	-	-	-	-	-	-	8
199	Hamilton	2,065	-	-	-	2	1	3	-	-	-	-	2	-	3
200	Upton	2,055	-	-	-	-	-	2	-	-	-	-	-	-	1
201	Douglas	2,052	-	-	-	-	-	2	-	-	-	-	-	-	3
202	Charlton	2,036	-	-	-	-	10	-	-	-	-	-	-	-	2
203	Ashburnham	2,015	-	-	-	-	-	-	-	-	-	-	-	-	2
204	Yarmouth	2,014	-	-	-	-	-	4	-	-	-	-	-	-	2
205	Burlington	1,968	-	-	-	1	-	-	-	-	-	-	-	-	3
206	Hardwick	1,967	-	-	-	-	-	-	-	-	-	-	-	-	1
207	Lunenburg	1,963	-	-	-	-	-	3	-	-	-	-	-	-	3
208	Westminster	1,954	-	-	-	-	-	-	-	-	-	-	-	-	2
209	Marion	1,948	-	-	-	2	-	4	-	-	-	-	2	-	2
210	Northfield	1,943	-	-	-	7	-	2	-	-	-	-	-	-	1
211	Northboro	1,932	-	-	-	-	-	6	-	-	-	-	-	-	2
212	Millville	1,899	-	-	-	-	-	-	-	-	-	-	-	-	-
213	Dennis	1,894	-	-	-	-	-	10	-	-	-	-	-	-	3
214	Georgetown	1,828	-	-	-	1	-	5	-	-	-	-	-	-	6



## Cases of Diseases Dangerous

Line No.	CITIES AND TOWNS IN ORDER OF POPULATION	Popu- lation esti- mated as of July 1, 1934	Actinomycosis	Anterior Poliomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhoea
			-	-	-	-	-	-	-	-	-	-	-	-
215	Lynnfield	1,812	-	-	-	-	-	-	-	-	-	-	-	1
216	Williamsburg	1,806	-	-	-	2	-	6	-	-	-	-	-	2
217	Middleton	1,746	-	-	-	-	-	6	-	-	-	-	-	3
218	West Newbury	1,727	-	-	-	-	-	-	-	-	-	-	-	3
219	Sturbridge	1,713	-	-	-	-	-	-	-	-	-	-	-	2
220	Stockbridge	1,707	-	-	-	1	-	1	-	-	-	-	-	2
221	Duxbury	1,700	-	-	-	-	-	-	-	-	-	-	-	-
222	Millis	1,698	-	-	-	-	-	18	-	-	-	-	-	1
223	Sheffield	1,679	-	-	-	1	-	1	-	-	-	-	-	1
224	Lakeville	1,676	-	-	-	-	1	-	-	-	-	-	-	1
225	Nahant	1,673	-	-	-	4	1	1	-	-	-	-	1	1
226	Freetown	1,652	-	-	-	-	-	-	-	-	-	-	-	4
227	Lincoln	1,650	-	-	-	-	-	-	-	-	-	-	-	-
228	Plainville	1,638	-	-	-	1	-	2	-	-	-	-	1	-
229	Townsend	1,636	-	-	-	6	-	1	-	-	-	-	-	-
230	Tisbury	1,634	-	-	-	-	-	-	-	-	-	-	-	1
231	Southwick	1,622	-	-	-	-	-	2	-	-	-	-	1	4
232	Norfolk	1,611	-	-	-	-	-	1	-	-	-	-	-	-
233	Newbury	1,610	-	-	-	-	-	-	-	-	-	-	-	-
234	Cheshire	1,575	-	-	-	7	1	2	-	-	-	-	-	1
235	Tyngsboro	1,566	-	-	-	-	-	-	-	-	-	-	-	-
236	Norwell	1,561	-	-	-	-	-	-	-	-	-	1	-	-
237	Shelburne	1,548	-	-	-	-	-	-	-	-	-	-	-	7
238	Hull	1,537	-	-	-	-	-	-	-	-	-	-	-	-
239	Essex	1,516	-	-	-	2	-	-	-	-	-	-	-	-
240	Pembroke	1,500	-	-	-	-	-	-	-	-	-	-	-	-
241	Marshfield	1,498	-	-	-	3	-	-	-	-	-	-	-	2
242	Sterling	1,494	-	-	-	-	1	7	-	-	-	-	-	-
243	Littleton	1,476	-	-	-	1	-	7	-	-	-	-	-	-
244	Mattapoisett	1,455	-	-	-	43	-	3	-	-	-	-	1	-
245	Buckland	1,452	-	-	-	2	-	-	-	-	-	-	-	6
246	Carver	1,440	-	-	-	1	-	1	-	-	-	-	-	5
247	Chester	1,423	-	-	-	-	-	-	-	-	-	-	-	-
248	Sandwich	1,403	-	-	-	2	1	1	-	-	-	-	-	-
249	Clarksburg	1,355	-	-	-	-	-	-	-	-	-	-	-	2
250	Oak Bluffs	1,350	-	-	-	8	-	-	-	-	-	-	-	1
251	Dover	1,322	-	-	-	6	-	-	-	-	-	-	-	1
252	Rowley	1,317	-	-	-	2	-	-	-	-	-	-	-	1
253	Brookfield	1,311	-	-	-	2	-	-	-	-	-	-	-	1
254	Edgartown	1,305	-	-	-	-	-	-	-	-	-	-	-	1
255	Orleans	1,266	-	-	-	5	-	4	-	-	-	-	-	1
256	Colrain	1,250	-	-	-	15	-	2	-	-	-	-	-	2
257	Hinsdale	1,225	-	-	-	-	-	2	-	-	-	-	-	-
258	Wenham	1,224	-	-	-	-	-	-	-	-	-	-	-	-
259	West Brookfield	1,211	-	-	-	1	-	2	-	-	-	-	1	1
260	Erving	1,208	-	-	-	-	-	-	-	-	-	-	-	-
261	Boylston	1,203	-	-	-	-	-	-	-	-	-	-	-	-
262	Rochester	1,170	-	-	-	-	3	-	-	-	-	-	5	5
263	Lanesboro	1,166	-	-	-	-	-	-	-	-	-	-	-	2
264	Mendon	1,166	-	-	-	3	-	1	-	-	-	-	-	3
265	Berkley	1,120	-	-	-	-	-	-	-	-	-	-	-	2
266	Stow	1,108	-	-	-	-	-	-	-	-	-	-	-	1
267	Russell	1,105	-	-	-	-	-	1	-	-	-	-	-	-
268	Berlin	1,075	-	-	-	-	-	-	-	-	-	-	-	1
269	Whately	1,060	-	-	-	-	-	-	-	-	-	-	-	-
270	West Stockbridge	1,055	-	-	-	5	-	-	-	-	-	-	-	2
271	Sunderland	1,053	-	-	-	-	-	-	-	-	-	-	-	-
272	Ashby	1,041	-	-	-	-	-	-	-	-	-	-	-	1
273	Topsfield	1,041	-	-	-	-	1	1	-	-	-	-	4	-
274	Gill	1,034	-	-	-	4	-	-	-	-	-	-	-	-
275	Sudbury	1,004	-	-	-	-	-	-	-	-	-	-	-	3
	TOWNS UNDER 1,000	38,443	-	1	-	66	-	43	-	-	-	1	4	32
276	Huntington	987	-	-	-	1	-	-	-	-	-	-	-	-
277	Harvard	983	-	-	-	-	-	5	-	-	-	-	-	2
278	Hubbardston	966	-	1	-	-	-	-	-	-	-	-	-	-
279	Granby	955	-	-	-	-	-	-	-	-	-	-	-	-
280	Sherborn	951	-	-	-	1	-	-	-	-	-	-	-	-
281	Southampton	939	-	-	-	2	-	-	-	-	-	-	-	1
282	Bernardston	932	-	-	-	-	-	-	-	-	-	-	-	1
283	East Brookfield	926	-	-	-	-	-	5	-	-	-	-	-	-
284	Brimfield	918	-	-	-	-	-	2	-	-	-	-	-	1
285	Conway	875	-	-	-	-	-	-	-	-	-	1	-	-
286	Wellfleet	852	-	-	-	-	-	-	-	-	-	-	-	-
287	Halifax	823	-	-	-	-	-	-	-	-	-	-	-	-
288	Charlemont	816	-	-	-	-	-	-	-	-	-	-	-	1
289	Ashfield	815	-	-	-	1	-	2	-	-	-	-	-	2



## Cases of Diseases Dangerous

Line No.	CITIES AND TOWNS IN ORDER OF POPULATION	Popu- lation esti- mated as of July 1, 1934	Actinomyco- sis	Anterior Pellomyelitis	Anthrax	Chicken Pox	Diphtheria	Dog Bite	Dysentery, Amebic	Dysentery, Bacillary	Encephalitis Lethargica	Epidemic Cerebrospinal Meningitis	German Measles	Gonorrhea
290	Brewster	769	-	-	-	-	-	3	-	-	-	-	-	-
291	New Marlboro	758	-	-	-	3	-	-	-	-	-	-	-	2
292	Bolton	735	-	-	-	5	-	-	-	-	-	-	-	-
293	Granville	725	-	-	-	-	-	-	-	-	-	-	-	-
294	Hampden	725	-	-	-	-	-	-	-	-	-	-	-	-
295	Boxford	707	-	-	-	-	-	5	-	-	-	-	-	-
296	Paxton	704	-	-	-	-	-	-	-	-	-	-	-	-
297	Princeton	698	-	-	-	-	-	-	-	-	-	-	-	-
298	Royalston	686	-	-	-	-	-	-	-	-	-	-	-	-
299	Leverett	685	-	-	-	-	-	-	-	-	-	-	-	1
300	Petersham	660	-	-	-	12	-	1	-	-	-	-	-	-
301	Blandford	632	-	-	-	-	-	-	-	-	-	-	-	-
302	Carlisle	613	-	-	-	-	-	-	-	-	-	-	-	2
303	Becket	587	-	-	-	6	-	1	-	-	-	-	-	1
304	Eastham	581	-	-	-	-	-	1	-	-	-	-	-	1
305	Richmond	553	-	-	-	4	-	-	-	-	-	-	-	-
306	Cummington	547	-	-	-	11	-	-	-	-	-	-	-	1
307	Egremont	542	-	-	-	1	-	2	-	-	-	-	-	-
308	Worthington	529	-	-	-	-	-	-	-	-	-	-	-	-
309	Truro	517	-	-	-	-	-	1	-	-	-	-	-	-
310	Plympton	511	-	-	-	-	-	-	-	-	-	-	-	-
311	Oakham	489	-	-	-	-	-	-	-	-	-	-	-	1
312	Dunstable	418	-	-	-	-	-	-	-	-	-	-	1	-
313	Mashpee	412	-	-	-	-	-	-	-	-	-	-	-	-
314	Pelham	404	-	-	-	-	-	-	-	-	-	-	-	-
315	Chesterfield	403	-	-	-	-	-	3	-	-	-	-	-	1
316	Westhampton	403	-	-	-	-	-	-	-	-	-	-	-	-
317	New Braintree	399	-	-	-	-	-	-	-	-	-	-	-	1
318	Windsor	387	-	-	-	-	-	-	-	-	-	-	-	3
319	Dana	378	-	-	-	-	-	-	-	-	-	-	-	-
320	Warwick	371	-	-	-	-	-	1	-	-	-	-	-	-
321	Sandisfield	366	-	-	-	1	-	2	-	-	-	-	-	-
322	Heath	356	-	-	-	-	-	-	-	-	-	-	-	-
323	Otis	350	-	-	-	-	-	2	-	-	-	-	-	-
324	New Salem	339	-	-	-	1	-	-	-	-	-	-	3	-
325	Phillipston	336	-	-	-	-	-	-	-	-	-	-	-	2
326	Plainfield	327	-	-	-	-	-	-	-	-	-	-	-	-
327	Wendell	319	-	-	-	-	-	-	-	-	-	-	-	1
328	Monterey	303	-	-	-	1	-	2	-	-	-	-	-	-
329	Rowe	302	-	-	-	-	-	-	-	-	-	-	-	-
330	Wales	300	-	-	-	-	-	-	-	-	-	-	-	-
331	Boxboro	297	-	-	-	2	-	-	-	-	-	-	-	1
332	Enfield	285	-	-	-	-	-	-	-	-	-	-	-	1
333	Hawley	283	-	-	-	-	-	-	-	-	-	-	-	-
334	Monroe	277	-	-	-	-	-	-	-	-	-	-	-	-
335	Florida	262	-	-	-	-	-	-	-	-	-	-	-	-
336	Chilmark	260	-	-	-	-	-	-	-	-	-	-	-	1
337	Leyden	260	-	-	-	-	-	-	-	-	-	-	-	-
338	Goshen	248	-	-	-	-	-	-	-	-	-	-	-	-
339	Savoy	240	-	-	-	-	-	-	-	-	-	-	-	-
340	Hancock	239	-	-	-	-	-	-	-	-	-	-	-	-
341	Shutesbury	230	-	-	-	-	-	-	-	-	-	-	-	1
342	Tyringham	221	-	-	-	1	-	1	-	-	-	-	-	-
343	West Tisbury	219	-	-	-	-	-	-	-	-	-	-	-	-
344	Washington	218	-	-	-	-	-	3	-	-	-	-	-	1
345	Alford	188	-	-	-	-	-	-	-	-	-	-	-	-
346	Middlefield	178	-	-	-	-	-	-	-	-	-	-	-	-
347	Gay Head	157	-	-	-	-	-	-	-	-	-	-	-	2
348	Holland	137	-	-	-	-	-	-	-	-	-	-	-	-
349	Tolland	126	-	-	-	-	-	-	-	-	-	-	-	-
350	Peru	108	-	-	-	-	-	-	-	-	-	-	-	-
351	Gosnold	107	-	-	-	-	-	-	-	-	-	-	-	-
352	Greenwich	102	-	-	-	3	-	-	-	-	-	-	-	-
353	Montgomery	102	-	-	-	-	-	-	-	-	-	-	-	-
354	New Ashford	75	-	-	-	-	-	-	-	-	-	-	-	-
355	Mount Washington	60	-	-	-	-	-	1	-	-	-	-	-	-
356	Tewksbury State Infirmary	-	-	-	-	3	-	-	-	-	-	-	-	-
357	Out of State	-	-	-	-	-	1	-	-	-	-	-	-	-

There were no cases of Smallpox reported during the year.

\*35 cases of gonorrhoeal ophthalmia.



## REPORT OF DIVISION OF FOOD AND DRUGS

HERMANN C. LYTHGOE, *Director*

The Food and Drug Division during the year 1934 has been engaged in the usual routine work relative to the enforcement of the laws pertaining to the sale of milk, food and drugs; the slaughtering laws; the cold storage laws; the bakery law; the mattress law; and the pasteurization law; as well as in the examination of liquors and chemicals submitted by police departments.

The Legislature of 1934 made a change in the ice cream law, which put additional duties upon the Department, including the making of bacteriological standards for ice cream, and providing a penalty for violating such standards.

There was also a change in the law relative to the licensing of dealers in denatured alcohol. The act passed at the special session of the Legislature in 1933 provided, in addition to the usual local license, for a State license. Because of the passage of this act, an additional inspector was requested, which was allowed in the supplemental budget. At the time the budget went through, however, there was a change in the law, which would provide for licensing of preparations containing more than 3 per cent wood alcohol by local boards of health, and, for state-wide purposes, by the Department of Public Health, and the same act provided for the licensing of dealers in denatured alcohol not containing wood alcohol by the local licensing board, and, state-wide, by the Alcoholic Beverage Control Commission. Work in connection with the issuing of these licenses was begun the latter part of the year, shortly after the change in the law went into effect.

The frozen dessert law also provided for licensing of out-of-state dealers who sold ice cream in Massachusetts, the act providing that such dealers must obtain a permit from the Department before they may sell in Massachusetts. As a result of this act, a number of importers of ice cream were duly licensed.

The number of prosecutions was considerably in excess of those of 1933. This large number was due to unusual violations of the oleomargarine law, to the sale of decomposed hamburger steak, etc., and to the sale of confectionery containing alcohol. There was also an unusual number of violations of the mattress law.

There were 16 cases for the sale of milk not of good standard quality, most of which were brought against restaurant keepers who were dispensing partly skimmed milk. There were 5 cases for selling as pure milk certain milk from which a portion of the fat had been removed; and there were 12 cases for the sale of milk containing added water. There was one case for the sale of low standard cream; and 10 cases for representing as pasteurized, certain milk not pasteurized as defined by law. There were 18 prosecutions for violations of the pasteurization law and regulations, 2 prosecutions for violations of the Grade A regulations, and 2 prosecutions for the misbranding of milk.

During the early part of the year there was a violation of the oleomargarine law by the sale of colored oleomargarine as butter. About the time the Department had gathered evidence for prosecution, it was ascertained that the U. S. Department of Agriculture, as well as the Treasury Department, was interested in the cases inasmuch as they involved evasion of taxes as well as violation of the food and drug law.

The oleomargarine was apparently imported in the legal manner and was stored in Boston. It was then removed to some place outside of Boston, where it was colored, and was then distributed to the stores. There were nine prosecutions involving three defendants. Two defendants, one a Massachusetts corporation, paid the penalty; another defendant appealed, and the appealed cases are still pending at the request of the U. S. Attorney. The defendant in these cases testified before the U. S. Courts in a conspiracy case, resulting in the conviction of the conspirators.

Of the cases pertaining to milk and milk products, 9 resulted in a finding of not guilty, and the rest resulted in conviction.

There were 48 cases for the sale of hamburger steak in violation of the law relative to the use of sodium sulphite in meat and meat products. Under this law, sodium sulphite may be used provided the quantity is less than 0.1%, and provided further that each package sold bears upon the outside a statement to that effect. Prosecutions were brought either for not labeling the package or for using excessive quantities of sodium sulphite. In most of the cases where excessive quantities were used,

the packages were not labeled. There were 12 cases of a similar nature pertaining to the sale of sausages containing sodium sulphite. There were 2 cases for the sale of sausages containing excessive cereal, and 1 case for the sale of colored sausage. There were 9 cases for the sale of sausages containing lungs, all of which resulted in conviction. The use of this material in sausages is specifically prohibited by statute.

Shortly after the beginning of the fiscal year, the Department received inquiries as to whether or not confectionery containing alcohol could be legally sold. The persons making the inquiries were informed that the repeal of the prohibition law did not affect the special law which had been on the books for about 20 years, prohibiting the sale of confectionery containing a liquid containing more than 1.0% of alcohol.

It was found practically impossible to trace this material to the manufacturer. In many instances the manufacturer was located outside of the State. In a few instances, where he was located in the State, we were able to secure samples upon which to base prosecutions. Most of the cases were therefore brought against the retail vendor, who was fully aware of the character of the material which he was selling. Practically all the newspapers of the State carried news items, stating that the sale of such material was a violation of the law.

Quite a number of confectionery stores bought this material from traveling salesmen, who made deliveries when they solicited orders. In several instances this material was shipped across the State line in the automobile of the salesman. The amount of alcohol in the liquid in this material varied from 1% to 22%; it averaged 12.3%. There were 48 cases, all but 2 resulting in conviction.

The sale of decomposed meat was excessive. There were 103 cases pertaining to hamburg steak, 3 pertaining to kidneys, and 44 pertaining to sausages. There were 5 cases pertaining to false advertising of buttered popcorn, the material used for buttering being other than butter.

The cases for violation of the law pertaining to eggs were somewhat less than during the prior year, due to a smaller number of samples being collected. There were 2 cases for the sale of decomposed eggs; 18 cases for falsely advertising as "Fresh Eggs" certain eggs which were not fresh; 2 cases for misbranding eggs with the word "Fresh"; and 30 cases for selling cold storage eggs without properly marking the container or without displaying the necessary sign. In many instances these cold storage eggs were represented by word of mouth as fresh eggs.

There was 1 case for operating an unsanitary food establishment, and 2 cases for the operation of unsanitary bakeries. There were 3 cases for violations of the ice cream law and 3 cases for the sale of adulterated or low standard drugs. It was necessary to make 1 prosecution for operating a cold storage warehouse without a license. There were 4 prosecutions for violations of the cold storage law. Violations of the mattress law were unusually large. It was necessary to make 34 prosecutions.

A summary of the prosecutions will be found in Table 1.

There were examined 4,928 samples of milk, of which 4,183 were above the legal standard. Of these, 55 samples showed evidence of the removal of cream and 65 contained added water. This is an increase in the percentage of watered milk over the past three years. This should not be construed to mean that more watered milk is being sold throughout the State. It has been the practice to collect milk from stores and milk dealers, and if there were anything suspicious, as pointed out by the analysis, to make further investigation.

During the past ten or twelve years, there has been a decrease in the number of milk dealers, with an increase in the amount of milk sold by the average dealer. In consequence of this practice a small amount of watered milk could get into the mixture and escape detection.

The Department has during the past four or five years been collecting at the pasteurization plants milk for bacteriological examination. During the past year, this procedure was varied by collecting at the same time milk for chemical examination, and in this way the Department found many producers shipping watered milk to the dealers who purchased it. When this was discovered, the inspectors obtained samples directly from the producers for purposes of prosecution. The average quality of the milk in consequence of this change in procedure has been somewhat reduced, although it is materially above that provided by the Massachusetts standard.

The average composition of the 4,777 samples of milk collected by the inspectors was 12.54% solids and 3.96% fat. Excluding the adulterated samples, there were 4,660 samples with an average solids of 12.58% and an average fat of 3.98%. When one considers that the standard for Grade A milk is 4% fat, we realize that the people of this State are getting exceptionally good milk. The standard for total solids is 12%, and the average milk sold exceeds 12.5% in solids.

A summary of these examinations will be found in Tables 2 and 3.

During the year, there were collected 4,102 samples of milk for bacteriological examination, of which 3,338 conformed with all the requirements.

The average quality of the milk is exceptionally good, although not as good as it was a year ago. This difference may be due to the character of the samples collected, and it may be due to market conditions. The certified and pasteurized milk was considerably higher in quality than that obtained a year ago. The geometric mean of these figures for 1933 was 36, and for 1934 was 10. The geometric mean of the bacterial count of the certified milk unpasteurized was 3,734. The Grade A milk was somewhat higher in bacterial count, the geometric mean being 8,315, which, however, is considerably below the 25,000 standard count, and also considerably below the 15,000 standard proposed by the Milk Regulation Board. The count of the pasteurized milk was higher than it should have been, the geometric mean being 26,865. The standard of the Department is 50,000. When compared with the Grade A milk standard, however, this milk is exceptionally good, nearly half the samples being below the Grade A standard of 25,000.

There were only 15 samples of Grade A Massachusetts milk obtained. The geometric mean of the bacterial counts was 38,397. The geometric mean of the counts of the 17 samples collected in 1933 was 14,655. The quantity of Grade A Massachusetts milk sold on the market is relatively small.

There were collected 314 samples of raw milk intended for consumption as such. The geometric mean of the bacterial count was 46,861, which is somewhat higher than last year's figure of 23,625.

The raw milk for Grade A purposes was considerably lower in bacterial count than that obtained in 1933, the figure for 1934 being 16,575, while the 1933 figure was 28,234. The number of samples collected each year was almost the same.

The average count of milk intended for ordinary pasteurized milk was higher than during 1933, the figure for 1934 being 88,701 and for 1933 being 64,334. One reason for this high count was repeated reinspections of milk because of high counts on the first inspection. There was evidently a fear on the part of milk dealers to stop taking milk from dairies having high counts because of Federal Milk Regulation control. One of the dealers stated at a hearing that if he stopped taking milk from those producers delivering milk with a high count, he would have trouble with the Federal Government. He was informed that he could take his choice of action by the Federal Government or action by the State. He was also informed that it was highly improbable that the Federal Milk Control could compel him to accept milk which he could not sell because of the Massachusetts Laws and Regulations. A subsequent investigation of this man's supply showed that in some way, shape or manner he had caused a reduction in the bacteria count of the milk which he was buying.

There have been established in Massachusetts three pieces of apparatus for the pasteurization of milk at high temperature for a short time. Under the Regulations of the Department, made in accordance with the law, milk heated to not less than 160° F. for a period of not less than 15 seconds may be called "Pasteurized Milk." This type of pasteurization has been carefully studied by the U. S. Public Health Service, by the State Board of Health of Pennsylvania, and by the State Health Department of New York, as well as by commercial interests, and it has been found to be as efficient in killing pathogenic bacteria as the low temperature, long time process. The high temperature, short time apparatus is more nearly "fool-proof" than is the other type as it is equipped with automatic control instruments, so that if the temperature of the milk drops below the pasteurization point the milk pump will instantly stop and will not start again until the milk reaches pasteurization temperature.

There have been a number of efficiency studies made upon these three plants, and in nearly all instances it was found that there was an increase in the bacterial

count of the milk as the process of pasteurization continued. This was very evident when the raw milk came from a uniformly mixed source. When the raw milk came from a variable source, the efficiency test was performed by taking a sample of the milk either from the dump tank or the pipe line, and, after the lapse of the calculated time, taking another sample of the finished product, these two samples representing the same milk before and after pasteurization. These figures were then plotted on arithmetic logarithmic paper, the time interval being arithmetic. It was found that the two curves had a tendency to approach each other as the time of operation increased.

We have been unable to ascertain the exact cause of this apparent increase in bacteria. We found on a few tests that there was no apparent increase during the entire process. The apparatus in all instances showed an average efficiency of more than 90% in reduction of bacteria. A few studies on the long flow holder of the low temperature, long time pasteurization showed the same peculiarity of increase in bacteria count as the process continued, although with this apparatus there were a few instances where there was practically no increase during the entire pasteurization period.

The milk sold in Massachusetts is bacteriologically of unusually high quality. Of the raw milk going to pasteurization plants, 70% was of Grade A quality bacteriologically, and 80% of this had a count below 500,000, which was the first count established in this State by regulation for the sale of milk to the consumer. There were examined only 314 samples of raw milk intended to be consumed as such, and half of these samples had a count below 50,000, 82% having a count below 300,000.

A summary of the bacteriological examinations will be found in Table 4.

The first inspections after the passage of the frozen dessert law showed that a strict enforcement of the law would result in an improvement in the quality of the ice cream sold in this State. The ice cream plants had for a number of years been operating under licenses issued by local Boards of Health, but the inspections made by the Department after the passage of the new law indicated that the unsanitary conditions of these plants far exceeded in number those found in the pasteurization plants at the time the pasteurization licensing law went into effect.

A short time after the inspections began, the Department received a letter enclosing a copy of a letter sent by another person who was an employee in an ice cream plant. The person writing the Department stated that, if requested, he would give the Department the name and address of the person writing the letter, if such person would be protected. A request was therefore made for permission to utilize this communication in the annual report, and a reply was received stating that this could be done. The statement is as follows:

*"One Billion Trillion Bacteria Can't Be Wrong"*

"Within recent times there have been published certain papers which have not been entirely complimentary to the ice cream industry—so some of our more learned and ethical dairy experts believed. Since graduating from college, I have been in the employ of a local ice cream concern and some of the practices which I have seen there have been entirely contradictory to the fundamental principles of cleanliness, fair play, and good ice cream making, which a four year training in college has taught me to recognize as such. My limited working experience enables me (in one instance, at least, and where one exists others must) to say that all is not well in the practice of ice cream making and that there is some truth in the papers referred to above.

"My arrival in the ice cream industry was incidental with the fly season. I have seen flies where ice cream is being made thicker in numbers than any gathering of those creatures of filth which soared over a manure heap. And when something was said to the plant manager concerning this disgusting condition (he, too, was a college graduate) he replied that there was nothing much you could do about it. I have seen flies frozen right in the ice cream, then to be consumed by babies, children or invalids who eat ice cream because it is easy on tender stomachs. I have seen people rinse their hands in the same water—containing no soap—where dairy utensils were being "washed." I have seen pipe lines and fittings lined with green, putrified ice cream mix. I have seen ice cream mix that was so old—in fact, just

plain lousey—that the odor arising therefrom would cause the aroma of decayed fish to pale to insignificance. And the nauseating odor of the ice cream made from this mix would permeate the hardening room for days. I have seen the plant manager repeatedly thrust the fore or index finger into a can of freshly made stock and obtain an official sample or perhaps a bit of nutriment to alleviate a hunger pang. I have seen a Stillson wrench picked up from the bottom of a vat. The same wrench was covered with a green slime which would indicate that it had been there for weeks—the bottom of a vat apparently being an excellent hiding place, for no one ever looked there. I have seen flies hovering about an open toilet (one toilet for 25 men) and there was nothing to prevent them from taking a little trip upstairs into the ice cream. I have seen a yellowish colored water (color caused because of the dissolved filth contained therein) drip right through from the porous floor above into the open taps of the package filling machines below. I have seen cans (40 quart variety) which contained a small puddle of brown rinse water filled with newly made mix to be shipped out to smaller dealers who did not make their own mix. The inside of the can being consequently seeded with trillions of bacteria—pathogenic or otherwise, and when the health inspector comes around the main parts of the plant were cleaned while the plant manager carefully manœvered the inspector about—tactfully avoiding those places most in need of a thorough inspection. I have seen men from every walk of life helping themselves at the freezer to ice cream, and this heterogeneous group included the cop on the beat who was especially fond of the rum which was—or was not—used in making frozen pudding. Lack in discipline invariably co-exists with an utter lack of simple sanitary precautions.

“Poorly tinned vats and coils, foul odors, inadequately cleaned utensils, finger contamination, lack of authority, the ignorance of the employees concerning the importance of their duties as affecting the cleanliness of the finished product. These were every day occurrences. The sin in sanitation which was committed in the name of ice cream making prompts me to state that much can be accomplished in the way of producing a better and healthier ice cream than has heretofore been produced.”

On October 16, one of the inspectors submitted a report, in part, as follows:

“On first floor, all pipe lines dirty. Green deposits on all couplings and valves. Large 3” pipes running from first floor up to the bottom of holding tanks with a capacity of 1,000 gallons each very dirty. The green was oozing out of the couplings at the bottom of the second floor. Verdigris in the valves; looked as if they had never been disconnected.

“The pipe lines running from the pasteurizer up and over the cooler covered with verdigris at each coupling. The distributor pipe that goes over the cooler was a great deal worse than the three or four other pipes. Valves and couplings to the pasteurizer covered with dirt and green deposits. Some casein on pasteurizer. The outside of these pipes, valves and couplings and the freezers were as dirty as the inside. Every time I put my hand on any part of the apparatus it came away with a black, greasy dirt with a stale odor. These large pipes running from the first floor to the holding tanks on the second floor where the ice cream mix goes into the freezer had a very foul odor.

“This concern has been in business about 25 years. The pasteurizing man informed me that they sold about 5,000 gallons of ice cream per week. They make all their own mix, using some cream and some butter.

“The utensils in use were not clean. Floors were greasy and the stock room was not properly kept. In my estimation, an ice cream plant could not be any dirtier than this one.”

Bacteriological examination of the samples collected showed especially high counts as might be expected. This case resulted in a prosecution and fine.

Another report reads, in part, as follows:

“When I went into the plant, one pasteurizer was half full of ice cream mix to be pasteurized. The pipe lines were all up. First, I had the distributor pipe over the cooler taken down. It contained rotten, decomposed milk products and there were green deposits on the end of each coupling. On the dead end of this pipe, after disconnecting the coupling, I found a half inch of rotten, sour cream or ice cream mix

with green deposits and with a very offensive odor. I had the rest of the pipe lines taken down and they contained dirty, green deposits with a sour, offensive odor. The couplings on each pipe contained green deposits and filth.

"There were three vats located in this plant. The one in the middle, No. 2, they claim they use only in the case of an emergency. I had the valves taken out of the bottom of this pasteurizer and the odor was bad. There were also green deposits on them. The foreman admitted that the valves on these pasteurizers had not been taken off for six weeks. He told me he had not taken down the distributor pipe over the cooler for a month.

"All pipe lines, valves and couplings were dirty on the inside and on the outside so that I had to use warm water and soap after this inspection to get the dirt off my hands."

This case resulted in a prosecution and fine.

One plant, located outside of the State, shipped ice cream mix to Massachusetts where it was frozen and sold. An application was made for a permit to ship into the State and a statement was made that the inspector of the town of Brookline had seen the plant and would report it to be satisfactory. A letter was therefore sent to Mr. Ward, the inspector of Brookline, who happened to be in the neighborhood of the plant in question. The letter was forwarded to him from his office and he inspected the plant and made a report similar to those quoted above, and the permit was refused. A short time afterwards we were informed that the place was in conformance with the law and that a Boston inspector was working in that vicinity. The Health Department of Boston was therefore requested to inspect the plant if an inspector were available in that vicinity, and the Boston Health Department reported that the plant was not in conformance with the Massachusetts regulations. Subsequently, the plant in the State where the mix was frozen was investigated and the inspector reported, in part, as follows:

"The ice cream mix is made out of the State and is shipped to the factory in Massachusetts. There are two freezers in this plant of about 20-gallon capacity each. The inlet pipe to each freezer was extremely dirty, green material was oozing out from the threads of the couplings, the paddles which were inside the cylinder could not be taken out and were extremely dirty, as were also the pipe lines, couplings and valves."

This resulted in a prosecution and payment of a fine.

One man was given a hearing for unsanitary conditions and for operating without a license. He stated at the hearing that this was the first inspection ever made of his plant during 25 years and that he had never had a license from the local board of health.

Another man was given a hearing for operating a plant under unsanitary conditions. Included in these conditions was a cylindrical plug of cheese found in the distributor pipe over the cooler. The excuse was that the pipe was cleaned every day, but, owing to the NRA code, the proprietor was unable to control his employees. In cleaning the pipe, it seems that the employee would put a brush into one end of the pipe and push the piece of cheese over to the other end. He would then go to the other end, insert the brush and push the piece of cheese back again.

It should not be assumed that all the plants are in an unsanitary condition. Far from it. Many of the plants inspected are found to be in absolute compliance with the law and regulations. The following report, as far as sanitary conditions are concerned, is characteristic of many of the plants:

"The ice cream mix is at present received once a week from the company's plant located outside of the State. It is carried over the road in jugs but in the summer time it is transported in glass-lined insulated tanks. There is no pasteurization done at the plant but the mix is all pasteurized. The pipes through which the mix passes were clean. There were three holding tanks which were clean as was also the general condition of the plant and the refrigeration room. The product is shipped exclusively in cardboard containers. There were two 80-quart Miller mixers and a Creamery Package freezer."

The samples of frozen desserts obtained at this plant were found to have a low bacteria count.

Under the regulations made by the Department, if a sample of frozen dessert is

found with a high bacterial count, a warning letter must be sent to the person responsible for the condition of the article or to the person from whom the article is obtained. Subsequently three samples may be obtained, either on the same day from different lots or on three days during a short period, and if the majority of these samples show a high count, a prosecution may follow. It is surprising to note the difference between the first sample and the samples obtained after a warning letter has been sent. In all but a very few instances the manufacturer has ascertained the cause of the high count and the subsequent samples have been below the maximum bacterial count set by the Department.

#### FOODS OTHER THAN MILK

During the year there were collected and examined 2,647 samples of food other than milk. A summary of the results of these examinations will be found in Table 5.

The 15 samples of butter found adulterated were oleomargarine sold as butter. The 14 samples of buttered popcorn found adulterated or misbranded were treated with material other than butter. The single sample of celery reported adulterated was misbranded as being produced in New England. This sample was collected as a result of a complaint, and we were able to get evidence that the celery was not "native" celery. The 61 samples of adulterated confectionery were so-called "brandy drops."

There were 67 samples of sour cream collected, of which 14 were adulterated. There were 72 samples of cream cheese collected, of which 19 were adulterated. The adulteration in some of these cases was the addition of gelatin or a similar substance for the purpose of increasing the viscosity of the cream, and in the case of cheese for the inclusion of additional quantities of water.

One case was set in the Springfield Court, to be heard in the early part of December. The Department also obtained some cheese containing foreign fat. This cheese was found in a cold storage warehouse and was discovered in the course of investigation to ascertain the source of some of the gelatinized cheese on the market. In only one instance was this cheese traced to the responsible person, who was prosecuted and convicted subsequent to the close of the fiscal year.

There were examined a number of samples of flavoring extracts, which were more or less misbranded. In most instances the manufacturers changed the labels to conform with the requirements of the law.

There were 415 samples of frozen desserts examined chemically, only 4 of which were found below the legal standard. The composition of the frozen desserts was above that required by statute. The statute sets a standard of 10% fat, which, however, may be reduced to not less than 8% by the addition of fruit, nuts, chocolate, etc. Fifty per cent of the samples had a fat content varying from 13% to 17%, and 22% of the samples had a fat content varying from 18% to 22%. The average of these samples was 14%. There were 380 samples of frozen desserts examined bacteriologically, of which 295 conformed with the regulations.

The meat products examined consisted of chicken salad, chicken, hamburger steak, kidneys, liver, pigs' feet, pork sausages, and stew beef, there being 1,338 samples in all. A number of these samples were submitted on complaint of local boards of health and individuals. Many of these submitted samples were said to have been responsible for food sickness. The 2 samples of decomposed chickens were submitted by a local board of health, but the chickens had been held for some days after purchase before delivery to the Department. They were decomposed on delivery to the Department.

Approximately 20% of the meat samples were in violation of the law. It is unfortunate that meat dealers will persist in selling meat which should be transferred to the refuse barrel. Many of the hamburger steak samples were made from decomposed meat and sufficient sodium sulphite was added to deodorize it. The inspectors in collecting these samples do not waste the Commonwealth's money upon material which appears to be good, but when the material has an unsatisfactory appearance a purchase is made.

One cause for decomposition in hamburger steak is not the use of poor meat, but the use of an unclean grinder. An inspector recently reported that he went to a store for some hamburger steak, and when he saw the man cut off a good piece of meat he told the proprietor not to grind it as he was an inspector. He then had the

machine disconnected and found that it had not been cleaned for some time and contained considerable decomposed meat apparently left over from the prior day. If the inspector had made a purchase, the meat upon analysis would have been found to be decomposed. This condition may possibly account for many explanations given at hearings, that the meat in question had been freshly ground from good meat the morning the purchase was made.

It has been found in a few instances that dealers mix pork with beef in making cheap hamburger steak. One store advertised the material as "Pork and Beef Hamburg Steak." This practice may result in an increase in trichinosis among humans. With but few exceptions, the public is aware that pork must be thoroughly cooked before it is eaten, and consequently there is very little trichinosis. Trichinosis usually occurs among those races that prefer pork uncooked. There is no possible means of inspection which will assure the public that pork is free from trichinosis. If, however, people buy hamburger steak believing it is beef, and the material contains pork, it is liable to be served somewhat rare, and if there are any trichinae present, there is liability of the development of trichinosis.

There were 5 samples of olive oil collected, of which 2 were found to be adulterated. This collection was made on the complaint of an olive oil dealer that some one was counterfeiting his brand and substituting an inferior oil. These 2 samples resulted in prosecution. The cans were labeled as containing olive oil, when in fact they contained a mixture consisting of cottonseed oil and some olive oil.

Owing to information received at the meeting of the New England Food Officials in the spring, 21 samples of sweet pickles were collected, of various makes, and 5 of these were found to be sweetened with saccharin. These 5 samples were all the product of one concern. There was a prosecution, which resulted in dismissal for lack of jurisdiction. Subsequent to the close of the fiscal year, the case was prosecuted in the correct jurisdiction, resulting in conviction and appeal. The appealed case has been disposed of by the payment of a fine.

In connection with this case, information was received from the U. S. Department of Agriculture that this corporation had, in Western Massachusetts, a large amount of decomposed pickles. The matter was investigated by an inspector, who found reason to confiscate a large quantity of this ill-smelling material. The inspector ascertained that some of this material had been shipped to the plant in Cambridge. A subsequent inspection of the Cambridge plant disclosed the presence of this material. The material at the plant was also confiscated. The Company agreed to take back all the pickles containing saccharin, and in some instances evidence was secured to show that this was done.

The three samples of adulterated pie filling were mince meat containing sodium benzoate, the package not being labeled as required by the regulations. The single sample of adulterated spice was a special spice which was colored with a dye which had not been certified.

During the month of August, 12 samples of whiskey were purchased and were examined in considerable detail to ascertain whether or not the material was properly labeled and to ascertain still further how this material compared with material on sale prior to prohibition. In general the material was properly labeled. There is considerable popular misinformation as to the composition of whiskey and the difference between so-called "pure" whiskey and "adulterated" whiskey. Whiskey contains approximately 99.6% of alcohol and water. The balance consists of color, solid extract, acids, esters, aldehydes, furfural, fusel oil, and, no doubt, some other unidentified substances. It is popularly supposed that when whiskey is aged, the poisonous fusel oil disappears. In fact, when whiskey ages, the poisonous fusel oil nearly doubles, and during the aging process the whiskey develops the acids, esters, aldehydes, and furfural, which is found in the material on the market. The so-called "blend" is a mixture of dilute alcohol, colored and flavored, and it may contain some aged whiskey.

Whiskey is consumed, both for its flavor, and second, for its alcoholic peculiarities. Prior to prohibition, the popular preference was for the so-called "blend" which contained but 45% alcohol, and the demand was much less for the so-called "straight" whiskey, which contained 50% alcohol.

One interesting label claimed that the material was "Straight Whiskey, Bottled in the Fall of 1934." In view of the fact that this whiskey was purchased in August,

1934, we must assume that the fall begins rather early. This whiskey corresponded in composition to aged whiskey, the fusel oil content being very close to that of the average four year old rye whiskey, and the coloring matter was that which is extracted from the charred oak barrel used in aging whiskey. Another whiskey was labeled "Straight Whiskey, Bottled in the Spring of 1934." This corresponded in composition to "straight" whiskey, although the fusel oil content was somewhat lower than the other sample, but corresponded very closely to that of a one year old whiskey. Another whiskey was labeled "Straight Whiskey, Bottled in the Summer of 1934, Aged in Wood 18 Months." This whiskey was apparently diluted with alcohol and was only 93 proof. It was labeled "95 proof." Another sample labeled "Straight Whiskey, Bottled in the Spring of 1934, 93 Proof" was found to be 93 proof, but was colored with caramel and therefore could not be characterized as "Straight Whiskey." The fusel oil content of this sample was the lowest of any.

Another very interesting sample was labeled "Blended Whiskey, 20% Straight Whiskey, Alcohol, Color. Spring 1934. 80% Neutral Spirits. 90 Proof." This was found to be 89.06 proof, and, strange to say, it had the highest fusel oil content of any sample collected, almost equal to the maximum of a four year old whiskey. This material was made from alcohol, color, and flavor, to which a considerable quantity of fusel oil had been added.

Another sample labeled "Straight Whiskey, Distilled in the Spring of 1930, Bottled in Bond, Bourbon, 100 Proof" was found to be 100.78 proof. The fusel oil content corresponded very closely with that of an eight year old whiskey, and the other ingredients indicated the accuracy of the label. All of these samples were tested for the presence of wood alcohol, with negative results.

#### EXAMINATION OF DRUGS

There were 347 samples collected, of which 25 were found to be adulterated or misbranded. There were 4 samples of Argyrol below the professed standard under which they were sold. Three samples of camphorated oil were low in camphor. One sample of lime water was somewhat deficient in lime and 5 samples of magnesium citrate solution contained magnesium sulphate. One sample of spirit of anise, 8 samples of spirit of nitrous ether, 1 sample of syrup of hydriodic acid, and 2 samples of tincture of iodine were found to be somewhat below the standard. It was found necessary to make only three prosecutions for the sale of low-standard drugs.

The New England Drug Show, at its exposition in Boston, gave some space to the Department for exhibition purposes. The Food and Drug Division collected a number of samples similar in character to those collections made 25 years ago, and a chart was prepared, showing the difference in composition of these articles at the beginning and end of the 25-year period. No comments were made upon the chart. Comments were unnecessary. The pharmacists have apparently cleaned house in the meantime.

The chart exhibited is as follows:

#### MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

#### Are Drugs More Pure Today Than Twenty-Five Years Ago?

In 1909, the State Board of Health collected and examined 889 samples of drugs including

- 26 samples of camphor liniment, of which 3 were adulterated.
- 76 samples of olive oil, of which 7 were adulterated.
- 156 samples of tincture of iodine, of which 23 were adulterated.
- 63 samples of spirit of camphor, of which 10 were adulterated.
- 69 samples of spirit of peppermint, of which 22 were adulterated.
- 49 samples of spirit of anise, of which 23 were adulterated.
- 4 samples of spirit of nitrous ether, of which 4 were adulterated.
- 443 total samples, of which 92 or 20.76% were adulterated.

- In March, 1934, the Department of Public Health collected and examined
- 20 samples of camphor liniment, of which none was adulterated.
  - 16 samples of olive oil, of which none was adulterated.
  - 13 samples of tincture of iodine, of which none was adulterated.
  - 14 samples of spirit of camphor, of which none was adulterated.
  - 9 samples of spirit of peppermint, of which none was adulterated.
  - 6 samples of spirit of anise, of which 1 was adulterated.
  - 21 samples of spirit of nitrous ether, of which 1 was adulterated.
  - 99 total samples, of which 2 or 2.02% were adulterated.

A summary of the analyses of drugs will be found in Table 6.

For the enforcement of the mattress law, the Department never had a specific appropriation. A few attempts have been made on the part of the mattress trade and the Boston Better Business Bureau to transfer the work to the Department of Labor and Industries and to make radical changes in the law. At the hearing before the Mercantile Affairs Committee, the Department stated that it had no objection to the transfer and did not comment upon the character of the bill. At the last session of the Legislature, the Mercantile Affairs Committee reported the bill but left the work with the Department of Public Health. When the bill came before the Ways and Means Committee, the Department objected to the construction of the bill. The Ways and Means Committee asked the Department and the proponents of the measure to agree upon a new draft, but the Boston Better Business Bureau declined to agree with the draft submitted by the Department. The Ways and Means Committee therefore reported the original bill, turning the work over to the Department of Labor and Industries. This bill was vetoed by the Governor.

There apparently is a demand on the part of mattress manufacturers for more inspectional service, and, consequently, the Division recommended in the 1935 budget that a request be made for an additional inspector to spend his whole time on this type of work. The Department purchased an ultra violet lamp to be used in this work, which can also be used in other types of laboratory examinations. This lamp has been found to be quite valuable in detecting secondhand material.

There were 41 prosecutions, all but 5 of which resulted in conviction. The penalties imposed by the courts were in some instances quite high. In Springfield, for example, a \$200 fine was imposed and was paid.

The Diamond Mattress Company of Woonsocket, Rhode Island, a few years ago shipped some secondhand mattresses into Fall River, labeling them as being filled with new material. The Company declined to come into Fall River to defend the cases and it was necessary to prosecute its customers. Similarly, this Company shipped to Raccicot Brothers of Webster some mattresses labeled as containing new material, which in fact contained secondhand material. The Company declined to come into Massachusetts, and a complaint was entered against Raccicot Brothers. The Company then decided to come into Massachusetts and defend the case, and on January 18, the Company was convicted and fined and the case against Raccicot Brothers was discharged upon recommendation of the Department. The same Company shipped some similar material to a store in New Bedford, and on July 27 came into New Bedford and was again convicted.

The Department has taken the attitude that the manufacturer of mattresses, even if he does buy the filling under a "New Material" label, should be able to ascertain upon inspection whether or not he is getting such material, whereas a person who buys the mattress for sleeping purposes is unable to ascertain the character of the material used for filling. Consequently, the Department has prosecuted the manufacturer wherever possible. It seems, from evidence which the Department has gathered, that the storekeeper is somewhat at fault by his attempts to make the manufacturer furnish him cheaper and cheaper mattresses, at the same time requiring that the mattress bear a label stating that it is filled with new material. At the close of the fiscal year, a change in policy has been seriously considered. It may produce better results, as far as the consuming public is concerned, if in the future the Department prosecutes not the manufacturer but the retail dealer. The retail dealer can very easily open a few mattresses of each shipment and ascertain if the filling corresponds to the label, and if it does, he may then sew up the mattress and sell without any fear of subsequent prosecution.

Many of the mattress violations were secured as the result of complaints both from the consuming public and the Association of New England Bedding Manufacturers. All complaints have been investigated, and, with but few exceptions, the complaints on the part of the consuming public were found to be valid.

#### CONFISCATIONS

The confiscations made by the Department are summarized in Table 7.

#### COLD STORAGE

The cold storage warehouses have been licensed and inspected, as usual, during the course of the year, and no serious violations were found in the warehouses. They have been kept in good sanitary condition.

A number of requests were made for extension of time in storage, and if the articles were found to be in proper shape for extension, it was granted. The general business situation has resulted in an increase in the storage of frozen eggs which are used by bakeries. The recent increase in the price of butter has led to a reduction in the storage of butter, and there has been a slight increase in the holdings of storage pork.

A summary of the extensions of time granted on goods in storage, as well as extensions refused, and a record of lots of food ordered removed from storage, will be found in Tables 8, 9, and 10.

Tables 11, 12, 13, and 14 contain the statistics on the amounts of food placed in storage and the amounts of food on hand in storage.

#### SLAUGHTERING INSPECTION

The usual routine work of considering nominations for the position of inspector of slaughtering was carried on. Fortunately, most of the towns made renominations, and such persons were automatically approved if the Department found no criticism of their work during the prior twelve months. There were but few violations of the slaughtering laws, 4 of which resulted in prosecution.

Table 15 gives a summary of the inspections and confiscations made by the local inspectors.

#### BAKERIES AND SOFT DRINK ESTABLISHMENTS

The work of inspecting bakeries and soft drink plants has been somewhat curtailed because of the increased work in connection with mattresses. A number of bakery inspections were made as the result of complaints, and in many instances the inspections were made at the request of and in company with the local health authorities. Many of the soft drink plants were inspected and were found to be operating in a reasonably sanitary manner.

In one city the plants were found to be operating without a license. They were clean, and immediately the proprietors went to the board of health for licenses. The inspector called upon the health officer, who inquired as to what he should do. He asked if he were supposed to request these persons to secure their licenses. The inspector told him it would be an act of courtesy to send a request either to renew the license or to close the plant. About twelve months prior to this visit, the same inspector had found one of these plants operating under extremely unsanitary conditions. He also found that it had been operating for a period of two years without a license. This case resulted in prosecution and conviction.

#### SILVER POLISH

A few years ago, the owners of hotels and high-grade restaurants agreed with the Department to stop the use of cyanide as a silver cleaner. As a result of this, the Department agreed not to propose any legislation to stop the practice. Once each year, the character of the silver polish used by these places had been investigated, and during the past year the restaurants and hotels were found not to be using any cyanide cleaner.

#### LIQUOR SAMPLES

The number of liquor samples submitted by the Police Departments has been materially reduced. A summary of these examinations will be found in Table 16. This naturally left more time on the hands of the employees doing this type of work, and consequently, the chemist was put on bacteriological work, which resulted in

an increased examination of milk and ice cream for bacteria. The clerk engaged in that work was given charge of the files connected with the new ice cream law and the new alcohol licensing law, so that apparently it will be unnecessary to employ additional clerical and laboratory service for this work. The wood alcohol licensing law has also resulted in an increased examination of commercial products for the presence of wood alcohol.

TABLE I. — *Prosecutions for Violations of the Food and Drug Laws  
For Sale of Milk not of Good Standard Quality*

NAME	ADDRESS	COURT	DATE	RESULT
Berry, Mazie	Salisbury	Amesbury	Aug. 24, 1934	Conviction <sup>1</sup>
Chaffin, Winslow	Brookfield	East Brookfield	June 8, 1934	Conviction
Chapin, George	Salisbury	Amesbury	Aug. 24, 1934	Conviction
Denosky, Adam	Lincoln	Concord	Aug. 1, 1934	Conviction
Deon, Rosa	Brookfield	East Brookfield	Aug. 3, 1934	Conviction
Doyle, James	Dalton	Pittsfield	Jan. 5, 1934	Conviction
Duffy, Charles J.	Leicester	Worcester	June 15, 1934	Conviction
Georgian Cafeteria, Inc.	Cambridge	Cambridge	Feb. 6, 1934	Conviction
Hill, Catherine	Concord	Concord	Aug. 1, 1934	Conviction
Hillside Dairy, Inc.	Marlboro	Natick	Apr. 11, 1934	Discharged
Joaquin, John	Fall River	Fall River	Feb. 27, 1934	Conviction
McManus, James H., Inc.	Concord	Concord	Aug. 1, 1934	Conviction
Ritchie, Agnes	Oxford	Webster	Aug. 2, 1934	Conviction
Ryan, Joseph W.	Charlton	Southbridge	Aug. 8, 1934	Conviction
Taylor, John C.	Bedford	Concord	Dec. 10, 1933	Conviction
Woodland, Charles L.	Watertown	Waltham	Nov. 13, 1934	Conviction

*For Sale of Milk from which a Portion of the Cream Had Been Removed*

Beaubieu, Nelson	Montague	Greenfield	July 6, 1934	Conviction
Grechel, Eva	Ashfield	Greenfield	May 17, 1934	Conviction
Hillside Dairy, Inc.	Marlboro	Newton	May 2, 1934	Conviction
Lemothe, Joseph	Mendon	Blackstone	July 3, 1934	Discharged
Tanner, Ralph	Clarksburg	North Adams	Feb. 8, 1934	Conviction

*For Sale of Milk Containing Added Water*

Antoski, Stanley	Ludlow	Springfield	Nov. 2, 1934	Conviction
Bray, Charles	Marlboro	Westboro	Sept. 24, 1934	Conviction
Crane, James B.	Leominster	Leominster	Aug. 31, 1934	Conviction
Diani, Frank	Holliston	Frammingham	May 31, 1934	Conviction
Dimock, Edgar S.	Oxford	Webster	April 17, 1934	Conviction
Hagopian, Peter	Marlboro	Westboro	Sept. 24, 1934	Conviction
Kareta, Andrew	Ludlow	Springfield	Nov. 2, 1934	Conviction
Malmosky, Stanley	Bellingham	Frammingham	May 31, 1934	Conviction
Oliver, Jesse	South Westport	New Bedford	Oct. 2, 1934	Conviction
Porter, George	Deerfield	Greenfield	July 27, 1934	Conviction
Trahan, Eugene	Westhampton	Northampton	April 10, 1934	Conviction
Vigneault, Arthur	Haverhill	Haverhill	Oct. 30, 1934	Conviction

*For Sale of Low Standard Cream*

Woodland, Charles L.	Newton	Newton	Jan. 22, 1934	Conviction
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*Selling Unpasteurized Milk as Pasteurized*

Bascombe, Ernest	Fall River	Fall River	Feb. 28, 1934	Conviction
Bookless, Max	Pittsfield	Pittsfield	June 5, 1934	Conviction
Burkinshaw, Chester A.	Salem	Salem	Nov. 14, 1934	Conviction
Dennehy & Sons, T.	Quincy	Quincy	May 31, 1934	Discharged
Goldman, Morris	Chelsea	Chelsea	June 1, 1934	Discharged
Harnisch, Ernest	Methuen	Methuen	May 7, 1934	Conviction
Lavoie, Napoleon	Lowell	Lowell	April 6, 1934	Conviction
Miller, Fred	Methuen	Methuen	May 7, 1934	Conviction
Rabinovitz, Arthur	Chelsea	Chelsea	June 15, 1934	Discharged
Rheault, David	Lowell	Lowell	Sept. 4, 1934	Conviction

*For Violation of Pasteurization Law and Regulations*

Atwell, Russell	Norton	Attleboro	July 17, 1934	Conviction
Brox, Abraham	Draut	Lowell	Sept. 4, 1934	Conviction
Davidson & Sons, J.	Chelsea	Chelsea	June 1, 1934	Discharged
Dennehy & Sons, T.	Quincy	Quincy	May 31, 1934	Conviction
Farrell, William C.	Lowell	Lowell	April 6, 1934	Conviction
Goldman, Morris	Chelsea	Chelsea	June 1, 1934	Discharged
Harnisch, Ernest	Methuen	Methuen	May 7, 1934	Conviction
Holder, Herman	Berlin	Clinton	April 5, 1934	Conviction
McAdams & Bros., J. F.	Chelsea	Chelsea	June 1, 1934	Conviction
Miller, Elwood	Seekonk	Taunton	July 23, 1934	Conviction
Monson Milk Co., Inc.	Monson	Palmer	Mar. 9, 1934	Conviction
Olivera, Claudino	Seekonk	Taunton	July 23, 1934	Conviction
Rheault, David	Lowell	Lowell	Sept. 4, 1934	Conviction
Richardson, Hazen K.	Middleton	Salem	Aug. 24, 1934	Conviction
Steele, Robert	North Adams	North Adams	Mar. 16, 1934	Conviction
Stetson, Lincoln	Abington	Abington	Oct. 4, 1934	Conviction
Swartz, Jennie	Chelsea	Chelsea	June 1, 1934	Discharged
United Farmers Co-op. Creamery Assn., Inc.	Everett	Malden	Oct. 4, 1934	Conviction

<sup>1</sup>Appealed; Not Prossed by District Attorney.

*For Violation of Grade A Regulations*

Hillside Dairy Co., Inc.	Marlboro . . . .	Hudson . . . .	Oct. 31, 1934	Conviction
Kirschner, Joseph W.	Pittsfield . . . .	Great Barrington . . . .	June 6, 1934	Conviction

*Misbranding of Milk*

Alta Crest Farms, Inc.	Spencer . . . .	East Brookfield . . . .	Aug. 10, 1934	Discharged
Wells, Frederick U.	Whately . . . .	Greenfield . . . .	Aug. 9, 1934	Conviction <sup>1</sup>

**BUTTER**

(Sale of Rancid Butter)

Wyman, Wilbur . . . .	Boston . . . .	Boston . . . .	June 20, 1934	Discharged
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*For Violation of Oleomargarine Law*

Chapin & Adams Corp.	Boston . . . .	Boston . . . .	June 6, 1934	Conviction
Leger, Albert A.	Fall River . . . .	Fall River . . . .	June 21, 1934	Conviction
Leger, Albert A.	Fall River . . . .	Fall River . . . .	June 21, 1934	Conviction
Leger, Albert A.	Fall River . . . .	Fall River . . . .	June 21, 1934	Conviction
Ryan, James W.	Boston . . . .	Boston . . . .	May 22, 1934	Conviction <sup>1</sup>
Ryan, James W.	Boston . . . .	Boston . . . .	May 22, 1934	Conviction <sup>1</sup>
Ryan, James W.	Boston . . . .	Boston . . . .	May 22, 1934	Conviction <sup>1</sup>
Ryan, James W.	Boston . . . .	Boston . . . .	May 22, 1934	Conviction <sup>1</sup>
Ryan, James W.	Boston . . . .	Boston . . . .	May 22, 1934	Conviction <sup>1</sup>
Ryan, James W.	Boston . . . .	Boston . . . .	May 22, 1934	Conviction <sup>1</sup>
Ryan, James W.	Boston . . . .	Boston . . . .	May 22, 1934	Conviction <sup>1</sup>
Ryan, James W.	Boston . . . .	Boston . . . .	May 22, 1934	Conviction <sup>1</sup>

*For Sale of Adulterated or Misbranded Foods Other than Milk and Milk Products***CELERY**

(Misbranded)

Lochiatto, Rose . . . .	Boston . . . .	Boston . . . .	Nov. 23, 1934	Conviction
Serenci, Thomas . . . .	Boston . . . .	Boston . . . .	Nov. 23, 1934	Conviction

**CHOCOLATE MILK**

(Deficient in fat)

Steele, Robert . . . .	North Adams . . . .	North Adams . . . .	Mar. 16, 1934	Discharged
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**CLAMS**

(Sewage Polluted)

Basil, Diana . . . .	Quincy . . . .	Quincy . . . .	Sept. 18, 1934	Conviction <sup>1</sup>
Knight, Frederick . . . .	Lynn . . . .	Concord . . . .	Aug. 10, 1934	Conviction <sup>1</sup>
Lane, Howard . . . .	Gloucester . . . .	Gloucester . . . .	Sept. 27, 1934	Conviction <sup>1</sup>
Naser, Ernest . . . .	Quincy . . . .	Quincy . . . .	Sept. 18, 1934	Discharged
Palmer, H. C. . . . .	Harpswell, Maine . . . .	Amesbury . . . .	June 1, 1934	Conviction
Parker, H. A. . . . .	Revere . . . .	Ipswich . . . .	July 6, 1934	Conviction <sup>1</sup>
Powers, John L. . . . .	Lynn . . . .	Ipswich . . . .	June 7, 1934	Conviction <sup>1</sup>
Savage, Carl, Jr. . . . .	Rowley . . . .	Boston . . . .	Jan. 24, 1934	Conviction
Wright, John . . . .	Gloucester . . . .	Gloucester . . . .	Sept. 27, 1934	Conviction <sup>1</sup>
Wright, John . . . .	Gloucester . . . .	Gloucester . . . .	Sept. 27, 1934	Conviction <sup>1</sup>

**DRIED FRUITS**

(Contained sulphur dioxide)

Dexter Food Corp. . . . .	Holyoke . . . .	Holyoke . . . .	Mar. 20, 1934	Conviction
Grand Union Stores, Inc.	Williamstown . . . .	Williamstown . . . .	Dec. 20, 1933	Conviction
Growers Outlet, Inc. . . . .	Greenfield . . . .	Greenfield . . . .	Jan. 18, 1934	Conviction

**EGGS**

(Misbranded)

Cohen, Harry . . . .	Greenfield . . . .	Greenfield . . . .	Dec. 27, 1933	Conviction
Vigoda, Philip . . . .	Brookline . . . .	Brookline . . . .	Dec. 4, 1933	Conviction

**IMITATION VANILLA EXTRACT**

(Misbranded)

Brod, Milton . . . .	Springfield . . . .	Springfield . . . .	April 18, 1934	Conviction
Davis, Nathan . . . .	Salem . . . .	Salem . . . .	Feb. 9, 1934	Conviction

**HAMBURG STEAK**

(Selling, or offering for sale, meat containing sodium sulphite in violation of the regulations of the Department of Public Health)

Berkman, Inc., Samuel R.	Roxbury . . . .	Roxbury . . . .	Dec. 8, 1933	Conviction
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<sup>1</sup>Appealed

*For Sale of Adulterated or Misbranded Foods Other than Milk and Milk Products — Concluded*

**HAMBURG STEAK**

(Violation of the law relative to use of sodium sulphite in meat and meat products)

Alpert, Archie	Cambridge	Cambridge	May 16, 1934	Conviction
Alpert, Victor	Cambridge	Cambridge	May 16, 1934	Conviction
Andrews, Max	Malden	Malden	Aug. 10, 1934	Conviction
Angilini, Ettore	Fall River	Fall River	July 20, 1934	Conviction <sup>1</sup>
Baker, Max	Roxbury	Boston	Jan. 16, 1934	Conviction
Bornstein, Morris	Boston	Boston	Feb. 20, 1934	Conviction
Charness, Joseph	Cambridge	Cambridge	Dec. 21, 1933	- <sup>2</sup>
Cohen, Samuel	Boston	Boston	Jan. 16, 1934	Conviction
Consumers Provision Stores, Inc.	Worcester	Worcester	July 9, 1934	Conviction
De Luca, Rose	Somerville	Somerville	Jan. 30, 1934	Conviction
Eidelman, Allick	Charlestown	Charlestown	June 12, 1934	Conviction
Eskow, George	Taunton	Taunton	Dec. 12, 1933	Conviction
Freni, John	Boston	Boston	June 7, 1934	Conviction
Goldman, Louis	Lynn	Lynn	April 3, 1934	Conviction
Gordon, Peter	Boston	Boston	July 13, 1934	Conviction
Handler, Alice	Brookline	Brookline	Dec. 4, 1933	Conviction
Horne, Abraham	Cambridge	Cambridge	April 5, 1934	Conviction
Kaufman, Samuel	Chelsea	Chelsea	Feb. 28, 1934	Conviction
Kaufman, Samuel	Chelsea	Chelsea	May 4, 1934	Conviction
Kisiel, August	Ware	Ware	Dec. 7, 1933	Conviction
Kline, Samuel	Lynn	Lynn	May 28, 1934	Conviction
Kresge Company, S. S.	Roxbury	Roxbury	Feb. 9, 1934	Conviction
Krivitsky, Harry	Boston	Boston	Mar. 26, 1934	Conviction
Kronick, Myer	Orange	Orange	Mar. 2, 1934	Conviction
Kummel, Irvin	Boston	Boston	April 17, 1934	Conviction
Leavitt, Harry	North Adams	North Adams	Dec. 6, 1933	Conviction
Levine, Louis	Roxbury	Dorchester	July 13, 1934	Conviction
Neck Market, Inc.	Charlestown	Charlestown	April 3, 1934	Conviction
Needle, Walter	Dorchester	Dorchester	July 13, 1934	- <sup>4</sup>
Needleman, Nathan	Chelsea	Chelsea	Jan. 9, 1934	Conviction
Norwood Provision Co., Inc.	Everett	Malden	Oct. 18, 1934	Conviction
Pasquale, Joseph	Newburyport	Newburyport	Sept. 28, 1934	Conviction <sup>3</sup>
Ring, Harry	Brookline	Brookline	Dec. 15, 1933	Conviction
Recheleau, Leo	New Bedford	New Bedford	Dec. 18, 1933	Conviction
Rosenberg, Phillip	Dorchester	Dorchester	June 21, 1934	Conviction
Rossman, Edward	Revere	Chelsea	Dec. 19, 1933	Conviction <sup>1</sup>
Ruggieri, John F.	Somerville	Somerville	Dec. 18, 1933	Conviction
Shlansky, Harry	Melrose	Malden	Mar. 1, 1934	Conviction
Shavitsky, Millie	Revere	Chelsea	Dec. 7, 1933	Conviction
Simons, Edward	Roxbury	Roxbury	Aug. 7, 1934	Conviction
Smokler, Julius	Boston	Boston	July 13, 1934	Conviction
Swerdlick, Israel	Boston	Boston	Dec. 29, 1933	Conviction
Tallent, Samuel	Springfield	Springfield	Aug. 1, 1934	Conviction
Tillman, Isaac	Springfield	Springfield	May 24, 1934	Conviction
Weinck, Samuel	Roxbury	Roxbury	Oct. 10, 1934	Conviction
Wernick, Abe I.	Brighton	Brighton	July 27, 1934	Conviction
Wolf, Samuel	Boston	Boston	July 13, 1934	Conviction
Zimberg, Samuel	Springfield	Springfield	June 20, 1934	Conviction

**ICE CREAM**

(Low Standard)

Hager, Clayton M.	Somerville	Somerville	Nov. 15, 1934	Conviction
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**MINCE MEAT**

(Contained benzoic acid)

Big Bear Meat Depart- ment, Inc.	Somerville	Somerville	April 12, 1934	Conviction
Growers Outlet, Inc.	Holyoke	Holyoke	April 26, 1934	Conviction

**OLIVE OIL**

(Adulterated with foreign oil)

Arena, John	Boston	Boston	April 13, 1934	- <sup>4</sup>
Arena, John	Boston	East Boston	May 8, 1934	Discharged
Borgia, Frank S.	Boston	East Boston	May 8, 1934	Conviction
Borgia, Frank S.	Boston	Boston	April 13, 1934	- <sup>4</sup>
Rutenberg, Norman	Boston	Boston	July 2, 1934	Conviction

**SAUSAGE**

(Violation of the law relative to use of sodium sulphite in meat and meat products)

Albertelli, Anthony	Boston	Boston	Feb. 1, 1934	Conviction
Andreottola, Frank	Revere	Chelsea	Jan. 23, 1934	Conviction <sup>1</sup>
Cavigiotti, C.	Milford	Milford	April 23, 1934	Conviction
Chicopee Falls Public Market, Inc.	Indian Orchard	Springfield	June 20, 1934	Conviction
City Provision Co., Inc.	Springfield	Springfield	April 4, 1934	Conviction <sup>3</sup>
Di Sola, Jerry	Somerville	Somerville	Jan. 8, 1934	Conviction
Kudla, Michael	Holyoke	Holyoke	Jan. 31, 1934	Conviction
La Magna, Michael	Cambridge	Cambridge	Mar. 28, 1934	Conviction
Moli, Renzo	East Boston	East Boston	April 13, 1934	Conviction
Moskal, John	Holyoke	Holyoke	Feb. 6, 1934	Conviction
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 24, 1934	Conviction
Zuffante & Co., G.	Boston	Somerville	April 26, 1934	Conviction

<sup>1</sup> Sentence suspended.

<sup>2</sup> Dismissed for want of prosecution.

<sup>3</sup> Appealed.

<sup>4</sup> Dismissed for lack of jurisdiction.

## SAUSAGE

(Contained starch in excess of 2 per cent)

Atlantic Provision Co., Inc.	Somerville	Somerville	May 7, 1934	Conviction
Levy, John A.	Lynn	Lynn	April 20, 1934	Conviction

## SAUSAGE

(Contained added color)

Balkus Sausage & Provision Company	Lynn	Lynn	May 3, 1934	Conviction
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## SAUSAGE

(Contained lungs)

Buonanno, Antonio	Lawrence	Lawrence	Mar. 5, 1934	Conviction
De Rosa, Charles	Boston	Boston	Mar. 7, 1934	Conviction
Fried, Joseph	Boston	Boston	Mar. 12, 1934	Conviction
Gibson, Abraham	Boston	Boston	Feb. 28, 1934	Conviction
Imperiali, Italo	Boston	Boston	Mar. 14, 1934	Conviction
Peluso, Dominick	Lawrence	Lawrence	Feb. 26, 1934	Conviction
Reinholtz, Joseph	Boston	Boston	Feb. 28, 1934	Conviction
Savastano, Cresenzo	Lawrence	Lawrence	Mar. 5, 1934	Conviction
Serena, Peter	Boston	Boston	Mar. 7, 1934	Conviction

## SWEET RELISH

(Contained saccharine)

Harvard Pickle Works, Inc.	Cambridge	Malden	Nov. 8, 1934	-1
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*For Sale of Confectionery Containing More than One Per Cent of Alcohol*

Anderson, William C.	Worcester	Worcester	Feb. 19, 1934	Conviction
Azer Drug Company	Chelsea	Chelsea	Jan. 23, 1934	Conviction
Ballos, Arthur	Worcester	Worcester	Feb. 19, 1934	Conviction
Bay State Drug Co., Inc.	Palmer	Palmer	Mar. 9, 1934	Conviction
Beerelis, George	Leominster	Leominster	Feb. 13, 1934	Conviction
Berger, David	Worcester	Worcester	Feb. 19, 1934	Conviction
Bernstein, William	Springfield	Springfield	Feb. 21, 1934	Conviction
Bezreh, Nicholas	Cambridge	Cambridge	Feb. 5, 1934	Conviction
Bozicas, Stephen A.	Fitchburg	Fitchburg	Feb. 12, 1934	Conviction
Connolly, Edward J.	Lynn	Lynn	Feb. 2, 1934	Conviction
Dimodica, Vincent J.	Boston	Boston	Feb. 8, 1934	Conviction
Doll, Joseph	Malden	Malden	Jan. 25, 1934	Conviction
Donnellis, Charles	Salem	Salem	Jan. 24, 1934	Discharged
Enright, Harold	Fitchburg	Fitchburg	Feb. 12, 1934	Conviction
Fins, Morris	Salem	Salem	Jan. 24, 1934	Conviction
Forbes & Wallace, Inc.	Springfield	Springfield	Feb. 21, 1934	Conviction
Galvanus, Peter	Salem	Salem	Jan. 24, 1934	Discharged
Gaudette, Leo	Spencer	East Brookfield	Feb. 21, 1934	Conviction
Giard, Edmound J.	Spencer	East Brookfield	Feb. 21, 1934	Conviction
Gilman & Moffet Co.	Worcester	Palmer	Mar. 9, 1934	Conviction
Greenberg, Maurice	Malden	Malden	Jan. 25, 1934	Conviction
Greenburg, Samuel	Springfield	Springfield	Feb. 20, 1934	Conviction
Gretsky, Henry	Chelsea	Chelsea	Jan. 29, 1934	Conviction
Hamilton, John	Worcester	Worcester	Feb. 19, 1934	Conviction
Jonas, Abraham	Worcester	Worcester	Mar. 9, 1934	Conviction
Kramer, Morris	Cambridge	Cambridge	Feb. 16, 1934	Conviction
Livingston, Benjamin	Roxbury	Boston	Feb. 15, 1934	Conviction
Livingston, Benjamin	Roxbury	Boston	Feb. 15, 1934	Conviction
Madden, Martin W.	Worcester	Worcester	Mar. 9, 1934	Conviction
Milne, Ida	Salem	Salem	Jan. 30, 1934	Conviction
Murphy Company, Eugene J.	Fitchburg	Fitchburg	Feb. 12, 1934	Conviction
Nemrow Bros., Inc.	Springfield	Springfield	Feb. 20, 1934	Conviction
Pallas, George	Worcester	Worcester	Feb. 19, 1934	Conviction
Piageneni, Louis	Spencer	East Brookfield	Feb. 21, 1934	Conviction
Poulos, George	Lynn	Lynn	Jan. 18, 1934	Conviction
Roth, Murray	Dorchester	Boston	Feb. 15, 1934	Conviction
Roth, Murray	Dorchester	Boston	Feb. 15, 1934	Conviction
Sherman, Harry	Dorchester	Cambridge	Mar. 14, 1934	Conviction <sup>2</sup>
Shiff, Louis M.	Springfield	Springfield	Feb. 20, 1934	Conviction
Soldani, Gerolamo	Spencer	East Brookfield	Feb. 21, 1934	Conviction
Starr, David	Boston	Boston	Mar. 7, 1934	Conviction
Stathis, Nicholas	Springfield	Springfield	Feb. 20, 1934	Conviction
Viteralli, Edward	Springfield	Springfield	Feb. 20, 1934	Conviction
Wilson, Walter E.	Worcester	Worcester	Feb. 19, 1934	Conviction
Winthrop, Phillip	Brookline	Fitchburg	Mar. 29, 1934	Conviction
Woodward, Seymour	Boston	Boston	Jan. 8, 1934	Conviction
Woodward, Seymour	Boston	Boston	Jan. 8, 1934	Conviction
Yakubowska, Mary	Salem	Salem	Jan. 30, 1934	Conviction

<sup>1</sup> Dismissed for lack of jurisdiction.<sup>2</sup> Guilty; placed on probation for 1 year

*For Sale of Decomposed Food*

Eggs

Rabinowitz Delicatessen & Lunch Company . . .	Roxbury . . .	Roxbury . . .	Aug. 7, 1934	Conviction
Santos, Frank . . .	Cambridge . . .	Cambridge . . .	Dec. 7, 1933	Conviction

HAMBURG STEAK

Alpert, Victor . . .	Cambridge . . .	Cambridge . . .	Dec. 21, 1933	Conviction
Andrews, Max . . .	Malden . . .	Malden . . .	Aug. 10, 1934	Conviction
Atlantic & Pacific Tea Co., Great . . .	Pittsfield . . .	Pittsfield . . .	Dec. 28, 1933	Conviction
Barron, Benjamin L. . .	Cambridge . . .	Cambridge . . .	Jan. 2, 1934	Conviction
Barron, Robert L. . .	Boston . . .	Boston . . .	July 13, 1934	Conviction
Beaudry, Alexander . . .	Lowell . . .	Lowell . . .	Feb. 14, 1934	Conviction
Bellanger, Harry . . .	Indian Orchard . . .	Springfield . . .	June 20, 1934	Conviction
Blood Company, J. B. . .	Malden . . .	Malden . . .	Aug. 10, 1934	Discharged
Brock, Harry . . .	Roxbury . . .	Roxbury . . .	Dec. 8, 1933	Conviction
Brockelman Bros., Inc. . .	Worcester . . .	Worcester . . .	Dec. 15, 1933	Conviction
Cambridge Provision Co. . .	Cambridge . . .	Cambridge . . .	May 1, 1934	Conviction
Clebnik, Israel . . .	Lynn . . .	Lynn . . .	June 11, 1934	Conviction
Cohen, Samuel . . .	Boston . . .	Boston . . .	Jan. 16, 1934	Conviction
Cohen, Samuel . . .	Boston . . .	Boston . . .	May 31, 1934	Conviction
Consumers Provision Stores, Inc. . .	Worcester . . .	Worcester . . .	July 9, 1934	Conviction
Consumers Provision Stores, Inc. . .	Worcester . . .	Worcester . . .	July 9, 1934	Conviction
Corey, Arthur . . .	Lawrence . . .	Lawrence . . .	Aug. 28, 1934	Conviction
Corey, Arthur . . .	Lawrence . . .	Lawrence . . .	Aug. 28, 1934	Conviction
Curley, Samuel . . .	Lowell . . .	Lowell . . .	Sept. 27, 1934	Conviction
Curley, Samuel . . .	Lowell . . .	Lowell . . .	Sept. 27, 1934	Conviction
Dee, William . . .	Roxbury . . .	Roxbury . . .	Dec. 8, 1933	Conviction
Economy Grocery Stores . . .	Revere . . .	Chelsea . . .	Mar. 20, 1934	Conviction <sup>1</sup>
Empire Beef Company . . .	Worcester . . .	Worcester . . .	Dec. 15, 1933	Conviction
Empire Beef Company . . .	Worcester . . .	Worcester . . .	Dec. 15, 1933	Conviction
Everybody's Market, Inc. . .	Fall River . . .	Fall River . . .	Dec. 22, 1933	Conviction
Fairburn's Market, Inc. . .	Lawrence . . .	Lawrence . . .	Aug. 28, 1934	Conviction
Fairburn's Market, Inc. . .	Lawrence . . .	Lawrence . . .	Aug. 28, 1934	Conviction
Ferman, Sarah . . .	Milford . . .	Milford . . .	Dec. 13, 1933	Conviction
Filiat, Aurila . . .	Springfield . . .	Springfield . . .	June 20, 1934	Conviction
Fishman, Nathan . . .	Allston . . .	Brighton . . .	Jan. 9, 1934	Conviction
Foster, Maurice . . .	Cambridge . . .	Cambridge . . .	Jan. 22, 1934	Conviction
Ganem, William . . .	Lawrence . . .	Lawrence . . .	Aug. 28, 1934	Conviction <sup>2</sup>
Ganem, William . . .	Lawrence . . .	Lawrence . . .	Aug. 28, 1934	Conviction <sup>2</sup>
Gaudreault, Arthur . . .	Lowell . . .	Lowell . . .	Feb. 14, 1934	Conviction
Gerogiosian, John . . .	Somerville . . .	Somerville . . .	Dec. 26, 1933	Conviction
Gillis, Harry . . .	Boston . . .	Boston . . .	May 29, 1934	Conviction
Ginsberg, Israel . . .	Chelsea . . .	Chelsea . . .	Mar. 20, 1934	Conviction <sup>3</sup>
Goldman, Lewis . . .	Lynn . . .	Lynn . . .	Dec. 21, 1933	Conviction
Goodfader, Morris . . .	Boston . . .	Roxbury . . .	Feb. 14, 1934	Conviction
Goodfader, Morris . . .	Roxbury . . .	Roxbury . . .	July 17, 1934	Conviction
Gordon, Joseph . . .	Lowell . . .	Lowell . . .	Sept. 27, 1934	Conviction
Gordon, Milton . . .	Waltham . . .	Waltham . . .	July 11, 1934	Conviction
Gordon, Peter . . .	Boston . . .	Boston . . .	July 13, 1934	Conviction
Hodes, Samuel . . .	Worcester . . .	Worcester . . .	July 3, 1934	Conviction
Holland, Abraham . . .	New Bedford . . .	New Bedford . . .	Dec. 18, 1933	Conviction
Hollis, Frank . . .	Chelsea . . .	Chelsea . . .	April 4, 1934	Discharged
Kessler, Keve . . .	Malden . . .	Malden . . .	Aug. 10, 1934	Conviction
Kline, Samuel . . .	Lynn . . .	Lynn . . .	May 28, 1934	Conviction
Kramer, Harry . . .	Hudson . . .	Hudson . . .	Oct. 31, 1934	Conviction
Kravitz, Robert . . .	New Bedford . . .	New Bedford . . .	Dec. 18, 1933	Conviction
Lampert, Harold . . .	Somerville . . .	Somerville . . .	Mar. 29, 1934	Conviction
Levy, Dave . . .	Boston . . .	Roxbury . . .	Oct. 26, 1934	Conviction
Levy, Jack . . .	Lynn . . .	Lynn . . .	Dec. 21, 1933	Conviction
Levy, John A. . .	Chelsea . . .	Chelsea . . .	Mar. 30, 1934	Discharged
Levy, John A. . .	Lynn . . .	Lynn . . .	April 20, 1934	Conviction
Levy, John A. . .	Lynn . . .	Lynn . . .	Nov. 20, 1934	Conviction
Mades Company, Inc., M. M. . .	Malden . . .	Malden . . .	Feb. 2, 1934	Conviction
Mades Company Inc., M. M. . .	Lynn . . .	Lynn . . .	April 12, 1934	Conviction <sup>4</sup>
Main Street Market, Inc. . .	Springfield . . .	Springfield . . .	June 20, 1934	Conviction
Mencis, Bert . . .	Haverhill . . .	Haverhill . . .	Sept. 6, 1934	Conviction
Miller, Abraham . . .	New Bedford . . .	New Bedford . . .	Dec. 18, 1933	Conviction
Moro, E. . .	Milford . . .	Milford . . .	April 6, 1934	Conviction
Most, Max . . .	Boston . . .	Boston . . .	July 13, 1934	Conviction
Neck Market, Inc. . .	Charlestown . . .	Charlestown . . .	April 3, 1934	Conviction
Neck Market, Inc. . .	Charlestown . . .	Charlestown . . .	June 6, 1934	Conviction
Needle & Davis, Inc. . .	Dorchester . . .	Dorchester . . .	Dec. 22, 1933	Conviction
Needleman, Nathan . . .	Chelsea . . .	Chelsea . . .	Jan. 9, 1934	Conviction
New England Market, Inc. . .	Cambridge . . .	Cambridge . . .	Dec. 7, 1933	Conviction
North Main Market, Inc. . .	Worcester . . .	Worcester . . .	July 9, 1934	Conviction
Parent, Arthur C. . .	Haverhill . . .	Haverhill . . .	Sept. 6, 1934	Conviction
Parker, Benjamin . . .	Worcester . . .	Worcester . . .	Sept. 7, 1934	Conviction
Parker, Harry . . .	Worcester . . .	Worcester . . .	Sept. 7, 1934	Conviction
Passay, Felix . . .	Ware . . .	Ware . . .	Jan. 11, 1934	Conviction

<sup>1</sup> Fined \$25.00; suspended in care of Probation Officer.

<sup>2</sup> Appealed; Not Prosecuted by District Attorney.

<sup>3</sup> Sentence suspended.

<sup>4</sup> Appealed.

<sup>5</sup> Dismissed for want of prosecution.

## For Sale of Decomposed Food — Concluded

Pasquale, Joseph	Newburyport	Newburyport	Sept. 28, 1934	Conviction
People's Public Market	Fall River	Fall River	Aug. 16, 1934	Conviction
Pleasant St. Market, Inc.	Northampton	Northampton	Mar. 13, 1934	Conviction
Popkin, Joseph	Roxbury	Roxbury	Aug. 7, 1934	Conviction
Publix Food Markets, Inc.	Malden	Malden	Aug. 10, 1934	Conviction
Publix Food Market, Inc.	Malden	Malden	Oct. 18, 1934	Conviction <sup>1</sup>
Racoff, Bessie	Roxbury	Roxbury	Oct. 10, 1934	Discharged
Rosenberg, Louis	Roxbury	Roxbury	July 17, 1934	Conviction
Rossman, Edward	Revere	Chelsea	Dec. 19, 1933	Conviction
Rossyn, George	Waltham	Waltham	July 11, 1934	Conviction
Rutkowsky, Andrew	Chelsea	Chelsea	April 4, 1934	Conviction
Sack, Benny	Everett	Malden	Sept. 27, 1934	Conviction
Sawyer, Saul	Taunton	Taunton	Dec. 12, 1933	Conviction
Schuster, Samuel	New Bedford	New Bedford	Dec. 7, 1933	Conviction
Silverman, Benjamin	Northampton	Northampton	Mar. 13, 1934	Conviction
Smokler, Julius	Boston	Boston	July 13, 1934	Conviction
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 24, 1934	Discharged
Stark Supply Company	Roxbury	Roxbury	Nov. 5, 1934	Conviction
Steinberg, David	Lynn	Lynn	April 20, 1934	Conviction <sup>1</sup>
Tapor, Joseph	Springfield	Springfield	July 18, 1934	Conviction
Uhlig, Fred	Pittsfield	Pittsfield	Feb. 13, 1934	Conviction
Waldman, Joseph	Roxbury	Roxbury	Oct. 22, 1934	Conviction
Weiner, Harry	Allston	Brighton	June 27, 1934	Conviction
Wernick, Samuel	Roxbury	Roxbury	May 17, 1934	Conviction
Woburn Provision Co.	Everett	Malden	Dec. 16, 1933	Conviction
Woburn Provision Co.	Everett	Malden	Dec. 16, 1933	Conviction
Woburn Provision Co.	Everett	Malden	Sept. 27, 1934	Conviction
Wolf, Samuel	Boston	Boston	July 13, 1934	Conviction
Zass, Lewis	Fall River	Fall River	Dec. 22, 1933	Conviction
Zellin, Samuel	Allston	Brighton	June 27, 1934	Conviction
<b>KIDNEYS</b>				
Moskal, John	Holyoke	Holyoke	Feb. 6, 1934	Discharged
North Main Market, Inc.	Worcester	Worcester	Dec. 28, 1933	Conviction
Superski, Albert	Holyoke	Holyoke	Jan. 31, 1934	Conviction
<b>LIVER</b>				
Brockelman Bros., Inc.	Worcester	Worcester	Dec. 15, 1933	Conviction
Brockelman Bros., Inc.	Gardner	Gardner	Sept. 9, 1934	Discharged
Brockelman Bros., Inc.	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Brockelman Bros., Inc.	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Brockelman Bros., Inc.	Lawrence	Lawrence	Aug. 28, 1934	Conviction
Dakin Co., Inc., H. L.	Worcester	Worcester	July 9, 1934	Conviction
Economy Grocery Stores, Company	Springfield	Springfield	Jan. 18, 1934	Conviction
Economy Grocery Co.	Springfield	Springfield	Aug. 1, 1934	Conviction
Everybody's Market, Inc.	Fall River	Fall River	Dec. 22, 1933	Conviction
Everybody's Market, Inc.	Fall River	Fall River	Dec. 22, 1933	Conviction
Everybody's Market, Inc.	Fall River	Fall River	Dec. 22, 1933	Conviction
Ferman, Sarah	Milford	Milford	Mar. 28, 1934	Conviction
Foti, Frank	Malden	Malden	Oct. 29, 1934	Conviction
Ganem, William	Lawrence	Lawrence	Aug. 28, 1934	Conviction <sup>3</sup>
Growers Outlet, Inc.	Holyoke	Holyoke	Feb. 6, 1934	Conviction
Jacobs, Harold B.	Brighton	Brighton	Aug. 3, 1934	Discharged
La Croix, William J.	Chicopee Falls	Chicopee	Jan. 5, 1934	Conviction
Louis Market, Inc.	Webster	Webster	May 1, 1934	Conviction
Main St. Market, Inc.	Springfield	Springfield	June 20, 1934	Conviction
Mello, Francis J.	Fall River	Fall River	Jan. 12, 1934	Conviction
Packers Outlet, Inc.	Cambridge	Cambridge	Feb. 8, 1934	Conviction
Packers Outlet, Inc.	Cambridge	Cambridge	Feb. 8, 1934	Conviction
Pasay, Felix	Ware	Ware	Jan. 11, 1934	Conviction
Sack, Benny	Everett	Malden	Sept. 27, 1934	Conviction
Schuster, Samuel	New Bedford	New Bedford	Dec. 7, 1933	Conviction
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 24, 1934	Discharged
Solomon, Isador	Gardner	Gardner	Aug. 9, 1934	Discharged
<b>SAUSAGE</b>				
Askinas, Abraham	Springfield	Springfield	June 20, 1934	Conviction
Atlantic & Pacific Tea Co., The Great	Worcester	Worcester	Feb. 9, 1934	Conviction
Atlantic & Pacific Tea Co., The Great	Northampton	Northampton	Mar. 13, 1934	Conviction
Central Meat Market & Provision, Inc.	Southbridge	Southbridge	Nov. 14, 1934	Conviction <sup>1</sup>
Chicopee Falls Public Market, Inc.	Indian Orchard	Springfield	June 20, 1934	Conviction
Feingold, Albert	Brookline	Brookline	Aug. 4, 1934	Conviction
Ferman, Sarah	Milford	Milford	Dec. 13, 1933	Conviction
Gould, David	Worcester	Worcester	Feb. 9, 1934	Conviction
Harper, Jr., John N.	Everett	Malden	Nov. 5, 1934	Conviction <sup>2</sup>
Klys, John	Springfield	Springfield	Jan. 18, 1934	Conviction
Klys, John	Springfield	Springfield	Jan. 18, 1934	Conviction
Modest, Herman	Cambridge	Cambridge	April 23, 1934	Conviction
Pasay, Felix	Ware	Ware	Jan. 11, 1934	Conviction
Roberts, Belaine	Shrewsbury	Southbridge	Nov. 14, 1934	Conviction <sup>1</sup>
Solin's Market, Inc.	Chicopee	Chicopee	Jan. 24, 1934	Discharged
Stolzberg, Benjamin	Haverhill	Haverhill	Feb. 23, 1934	Conviction
Tillman, Thomas	Springfield	Springfield	Aug. 1, 1934	Conviction

<sup>1</sup> Appealed.<sup>2</sup> In Superior Court found guilty—given suspended sentence of one month in jail for two years.<sup>3</sup> Conviction—Appealed; Not Prossed by District Attorney.

*False and Misleading Advertising*

## BUTTERED POP CORN

(Contained foreign fat substituted for butter)

Bellevue, Howard . . .	Old Orchard, Me. . .	Brockton . . .	Sept. 14, 1934	Conviction
Boghoshian, Andrew . . .	Indian Orchard . . .	Springfield . . .	Oct. 11, 1934	Conviction
Cook, Herbert W. . . .	Springfield . . . .	Springfield . . . .	Nov. 20, 1934	Conviction
Dayon, Ernest R. . . .	Beverly . . . . .	Salem . . . . .	Sept. 27, 1934	Conviction <sup>1</sup>
Secol, George . . . . .	New Haven, Conn. . .	Brockton . . . . .	Sept. 14, 1934	Conviction

## Eggs

(Representing eggs which were not fresh as fresh eggs)

Battaglia, Joseph . . .	Boston . . . . .	Boston . . . . .	Feb. 20, 1934	Conviction
Berkman, Inc., Samuel R.	Roxbury . . . . .	Roxbury . . . . .	Dec. 8, 1933	Conviction
Bianchi, Leo A. . . . .	Springfield . . . . .	Springfield . . . . .	July 18, 1934	Conviction
Corey, Arthur . . . . .	Lawrence . . . . .	Lawrence . . . . .	Aug. 23, 1934	Conviction
Erysin, Harry A. . . . .	Malden . . . . .	Malden . . . . .	Oct. 18, 1934	Dismissed
Feldman, Samuel . . . .	Roxbury . . . . .	Roxbury . . . . .	Dec. 8, 1933	Conviction
General Fruit Store, Inc.	Worcester . . . . .	Worcester . . . . .	Oct. 26, 1934	Conviction
Hood & Sons, Inc., H. P.	Boston . . . . .	Roxbury . . . . .	Mar. 7, 1934	Conviction
Jamgochian, George . . .	Somerville . . . . .	Somerville . . . . .	May 29, 1934	Conviction
Lessner, Harry . . . . .	Malden . . . . .	Lowell . . . . .	Nov. 13, 1934	Conviction
Manguso, James . . . . .	Milford . . . . .	Milford . . . . .	May 18, 1934	Discharged
Mass. Mohican Company	Salem . . . . .	Salem . . . . .	Dec. 1, 1933	Conviction
Pietrella, Samuel . . . .	Everett . . . . .	Malden . . . . .	Nov. 5, 1934	Conviction
Pirosseno, Achille . . . .	North Wilbraham . . .	Palmer . . . . .	Feb. 16, 1934	Conviction
Polen, Samuel . . . . .	Waltham . . . . .	Waltham . . . . .	Sept. 7, 1934	Conviction
Rabinowitz Delicatessen & Lunch Company . . . . .	Brookline . . . . .	Brookline . . . . .	July 30, 1934	Conviction
Rabinowitz Delicatessen & Lunch Company . . . . .	Roxbury . . . . .	Roxbury . . . . .	Aug. 7, 1934	Conviction
Winer Company, M. . . . .	Brookline . . . . .	Brookline . . . . .	July 20, 1934	Discharged

## MAPLE SYRUP

(False advertising of maple syrup)

Lazaros, Charles . . . .	Worcester . . . . .	Worcester . . . . .	Jan. 26, 1934	Conviction
Voudouris, Spero . . . .	Brookline . . . . .	Brookline . . . . .	May 24, 1934	Conviction

*For Violation of the Sanitary Food Law*

City Provision Co., Inc. . .	Springfield . . . . .	Springfield . . . . .	April 4, 1934	Conviction <sup>1</sup>
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*For Violation of Bakery Laws*

Dauten, Ludwig . . . . .	Newton . . . . .	Newton . . . . .	Jan. 22, 1934	Conviction
Freshette, Alphonse . . . .	Newton . . . . .	Newton . . . . .	Jan. 27, 1934	Conviction <sup>2</sup>

*For Violation of Ice Cream Law*

Hager, Clayton M. . . . .	Somerville . . . . .	Somerville . . . . .	Nov. 15, 1934	Conviction
Partridge, Ashley W. . . .	Lexington . . . . .	Concord . . . . .	Nov. 22, 1934	Conviction
Puritan Ice Cream Co. of Boston, Inc., The . . . . .	Forest Hills . . . . .	Jamaica Plain . . . . .	Nov. 16, 1934	Conviction

*For Sale of Drugs Not Conforming to the Requirements of the  
U. S. Pharmacopoeia*

## ARGYROL

Fogel, Hyman . . . . .	Boston . . . . .	Boston . . . . .	Nov. 27, 1934	Conviction
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## CITRATE OF MAGNESIA

Kidder & Co., Inc., Samuel	Charlestown . . . . .	Lawrence . . . . .	May 18, 1934	Conviction
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## SWEET SPIRIT OF NITRE

Kimball Pharmacy, Inc. . .	Springfield . . . . .	Springfield . . . . .	May 9, 1934	Conviction
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<sup>1</sup> Appealed.<sup>2</sup> Sentence suspended.

*For Violation of the Laws Relative to Cold Storage*

## SELLING COLD STORAGE EGGS WITHOUT MARKING THE CONTAINER

Armour & Company	Fall River	Fall River	Dec. 22, 1933	Conviction
Baker, Max	Roxbury	Boston	Jan. 16, 1934	Conviction
Beanstock, Lilly	Peabody	Peabody	Jan. 19, 1934	Conviction
Bettencourt, Doulingos S.	Fall River	Fall River	Jan. 12, 1934	Conviction
Bloom, Charles	Cambridge	Cambridge	Feb. 8, 1934	Conviction
Bruno, James	Springfield	Springfield	Jan. 24, 1934	Conviction
Caidozo, Manuel	Pittsfield	Pittsfield	Feb. 9, 1934	Conviction
Carminas, Nicolas	Springfield	Springfield	Nov. 28, 1934	Conviction
Cimini, Felix	Pittsfield	Pittsfield	Feb. 9, 1934	Conviction
Cohen, Hyman	Boston	Boston	Jan. 3, 1934	Conviction
Cookis, Israel	North Adams	North Adams	Dec. 13, 1933	Conviction
Di Sola, Jerry	Somerville	Somerville	Jan. 8, 1934	Conviction
Donoghue, Raymond	Somerville	Somerville	Dec. 18, 1933	Conviction
Finkle, Morris	Somerville	Somerville	Dec. 18, 1933	Conviction
Fresia, Phillip	Pittsfield	Pittsfield	Feb. 9, 1934	Conviction
Gervis, George	Peabody	Peabody	Jan. 22, 1934	Conviction
Giberti, Chester	Revere	Chelsea	Jan. 23, 1934	Conviction
Greenberg, Barney	Fall River	Fall River	Dec. 22, 1933	Conviction
Iacopoci, Peter	Somerville	Somerville	Jan. 8, 1934	Conviction
Kelsey Co., Inc., George	Pittsfield	Pittsfield	Dec. 28, 1933	Conviction
Kinder, John	Norwood	Dedham	Dec. 28, 1933	Conviction
Koszik, Matthew J.	Greenfield	Greenfield	Jan. 18, 1934	Conviction
Nardella, Cosimo	Somerville	Somerville	Jan. 8, 1934	Conviction
Pontes, Frank S.	Fall River	Fall River	Jan. 12, 1934	Conviction
Samia, James	North Adams	North Adams	Dec. 20, 1933	Conviction
Santos, Frank	Cambridge	Cambridge	Dec. 7, 1933	Conviction
Santousosso, Saverio	Revere	Chelsea	Jan. 5, 1934	Conviction
Stilman, Inc., Morris	Lynn	Lynn	Jan. 4, 1934	Conviction
Torres, Manuel	Fall River	Fall River	Jan. 12, 1934	Conviction
Vigoda, Philip	Brookline	Brookline	Dec. 4, 1933	Conviction

## OPERATING A COLD STORAGE PLANT WITHOUT A LICENSE

Chesman & Son, Inc., B.	Boston	Boston	June 12, 1934	Conviction
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*For Violation of the Laws Relative to Slaughtering*

## SLAUGHTERING OR AUTHORIZING SLAUGHTERING IN THE ABSENCE OF INSPECTOR

Broverman, Isaac	Millis	Walpole	Mar. 26, 1934	Conviction
Davis, Salim	Agawam	Springfield	June 6, 1934	Conviction
Grasso, Angelo	Agawam	Springfield	June 6, 1934	Conviction
Sekscencksi, Stanley	Holyoke	Northampton	Oct. 19, 1934	Conviction

*For Violation of the Mattress Laws*

American Mattress Mfg. Co.	Boston	Boston	April 2, 1934	Discharged
American Mattress Mfg. Co.	Boston	Boston	April 9, 1934	Conviction
Boodman, Abraham	Boston	Boston	Sept. 20, 1934	Conviction
Charron, Wilfred	Fall River	Fall River	July 19, 1934	Conviction
Cohen, Benjamin	Salem	Salem	May 17, 1934	Conviction <sup>1</sup>
Diamond Mattress Co.	Woonsocket, R. I.	Webster	Jan. 18, 1934	Conviction
Diamond Mattress Co.	Woonsocket, R. I.	New Bedford	July 27, 1934	Conviction
Eagle Upholstery Co., Inc.	Boston	Boston	Nov. 9, 1934	Conviction
Eastern Mattress & Bed Spring Company	Lowell	Lowell	April 18, 1934	Conviction
Feinberg, Samuel	Chelsea	Roxbury	Mar. 13, 1934	Conviction
Florence, Benjamin	Boston	Boston	Mar. 8, 1934	Conviction
Florence, Benjamin	Boston	Charlestown	July 13, 1934	Conviction
Gerson Bedding Company	Lowell	Lynn	Oct. 15, 1934	Conviction
Gerson Bedding Company	Lowell	Lynn	Oct. 15, 1934	Conviction
Gladstone, Harry	Malden	Malden	Oct. 23, 1934	Conviction
Goldstein, Morris	Haverhill	Haverhill	Oct. 13, 1934	Conviction <sup>1</sup>
Interstate Furniture Co.	Worcester	Fitchburg	Sept. 21, 1934	Discharged
Kerr, Samuel D.	Salem	Salem	Aug. 24, 1934	Conviction
Malick, Benjamin	Lynn	Lynn	Mar. 15, 1934	Conviction
Miller, Harry	Lynn	Lynn	Feb. 6, 1934	Conviction
Miller, Morris	Lynn	Lynn	Feb. 6, 1934	Conviction
Milstone, Edward	Lawrence	Lawrence	Nov. 21, 1934	Dismissed
Orenstein, Philip	Springfield	Springfield	Aug. 1, 1934	Conviction
Providence Mattress Co.	Providence, R. I.	Webster	Oct. 25, 1934	Conviction
Radicot Brothers	Webster	Webster	Jan. 18, 1934	Discharged
Rudnick, Harry	Roxbury	Roxbury	Mar. 13, 1934	Conviction <sup>2</sup>
Sachs, Albert	New Bedford	New Bedford	July 27, 1934	Conviction
Schlagler, Saul	Malden	Malden	Oct. 23, 1934	Conviction
Springfield Mattress Co., Inc.	Springfield	Springfield	Feb. 8, 1934	Conviction
Summerfield Company	Boston	Boston	April 10, 1934	Dismissed
Taylor, Saul	New Bedford	New Bedford	July 27, 1934	Conviction
Warshaver, Rubin	Boston	Boston	Aug. 29, 1934	Conviction <sup>3</sup>
Weiner, Samuel	Lynn	Lynn	Mar. 2, 1934	Conviction
Yaffa, Abraham	Beverly	Boston	April 10, 1934	Conviction

<sup>1</sup> Appealed.<sup>2</sup> Fined \$50, paid; sentenced to 3 months in jail—latter sentence suspended.<sup>3</sup> Superior Court, 2 months in House of Correction—sentence suspended for 1 year.

TABLE 2. — Summary of Milk Statistics

Number of samples above standard	4,183
Number of samples below standard	745
Total samples	4,928
Number having more than 15% solids	38
“ “ between 14% and 15% solids	166
“ “ 13% and 14% solids	1,082
“ “ 12% and 13% solids	2,897
“ “ 11% and 12% solids	651
“ “ 10% and 11% solids	72
“ “ 9% and 10% solids	17
“ “ 8% and 9% solids	4
“ “ 7% and 8% solids	1
Number of samples showing removal of part of the cream	55
Number of samples showing added water	65

TABLE 3. — Average Composition of Milk Samples

	TOTAL SAMPLES COLLECTED				SAMPLES FOUND NOT ADULTERATED			
	Number of Samples	Solids	Fat	Solids not Fat	Number of Samples	Solids	Fat	Solids not Fat
		%	%	%	%	%	%	%
December	236	12.94	4.14	8.80	233	12.97	4.17	8.80
January	106	12.82	4.08	8.74	104	12.86	4.10	8.76
February	62	12.73	4.00	8.73	60	12.70	4.00	8.69
March	465	12.70	3.97	8.73	457	12.72	3.98	8.74
April	494	12.60	3.92	8.68	487	12.63	3.94	8.69
May	698	12.46	3.89	8.57	680	12.49	3.91	8.58
June	451	12.59	3.96	8.63	434	12.64	4.00	8.64
July	480	11.86	3.74	8.12	465	11.89	3.78	8.11
August	649	12.46	3.94	8.52	635	12.51	3.95	8.56
September	552	12.53	4.02	8.51	533	12.61	4.05	8.56
October	357	12.76	4.08	8.68	350	12.79	4.10	8.69
November	227	12.96	4.17	8.79	222	13.01	4.19	8.82
Totals	4,777	12.54	3.96	8.58	4,660	12.58	3.98	8.60

TABLE 4. — Summary of Bacteriological Examinations of Milk

CERTIFIED AND PASTEURIZED MILK		
Total samples		65
Samples with count below 50		61
Samples with count below 500		65
Lowest count	less than 10	
Highest count		170
Geometric mean		10
CERTIFIED MILK		
Total samples		59
Samples with count below 10,000		56
Lowest count		900
Highest count		16,000
Geometric mean		2,734
GRADE A MILK		
Total samples		166
Samples with count below 15,000		125
Samples with count below 25,000		141
Lowest count		200
Highest count		440,000
Geometric mean		8,315
PASTEURIZED MILK		
Total samples		1,028
Samples with count below 25,000		517
Samples with count below 50,000		710
Lowest count		30
Highest count		4,700,000
Geometric mean		26,865
GRADE A MASSACHUSETTS MILK		
Total samples		15
Samples with count below 100,000		11
Lowest count		4,800
Highest count		640,000
Geometric mean		38,397
RAW MILK SOLD AS SUCH		
Total samples		314
Samples with count below 300,000		259
Lowest count		1,300
Highest count		3,500,000
Geometric mean		46,861

## RAW MILK FOR GRADE A PURPOSES

Total samples									168
Samples with count below 100,000									105
Samples with count below 250,000									150
Lowest count									1,000
Highest count									4,600,000
Geometric mean									16,575

## RAW MILK FOR PASTEURIZATION PURPOSES

Total samples									2,287
Samples with count below 100,000									1,214
Samples with count below 250,000									1,609
Samples with count below 500,000									1,850
Samples with count below 750,000									1,946
Lowest count									300
Highest count									34,000,000
Geometric mean									88,701

## SUMMARY

Total samples examined									4,102
Samples complying with requirements									3,338

TABLE 5. — Summary of Analyses of Food Samples

CHARACTER OF SAMPLE	NOT DECLARED	ADULTERATED	TOTAL
	ADULTERATED OR MISBRANDED	OR MISBRANDED	
Alcoholic beverages	12	2	14
Bakery products	4	4	8
Butter	92	15	107
Buttered popcorn	4	14	18
Buttermilk	2	—	2
Canned foods	6	—	6
Celery	5	1	6
Cereal preparations	4	—	4
Chocolate drink	5	—	5
Chocolate milk	1	1	2
Chocolate syrup	2	—	2
Cider	1	—	1
Confectionery	25	61	86
Cream	53	3	56
Cream (sour)	53	14	67
Cream cheese	53	19	72
Dried fruits	2	5	7
Eggs	159	75	234
Flavoring extracts: (other than vanilla)	18	11	29
Flavoring extracts, vanilla	106	15	121
Fish	5	2	7
Frozen desserts: (chemical examinations)	411	4	415
Fruit syrup	—	1	1
Horse radish	1	—	1
Jam	1	—	1
Marshmallow	1	—	1
Maple butter	—	1	1
Maple sugar	1	—	1
Maple syrup	2	2	4
Meat products:			
Chicken salad	3	—	3
Chicken	—	2	2
Hamburg steak	335	152	487
Kidneys	3	2	5
Liver	29	30	59
Pigs' feet	1	—	1
Pork	2	—	2
Sausages	698	78	776
Stew beef	2	1	3
Olive oil	3	2	5
Pickles	16	5	21
Pie filling	5	3	8
Spices	8	1	9
Vinegar	14	—	14
Totals	2,148	526	2,674

TABLE 6. — Summary of Analyses of Drug Samples

CHARACTER OF SAMPLE	NOT DECLARED ADULTERATED OR MISBRANDED	ADULTERATED OR MISBRANDED	TOTAL
Argyrol solution . . . . .	35	4	39
Aromatic spirit of ammonia . . . . .	3	—	3
Aspirin tablets . . . . .	2	—	2
Camphorated oil . . . . .	49	3	52
Effervescent salts . . . . .	2	—	2
Headache powders . . . . .	2	—	2
Lime water . . . . .	3	1	4
Magnesium citrate solution . . . . .	19	5	24
Mineral oil . . . . .	1	—	1
Olive oil . . . . .	26	—	26
Sodium phosphate . . . . .	12	—	12
Sodium sulphite . . . . .	2	—	2
Spirit of anise . . . . .	5	1	6
Spirit of camphor . . . . .	43	—	43
Spirit of nitrous ether . . . . .	54	8	62
Spirit of peppermint . . . . .	10	—	10
Syrup of hydriodic acid . . . . .	4	1	5
Tincture of iodine . . . . .	50	2	52
Totals . . . . .	322	25	347

TABLE 7. — Confiscations

IN WAREHOUSES		
Geese . . . . .	55 lbs.	Decomposed
Ham (cooked) . . . . .	8 lbs.	Decomposed
Ham (cooked) . . . . .	644 lbs.	Decomposed
Ham, spiced . . . . .	766 lbs.	Decomposed
Ham, spiced (cooked) . . . . .	4,000 lbs.	Decomposed
Lamb . . . . .	110 lbs.	Dried out
Luncheon meat . . . . .	6 lbs.	Decomposed
Luncheon meat (cooked) . . . . .	161 lbs.	Decomposed
Moose meat . . . . .	212 lbs.	Decomposed
Pigs' feet (cooked) . . . . .	120 lbs.	Decomposed
Pork loins . . . . .	137 lbs.	Decomposed
Veal . . . . .	120 lbs.	Dried out
Squid . . . . .	225 lbs.	Decomposed
IN STORES, MARKETS, ETC.		
Fowl . . . . .	25 lbs.	Decomposed
Turkey (cut up) . . . . .	43 lbs.	Decomposed
Beefsteak . . . . .	3½ lbs.	Decomposed
Frankforts . . . . .	40 lbs.	Decomposed
Frankforts . . . . .	30 lbs.	Decomposed
Frankforts . . . . .	30 lbs.	Decomposed
Hamburg steak . . . . .	5 lbs.	Decomposed
Hamburg steak . . . . .	20 lbs.	Decomposed
Hamburg steak . . . . .	4 lbs.	Decomposed
Hamburg steak . . . . .	20 lbs.	Decomposed
Hamburg steak . . . . .	3 lbs.	Decomposed
Hamburg steak . . . . .	3 lbs.	Decomposed
Hamburg steak . . . . .	30 lbs.	Decomposed
IN FACTORY		
Pickles . . . . .	1,500 bbls.	Decomposed
Pickles . . . . .	51 bbls.	Decomposed
Total Confiscations . . . . .	6,820½ lbs. 1,551 bbls.	

Summary of Tables 8, 9, 10

Requests for extension of time granted . . . . .	120
Butter . . . . .	1
Eggs . . . . .	34
Poultry . . . . .	40
Meat and Meat Products . . . . .	24
Game . . . . .	2
Fish . . . . .	19
Requests for extension of time not granted . . . . .	6
Eggs . . . . .	1
Meat and meat products . . . . .	4
Fish . . . . .	1
Articles ordered removed from storage (no requests made) . . . . .	12
Butter . . . . .	1
Eggs . . . . .	2
Poultry . . . . .	3
Meat and meat products . . . . .	5
Game . . . . .	1

TABLE 8. — *Requests for Extension of Time Granted on Goods in Cold Storage from December 1, 1933, to December 1, 1934*

(Reason for such extension being that goods were in proper condition for further storage.)

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to —	Name
Butter	960	July 1, 1933	*Sept. 15, 1934	State Teachers College
Eggs, Mixed	46,830	June 7, 1933	Sept. 7, 1934	Borden Sales Co., Inc.
Eggs, Mixed	1,000	May 5, 1933	Aug. 5, 1934	Standard Brands, Inc.
Eggs, Mixed	14,370	May 20, 1933	Aug. 20, 1934	Standard Brands, Inc.
Eggs, Mixed	2,160	May 31, 1933	Aug. 31, 1934	Standard Brands, Inc.
Eggs, Mixed	1,380	May 27, 1933	Aug. 1, 1934	Stone Co., Charles H.
Eggs, Mixed	29,100	May 1, 1933	*Dec. 31, 1934	Swift & Co.
Sugaryolks	630	June 16, 1933	Sept. 18, 1934	Frigid Food Products, Inc.
Sugaryolks	14,700	May 1, 1933	*Dec. 31, 1934	Swift & Co.
Egg Whites	5,790	Mar. 24, 1933	July 1, 1934	Frigid Food Products, Inc.
Egg Whites	7,440	April 4, 1933	July 4, 1934	Standard Brands, Inc.
Egg Whites	24,000	May 5, 1933	Aug. 5, 1934	Standard Brands, Inc.
Egg Whites	465	Mar. 29, 1933	July 1, 1934	Stone Co., Charles H.
Egg Whites	2,490	May 27, 1933	*Dec. 1, 1934	Stone Co., Charles H.
Egg Whites	900	May 1, 1933	June 30, 1934	Swift & Co.
Eggs, Whole	18,000	Mar. 1, 1933	June 17, 1934	Armour & Co.
Eggs, Whole	2,760	Mar. 28, 1933	July 1, 1934	Borden Sales Co., Inc.
Eggs, Whole	1,170	Feb. 1, 1933	May 1, 1934	Standard Brands, Inc.
Eggs, Whole	27,900	Feb. 1, 1933	May 1, 1934	Standard Brands, Inc.
Eggs, Whole	8,730	Feb. 1, 1933	May 1, 1934	Standard Brands, Inc.
Eggs, Whole	870	Feb. 1, 1933	May 1, 1934	Standard Brands, Inc.
Eggs, Whole	330	June 8, 1933	July 8, 1934	Swift & Co.
Egg Yolks	2,520	Mar. 16, 1933	June 16, 1934	Frigid Food Products, Inc.
Egg Yolks	4,380	Mar. 16, 1933	June 16, 1934	Frigid Food Products, Inc.
Egg Yolks	3,240	June 16, 1933	Sept. 18, 1934	Frigid Food Products, Inc.
Egg Yolks	420	Feb. 1, 1933	*Aug. 1, 1934	Standards Brands, Inc.
Egg Yolks	1,000	Feb. 1, 1933	*Aug. 1, 1934	Standard Brands, Inc.
Egg Yolks	11,850	May 5, 1933	Aug. 5, 1934	Standard Brands, Inc.
Egg Yolks	8,630	May 13, 1933	*Nov. 13, 1934	Standard Brands, Inc.
Egg Yolks	1,920	June 27, 1933	Aug. 1, 1934	Standard Brands, Inc.
Egg Yolks	1,326	April 17, 1933	May 27, 1934	Genery Stevens Co.
Egg Yolks	1,350	Mar. 29, 1933	July 1, 1934	Stone Co., Charles H.
Egg Yolks	2,880	April 5, 1933	July 1, 1934	Stone Co., Charles H.
Egg Yolks	2,340	May 27, 1933	*Dec. 1, 1934	Stone Co., Charles H.
Egg Yolks	6,000	May 31, 1933	*Dec. 31, 1934	Swift & Co.
Broilers	4,922	Aug. 1, 1933	Jan. 1, 1935	Frosted Foods Sales Corp.
Broilers	5,659	Aug. 1, 1933	Jan. 1, 1935	Frosted Foods Sales Corp.
Chickens	3,628	Dec. 17, 1932	Mar. 17, 1934	Bartlett, Varney Co.
Chickens	468	Jan. 24, 1933	Mar. 24, 1934	Bartlett, Varney Co.
Chickens	3,612	April 16, 1933	Oct. 1, 1934	Frosted Foods Sales Corp.
Cocks	1,218	May 20, 1933	July 20, 1934	Bartlett, Varney Co.
Cocks	6,020	May 20, 1933	July 20, 1934	Bartlett, Varney Co.
Cocks	13,883	May 29, 1933	July 29, 1934	Bartlett, Varney Co.
Cocks	1,060	May 29, 1933	July 29, 1934	Bartlett, Varney Co.
Cocks	1,612	May 29, 1933	July 29, 1934	Bartlett, Varney Co.
Cocks	1,071	June 14, 1933	Oct. 22, 1934	Berman & Co., Inc.
Cocks	3,543	June 22, 1933	Oct. 22, 1934	Berman & Co., Inc.
Cocks	2,871	June 27, 1933	Oct. 22, 1934	Berman & Co., Inc.
Cocks	2,592	June 27, 1933	Oct. 22, 1934	Berman & Co., Inc.
Cocks	2,356	June 28, 1933	Oct. 28, 1934	Berman & Co., Inc.
Cocks	12,681	June 28, 1933	Oct. 28, 1934	Berman & Co., Inc.
Cocks	450	June 28, 1933	Oct. 28, 1934	Berman & Co., Inc.
Cocks	6,866	June 28, 1933	Oct. 28, 1934	Berman & Co., Inc.
Cocks	1,269	July 3, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	1,640	July 3, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	4,264	July 3, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	2,522	July 6, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	5,784	July 6, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	2,565	July 6, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	2,022	July 9, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	3,275	July 9, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	4,500	July 9, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	1,459	July 10, 1933	Dec. 9, 1934	Berman & Co., Inc.
Cocks	795	July 12, 1933	Dec. 12, 1934	Berman & Co., Inc.
Cocks	264	July 12, 1933	Dec. 12, 1934	Berman & Co., Inc.
Cocks	3,174	July 13, 1933	Dec. 12, 1934	Berman & Co., Inc.
Cocks	13,715	July 13, 1933	Dec. 12, 1934	Berman & Co., Inc.
Cocks	914	July 19, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	9,331	July 19, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	479	July 20, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	10,503	July 20, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	2,137	July 26, 1933	Dec. 20, 1934	Berman & Co., Inc.
Cocks	7,895	July 26, 1933	Dec. 20, 1934	Berman & Co., Inc.
Fowl	5,096	Dec. 8, 1932	*Aug. 30, 1934	Frosted Foods Sales Corp.
Fowl	128	June 27, 1933	Aug. 26, 1934	Gilbert, A. W.
Beef Briskets	7,923	Mar. 18, 1933	June 15, 1934	New England Provision Co.
Beef Briskets	5,172	Feb. 21, 1933	June 1, 1934	Quincy Market C. S. & W. Co.
Briskets	2,178	June 3, 1933	July 10, 1934	Learnard Co., S. S.
Briskets	867	June 10, 1933	July 10, 1934	Learnard Co., S. S.
Beef Livers	12,250	Oct. 13, 1933	Jan. 31, 1935	United Markets, Inc.
Beef Loins	990	May 19, 1933	July 1, 1934	Learnard Co., S. S.
Beef Loins	5,104	Mar. 31, 1933	Aug. 15, 1934	South Market Beef Co.
Beef Ribs	450	May 6, 1933	Aug. 7, 1934	Learnard Co., S. S.

TABLE 8. — *Requests for Extension of Time Granted on Goods in Cold Storage, from December 1, 1933, to December 1, 1934 — Concluded*

ARTICLE	Weight (Pounds)	Placed in Storage	Extension Granted to —	Name
Beef Ribs . . . . .	996	May 13, 1933	July 13, 1934	Learnard Co., S. S.
Beef Ribs . . . . .	900	May 17, 1933	July 1, 1934	Learnard Co., S. S.
Beef Tenderloins . . . . .	101	May 6, 1933	Aug. 7, 1934	Learnard Co., S. S.
Beef Tenderloins . . . . .	155	May 17, 1933	July 1, 1934	Learnard Co., S. S.
Calves' Liver . . . . .	1,200	Aug. 1, 1933	Jan. 1, 1935	Brockelman Bros., Inc.
Pot Roasts . . . . .	1,971	Jan. 11, 1933	April 1, 1934	Frosted Foods Sales Corp.
Rib Roasts . . . . .	5,214	Jan. 17, 1933	April 1, 1934	Frosted Foods Sales Corp.
Sirloin Roasts . . . . .	3,465	Jan. 3, 1933	May 1, 1934	Frosted Foods Sales Corp.
Lamb . . . . .	10,738	Aug. 1, 1932	Mar. 1, 1934	Armour & Co.
Lamb . . . . .	21,056	Sept. 1, 1932	Mar. 1, 1934	Armour & Co.
Lamb . . . . .	21,310	Sept. 1, 1932	Mar. 1, 1934	Armour & Co.
Lamb Legs . . . . .	6,498	Mar. 30, 1933	July 1, 1934	Frosted Foods Sales Corp.
Pork Loins . . . . .	6,655	July 12, 1933	Oct. 8, 1934	Boston Beef Co.
Pork Loins . . . . .	9,263	Dec. 21, 1932	*April 1, 1934	Learnard Co., S. S.
Pork Loins . . . . .	502	July 1, 1933	Aug. 3, 1934	Learnard Co., S. S.
Pork Loins . . . . .	603	July 3, 1933	Aug. 3, 1934	Learnard Co., S. S.
Venison . . . . .	139	Nov. 1, 1933	Mar. 1, 1935	Wells, L. H.
Venison . . . . .	54	Nov. 28, 1933	Mar. 1, 1935	Wells, L. H.
Eels . . . . .	1,500	Sept. 25, 1933	Mar. 25, 1935	Busalacchi, T. & J.
Haddock Fillets . . . . .	18,360	June 1, 1933	*Jan. 18, 1935	Gorton-Pew Fisheries Co., Ltd
Haddock Fillets . . . . .	690	Sept. 29, 1933	Nov. 29, 1934	Rush Fish Co.
Halibut . . . . .	1,953	Oct. 30, 1933	Jan. 15, 1935	Warren Fitch Co., Inc.
Halibut . . . . .	2,081	Nov. 3, 1933	Feb. 8, 1935	Harding Co., F. E.
Halibut . . . . .	803	Oct. 9, 1933	Jan. 15, 1935	Pier Fish Co.
Halibut . . . . .	4,039	Oct. 11, 1933	Jan. 15, 1935	Pier Fish Co.
Halibut . . . . .	1,600	Oct. 18, 1933	Jan. 1, 1935	Rich Co., Joseph A.
Halibut . . . . .	5,129	Oct. 18, 1933	Jan. 1, 1935	Rich Co., Joseph A.
Halibut . . . . .	7,093	Oct. 18, 1933	Jan. 1, 1935	Rich Co., Joseph A.
Halibut, Chicken . . . . .	200	July 20, 1933	Dec. 31, 1934	New England Fish Co.
Halibut, L. & M. . . . .	2,420	July 19, 1933	Dec. 31, 1934	Booth Fisheries Co.
Halibut, Medium . . . . .	1,252	July 19, 1933	Dec. 31, 1934	Booth Fisheries Co.
Halibut, S. & M. . . . .	1,800	July 19, 1933	Dec. 31, 1934	New England Fish Co.
Mullets . . . . .	270	Nov. 28, 1933	Dec. 27, 1934	Crocker & Winsor
Salmon, King . . . . .	600	Oct. 31, 1933	Jan. 1, 1935	Prior Co., P. H.
Salmon, Silver . . . . .	809	Oct. 11, 1933	Jan. 1, 1935	Neal Co., J. R.
Shrimp . . . . .	1,200	**Nov. 11, 1933	Nov. 18, 1934	Foley Co., M. F.
Sole Fillets . . . . .	2,320	June 28, 1933	Sept. 28, 1934	General Seafoods Corp.

\*The extension granted on this lot was amended before the expiration of the time to which extended. The length of time given includes the total amended period, and the weights given are the initial weights upon which extensions were asked.

\*\*Received frozen and undated from outside state.

TABLE 9. — *Requests for Extension of Time Not Granted on Goods in Cold Storage from December 1, 1933, to December 1, 1934*

ARTICLE	Weight (Pounds)	Placed in Storage	Name
Egg Whites . . . . .	4,110	April 11, 1933	Frigid Food Products, Inc.
Briskets . . . . .	—	June 3, 1933	Learnard Co., S. S.
Briskets . . . . .	—	June 10, 1933	Learnard Co., S. S.
Tenderloins . . . . .	—	May 17, 1933	Learnard Co., S. S.
Pork Loins . . . . .	—	Dec. 21, 1932	Learnard Co., S. S.
Halibut, Medium . . . . .	250	Sept. 20, 1933	Nagle Co., John

TABLE 10. — *Articles Which Had Been in Cold Storage Longer than Twelve Months, and on Which No Requests for Extensions Had Been Made, Ordered Removed, from December 1, 1933, to December 1, 1934*

ARTICLE	Weight (Pounds)	Placed in Storage	Name
Butter . . . . .	128	July 1, 1933	State Teachers College
Egg Whites . . . . .	690	Mar. 1, 1933	Armour & Co.
Eggs, Whole . . . . .	—	June 23, 1933	Standard Brands, Inc.
Chickens . . . . .	30	Feb. 25, 1933	Green, H. W.
Chickens . . . . .	885	Dec. 3, 1932	Rosoff, T.
Turkeys . . . . .	125	Jan. 2, 1933	Holland Butter Co.
Beef Livers . . . . .	—	—	Anderson & Sundquist
Beef Livers . . . . .	—	July 12, 1933	Bond, G. F.
Beef Ribs . . . . .	783	June 19, 1933	Butterfield, J. H.
Beef Ribs . . . . .	1,124	June 28, 1933	Butterfield, J. H.
Pork Loins . . . . .	—	—	Laurier & Hutchinson
Venison . . . . .	6	Jan. 14, 1933	Cosgrove, E. A.

TABLE 11. — Articles Other than Fish Placed in Cold Storage from December 1, 1933, to December 1, 1934

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
December	760,549	217,260	322,940	335,562	1,500,295	179,305	2,105,021	65,716	548,456	465,943	1,784,058	68,401	1,639,161
January	807,818	284,430	341,968	156,505	978,046	119,599	833,420	41,268	184,554	337,320	2,706,105	18,164	1,348,094
February	434,732	165,930	419,970	89,737	489,042	128,077	290,384	17,654	223,835	337,993	2,141,126	53,058	1,160,304
March	328,564	688,260	521,243	43,622	487,123	100,750	226,819	17,737	104,070	325,726	872,174	17,756	1,236,629
April	394,582	3,698,280	1,385,021	64,090	444,202	60,059	148,883	11,756	316,290	393,560	1,015,974	27,624	667,544
May	1,111,546	2,952,030	1,782,308	84,251	389,481	312,589	343,576	42,074	371,640	396,578	2,869,479	37,111	865,045
June	2,711,477	1,439,640	1,728,645	14,063	1,217,630	341,775	238,428	206,638	309,811	292,286	1,856,884	66,233	1,067,069
July	3,689,854	439,680	1,028,048	179,266	150,575	336,602	186,162	298,459	240,993	396,887	1,648,874	61,297	1,795,121
August	1,890,426	461,910	625,589	96,986	255,942	281,442	153,352	273,373	179,345	827,253	1,857,621	40,966	1,289,974
September	1,175,716	488,160	210,350	451,869	119,564	221,654	118,309	168,219	205,183	919,446	1,578,003	130,879	1,532,727
October	822,398	388,740	351,155	617,273	261,734	170,549	38,002	71,174	204,362	761,742	1,347,024	112,078	1,403,350
November	486,327	262,170	671,456	324,998	551,454	337,796	734,009	36,439	145,930	1,291,875	3,151,407	217,141	2,266,922

TABLE 12. — Articles Other than Fish on Hand in Cold Storage on the First Day of the Month, from January 1, 1934, through December 1, 1934

	Butter (lbs.)	Eggs (Dozens)	Broken-out Eggs (lbs.)	Broilers (lbs.)	Roasters (lbs.)	Fowls (lbs.)	Turkeys (lbs.)	Ducks (lbs.)	Miscellaneous Poultry (lbs.)	Beef (lbs.)	Pork (lbs.)	Lamb and Mutton (lbs.)	Miscellaneous Meats (lbs.)
January	2,888,562	497,580	2,052,567	1,640,240	3,052,201	1,467,524	2,112,898	837,337	716,857	1,409,416	2,490,494	399,332	2,341,866
February	1,885,372	15,120	1,635,382	1,530,243	3,660,688	1,130,754	2,609,828	659,635	620,990	1,274,178	4,610,276	309,807	1,986,674
March	1,018,238	46,380	1,200,571	1,359,462	3,926,899	838,564	2,307,772	388,380	598,258	1,055,140	5,065,712	251,511	1,626,204
April	438,664	628,380	937,356	1,026,330	3,146,966	457,740	1,592,759	112,491	414,265	1,110,469	4,623,348	282,518	1,621,511
May	1,081,119	4,213,830	1,514,359	550,822	1,966,542	266,012	1,141,583	5,483	358,322	892,231	4,128,121	200,356	1,615,685
June	3,361,728	6,995,610	2,307,160	306,271	1,966,191	481,973	972,028	23,382	426,062	804,602	5,442,448	179,271	1,619,782
July	6,399,369	8,048,010	3,303,774	178,109	749,994	635,780	850,549	219,262	508,554	782,034	5,336,438	136,493	2,215,153
August	6,796,664	7,648,350	3,595,389	250,729	749,994	617,322	507,713	699,636	461,251	1,127,265	4,430,150	106,578	3,176,735
September	6,663,665	6,882,720	3,476,928	460,875	354,421	619,898	398,766	846,956	468,255	1,436,665	3,557,700	130,008	3,074,735
October	5,584,413	5,594,940	2,988,846	881,296	250,163	619,898	398,766	883,774	536,660	1,518,082	3,259,200	191,278	3,034,049
November	2,809,181	2,033,730	2,548,557	1,447,550	334,635	484,874	104,812	740,250	540,011	2,457,995	4,650,614	362,849	3,831,388
December	2,809,181	2,033,730	2,305,818	1,704,434	777,018	653,957	599,873	740,250	540,011	2,457,995	4,650,614	362,849	3,831,388

TABLE 13. — Fish Placed in Cold Storage from December 15, 1933, to December 15, 1934

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollack and Haddock (lbs.)	Founders (lbs.)	Haddock (lbs.)	Haddock Fillets (lbs.)	Hallbut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Lanians (lbs.)
January	1,070	3,995	2,565	6,022	264,666	16,605	622,401	148,185	142,919	23,276	86,290	2,500	17,422	10,018	17,422	1,536	—	5,295	408,819
February	605	5,729	6,400	1,668	98,510	33,685	727,334	136,756	78,697	86,587	109,542	3,800	37,657	10,181	37,657	13,906	—	306,040	354,187
March	819	4,720	10,500	17,673	103,535	11,525	719,920	224,020	49,440	64,033	97,114	2,431	74,680	20,851	74,680	13,906	7,874	123,895	121,548
April	634	1,959	50,554	8,067	890,745	27,292	2,115,223	4,577	33,650	3,650	1,436	2,512	77,654	—	77,654	—	—	158,639	430,469
May	1,496	83,926	1,080	710,192	98,898	2,301,544	28,460	109,260	109,260	1,983,755	1,970	1,964	16,399	1,964	16,399	100,366	—	22,950	421,658
June	5,638	241,771	43,892	6,008	506,406	172,138	2,966,780	13,564	1,295,310	1,778,700	1,001	1,586	9,782	9,782	9,782	190	1,914	1,914	358,537
July	372	256,417	16,653	8,164	396,991	44,666	1,721,338	52,268	243,195	1,559,689	14,759	15,518	306,470	306,470	306,470	1,400	5,830	5,830	544,376
August	6,223	15,230	1,480	8,164	80,688	12,580	2,467,579	17,997	243,900	1,642,592	10,438	9,958	11,695	11,695	11,695	2,325	6,223	6,223	707,468
September	17,899	4,360	3,800	6,639	580,688	2,738	2,690,854	2,924	292,970	3,657,036	2,381	3,160	13,900	13,900	13,900	5,937	505	1,211	398,604
October	30,204	2,432	4,05	8,083	681,768	28,275	1,816,937	11,314	272,683	1,269,606	5,625	3,812	9,550	9,550	9,550	1,475	1,475	696,547	570,641
November	1,093	4,463	75	—	903,826	19,817	368,967	290,184	205,361	95,428	30,325	9,094	232	232	232	215,725	355	307,244	371,753
December	1,764	2,415	761	2,250	4,556,338	79,451	1,277,530	143,734	184,520	36,099	98,384	2,050	61,914	4,525	61,914	70,916	15,804	166,760	1,084,187

TABLE 14. — Fish on Hand in Cold Storage on the Fifteenth Day of the Month, from January 15, 1934, through December 15, 1934

	Bluefish (lbs.)	Butterfish (lbs.)	Catfish (lbs.)	Ciscoes (lbs.)	Cod, Hake, Pollack and Haddock (lbs.)	Founders (lbs.)	Haddock (lbs.)	Haddock Fillets (lbs.)	Hallbut (lbs.)	Herring (lbs.)	Mackerel (lbs.)	Fall and Silver Salmon (lbs.)	Salmon all Others (lbs.)	Shad (lbs.)	Smelts, Etc. (lbs.)	Squid (lbs.)	Whitefish (lbs.)	Whiting (lbs.)	Miscellaneous Frozen Lanians (lbs.)
January	17,121	77,329	29,244	6,022	1,245,563	48,888	3,167,578	221,273	510,594	3,755,823	43,618	26,641	20,686	21,872	20,686	183,718	997	3,768,036	1,463,596
February	8,940	51,461	24,258	3,754	505,697	43,837	1,879,222	179,152	371,050	2,467,032	96,956	16,000	23,577	23,295	23,577	119,166	392	2,962,522	1,204,116
March	4,847	26,634	11,158	9,007	112,445	11,977	494,556	103,765	188,901	1,185,876	124,941	16,000	73,021	4,520	73,021	55,058	—	1,481,232	778,706
April	973	2,601	19,045	8,159	578,333	25,612	1,254,474	99,417	91,445	202,717	60,632	12,299	118,224	4,900	118,224	6,212	—	1,644,910	720,611
May	1,583	80	95,204	1,419	838,508	113,610	2,014,958	110,459	106,955	98,988	23,252	10,357	118,769	2,080	118,769	101,136	—	564,562	746,937
June	5,141	241,145	125,959	13,462	883,744	264,915	3,769,438	116,445	1,079,565	1,764,399	1,047	10,791	11,786	2,080	11,786	1,010,269	190	1,735,165	759,194
July	4,939	491,145	115,481	19,511	1,956,808	306,590	5,230,724	160,873	1,079,565	1,764,399	1,047	10,791	11,786	317,707	11,786	1,035,779	5,845	4,462,070	1,683,257
August	10,451	491,014	115,481	19,511	1,956,808	306,590	5,230,724	160,873	1,079,565	1,764,399	1,047	10,791	11,786	317,707	11,786	1,035,779	6,021	7,656,270	1,963,257
September	27,468	485,797	20,405	24,580	1,779,486	268,498	5,802,282	111,628	1,054,766	7,532,511	16,943	15,529	335,225	335,225	335,225	1,035,779	6,346	7,021,938	2,097,368
October	55,382	456,564	13,580	1,980	1,274,859	274,298	4,573,765	177,220	1,090,375	7,955,359	19,451	20,580	269,765	269,765	269,765	916,660	6,508	7,021,938	2,097,368
November	48,302	435,209	3,396	15,415	1,582,405	192,552	3,175,502	397,883	1,016,861	6,688,011	40,487	18,491	101,296	101,296	101,296	749,388	4,676	6,247,639	1,735,527
December	41,580	382,272	3,562	13,625	3,604,525	246,019	3,627,503	339,793	846,737	5,249,888	86,788	14,232	99,049	174,071	99,049	689,908	17,852	5,761,795	2,365,218

TABLE 15. — Summary of Slaughtering Inspections from December 1, 1933, through November 30, 1934

Total number of carcasses inspected	159,396	Total number of carcasses condemned	1,931
Cattle	31,681	Cattle	381
Calves	77,586	Calves	1,308
Hogs	42,738	Hogs	240
Sheep	7,391	Sheep	2

REASONS FOR CONDEMNATION	Cattle	Calves	Hogs	Sheep	Totals
Immaturity	—	1,200	—	—	1,200
Tuberculosis	312	3	32	—	347
Cholera	—	—	114	—	114
Died otherwise than by slaughter	3	64	14	1	82
Bruised or injured	8	15	15	—	38
Septicemia	6	1	22	1	30
Emaciated	10	10	7	—	27
Pneumonia	12	2	12	—	26
Multiple abscesses	10	2	4	—	16
Decomposition	—	—	10	—	10
Parturient Paresis	7	—	—	—	7
Enteritis	—	3	1	—	4
Icterus	2	2	—	—	4
Peritonitis	2	—	—	—	2
Tumor	—	—	2	—	2
Mastitis	2	—	—	—	2
Stillborn	—	2	—	—	2
Abortion	1	1	—	—	2
Urticaria	—	—	2	—	2
Purulent Pericarditis	2	—	—	—	2
Exposure	—	1	1	—	2
Slaughtered illegally	—	—	1	—	1
Worms	—	—	1	—	1
Measles	—	—	1	—	1
Dystocia	1	—	—	—	1
Prostration	—	1	—	—	1
Septic Metritis	1	—	—	—	1
Sexual odor	1	—	—	—	1
Insufficient bleeding	—	1	—	—	1
Gastritis	—	—	1	—	1
Actinomycosis	1	—	—	—	1
Totals	381	1,308	240	2	1,931

Liquor Report for 1934  
Character of Samples

CITIES AND TOWNS	Beer	Cider	Wine	Distilled spirits	Extracts	Alcohol	Miscellaneous	Total
Boston	42	—	7	223	—	87	4	363
Cambridge	9	—	2	31	—	9	—	51
Chelsea	—	—	1	29	—	2	—	32
Everett	3	—	—	15	—	8	—	26
Lawrence	3	—	2	17	—	6	—	28
Lowell	13	—	1	38	—	8	—	60
Lynn	4	—	1	34	—	5	—	44
Dep't Pub. Safety	43	1	9	110	—	19	—	182
Alc. Bev. Con. Com.	96	—	4	96	—	5	2	203
*Miscellaneous	99	3	21	141	—	36	11	311
Total	312	4	48	734	—	185	17	1,300

\* From 58 towns submitting less than twenty-five samples each.

GENERAL SUMMARY OF ANALYSES

	Complying with Requirements	Not Complying with Requirements	Total
Milk (chemical)	4,183	745	4,928
Milk (bacteriological)	3,338	764	4,102
Ice cream (bacteriological)	295	85	380
Food other than milk	2,148	526	2,674
Whiskey	8	2	10
Drugs	322	25	347
Mattress filling	16	14	30
Industrial preparations examined for quantity of methyl alcohol	121	39	160
Coal	1	4	5
Samples examined for Department of Labor and Industries	2	—	2
Liquor examined for police departments	—	—	1,300
Drugs and chemicals examined for police departments	28	80	108
Total (except liquor)	10,462	2,284	12,746
Total			14,046

## REPORT OF THE DIVISION OF SANITARY ENGINEERING

ARTHUR D. WESTON, *Director and Chief Engineer*

### OVERSIGHT AND CARE OF INLAND WATERS

During the year 1934 the Division of Sanitary Engineering investigated 662 applications requiring the advice of this Department, of which 199 related to municipal water supplies, 164 to private water supplies, 17 to water supplies at schools, 58 to water supplies at camps, 6 to sources of ice supply, 55 to bathing and swimming pools, 19 to shellfish, 6 to pollution of streams, 58 to sewerage and sewage disposal, 12 to Civilian Conservation Corps Camps and 68 to miscellaneous matters. The number of applications received is the largest ever received by the Department in any calendar year and is about 33 per cent in excess of the number received during the year 1933. All of these applications required field investigations by the engineers and in most cases chemical analyses by the Water and Sewage Laboratories and bacterial examinations by the Lawrence Experiment Station. In addition, many of the applications required field examinations by the chemists.

### WATER SUPPLIES

#### *Examination of Public Water Supplies*

During the year public water supplies were introduced in the towns of Paxton and Townsend and the village of Barnstable in the town of Barnstable. Consequently, the number of cities and towns having public water supplies has now been increased to 241 which includes several smaller towns supplied only in part by water companies, industrial plants and by other towns. Plans have been approved in the matter of public water supply in the town of Sterling, but efforts to introduce such supplies in Essex and Sudbury failed because of the adverse town meeting action. There have been a number of important improvements in some of the water supplies, viz., construction of filters at Braintree and Newburyport and introduction of chlorinating apparatus at Colrain (Griswoldville), Danvers, Dracut, Gardner, Leominster, Maynard, Northborough, Pittsfield and Russell. Water supplies in South Deerfield, Egremont, Fitchburg and Hudson were chlorinated temporarily during periods of the year. In Fitchburg chlorination was necessary because of an epidemic of enteritis believed to have been caused by workmen employed on the watershed, while in Danvers it was necessary to chlorinate the water because of known sewage pollution at no great distance from the water works pumping station. Plans for filtering the water supplies of Leominster, Northborough, Weymouth and of Salem and Beverly were approved by the Department during the year.

As in the year 1933, the examinations of the public water supplies have been somewhat more extensive than in previous years. This practice was deemed necessary because of the possibility of insanitary conditions on the watersheds from the employment of men in various programs of relief of unemployment. Samples have been collected regularly for chemical analysis and microscopical examination and a large number of samples have been collected for bacterial examination in connection with the various supplies.

In order to expedite the work of the Division an assistant engineer was assigned to the office of the District Health Officer at Springfield to investigate and report relative to sanitary engineering problems in Health Districts 6 and 7 and the Southern Berkshire Health District. This assignment not only made it possible to maintain closer supervision in matters of water supply, sewerage and sewage disposal but reduced considerably the cost of travel.

The following tables show the average results of chemical analyses of samples of water collected from the various sources of public water supply during the year 1934:

*Analyses of the Water of Public Water Supplies*  
Average of Chemical Analyses of Surface-Water Sources for the Year 1934

[Parts per Million]

CITY OR TOWN	SOURCE	Color	Residue on Evaporation	AMMONIA			Chlorine	Hardness
				Free	ALBUMINOID			
					Total	Sus-pended		
Metropolitan Water District	Wachusett Reservoir, upper end	24	38	.028	.101	.027	2.5	15
	Wachusett Reservoir, lower end	10	35	.020	.088	.024	2.5	15
	Sudbury Reservoir	15	40	.024	.104	.030	2.9	17
	Framingham Reservoir No. 3	17	42	.040	.111	.028	3.3	20
	Hopkinton Reservoir	49	44	.022	.135	.027	3.2	14
	Ashland Reservoir	51	47	.014	.141	.034	4.1	16
	Framingham Reservoir No. 2	78	61	.059	.181	.039	6.6	17
	Lake Cochituate	17	75	.109	.149	.041	8.2	31
	Chestnut Hill Reservoir	13	46	.086	.105	.029	4.1	21
	Weston Reservoir	16	40	.020	.104	.031	3.0	19
	Spot Pond	9	39	.011	.106	.032	3.8	19
	Tap in State House	11	40	.013	.083	.021	3.8	19
	Tap in Revere	7	40	.007	.073	.019	3.7	18
	Tap in Quincy	9	41	.005	.062	.016	3.8	21
	Big Sandy Pond	6	38	.017	.119	.028	8.4	9
Abington								
Acushnet (Fire and Water District)	New Bedford Water Supply							
Adams (Fire District)	Bassett Brook	0	44	.006	.026	.009	1.0	32
Agawam	Springfield Water Supply							
Amherst (Water Co.)	Atkins Pond	9	34	.076	.237	.106	1.7	10
	Amethyst Brook-intake reservoir	22	40	.022	.086	.019	1.8	10
Andover	Haggett's Pond	14	51	.051	.134	.043	5.2	24
Arlington	Metropolitan Water Supply							
Ashburnham	Upper Naukeag Lake	4	28	.011	.067	.015	1.8	8
Ashfield (Water Co.)	Highland Spring Reservoir	27	54	.005	.069	.016	1.1	37
Athol	Buckman Brook Reservoir (Newton Reservoir)	17	30	.008	.098	.037	1.4	9
	Thousand Acre Meadow Brook	132	57	.037	.261	.094	1.6	15
	Inlet, Summer Street filters	16	31	.014	.095	.036	1.5	10
	Outlet, Summer Street filters	12	32	.016	.095	.027	1.7	10
	Phillipston Reservoir	43	45	.129	.246	.065	2.9	14
	Outlet of Mechanical Filter Reservoir	44	42	.041	.221	-	2.4	14
Barre		13	32	.022	.112	.021	1.6	17
Belmont	Metropolitan Water Supply							
BEVERLY	Joint supply with Salem							
Blackstone	Tap (supply from Woonsocket, R. I.)	29	46	.004	.101	.021	4.1	22
Blandford	Freeland Brook	6	37	.003	.025	.005	2.0	19
BOSTON	Metropolitan Water Supply							
Braintree	Joint supply with Randolph							
BROCKTON	Silver Lake	6	33	.018	.099	.040	6.0	8
Brookfield	Cooley Hill Reservoir	7	34	.060	.140	.036	1.8	12
CAMBRIDGE	Fresh Pond	9	91	.046	.127	.029	7.8	42
	Filter effluent	1	96	.021	.047	-	7.5	47
	Stony Brook Reservoir	29	70	.048	.163	.034	6.4	31
	Upper Hobbs Brook Reservoir	34	62	.054	.191	.036	5.2	27
	Lower Hobbs Brook Reservoir	14	57	.046	.186	.045	5.2	27
	Metropolitan Water Supply							
CHELSEA	Kitchen Brook Reservoir	4	50	.005	.021	.009	1.2	36
Cheshire (Water Co.)	Austin Brook Reservoir	10	37	.019	.065	.021	1.3	15
Chester	Horn Pond	14	39	.021	.127	.027	1.2	16
CHICOPEE	Cooley Brook Reservoir, filtered	2	60	.024	.025	-	2.6	30
	Morton Brook	5	55	.023	.064	.036	3.3	23
Clinton	Lower Lynde's Reservoir	18	35	.108	.159	.057	2.4	14
	Heywood Pond	8	25	.051	.113	.038	2.0	9
	Spring Basin	8	50	.060	.089	-	2.8	21
Colrain (Griswoldville)	McClellan Brook Reservoir	4	72	.003	.064	.028	1.7	50
Colrain (Fire District No. 1)	Mountain Brook Reservoir	8	80	.002	.027	.005	1.3	68
Concord	Nagoy Pond	4	33	.023	.134	.041	4.4	16
Dalton (Fire District)	Egypt Brook Reservoir	26	35	.016	.082	.013	1.3	11
	Cady Brook	28	48	.021	.083	.019	1.3	26
	Tap in town	23	40	.003	.071	.017	1.2	21
	Windsor Reservoir	33	48	.057	.128	.023	1.1	28
Danvers	Middleton Pond	47	41	.019	.177	.047	3.8	16
	Swan Pond	24	42	.039	.161	.042	3.6	19
Dartmouth	New Bedford Water Supply							
Deerfield (South Deerfield Water Supply District)	Roaring Brook Reservoir	7	61	.001	.026	.006	1.3	42
East Bridgewater	Brockton Water Supply							
East Longmeadow	Springfield Water Supply							
Egremont (South Egremont Water Co.)	Goodale Brook Reservoir	0	43	.004	.017	.005	1.1	30
Erving (Millers Falls Water Supply Dist.)	Montague (Turners Falls Fire Dist.) Water Supply							

Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued  
 [Parts per Million]

CITY OR TOWN	SOURCE	Color	Residue on Evaporation	AMMONIA			Chlorine	Hardness
				Free	ALBUMINOID			
					Total	Sus-pended		
EVERETT	Metropolitan Water Supply	7	37	.017	.106	.025	5.5	11
FALL RIVER	North Watuppa Lake	2	36	.006	.071	.022	10.6	8
Falmouth	Long Pond	20	30	.069	.144	.052	1.8	9
FITCHBURG	Ashby Reservoir	7	31	.072	.122	.027	1.7	9
	Scott Reservoir	4	30	.055	.137	.032	2.0	10
	Meetinghouse Pond	6	27	.026	.136	.045	1.8	8
	Wachusett Lake	20	30	.011	.100	.028	1.7	7
	Falulah Brook	17	29	.075	.127	.039	1.7	7
	Lovell Reservoir	4	46	.027	.138	.033	3.6	24
GARDNER	Crystal Lake	13	39	.011	.069	.018	8.0	6
GLOUCESTER	Haskell Reservoir	45	45	.054	.125	.027	8.6	6
	Dike's Reservoir	62	51	.019	.144	.039	9.1	
	Wallace Reservoir							
Great Barrington (Housatonic Water Works Co.)	Long Pond	4	80	.023	.156	.044	1.4	80
Great Barrington (Fire District)	East Mountain Reservoir	12	55	.046	.071	.021	1.3	34
Greenfield	Glen Brook Upper Reservoir	1	62	.009	.045	.017	1.7	40
	Glen Brook Lower Reservoir	2	58	.013	.046	.018	1.5	37
	Haverhill Water Supply							
Groveland	Hart's Brook Reservoir	8	47	.003	.051	.017	1.6	25
Hadley (Water Supply District)	Brockton Water Supply	11	71	.004	.032	.009	1.9	34
Hanson	Running Gutter Brook Reservoir	58	56	.027	.176	.044	4.5	25
Hatfield	Millvale Reservoir	18	55	.034	.135	.029	5.7	30
HAVERHILL	Johnson's Pond	14	39	.010	.129	.027	4.0	17
	Crystal Lake	4	47	.026	.153	.043	4.5	23
	Pentucket Lake	19	51	.021	.125	.032	5.4	27
	Kenoza Lake	17	37	.011	.126	.044	6.4	9
Hingham (Water Co.)	Accord Pond	8	18	.002	.040	.014	1.4	10
Hinsdale (Fire Dist.)	Reservoir							
Holbrook	Joint supply with Randolph							
Holden	Rutland Water Supply	8	40	.025	.109	.028	1.4	23
HOLYOKE	High Service Reservoir	23	34	.029	.140	.050	1.5	15
	Fomer Reservoir	8	49	.023	.091	.030	1.5	27
	Wright and Ashley ponds	17	37	.038	.103	.037	1.4	18
	White Reservoir	5	52	.031	.116	.032	1.7	32
	Whiting Street Reservoir							
Hopedale	Milford Water Supply	6	33	.017	.110	.031	2.5	16
Hudson	Gates Pond							
Hull	Hingham Water Supply							
Huntington (Fire District)	Cold Brook Reservoir	12	36	.002	.037	.009	1.3	14
Ipswich	Dow's Brook Reservoir	21	53	.014	.168	.050	6.9	23
	Bull Brook Reservoir	106	81	.022	.217	.049	7.3	30
Lancaster	Clinton Water Supply							
LAWRENCE	Merrimack River, filtered	36	52	.064	.104	-	5.6	16
Lee (Berkshire Water Co.)	Codding Brook Upper Reservoir	4	48	.008	.034	.011	1.2	33
	Codding Brook Lower Reservoir	4	50	.006	.025	.008	1.2	33
	Basin Pond Brook	30	41	.006	.093	.026	1.0	19
Lenox (Water Co.)	Lower Root Reservoir	6	75	.005	.102	.043	1.2	60
	Woolsey Reservoir	2	64	.013	.043	.018	1.2	49
LEOMINSTER	Fall Brook Reservoir	13	29	.020	.086	.029	1.7	5
	Haynes Reservoir	13	25	.042	.145	.062	1.3	5
	Morse Reservoir	12	28	.039	.070	.016	1.6	5
	No-Town Reservoir	28	30	.017	.110	.023	1.4	6
Lexington	Metropolitan Water Supply							
Lincoln	Sandy Pond	5	29	.062	.093	.013	3.2	10
Longmeadow	Springfield Water Supply							
Ludlow	Springfield Water Supply							
LYNN	Breeds Pond	22	54	.035	.150	.030	6.9	23
	Birch Pond	6	50	.038	.145	.037	7.2	22
	Hawkes Pond	52	67	.066	.237	.046	7.0	32
	Walden Pond	44	60	.038	.187	.037	6.9	26
Lynnfield	Lynn Water Supply							
MALDEN	Metropolitan Water Supply							
Manchester	Gravel Pond	14	46	.010	.102	.026	8.6	16
MARLBOROUGH	Lake Williams	4	56	.073	.175	.049	5.6	25
	Millham Brook Reservoir	45	55	.066	.163	.029	4.1	18
	White Pond	1	29	.020	.107	.025	2.6	7
Maynard	Metropolitan Water Supply							
MEDFORD	Metropolitan Water Supply							
MELROSE	Metropolitan Water Supply							
Middleton	Joint supply with Danvers							
Milford (Water Co.)	Dug wells and Charles River, filtered	12	47	.004	.039	-	3.5	26
Milton	Metropolitan Water Supply							

## Averages of Chemical Analyses of Surface-Water Sources, etc.—Continued

[Parts per Million]

CITY OR TOWN	SOURCE	Color	Residue on Evaporation	AMMONIA			Chlorine	Hardness
				Free	ALBUMINOID			
					Total	Sus-pended		
Montague (Turners Falls Fire District)	Lake Pleasant Reservoir	6	31	.011	.054	.015	1.4	13
Monterey (Water Co.)	Reservoir	4	84	.002	.019	.009	1.3	77
Nahant	Metropolitan Water Supply							
NEW BEDFORD	Great Quittacas Pond	40	42	.019	.149	.034	5.3	10
	Little Quittacas Pond	24	40	.029	.141	.043	5.4	11
NEWBURYPORT	Dug wells and Artichoke River, filtered	11	64	.013	.092	—	7.0	32
NORTH ADAMS	Broad Brook	9	38	.009	.046	.015	1.1	20
	Notch Brook Reservoir	4	71	.015	.030	.011	1.1	60
	Mount Williams Reservoir	2	75	.012	.046	.013	1.0	63
NORTHAMPTON	Middle Reservoir (Roberts Meadow Brook)	23	44	.030	.089	.026	1.5	22
	Mountain Street Reservoir	6	39	.022	.063	.020	1.2	24
North Andover	Great Pond	17	51	.017	.138	.027	4.8	23
Northborough	Lower Reservoir (Cold Harbor Brook)	80	47	.042	.182	.039	2.6	15
North Brookfield	Doane Pond	28	40	.134	.224	.055	2.4	12
	North Pond	31	37	.109	.196	.053	2.1	12
Northfield (Water Co.)	Reservoir—Northfield	19	37	.005	.025	.005	1.4	14
Northfield (Northfield Schools, Inc.)	Reservoir—East Northfield	12	49	.013	.049	.019	2.6	23
Norwood	Buckmaster Pond, filtered	9	58	.011	.095	—	6.1	25
Orange	Coolidge Brook Reservoir	25	34	.009	.092	.029	1.8	7
Palmer (Fire District No. 1.)	Lower Reservoir (Graves Brook)	19	40	.037	.080	.025	2.1	14
PEABODY	Spring Pond	11	53	.028	.136	.038	6.3	20
	Suntaug Lake	32	65	.051	.184	.034	7.6	23
Pembroke	Brockton Water Supply							
PITTSFIELD	Sackett Reservoir	7	68	.015	.049	.019	1.2	54
	Hathaway Reservoir	5	81	.012	.043	.018	1.3	69
	Ashley Reservoir	7	71	.005	.060	.026	1.4	60
	Ashley Lake	6	28	.039	.085	.025	1.2	17
	Farnham Reservoir	37	43	.093	.175	.053	1.2	18
	Mill Brook	24	48	.081	.101	.023	1.1	26
Plainville	No. Attleborough Water Supply							
Plymouth	Little South Pond	0	30	.048	.108	.033	6.6	4
	Great South Pond	0	29	.018	.079	.028	6.5	4
QUINCY	Metropolitan Water Supply							
Randolph	Great Pond	35	57	.028	.150	.033	7.5	18
REVERE	Metropolitan Water Supply							
Rockland	Joint supply with Abington							
Rockport	Cape Pond	42	85	.077	.249	.081	24.0	19
Russell	Black Brook Reservoir	15	37	.002	.042	.012	1.8	14
Rutland	Muschopauge Lake	4	36	.065	.120	.042	3.6	19
SALEM	Wenham Lake	30	72	.094	.183	.066	10.0	29
	Longham Reservoir	85	88	.136	.257	.070	9.3	29
	Ipswich River at pumping station	56	124	.079	.324	.170	8.7	57
Saugus	Lynn Water Supply							
Shelburne (Shelburne Falls Fire District)	Fox Brook Reservoir	9	58	.003	.029	.012	1.2	39
SOMERVILLE	Metropolitan Water Supply							
Southborough	Sudbury Reservoir	17	41	.018	.101	.023	3.4	18
Southbridge (Water Supply Co.)	Hatchet Brook Reservoir No. 3	18	32	.022	.095	.024	2.1	9
	Hatchet Brook Reservoir No. 4	21	31	.037	.121	.034	2.2	10
So. Hadley (So. Hadley Falls Fire Dist. No. 1)	Buttery Brook Reservoir	13	46	.044	.081	.028	3.3	20
	Leaping Well Reservoir	3	31	.025	.095	.049	2.0	13
Southwick	Springfield Water Supply							
SPENCER	Shaw Pond	8	27	.009	.088	.017	2.0	9
SPRINGFIELD	Cobble Mountain Reservoir	26	35	.036	.118	.038	1.3	13
	Westfield Little River, filtered	11	34	.001	.045	—	1.3	14
Stockbridge (Water Co.)	Lake Averie	6	68	.019	.094	.018	1.4	48
Stoneham	Metropolitan Water Supply							
Stoughton	Muddy Pond	12	40	.006	.045	.012	3.5	11
Sunderland	Saw Mill Brook Reservoir	5	62	.002	.014	—	1.6	40
Swampscott	Metropolitan Water Supply							
TAUNTON	Assawompsett Pond	25	40	.035	.157	.046	5.0	9
	Elder's Pond	7	33	.018	.115	.028	4.9	9
Wakefield	Crystal Lake, filtered	6	70	.009	.118	—	8.6	34
Wareham (Onset Fire District)	Jonathan Pond	5	30	.007	.098	.027	5.9	7
Watertown	Metropolitan Water Supply							
West Bridgewater	Brockton Water Supply							
WESTFIELD	Montgomery Reservoir	37	32	.027	.114	.021	1.3	7
	Winchell Reservoir	13	29	.027	.064	.022	1.4	6
	New Granville Reservoir	12	31	.062	.070	.024	1.5	8
Westhampton (Water Co.)	Reservoir	6	38	.003	.033	.013	1.5	20

## Averages of Chemical Analyses of Surface-Water Sources, etc.—Concluded

[Parts per Million]

CITY OR TOWN	SOURCE	Color	Residue on Evaporation	AMMONIA			Chlorine	Hardness
				Free	ALBUMINOID			
					Total	Sus-pended		
West Springfield . . .	Bear Hole Brook Reservoir	10	70	.020	.076	.031	1.7	42
	Bear Hole Brook Reservoir, filtered	4	69	.009	.021	-	1.8	42
West Stockbridge (East Mountain Water Co.)	East Mountain Reservoir . . .	5	57	.002	.019	.005	1.3	34
Weymouth . . . . .	Great Pond . . . . .	42	43	.020	.128	.028	5.8	11
Whitman . . . . .	Brockton Water Supply . . . . .							
Wilbraham . . . . .	Springfield Water Supply . . . . .							
Williamsburg . . . . .	Reservoir . . . . .	11	46	.011	.057	.015	1.3	26
Williamstown (Water Co.) . . . . .	Paul Brook . . . . .	0	94	.004	.018	.007	1.1	76
	Rattlesnake Brook Reservoir . . . . .	2	82	.012	.026	.015	1.1	79
Winchester . . . . .	North Reservoir . . . . .	3	41	.028	.108	.028	4.2	22
	Middle Reservoir . . . . .	5	34	.028	.148	.035	4.0	18
	South Reservoir . . . . .	6	39	.028	.086	.014	4.2	20
Winthrop . . . . .	Metropolitan Water Supply							
WORCESTER . . . . .	Pine Hill Reservoir . . . . .	13	33	.060	.135	.042	2.4	16
	Upper Holden Reservoir . . . . .	9	31	.015	.103	.034	2.1	11
	Lower Holden Reservoir . . . . .	7	32	.009	.091	.027	2.1	12
	Leicester Reservoir . . . . .	17	38	.036	.132	.038	2.2	15
	Bottomly Reservoir . . . . .	32	48	.036	.189	.056	2.5	20
	Kent Reservoir . . . . .	25	40	.045	.164	.043	2.6	19
	Mann Reservoir . . . . .	18	38	.015	.131	.032	2.3	18
	Kendall Reservoir . . . . .	9	31	.026	.109	.036	2.4	16
	Quinapoxet Pond . . . . .	33	35	.018	.123	.034	2.0	13

## Averages of Chemical Analyses of Ground-Water Sources for the Year 1934

(Parts per Million)

CITY OR TOWN	Source	Color	Residue on Evaporation	AMMONIA		Chlorine	NITROGEN AS —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Acton (West and South Water Supply District)	Tubular wells	0	103	.001	.006	7.0	1.460	.000	44	.06
Adams (Fire District)	Tubular wells	0	132	.000	.014	1.0	.400	.000	131	.05
Amesbury	Tubular wells	14	141	.076	.027	6.0	.020	.000	67	5.57
	Tubular wells, filtered	1	127	.000	.018	5.5	.020	.000	69	.07
Ashland	New tubular wells	2	57	.003	.025	4.0	.050	.000	26	.17
ATTLEBORO	Dug wells and filtered water, South Attleboro	1	47	.005	.020	4.6	.030	.000	28	.06
	Tubular wells, West Mansfield	3	48	.027	.019	4.4	.020	.000	21	.98
Auburn (Water Co.)	Tubular wells	0	108	.000	.009	9.1	1.567	.000	52	.05
Avon	Dug and tubular wells	2	82	.001	.012	6.2	1.104	.000	38	.10
Ayer	Dug well	1	86	.001	.006	7.9	1.250	.000	37	.10
	Tubular wells	2	73	.009	.010	5.1	.023	.000	41	.51
Barnstable (Water Co.)	Tubular wells (old supply)	0	42	.003	.008	11.0	.020	.000	9	.13
Bedford	Dug well	1	37	.000	.013	3.7	.020	.000	17	.05
	Tubular wells	1	45	.000	.005	3.7	.035	.000	17	.39
Belchertown (Water District)	Tubular wells	0	69	.000	.005	4.3	.135	.000	31	.07
BillERICA	Gravel-packed wells—Tap in pumping station	23	77	.100	.080	8.5	.020	.000	31	.30
Bourne (Monument Beach)	Tubular wells	1	46	.000	.007	10.1	.367	.000	15	.05
Bridgewater	Tubular wells	0	70	.005	.006	6.6	1.600	.000	24	.08
Brookline	Tubular wells and filter gallery, filtered	7	92	.009	.042	7.8	.202	.002	42	.08
Canton	Henry's Spring well	6	63	.006	.019	6.7	.675	.000	28	.08
	Ward well	4	65	.015	.025	6.1	.355	.000	31	.10
	Springdale well	4	68	.003	.016	5.9	.250	.000	27	.10
Chatham (Water Co.)	Filter gallery near White Pond	5	48	.007	.081	17.9	.020	.000	8	.07
	Tubular wells	0	45	.003	.005	13.0	.020	.000	11	.05
Chelmsford (North Chelmsford Fire District)	Tubular wells	12	50	.123	.065	4.2	.220	.000	24	.35
Chelmsford (Water District)	Tubular wells	3	80	.007	.018	6.4	.875	.003	37	.20
Cohasset (Water Co.)	Tubular wells, Elms Meadow	1	140	.003	.023	18.9	1.433	.000	56	.07
	Dug well, filtered	19	74	.048	.072	11.1	.020	.000	23	.23
Cummington	Springs, tap	0	47	.001	.003	2.9	1.300	.000	24	.08
Dedham (Water Co.)	Dug and tubular wells	6	101	.011	.035	9.8	.817	.000	43	.10
Deerfield (Fire District)	Springs	0	54	.000	.005	2.0	.020	.000	28	.05
Douglas	Tubular wells	0	55	.000	.006	3.9	.625	.000	26	.07
Dracut (Water Supply District)	Tubular wells, Dracut	10	132	.016	.037	8.7	1.500	.000	61	.19
	Tubular wells, Collinsville	3	66	.004	.018	2.7	.025	.000	30	.07
Dudley	Tubular wells	0	39	.000	.006	3.1	.020	.000	17	.11
Dunstable	Dug and tubular wells	1	58	.001	.006	3.1	1.600	.000	29	.09
Duxbury (Fire and Water District)	Tubular wells	0	45	.000	.002	9.3	.023	.000	11	.05
East Brookfield	Dug well	0	27	.000	.007	2.2	.020	.000	10	.05
Easthampton	Tubular wells	2	78	.000	.003	2.1	.243	.000	44	.05
Easton (North Easton Village District)	Dug well	8	50	.001	.022	4.8	.322	.000	23	.37
Easton (Unionville Fire and Water Dist.)	North Easton Village District Water Supply									
Edgartown (Water Co.)	Dug and tubular wells	0	31	.002	.004	9.8	.020	.000	7	.08
Fairhaven (Water Co.)	Tubular wells near Nasketucket River	25	77	.002	.065	9.3	.383	.000	30	.22
	Tubular wells near Mattapoissett River	0	61	.001	.022	8.6	.583	.000	24	.09

## Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

[Parts per Million]

CITY OR TOWN	Source	Color	Residue on Evaporation	AMMONIA		Chlorine	NITROGEN AS —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Foxborough	Tubular wells	0	57	.000	.010	5.0	.533	.000	26	.12
Framingham	Tap in pumping station	11	67	.163	.092	9.2	—	—	33	.19
Franklin	Tubular wells	1	50	.000	.010	4.7	.030	.000	22	.17
Gill (Riverside Water Co.)	Spring	2	72	.001	.011	2.4	1.025	.000	42	.08
Grafton (Water Co.)	Gravel-packed well at North Grafton	0	64	.018	.009	6.4	.467	.005	33	.09
	Dug wells at Grafton	0	109	.000	.013	11.1	2.100	.000	46	.08
Granville (Water Co.)	Well and springs	1	32	.000	.015	1.7	.020	.000	14	.10
Great Barrington (Fire District)	Dug well near Green River	0	95	.000	.005	1.2	.039	.000	76	.05
	Filter gallery near Green River	0	95	.001	.011	1.5	.040	.000	77	.05
Greenfield	Dug well near Green River	5	62	.001	.012	1.3	.020	.000	44	.14
Groton (Water Co.)	Dug well	3	70	.023	.017	2.5	.020	.000	41	.31
Groton (West Groton Water Supply District)	Tubular wells	0	52	.001	.007	2.2	.042	.000	31	.07
Hanover	Tubular wells	0	63	.001	.006	7.4	.027	.000	25	.09
Hardwick (Center)	Dug well	1	35	.003	.006	2.0	.023	.000	18	.46
Hardwick (Gilbertville)	Dug and tubular wells	1	73	.000	.006	1.8	.020	.000	44	.09
Hardwick (Wheelwright)	Tubular wells	0	43	.001	.005	3.3	.400	.000	9	.08
Hingham (Water Co.)	Filter galleries	17	76	.004	.037	7.4	.147	.000	38	.11
Holliston (Water Co.)	Large well	26	53	.025	.073	3.9	.020	.000	25	.94
Hopdale	Milford Water Supply									
Hopkinton	New tubular wells	0	68	.002	.008	4.2	.833	.001	30	.07
Hull	Hingham Water Supply									
Kingston	Tubular wells	0	42	.001	.004	7.5	.027	.000	14	.06
Leicester (Water Supply District)	Dug wells	4	63	.001	.015	3.0	.833	.000	33	.08
Leicester (Cherry Valley and Rochdale Water District)	Dug wells	29	51	.036	.093	3.0	.023	.000	24	.15
Littleton	Tubular wells	0	36	.000	.004	2.2	.033	.000	21	.05
LOWELL	Boulevard wells, filtered	11	58	.002	.021	4.5	.309	.000	27	.24
Manchester	Dug and tubular wells	2	92	.001	.019	15.1	.703	.000	36	.11
Mansfield	Dug well	0	43	.001	.005	3.5	.027	.000	17	.10
Marblehead	Inlet of filter	10	174	.051	.046	21.9	.022	.000	83	1.89
	Dug and tubular wells, filtered	10	174	.002	.032	21.7	.065	.000	87	.22
Marion	Old tubular wells	0	45	.001	.007	7.0	.225	.000	20	.05
	New tubular wells	0	101	.002	.006	21.4	.200	.000	43	.08
Marshfield	Tubular wells	2	49	.001	.004	7.7	.020	.000	11	.07
Mattapoisett	Tubular wells	0	62	.000	.006	8.2	.020	.000	24	.09
Medfield	Tubular wells, tap in town	1	69	.001	.018	4.1	.065	.000	35	.08
Medway	Tubular wells	1	78	.035	.013	9.3	.484	.000	57	.13
Merrimac	Tubular wells	0	87	.004	.008	6.3	.187	.000	38	.14
Methuen	Tubular wells at Pine Island	0	115	.069	.010	9.1	1.757	.002	63	.09
	Lone Tree Hill wells	3	75	.249	.035	6.0	.234	.008	39	.07
Middleborough	Dug well, filtered	9	64	.004	.014	6.7	.230	.000	29	.31
Millbury (Water Co.)	Dug well	1	45	.001	.018	2.8	.027	.000	21	.06
Millis	Dug wells	0	130	.001	.007	11.4	2.090	.000	65	.06
Monson	Old dug well	13	35	.003	.034	1.9	.020	.000	11	.10
	New dug well	0	32	.008	.008	2.0	.020	.000	11	.06
Montague (Montague Village)	Montague Village Springs	3	49	.002	.028	2.0	.023	.000	27	.15
Nantucket (Wannacomet Water Co.)	Wells at Wyers Valley	0	58	.001	.004	17.6	.020	.000	17	.05
Nantucket (Siasconset)	Dug wells	1	61	.000	.005	17.8	.020	.000	19	.60
Natick	Dug well	0	113	.001	.007	11.5	.476	.000	58	.06

## Averages of Chemical Analyses of Ground-Water Sources, etc.—Continued

[Parts per Million]

CITY OR TOWN	Source	Color	Residue on Evaporation	AMMONIA		Chlorine	NITROGEN AS —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
Needham	Dug well No. 1	1	85	.001	.022	8.3	1.267	.000	39	.06
	Dug well No. 2	0	83	.000	.014	7.5	.783	.000	39	.06
	Tubular wells (Great Plain Avenue)	1	75	.005	.022	8.2	.425	.000	35	.13
NEWTON	Tap in pumping station. (Treated water)	1	113	.004	.016	7.4	.137	.000	30	.10
	Dug well No. 1	0	75	.002	.013	6.6	.045	.000	36	.07
	Dug well No. 2	0	70	.002	.024	7.1	.060	.000	34	.05
North Attleborough Northbridge	Dug wells	3	58	.001	.011	5.6	.205	.000	32	.20
	Tubular wells (Meadow Pond)	0	42	.004	.010	3.8	.145	.000	18	.11
	Tubular wells (Cook Allen)	0	48	.003	.011	3.7	.060	.000	17	.05
Norton	Tubular wells	0	47	.000	.005	3.3	.020	.000	18	.18
Norwood	Tubular wells	7	97	.006	.015	7.4	.574	.000	40	2.80
Oak Bluffs (Cottage City Water Co.)	Springs	0	40	.062	.055	9.2	.157	.000	12	.07
Orange	Crystal Spring	6	34	.006	.021	2.3	—	—	11	.11
Oxford (Water Co.)	Tubular wells	0	51	.001	.007	3.7	.367	.000	25	.05
Palmer (Bondsville Water Co.)	Tubular wells	1	65	.000	.007	3.5	.250	.000	27	1.98
Pepperell	Tubular wells	0	38	.000	.004	2.0	.020	.000	17	.04
Provincetown	Tubular wells	1	163	.006	.005	66.1	.020	.000	36	.34
Reading	New tubular wells	2	76	.002	.013	5.4	.117	.000	37	.29
Rockport	Tubular wells	0	85	.000	.012	15.8	.930	.000	29	.20
Salisbury (Water Supply Co.)	Old dug well	5	88	.001	.013	6.4	.033	.000	40	.21
	New dug well	10	93	.001	.007	6.6	.020	.000	52	.76
Scituate	Webster Meadow wells	0	169	.000	.008	35.5	1.171	.000	73	.15
	Bound Brook well	26	107	.001	.073	16.3	.533	.000	45	.09
	Dug well	0	205	.001	.012	36.7	2.775	.004	92	.05
Sharon	Tubular wells	2	66	.002	.011	6.6	.600	.000	26	.18
	Smith's Spring	0	33	.000	.004	1.3	.020	.000	21	.06
	Clark's Spring	9	44	.026	.030	1.5	.020	.000	25	.08
Shirley	Dug wells	0	59	.000	.007	6.1	2.200	.000	26	.05
Shrewsbury	Tubular wells (South Street)	2	59	.007	.011	3.7	.235	.000	29	0.9
	Tubular wells (Oak Street)	0	54	.001	.007	4.4	.140	.000	26	.05
	Tubular wells	12	133	.001	.022	6.4	.080	.000	34	.43
Somerset	Tubular wells	12	133	.001	.022	6.4	.080	.000	34	.43
South Hadley (Fire District No. 2)	Dug wells	0	57	.005	.006	2.5	.283	.000	32	.05
Sturbridge	Tubular wells	2	58	.000	.005	3.6	.219	.000	23	.41
Sutton (Water Co.)	Tubular wells	2	102	.004	.015	4.5	.900	.000	53	.12
Tisbury	Tashmoo Spring	0	43	.000	.003	10.4	.020	.000	10	.05
Uxbridge	Tubular wells	0	69	.007	.011	6.8	1.100	.000	31	.04
Walpole	Tubular wells	0	58	.002	.018	4.7	.333	.000	26	.07
WALTHAM	Old dug well	6	102	.055	.021	9.7	.072	.000	48	1.20
	New dug well	0	73	.003	.018	6.6	.162	.000	38	.06
Ware	Dug and tubular wells	0	96	.006	.007	6.4	1.486	.000	41	.12
Wareham (Wareham Fire District)	Tubular wells	0	35	.002	.005	6.5	.020	.000	9	.05
Warren (Water District)	Tubular wells	0	35	.001	.009	2.7	.200	.000	13	.07
Warren (West Warren Water Co.)	Dug wells	8	53	.000	.017	2.1	.042	.000	20	.19
Wayland	Tubular wells	0	103	.003	.008	6.3	.917	.000	47	.08
Webster	Dug and tubular wells	0	49	.009	.005	3.4	.165	.000	25	.09
Wellesley	Tubular wells at pumping station No. 1	0	93	.004	.014	8.7	.525	.000	41	.18
	Dug well at pumping station No. 2	0	81	.000	.008	7.4	.575	.000	36	.06
	Large tubular well at pumping station No. 3	0	81	.001	.006	6.6	.750	.000	34	.08
Westborough	Filter basin	3	34	.010	.058	2.9	—	—	14	.12
West Brookfield	Tubular wells	0	44	.001	.005	2.6	.023	.000	17	.06
Westford (Water Co.)	Tubular wells (Westford)	0	57	.000	.006	2.2	.020	.000	29	.05
Weston	Tubular wells at Warren Avenue	2	103	.003	.012	6.6	2.200	.000	46	.22
	Tubular wells at Kendal Green	0	78	.000	.007	6.5	.575	.000	36	.05

*Averages of Chemical Analyses of Ground-Water Sources, etc.—Concluded*

[Parts per Million]

CITY OR TOWN	Source	Color	Residue on Evaporation	AMMONIA		Chlorine	NITROGEN AS —		Hardness	Iron
				Free	Albuminoid		Nitrates	Nitrites		
West Stockbridge (East Mountain Water Co.)	Johnson's Spring	0	110	.001	.012	1.1	.020	.000	89	.04
	Blake's Spring	0	134	.013	.006	1.0	.020	.000	115	.05
Westwood . . . . .	Dedham Water Supply . . . . .									
Williamstown (Water Co.)	Cold Spring	1	142	.014	.008	1.0	.333	.000	142	.05
	Sherman Spring	1	108	.002	.005	1.1	.047	.000	91	.05
Wilmington . . . . .	Tubular wells	0	64	.001	.007	5.9	.515	.000	28	.05
Winchendon . . . . .	Old dug well	45	38	.047	.063	1.8	.020	.000	16	2.07
	New dug well	16	29	.022	.044	1.7	.020	.000	15	.29
WOUBURN . . . . .	Gravel-packed well A	2	135	.019	.034	13.1	.287	.000	64	.05
	Gravel-packed well B	1	129	.063	.030	13.4	.140	.000	65	.05
	Gravel-packed well C	1	101	.003	.019	9.3	.333	.000	49	.06
	Gravel-packed well D	0	79	.006	.018	8.2	.093	.000	40	.05
	Springs	4	27	.005	.035	1.3	.020	.000	17	.16
Worthington . . . . .	Dug and tubular wells	0	64	.000	.005	4.7	2.400	.000	31	.06
Wrentham . . . . .	Tubular wells	0	45	.000	.004	13.7	.020	.000	10	.07

*Sanitary Protection of Public Water Supplies*

During the year 1934 rules and regulations were adopted by the Department in accordance with Section 160 of Chapter 111 of the General Laws for the sanitary protection of the waters used as sources of water supply by the city of Brockton and the towns of Athol, Hatfield, Manchester, Northborough and Spencer and the Colrain Fire District in Colrain.

The cities, towns, fire and water districts, and water companies, for which rules and regulations have been adopted by the department are as follows:

Abington and Rockland . . . . .	1927	Gardner . . . . .	1910
Adams (Fire District) . . . . .	1921	Gloucester . . . . .	1930
Amherst (Water Company) . . . . .	1931	Great Barrington (Housatonic Water Works Company) . . . . .	1929
Andover . . . . .	1908	Greenfield . . . . .	1904
Ashburnham . . . . .	1922	Hatfield . . . . .	1934
Ashfield (Water Company) . . . . .	1923	Haverhill . . . . .	1921
Athol . . . . .	1934	Hingham and Hull (Hingham Water Company) . . . . .	1912
Attleboro . . . . .	1926	Holden . . . . .	1914
Braintree . . . . .	1913, 1926	Holyoke . . . . .	1908, 1918
Brockton . . . . .	1905, 1934	Hudson . . . . .	1929
Cambridge . . . . .	1899	Lakeville (State Sanatorium) . . . . .	1926
Cheshire (Water Company) . . . . .	1933	Lee (Berkshire Water Company) . . . . .	1919
Chester (Fire District) . . . . .	1914	Leicester (Cherry Valley and Rochdale Water District) . . . . .	1914
Chicopee . . . . .	1906	Lenox (Water Company) . . . . .	1933
Cohasset (Water Company) . . . . .	1923	Leominster . . . . .	1919, 1927
Colrain (Fire District) . . . . .	1932, 1934	Lincoln and Concord . . . . .	1903
Concord . . . . .	1910	Lynn . . . . .	1907
Dalton (Fire District) . . . . .	1919	Manchester . . . . .	1934
Danvers and Middleton . . . . .	1920	Marlborough . . . . .	1901
Deerfield (So. Deerfield Water Supply District) . . . . .	1932	Maynard . . . . .	1907
Easthampton . . . . .	1904	Medfield (State Hospital) . . . . .	1922
Egremont (So. Egremont Water Company) . . . . .	1932	Metropolitan Water District . . . . .	1925
Fall River . . . . .	1907	Milford (Water Company) . . . . .	1924
Falmouth . . . . .	1930	Montague (Turners Falls Fire Dist.) . . . . .	1908
Fitchburg . . . . .	1903, 1907, 1918		

New Bedford . . . . .	1932	Scituate . . . . .	1927
Newburyport . . . . .	1921	Southbridge (Southbridge Water Supply Company) . . . . .	1931
Norfolk (State Hospital) . . . . .	1926	Spencer . . . . .	1934
Northampton . . . . .	1904	Springfield . . . . .	1904, 1910
North Andover . . . . .	1912	Stockbridge (Water Company) . . . . .	1910
Northborough . . . . .	1905, 1934	Taunton . . . . .	1932
Norwood . . . . .	1901	Wakefield . . . . .	1904
Palmer (Fire District No. 1) . . . . .	1933	Westborough . . . . .	1929
Peabody . . . . .	1922	Westfield . . . . .	1922
Pittsfield . . . . .	1903, 1909	West Springfield . . . . .	1907
Plymouth . . . . .	1908	Weymouth . . . . .	1903
Randolph and Holbrook . . . . .	1926	Williamsburg . . . . .	1914
Rockport . . . . .	1902	Winchester . . . . .	1909
Russell . . . . .	1910	Worcester . . . . .	1926
Rutland . . . . .	1914		
Salem and Beverly . . . . .	1901		

The Department during the year has received 6 applications for its approval of the acquisition of land for protecting sources of water supply. In cases where request for the approval of the purchase or taking was in accordance with Chapter 40, Section 41, of the General Laws, hearings were given by the Department under that section. The following takings were approved by the Department:

PURCHASE OF LAND DURING THE YEAR 1934 FOR THE PURPOSE OF PROTECTING  
SOURCES OF WATER SUPPLY

CITY OR TOWN	SOURCE OF SUPPLY	Approximate Area of Land in Proposed Taking (Acres)
Holyoke . . . . .	Fomer Reservoir—Manhan River	426.0
Salem and Beverly Water Supply Board . . . . .	Wenham Lake	40.0
Spencer . . . . .	Shaw Pond	60.35
Warren . . . . .	Tubular Wells	76.25
Montague (Turners Falls Fire District) . . . . .	Lake Pleasant	8.0
West Springfield . . . . .	Black Brook	75.0

*Consumption of Water*

In general there was an increase in the water consumption during the year 1934 over that of the year 1933, and in the Metropolitan Water District the increase was about 6.8 per cent. Much of this increase resulted during the winter months from the waste of water in preventing freezing but there was considerable increase during the months of June to September, inclusive, because of the large amount of water used in irrigation especially during the extremely dry months of July and August.

The average daily water consumption in the various cities and towns where records are kept and supplied to this Department, the estimated population in these cities and towns and the per capita water consumption are shown in the following table:

*Average Daily Consumption of Water in Various Cities and Towns in 1934*

CITY OR TOWN	Esti- mated Popu- lation	Gallons	Gallons per Inhabit- ant	CITY OR TOWN	Esti- mated Popu- lation	Gallons	Gallons per Inhabit- ant
Metropolitan Water District				MELROSE . . . . .	25,574	1,706,000	67
Arlington . . . . .	45,015	2,212,000	49	Milton . . . . .	19,292	945,000	49
Belmont . . . . .	26,942	1,426,000	53	Nahant . . . . .	1,673	269,000	161
BOSTON . . . . .	782,442	89,257,000	114	QUINCY . . . . .	81,525	4,995,000	61
CHELSEA . . . . .	45,816	3,480,000	76	REVERE . . . . .	37,613	2,269,000	60
EVERETT . . . . .	53,506	4,575,000	86	SOMERVILLE . . . . .	107,809	9,163,000	85
Lexington . . . . .	10,813	668,000	62	Stoneham . . . . .	10,840	904,000	83
MALDEN . . . . .	63,033	4,012,000	64	Swampscott . . . . .	11,460	937,000	82
MEDFORD . . . . .	69,384	3,347,000	48	Watertown . . . . .	42,457	2,286,000	54
				Winthrop . . . . .	17,407	1,188,000	68

*Average Daily Consumption of Water in Various Cities and Towns in 1934*

CITY OR TOWN	Estimated Population	Gallons	Gallons per Inhabitant	CITY OR TOWN	Estimated Population	Gallons	Gallons per Inhabitant
Abington and Rockland	13,396	656,000	49	Mattapoisett	1,501	123,000	82
Acton	2,558	110,000	43	Maynard	7,156	339,000	47
Acushnet	4,092	77,000	19	Medfield	4,225	63,000	15
Agawam	7,739	335,000	43	Medway	3,160	206,000	65
Amesbury	12,435	665,000	53	Merrimac	2,426	197,000	81
Amherst	5,888	602,000	102	Methuen	21,441	1,251,000	58
Andover	9,969	987,000	99	Middleborough	8,608	325,000	38
Ashland	2,397	194,000	81	Milford and Hopedale	17,714	854,000	48
Athol	11,537	680,000	59	Millbury	7,370	777,000	105
ATTLEBORO	22,686	1,206,000	53	Millis	1,738	176,000	101
Avon	2,457	128,000	52	Montague and Erving	9,374	870,000	93
Ayer	3,082	201,000	65	Nantucket	4,099	604,000	147
Barnstable	7,271	481,000	66	Natick	14,163	797,000	56
Bedford	3,474	143,000	41	Needham	12,339	803,000	65
Belchertown	3,327	27,000	8	NEW BEDFORD	112,597	9,013,000	80
BEVERLY	27,007	1,628,000	60	NEWBURYPORT	15,084	1,379,000	91
Billerica	6,654	282,000	42	NEWTON	75,094	4,650,000	62
Braintree	17,728	1,131,000	64	NORTH ADAMS	21,621	2,423,000	112
Bridgewater	9,055	214,000	24	North Andover	7,059	523,000	74
BROCKTON	63,797	3,246,000	51	North Attleborough	10,523	757,000	72
Brookfield	1,352	30,000	22	Northbridge	9,713	710,000	73
Brookline	51,338	4,847,000	94	North Brookfield	3,013	314,000	104
CAMBRIDGE	113,643	12,226,000	108	Norton	2,737	127,000	46
Canton	5,816	682,000	117	Norwood	15,767	1,165,000	74
Chatham	2,083	114,000	55	Oak Bluffs	1,348	155,000	115
Chelmsford	7,381	225,000	30	Oxford	3,943	240,000	61
CHROOPEE	45,568	3,502,000	77	PEABODY	22,525	2,704,000	120
Clinton	12,817	1,046,000	82	Pepperell	3,036	250,000	82
Cohasset	3,219	354,000	110	PITTSFIELD	51,917	5,641,000	109
Concord	7,813	642,000	82	Plainville	1,640	97,000	59
Dalton	4,322	1,211,000	280	Plymouth	13,042	1,190,000	91
Danvers and Middleton	15,632	1,321,000	85	Provincetown	3,905	503,000	129
Dartmouth	8,778	266,000	30	Randolph and Holbrook	10,697	649,000	61
Dedham	16,110	1,499,000	93	Reading	10,626	606,000	57
Douglas	2,195	194,000	88	Rockport	3,630	419,000	115
Draeut	7,322	199,000	27	Rutland	2,607	229,000	88
Dudley	4,265	179,000	42	SALEM	43,780	4,971,000	114
Duxbury	1,703	234,000	137	Salisbury	2,493	208,000	83
East Bridgewater	3,634	165,000	45	Saugus	16,275	992,000	61
East Brookfield	926	40,000	43	Scituate	3,442	582,000	169
Easthampton	11,323	832,000	73	Sharon	3,537	311,000	88
East Longmeadow	3,481	83,000	24	Shelburne	1,549	84,000	54
Easton	5,298	264,000	50	Shirley	2,453	89,000	36
Edgartown	1,309	161,000	123	Shrewsbury	7,782	304,000	39
Fairhaven	11,050	419,000	38	Somerset	5,862	175,000	30
FALL RIVER	115,274	6,476,000	56	Southborough	2,256	74,000	33
Falmouth	4,923	914,000	186	Southbridge	14,264	999,000	70
FITCHBURG	40,692	4,367,000	107	Southwick	1,617	26,000	16
Framingham	23,116	1,526,000	66	SPRINGFIELD	156,168	14,245,000	91
Franklin	7,028	628,000	89	Stockbridge	1,762	255,000	128
GARDNER	19,934	992,000	50	Stoughton	8,482	659,000	78
GLOUCESTER	24,867	1,939,000	78	Sturbridge	1,772	33,000	19
Grafton	7,076	109,000	15	TAUNTON	37,355	2,782,000	74
Greenfield	15,703	1,348,000	86	Tisbury	1,629	272,000	167
Groton	2,439	235,000	96	Uxbridge	6,376	235,000	37
Groveland	2,336	63,000	27	Wakefield	16,884	824,000	49
Hanover	2,850	119,000	42	Walpole	7,885	1,081,000	137
Hanson and Pembroke	3,700	104,000	28	WALTHAM	42,848	2,318,000	54
HAVERHILL	48,710	4,011,000	82	Ware	7,385	360,000	49
Holden	4,219	297,000	70	Wareham	5,760	363,000	63
Holliston	2,906	95,000	33	Warren	3,765	77,000	20
HOLYOKE	56,537	7,314,000	129	Wayland	3,402	316,000	93
Hudson	8,740	398,000	46	Webster	12,992	643,000	49
Ipswich	5,599	271,000	48	Wellesley	13,351	1,016,000	76
Kingston	2,790	249,000	89	West Bridgewater	3,274	189,000	58
Lancaster	3,072	105,000	34	West Brookfield	1,255	53,000	42
LAWRENCE	85,068	5,442,000	64	WESTFIELD	20,121	1,873,000	93
Lenox	2,742	300,000	109	Westford	3,623	168,000	46
Littleton	1,476	74,000	50	Weston	3,673	226,000	62
Longmeadow	5,320	192,000	36	West Springfield	17,770	1,826,000	103
LOWELL	100,234	5,752,000	57	Weymouth	23,785	1,730,000	73
Ludlow	8,935	298,000	33	Whitman	7,638	291,000	38
LYNN	102,320	7,499,000	73	Wilbraham	2,719	42,000	16
Lynnfield	1,804	48,000	27	Wilmington	4,411	167,000	38
Manchester	2,746	422,000	154	Winchester	13,642	1,023,000	75
Mansfield	6,364	512,000	80	WOBURN	20,284	1,806,000	94
Marblehead	9,032	813,000	90	WORCESTER	198,954	14,871,000	75
Marion	1,932	221,000	114	Wrentham	3,880	176,000	45
MARLBOROUGH	15,587	711,000	46	Yarmouth	2,004	51,000	25
Marshfield	1,625	263,000	162				

There were no shortages in any of the sources of water supply in the State during the year and it was not necessary for the Metropolitan District Water Supply Commission to divert water through its tunnel from the Ware River into Wachusett Reservoir. The yield of that reservoir and of the other sources of supply of the district was sufficient to meet all of the water supply requirements of the district and to allow a wastage over the dam at Clinton from March 31 to about July 1 of 11,502.2 million gallons. At the end of the year 1934 the water in this reservoir was 5.35 feet below the crest of the dam which represents 1205.4 million gallons of storage in this reservoir. The progress in the construction of the new sources of water supply for the Metropolitan Water District in connection with the diversion of the waters of the Swift and Ware rivers has been satisfactory during the year and by the end of the year the tunnel for diverting the waters of the Swift and Ware rivers had been completed except for about 1,000 feet of lining. There is some work to be completed in the Swift River intake, and there still remains considerable work in connection with the Quabbin Reservoir on the Swift River.

CLIMATOLOGICAL DATA

Temperature

The extreme cold weather in December, 1933, and February, 1934, was undoubtedly the direct cause for a considerable increase in water drawn from the various supplies of the State. The cumulative daily mean temperatures in the vicinity of Boston for the winter of 1933-1934 show a deficiency of 449 degrees when compared with the normal. There were nine consecutive days, February 2 to February 11, when the maximum temperature did not rise above 30 degrees. During the winter of 1917-18, which was the coldest winter since 1871, there was a temperature deficiency of 532 degrees and during January and February of that winter there were fifteen consecutive days when the maximum temperature did not reach 30 degrees.

The monthly normal and actual mean temperatures for the vicinity of Boston for 1934 are shown in the following table.

	DEGREES F.			DEGREES F.	
	Normal	1934		Normal	1934
January . . . . .	27.9	29.6	July . . . . .	71.7	73.2
February . . . . .	28.8	17.5	August . . . . .	69.9	67.3
March . . . . .	35.6	35.1	September . . . . .	63.2	64.6
April . . . . .	46.4	48.0	October . . . . .	53.6	49.6
May . . . . .	57.1	60.6	November . . . . .	42.0	45.6
June . . . . .	66.5	66.9	December . . . . .	32.5	28.4

The following table has been prepared to show the monthly mean and the maximum and minimum temperature for each month in 1934 at Boston, Worcester, Amherst and Pittsfield.

Temperatures  
(Degrees Fahrenheit)

1934	BOSTON			WORCESTER			AMHERST			PITTSFIELD		
	Mean	Max.	Min.									
January . . . . .	30	56	-2	22	54	-5	24	43	-5	23	46	-12
February . . . . .	18	44	-18	14	44	-20	12	37	-22	10	42	-23
March . . . . .	35	68	6	32	64	1	31	61	5	30	57	-2
April . . . . .	48	72	32	47	73	25	46	73	25	45	74	23
May . . . . .	61	87	41	59	87	31	59	86	32	59	88	29
June . . . . .	67	94	50	67	92	38	68	93	39	67	93	39
July . . . . .	73	93	57	72	93	48	72	92	48	72	96	47
August . . . . .	67	86	50	65	85	40	65	89	38	65	90	36
September . . . . .	65	81	52	64	85	38	65	83	42	62	82	39
October . . . . .	50	71	32	48	74	25	48	72	28	45	69	24
November . . . . .	46	69	23	43	71	17	43	67	12	40	65	17
December . . . . .	28	65	3	26	61	0	26	64	2	24	62	-2
Year . . . . .	49	94	-18	47	93	-20	47	93	-22	45	96	-23
Normal . . . . .	50 (46 yrs.)			48 (38 yrs.)			47 (46 yrs.)			46 (14 yrs.)		

*Rainfall*

The average rainfall in the State for the year ending December 31, 1934, as recorded at seven long-term stations located in different parts of the State, was 44.05 inches which is about 0.57 of an inch less than the normal. There were deficiencies in rainfall during the months of January, May, July, August, October, November and December. The cumulated rainfall from January 1 to July 1 was 1.68 inches in excess of the normal but in July and August the deficiency of 3.81 inches occurred which, except for the excessive rainfall in September, probably would have caused shortages in water in some of the smaller supplies of the State where only limited storage facilities are available. During the climatological year ending September 30, 1934, there was a deficiency of rainfall of 1.26 inches. The following table shows the normal rainfall as deduced from the records of seven widely-distributed stations having records for more than sixty years; also, the rainfall for the year 1934, and the excess or deficiency of precipitation during each month as compared with the normal:

MONTH	Normal Rainfall (Inches)	Rainfall in 1934 (Inches)	Excess or Deficiency in 1934 (Inches)
January . . . . .	3.74	3.60	-0.14
February . . . . .	3.58	3.63	+0.05
March . . . . .	3.95	4.26	+0.31
April . . . . .	3.70	4.19	+0.49
May . . . . .	3.66	3.45	-0.21
June . . . . .	3.33	4.51	+1.18
July . . . . .	3.73	1.77	-1.96
August . . . . .	4.16	2.31	-1.85
September . . . . .	3.57	6.68	+3.11
October . . . . .	3.70	3.25	-0.45
November . . . . .	3.84	3.22	-0.62
December . . . . .	3.66	3.18	-0.48
Totals . . . . .	44.62	44.05	-0.57

## FLOW OF STREAMS

In those streams where records have been kept by this Department for a number of years the average flow during 1934 has been somewhat greater than the normal.

*Sudbury River*

The average yield of the Sudbury River in the year 1934 was 1.584 cubic feet per second, or 1,024,000 gallons per day, per square mile of drainage area. The normal flow of this stream for the sixty years during which records have been maintained is 1.501 cubic feet per second, or 970,000 gallons per day, per square mile. The average daily yield for the past year during the six driest months, June to November, inclusive, was 424,000 gallons per day per square mile, or 7.8 per cent more than the normal.

The following table shows the relation between the average daily yield of the Sudbury River per square mile in each month of the year 1934 and the normal yield of the river during the past sixty years. The drainage area of the Sudbury River at the point of measurement is 75.2 square miles.

## Sudbury River

Table showing the Average Daily Yield of the Sudbury River for Each Month in the Year 1934, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.

MONTH	NORMAL YIELD		ACTUAL YIELD IN 1934		EXCESS OR DEFICIENCY	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January . . . . .	1.724	1.114	2.629	1.699	+ .905	+ .585
February . . . . .	2.310	1.493	.721	.466	-1.589	-1.027
March . . . . .	4.111	2.657	4.146	2.680	+ .035	+ .023
April . . . . .	3.096	2.001	4.236	2.738	+1.140	+ .737
May . . . . .	1.683	1.088	1.980	1.280	+ .297	+ .192
June . . . . .	.795	.514	.709	.458	- .086	- .056
July . . . . .	.301	.194	-.053	-.034	- .354	- .228
August . . . . .	.325	.210	-.050	-.033	- .375	- .243
September . . . . .	.421	.272	1.263	.816	+ .842	+ .544
October . . . . .	.625	.404	1.162	.751	+ .537	+ .347
November . . . . .	1.206	.780	.937	.605	- .269	- .175
December . . . . .	1.466	.947	1.276	.825	- .190	- .122
Average for whole year . . . . .	1.501	.970	1.584	1.024	+ .083	+ .054

The rainfall on the Sudbury River watershed and the total yield expressed in inches in depth (inches of rainfall collected) for each of the past six years, 1929-1934, inclusive, together with the average for a period of sixty years, are given in the following table:

## Rainfall, in Inches, received and collected on the Sudbury River Drainage Area

MONTH	1929			1930			1931		
	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per Cent collected
January . . . . .	3.99	2.349	58.9	2.62	1.113	42.4	3.95	.832	21.0
February . . . . .	3.84	2.434	63.3	2.52	1.515	60.1	2.57	1.649	64.3
March . . . . .	3.14	4.751	151.5	3.84	2.584	67.4	5.89	6.159	104.5
April . . . . .	7.30	5.070	69.4	2.06	1.709	83.0	3.12	3.349	107.5
May . . . . .	3.65	3.199	87.6	3.07	.722	23.5	3.87	2.120	54.8
June . . . . .	1.65	.394	23.9	1.62	.077	4.8	7.18	3.405	47.4
July . . . . .	0.90	-.198	-21.9	4.08	-.041	-1.0	1.66	.557	33.5
August . . . . .	2.14	-.105	-4.9	2.49	-.147	-5.9	4.93	.229	4.6
September . . . . .	2.11	-.043	-2.1	0.81	-.313	-38.5	1.19	-.176	-14.8
October . . . . .	2.85	.097	3.4	4.37	.032	1.2	2.23	-.048	-2.1
November . . . . .	2.97	.439	14.8	4.36	.860	19.7	0.95	.074	7.8
December . . . . .	4.08	.630	15.5	2.56	.251	9.8	3.29	.532	16.1
Totals and averages . . . . .	38.62	19.017	49.2	34.40	8.382	24.4	40.83	18.682	45.7

## Rainfall, in Inches, received and collected on the Sudbury River Drainage Area—Cont.

MONTH	1932			1933			1934			Mean for Sixty Years (1875-1934)		
	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per Cent collected
January . . . . .	4.69	1.835	39.1	2.36	1.854	78.5	3.85	3.031	78.7	3.92	1.987	50.7
February . . . . .	2.59	1.384	53.4	4.09	1.539	37.6	4.36	.751	17.2	3.98	2.426	61.0
March . . . . .	5.51	3.288	59.7	7.13	5.245	73.5	4.73	4.780	101.1	4.27	4.740	111.1
April . . . . .	2.19	3.126	142.9	5.65	6.331	112.1	3.59	4.720	131.3	3.65	3.454	94.5
May . . . . .	1.55	.819	52.8	2.49	1.300	52.1	3.70	2.283	61.7	3.22	1.940	60.2
June . . . . .	3.28	.162	5.0	1.47	.205	13.9	4.53	.791	17.5	3.30	.887	26.9
July . . . . .	1.92	-.175	-9.1	2.13	-.206	-9.7	2.91	-.061	-2.1	3.59	.346	9.7
August . . . . .	5.21	.056	1.1	3.53	-.137	-3.9	2.10	-.058	-2.8	3.82	.374	9.8
September . . . . .	10.57	2.185	20.7	10.25	2.118	20.7	8.56	1.411	16.5	3.60	.470	13.1
October . . . . .	6.59	3.067	46.6	2.98	.954	32.0	3.26	1.340	41.0	3.62	.720	19.9
November . . . . .	5.10	5.030	98.6	1.11	.693	62.4	2.68	1.045	38.9	3.76	1.346	35.8
December . . . . .	1.92	1.692	87.7	4.05	1.084	26.8	3.02	1.471	48.7	3.73	1.690	45.3
Totals and averages . . . . .	51.12	22.469	43.9	47.24	20.980	44.4	47.29	21.504	45.5	44.46	20.381	45.8

The following table gives the record of the yield of the Sudbury River in gallons per day per square mile for each of the past six years and the mean for the past sixty years:

*Yield of the Sudbury River Drainage Area in Gallons per Day per Square Mile*

MONTH	1929	1930	1931	1932	1933	1934	Mean for Sixty Years, 1875-1934
January . . . . .	1,317,000	624,000	466,000	1,029,000	1,040,000	1,699,000	1,114,000
February . . . . .	1,511,000	940,000	1,024,000	830,000	955,000	466,000	1,493,000
March . . . . .	2,664,000	1,449,000	3,453,000	1,843,000	2,941,000	2,680,000	2,657,000
April . . . . .	2,941,000	991,000	1,943,000	1,814,000	3,673,000	2,738,000	2,001,000
May . . . . .	1,793,000	405,000	1,188,000	459,000	729,000	1,280,000	1,088,000
June . . . . .	228,000	45,000	1,972,000	94,000	119,000	458,000	514,000
July . . . . .	-111,000	-23,000	312,000	-98,000	-115,000	-34,000	194,000
August . . . . .	-59,000	-83,000	129,000	31,000	-77,000	-33,000	210,000
September . . . . .	-25,000	-181,000	-102,000	1,264,000	1,225,000	816,000	272,000
October . . . . .	54,000	29,000	-27,000	1,719,000	535,000	751,000	404,000
November . . . . .	254,000	498,000	43,000	2,914,000	401,000	605,000	780,000
December . . . . .	353,000	141,000	298,000	949,000	608,000	825,000	947,000
Average for whole year . . . . .	905,000	399,000	889,000	1,067,000	999,000	1,024,000	970,000
Average for driest six months . . . . .	55,000	33,000	110,000	578,000	344,000	424,000	393,500

The drainage area of the Sudbury River used in making up these records included water surfaces amounting to about 2 per cent of the whole area from 1875 to 1878, inclusive, subsequently increasing by the construction of storage reservoirs to about 3 per cent in 1879, to 3.5 per cent in 1885, to 4 per cent in 1894, and to 6.5 per cent in 1898. The drainage area also contains extensive areas of swampy land, which, though covered with water at times, are not included in the above percentages of water surfaces.

#### *Nashua River*

The average yield of the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton during the year 1934 was 1,315,000 gallons per day per square mile of drainage area, or 20.8 per cent above the average for the past 38 years. The average rainfall on this watershed for the past three years was 50.37 inches or 11.3 per cent more than the normal.

The average yield for the six driest months, June to November, inclusive, was 687,100 gallons per day per square mile of drainage area, or 20.8 per cent greater than the normal for this period.

There were large deficiencies in the yield during the months of February, July and August. The yield was in excess of the normal in the months of January, March, April, May, June, September, October, November and December.

The following table shows the normal yield of the South Branch of the Nashua River by months for the past 38 years, the actual yield in the year 1934 and the excess or deficiency in each month. The drainage area of the Nashua River above the point of measurement was 119 square miles from 1897 to 1907 and 118.19 square miles from 1908 to 1913, inclusive. Since January 1, 1914, the city of Worcester has been diverting water from 9.35 square miles of this drainage area for the supply of that city. The net drainage area tributary to Wachusett Reservoir is now 108.84 square miles.

*Table showing the Average Daily Yield of the South Branch of the Nashua River for Each Month in the Year 1934, in Cubic Feet per Second per Square Mile of Drainage Area, and in Million Gallons per Day per Square Mile of Drainage Area; also Departure from the Normal.*

MONTH	NORMAL YIELD		ACTUAL YIELD IN 1934		EXCESS OR DEFICIENCY	
	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile	Cubic Feet per Second per Square Mile	Million Gallons per Day per Square Mile
January . . . . .	1.807	1.168	2.340	1.513	+ .533	+ .345
February . . . . .	1.967	1.272	1.263	.816	- .704	- .456
March . . . . .	3.912	2.528	4.382	2.832	+ .470	+ .304
April . . . . .	3.550	2.295	5.485	3.545	+1.935	+1.250
May . . . . .	2.000	1.293	2.615	1.690	+ .615	+ .397
June . . . . .	1.267	.819	1.474	.953	+ .207	+ .134
July . . . . .	.704	.455	.500	.323	- .204	- .132
August . . . . .	.633	.409	.213	.137	- .420	- .272
September . . . . .	.659	.426	1.444	.953	+ .785	+ .507
October . . . . .	.771	.498	1.214	.785	+ .443	+ .287
November . . . . .	1.264	.817	1.575	1.018	+ .311	+ .201
December . . . . .	1.716	1.109	1.892	1.223	+ .176	+ .114
Average for whole year . . . . .	1.685	1.089	2.034	1.315	+ .349	+ .226

The rainfall on the Nashua River watershed and the total yield expressed in inches in depth upon the watershed (inches of rainfall collected) for each of the past six years, 1929 to 1934, inclusive, together with the average for the past 38 years, are given in the following table:

*Rainfall, in Inches, received and collected on the Nashua River Drainage Area*

MONTH	1929			1930			1931		
	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per Cent collected
January . . .	4.80	2.140	44.5	2.11	1.156	54.8	3.44	.881	25.6
February . . .	4.28	2.310	54.0	2.20	1.396	63.5	2.71	1.103	40.7
March . . .	3.40	4.912	144.5	3.65	2.146	58.7	5.00	4.545	90.9
April . . .	5.83	4.953	84.9	1.88	1.646	87.8	2.98	4.001	134.2
May . . .	4.62	3.851	83.3	2.77	1.039	37.5	5.01	2.258	45.1
June . . .	3.09	1.020	33.0	2.96	.773	26.1	6.07	3.089	51.0
July . . .	.85	.265	31.2	5.72	.808	14.1	2.71	.694	25.6
August . . .	1.50	.125	8.4	1.69	.399	23.5	6.95	1.083	15.6
September . . .	2.00	.272	13.6	1.91	.406	21.3	2.04	.517	25.3
October . . .	3.12	.427	13.7	3.55	.655	18.4	2.46	.487	19.8
November . . .	3.14	.630	20.1	3.92	.810	20.7	1.35	.546	40.5
December . . .	3.30	.739	22.4	2.61	.661	25.4	3.63	1.209	33.3
Totals and averages . . .	39.93	21.644	54.2	34.97	11.895	34.0	44.35	20.413	46.0

*Rainfall, in Inches, received and collected on the Nashua River Drainage Area—Cont.*

MONTH	1932			1933			1934			Mean for Thirty-eight Years 1897-1934		
	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per cent collected	Rain-fall	Rain-fall collected	Per Cent collected	Rain-fall	Rain-fall collected	Per Cent collected
January . . .	5.71	3.024	53.0	2.71	2.323	85.8	3.87	2.698	69.7	3.65	2.083	57.0
February . . .	3.14	1.906	60.7	4.78	2.457	51.4	4.11	1.315	32.0	3.81	2.064	54.2
March . . .	5.25	3.218	61.3	5.92	4.677	79.0	4.26	5.053	118.7	4.03	4.510	112.0
April . . .	2.10	4.234	201.1	6.39	8.336	130.5	4.41	6.111	138.6	3.88	3.961	102.0
May . . .	1.58	1.260	79.7	2.58	1.942	75.2	4.21	3.015	71.6	3.31	2.306	69.6
June . . .	2.27	.585	25.8	1.93	.742	38.5	5.10	1.644	32.3	3.81	1.413	37.1
July . . .	3.55	.383	10.8	2.16	.401	18.6	2.35	.577	24.6	3.96	.812	20.5
August . . .	4.23	.503	11.9	4.68	.564	12.0	2.40	.245	10.2	4.03	.729	18.1
September . . .	7.31	.880	12.0	10.88	3.020	27.8	9.64	1.614	16.7	3.94	.736	18.6
October . . .	7.38	2.708	36.7	3.40	1.463	43.1	2.94	1.400	47.6	3.31	.889	26.8
November . . .	5.21	3.992	76.7	1.68	1.034	61.6	2.76	1.757	63.7	3.64	1.410	38.8
December . . .	2.20	1.916	87.2	3.86	1.388	35.9	4.16	2.181	52.4	3.90	1.978	50.8
Totals and averages . . .	49.93	24.609	49.3	50.97	28.347	55.6	50.21	27.610	55.0	45.27	22.891	50.6

The following table gives the record of the yield of the Nashua River watershed in gallons per day per square mile for each of the past six years and the mean for the past 38 years.

*Yield of the Nashua River Drainage Area in Gallons per Day per Square Mile<sup>1</sup>*

MONTH	1929	1930	1931	1932	1933	1934	Mean for Thirty-eight Years, 1897-1934
January . . .	1,200,000	648,000	494,000	1,695,000	1,302,000	1,513,000	1,168,000
February . . .	1,434,000	867,000	685,000	1,143,000	1,525,000	816,000	1,272,000
March . . .	2,754,000	1,203,000	2,548,000	1,804,000	2,622,000	2,832,000	2,528,000
April . . .	2,873,000	955,000	2,321,000	2,456,000	4,836,000	3,545,000	2,295,000
May . . .	2,159,000	583,000	1,266,000	706,000	1,089,000	1,690,000	1,293,000
June . . .	591,000	448,000	1,789,000	339,000	430,000	953,000	819,000
July . . .	148,000	453,000	389,000	215,000	225,000	323,000	455,000
August . . .	70,000	224,000	607,000	282,000	316,000	137,000	409,000
September . . .	157,000	235,000	299,000	509,000	1,747,000	933,000	426,000
October . . .	239,000	367,000	273,000	1,518,000	820,000	785,000	498,000
November . . .	365,000	469,000	316,000	2,313,000	599,000	1,018,000	817,000
December . . .	414,000	371,000	678,000	1,074,000	778,000	1,223,000	1,109,000
Average for whole year . . .	1,031,000	566,000	972,000	1,169,000	1,350,000	1,315,000	1,089,000
Average for driest six months . . .	232,000	353,000	428,000	597,000	682,300	687,100	568,800

<sup>1</sup>The drainage area used in making up these records included water surfaces amounting to 2.2 per cent of the whole area from 1897 to 1902, inclusive, to 2.4 per cent in 1903, to 3.6 per cent in 1904, to 4.1 per cent in 1905, to 5.1 per cent in 1906, to 6 per cent in 1907, to 7 per cent in 1908, 1909 and 1910, to 6.5 per cent in 1911, to 6.8 per cent in 1912, to 7 per cent in 1913, to 7.4 per cent in 1914 and 1915, to 7.6 per cent in 1916, to 7.4 per cent in 1917 and 1918, to 7.5 per cent in 1919, 1920, 1921 and 1922, to 7.4 per cent in 1923 and 1924, to 6.4 per cent in 1925, to 5.9 per cent in 1926, to 5.7 per cent in 1927, to 7.6 per cent in 1928, to 7.4 per cent in 1929, to 5.6 per cent in 1930, to 6 per cent in 1931, to 7.3 per cent in 1932, and 7.6 per cent in 1933 and 7.6 per cent in 1934.

*Merrimack River*

The Merrimack River is the second largest stream in the State of Massachusetts. It rises in the White Mountains in the State of New Hampshire and flows southerly through the central part of that state until it enters Massachusetts, where it turns to the east and flows in a general northeasterly direction the remainder of its course to the sea. The total length of its watershed from its extreme northerly limits in the mountains of northern New Hampshire to its extreme southerly limits in the hills of Hopkinton, Massachusetts, is about 137 miles and its extreme width is about 66 miles. The total drainage area above the mouth of the river at Newburyport comprises about 5,000 square miles, of which about one-quarter or 1,250 square miles are within the limits of Massachusetts and three-quarters or 3,750 square miles are within the State of New Hampshire.

Records of the flow of the Merrimack River have been kept continuously at Lawrence in the office of the Essex Company since 1880. The original drainage area of the river at that point was 4,663 square miles and included 118.19 square miles tributary to the South Branch of the Nashua River used for the water supply of the Metropolitan Water District and in part for the city of Worcester, 75.2 square miles on the Sudbury River, and 18 square miles tributary to Lake Cochituate. The flow as measured at Lawrence includes the water wasted from these drainage areas. In presenting the record of the flow of the river these drainage areas have been deducted, leaving the net drainage area above Lawrence 4,567 square miles in 1880, 4,570 square miles in 1891 to 1897, inclusive, and 4,452 square miles since the latter date. The quantity of water overflowing from the Cochituate and Sudbury watersheds as measured by the Metropolitan District Commission also has been deducted from the flow of the river as measured at Lawrence. The average flow of the river during the year 1934 amounted to 1.718 cubic feet per second per square mile, which is about 18.2 per cent more than the normal for the past 55 years. The flow was more than the normal during the months of January, April, May, September, October, November and December and less than the normal during the months of February, March, June, July and August. The greatest deficiency occurred in the month of June.

The following table shows the relation between the normal flow of this stream during the past 55 years and the actual flow during each month of the year 1934:

*Table Showing the Average Monthly Flow of the Merrimack River at Lawrence for the Year 1934; also the Normal and Departure therefrom in Cubic Feet per Second per Square Mile of Drainage Area.*

MONTH	Normal Flow, 1880-1934	Actual Flow in 1934	Excess or Deficiency
January	1.260	1.468	+ .208
February	1.326	1.248	— .078
March	2.689	2.434	— .255
April	3.622	6.042	+2.420
May	2.222	2.325	+ .103
June	1.242	.957	— .285
July	.749	.479	— .270
August	.643	.450	— .193
September	.655	.939	+ .284
October	.803	1.210	+ .407
November	1.147	1.475	+ .328
December	1.086	1.591	+ .505
Average for whole year	1.454	1.718	+ .264

The following table gives the record of the flow of the Merrimack River at Lawrence for each of the past six years, together with the average flow in the past 55 years, this amount being expressed in cubic feet per second per square mile of drainage area.

*Flow of the Merrimack River at Lawrence in Cubic Feet per Second per Square Mile*

MONTH	1929	1930	1931	1932	1933	1934	Mean for Fifty-five Years, 1880-1934
January	1.537	.861	.423	1.803	1.333	1.468	1.260
February	1.487	.949	.478	1.301	1.295	1.248	1.326
March	3.649	2.242	1.603	1.363	2.392	2.434	2.689
April	3.993	2.035	3.665	4.454	7.363	6.042	3.622
May	3.424	1.172	1.897	1.319	2.144	2.325	2.222
June	.973	1.055	2.207	.493	.816	.957	1.242
July	.583	.521	.756	.499	.406	.479	.749
August	.400	.520	.520	.483	.509	.450	.643
September	.365	.378	.471	.673	.971	.939	.655
October	.408	.311	.471	1.223	1.367	1.210	.803
November	.499	.562	.621	2.431	1.157	1.475	1.147
December	.488	.518	.973	1.157	1.187	1.591	1.086
Average for whole year	1.484	.927	1.174	1.433	1.745	1.718	1.454
Average for driest six months	.457	.468	.635	.782	.871	.918	.847

*Weekly Flow of the Sudbury, Nashua and Merrimack Rivers*

The following table shows the weekly fluctuations during the year 1934 in the yield of the Sudbury River at Framingham, the South Branch of the Nashua River at the outlet of the Wachusett Reservoir in Clinton and the Merrimack River at Lawrence. The flow of these streams, particularly that of the Sudbury River and the South Branch of the Nashua River, serves to indicate the flow of other streams in eastern Massachusetts. The area of the Sudbury River watershed is 75.2 square miles, of the South Branch of the Nashua River 118.19 square miles, and of the Merrimack River at Lawrence 4,452 square miles.

*Table Showing the Average Weekly Flow of the Sudbury, South Branch of the Nashua and the Merrimack Rivers for the Year 1934, in Cubic Feet per Second per Square Mile of Drainage Area*

WEEK ENDING SUNDAY —	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River	WEEK ENDING SUNDAY —	Yield of Sudbury River	Yield of South Branch Nashua River	Flow of Merrimack River
Jan. 7	1.641	2.143	1.363	July 1	.391	.757	.830
14	4.738	3.168	1.516	8	— .025	.531	.484
21	2.192	1.555	1.382	15	— .264	.258	.424
28	2.412	2.714	1.515	22	— .324	.200	.364
Feb. 4	1.281	1.643	1.446	29	.246	1.014	.407
11	.774	1.131	1.263	Aug. 5	.060	.374	.824
18	.379	.973	1.170	12	— .328	.173	.556
25	1.374	1.503	1.241	19	— .148	.406	.335
Mar. 4	1.314	2.029	1.200	26	.152	.188	.331
11	7.394	6.053	2.941	Sept. 2	— .049	— .068*	.356
18	2.517	2.825	2.166	9	.906	1.278	.300
25	3.161	3.276	2.519	16	.540	.514	.869
Apr. 1	5.012	7.238	3.276	23	1.935	2.832	1.765
8	6.931	5.026	6.971	30	1.708	1.617	1.041
15	5.807	8.847	6.772	Oct. 7	1.812	1.590	1.317
22	4.703	5.262	6.820	14	1.120	.930	1.278
29	2.359	2.621	4.173	21	.951	.870	1.140
May 6	3.788	4.608	3.214	28	1.078	1.491	1.100
13	2.316	2.916	3.047	Nov. 4	.855	1.852	1.159
20	1.948	2.117	2.076	11	1.173	1.804	1.826
27	.650	1.584	1.648	18	.923	1.308	1.458
June 3	.618	1.156	1.106	25	.667	1.182	1.393
10	.275	1.003	.887	Dec. 2	1.569	2.234	1.598
17	.833	1.401	.861	9	1.681	1.952	2.460
24	1.405	2.679	1.248	16	.466	.955	1.177
				23	1.424	2.458	1.296
				30	1.306	1.682	1.303

\*There was no draft Aug. 21 to Oct 1

Note: For drainage areas used see previous pages

## EXAMINATION OF RIVERS

During the six months, June to November, inclusive, the principal streams of the State were examined by the engineers, and samples of water were collected for chemical analysis and dissolved oxygen determination, while in some instances bacterial examination was made of the samples. In many instances the sanitary condition of these streams shows an improvement over that found in more recent years. The reason for this improvement is probably due to the even distribution of a nearly normal rainfall and a continued decrease in industrial activities.

*Aberjona River*

The effect of seepage through deposits of various partially-spent chemicals at the abandoned chemical plant in North Woburn has been increasingly noticeable in the upper portion of the Aberjona River during the past year, but in the lower portion of its course this river was in a comparatively good condition. The Aberjona River sewer was practically completed at the end of the year, and presumably the offensive tannery wastes now discharged into the upper reaches of this stream will be removed early during the coming year. A new industry is being established at the abandoned chemical plant in North Woburn from which the wastes will be discharged into the sewer now nearing completion.

*Assabet River*

The analyses have shown an improvement in the Assabet River below Westborough, and there has been a slight improvement throughout parts of the lower portion of its course. Much untreated sewage has been allowed to overflow into the river at Hudson due to the reconstruction of the filter beds and difficulties with the pumps. The river has been unsightly during the last year due to sewage and oily discharges from Hudson and to industrial wastes from Maynard. Some improvement has been made in the sewage disposal works at Hudson during the year, and the improvements at the sewage disposal works at Westborough and at the Massachusetts Reformatory at Concord should assist in improving the condition of this river.

*Blackstone River*

The examinations indicate a slight increase in the pollution of the Blackstone River below Worcester due apparently to renewed activities in certain industrial establishments, and the river has been badly discolored by industrial wastes containing iron and oil. The effluent from the Worcester sewage treatment works, however, has tended to decrease the concentration of iron in the river.

Kettle Brook in the upper portion of the watershed is still highly discolored by industrial wastes. While there has been a very slight increase in organic pollution in the lower portion of this stream, the conditions are not materially different from those found in recent years.

The Rutland-Holden-Worcester sewer, by means of which sewage from certain institutions in Rutland is now conveyed to the Worcester sewage treatment works, was put into use late in the year, and there is no reason to believe that the addition of this comparatively small quantity of sewage will have any detrimental effect on the character of the Blackstone River.

*Charles River*

The Charles River below Milford has been turbid during much of the year and has shown evidence of improper purification of the sewage from the town of Milford. The analyses have shown the objectionable effect of certain industrial wastes discharged into the stream at Medway, and the stream lower down in its course has shown evidence of more pollution than in recent years. There also has been evidence of an increase in organic matter in the water of the Charles River Basin and an increase in the number of micro-organisms.

There have been several conferences during the year relative to the improvement of the Milford sewage treatment works in order to protect from pollution this stream which can be considered in part a water supply stream. The conferences have been held with State and Federal authorities particularly with regard to Federal assistance in the construction of the much needed additions to the Milford

sewage treatment works, and there is reason to believe that suitable action will be taken by the authorities early next year looking to the removal of this serious source of pollution of the Charles River.

#### *Chicopee River*

The analyses have shown a slight change for the better in the condition of the Quabog River. This is also true of the Ware River, both below Barre and below Ware. This improvement probably was due to a reduction in industrial activities in this valley. There has been evidence of a slight increase in pollution in the lower portion of the Chicopee River. During the past year plans have been approved for certain changes in the Palmer sewerage system, and a modern sewage disposal works has been constructed at the Monson State Hospital. In addition, near the end of the year the Department approved the purchase or taking of certain additional areas of land for sewage disposal purposes at Spencer, and a much needed addition to the sewage disposal works of this town is now under construction.

#### *Concord and Sudbury Rivers*

The analyses of the water of Bannister Brook, which receives the effluent from the Natick and Framingham sewage disposal works, made during 1934 have shown the presence of greater quantities of albuminoid ammonia than last year, and the examinations have shown visible pollution from the sewage treatment works of these two municipalities. There has been practically no evidence of an increase in the pollution of the Sudbury River below Saxonville or of the Concord River down to its mouth in the Merrimack River at Lowell, though the amount of dissolved oxygen in both the Sudbury and Concord rivers shows a tendency to decrease. During the past year the town of Framingham started an investigation relative to additional sewage disposal works, and a contract was made for the construction of a new sewage treatment plant for the town of Natick. In addition, the management of the carpet mills at Saxonville has retained engineers who are studying the question of treating the industrial wastes at that point, and the domestic sewage formerly discharged into the river from this mill has been largely diverted to the Framingham sewerage system.

#### *Connecticut River*

No special examination has been made of the Connecticut River and its tributaries, though samples of the water have been collected at various points as usual for analysis. The Mill River below Northampton showed somewhat less evidence of pollution than in the past few years; while above Holyoke there was some evidence of an increase in pollution. The Connecticut River below Springfield showed somewhat less evidence of pollution than last year. There has been much interest in the Connecticut River Valley during the year looking to the removal of pollution of this stream and its tributaries, and several conferences have been held in that vicinity. The Department was represented at one of the larger meetings in Springfield. Any activity looking toward the cleaning up of this stream should be in accordance with a comprehensive engineering study of the whole matter.

#### *French River*

There is some evidence of additional pollution above Webster and Dudley, but the condition of the river below these municipalities does not appear to have changed during the past year. The sewage of Webster and Dudley is still discharged into this stream without treatment although such works are greatly needed.

#### *Hoosick River*

Immediately below the town of Adams there appears to have been no particular change in the condition of the water of the Hoosick River, but at the point where this stream reaches the thickly settled part of North Adams the analyses have shown a decrease in the amount of dissolved oxygen due evidently to the pollution from the town of Adams. A slight improvement in the character of the stream has been noted in Williamstown. Plans have been considered by the Department during the past year for the construction of sewage treatment works at Adams, but no

action toward the construction of these plants had been taken at the end of the year. The city of North Adams, however, with the assistance of Federal funds has been engaged throughout the year in the construction of intercepting sewers by means of which the sewage of practically the whole city will be conveyed to a point below North Adams where it is to be treated for the removal of suspended matter in works approved by the Department. The town of Williamstown was engaged during the year in improving and extending its sewerage system, and permission was given for the discharge of Williamstown sewage directly into the river without treatment for a limited time.

#### *Housatonic River*

The analyses have shown an improvement in the condition of the west branch of the Housatonic River in Pittsfield, while below the city the analyses of the main stream also have shown a slight improvement, though there has been a decrease in the amount of dissolved oxygen at several points on the stream below the city. The city of Pittsfield has given some consideration to the construction of additional sewage disposal works, and certain drainage work has been carried on during the year at these works, though no increase in the capacity of the works has been provided. Much sewage is allowed to overflow from the sewers and sewage treatment works of this city, and it is impracticable to make any marked improvement in the character of this stream until adequate sewage treatment works are provided.

#### *Merrimack River*

Samples collected above Nashua, New Hampshire, have shown an improvement in the condition of the river, and this improvement has been noticeable down stream to Lawrence. There has been a slight increase in pollution just below Lawrence as compared to the last few years, while below Haverhill the stream was noticeably polluted. As in past years the river has been examined in accordance with the provisions of Chapter 202 of the Acts of 1929. No substantial change in the character of the river has been noted other than as stated above. Some interest was shown toward the end of the year in the Merrimack Valley sewerage question, particularly with a view to obtaining Federal assistance in financing the necessary works.

On February 14, 1934, the Department in response to a request and in accordance with law, determined the sources of pollution of the shellfish areas at Newburyport and the proportions in which the various municipalities were responsible. The list reported to the Commissioner of Conservation of the municipalities and the proportion each contributes to the pollution of the shellfish areas are as follows:

Cities and Towns	Per Cent of Total Pollution Contributed
Chelmsford . . . . .	0.1
Lowell . . . . .	7.8
Dracut . . . . .	0.2
Lawrence . . . . .	8.5
Methuen . . . . .	2.1
Andover . . . . .	1.8
North Andover . . . . .	0.9
Haverhill . . . . .	10.5
Amesbury . . . . .	5.2
Salisbury . . . . .	14.1
Newburyport . . . . .	48.8

#### *Millers River*

The analyses have shown evidence of pollution of the Millers River below Gardner, but there has been no material change in the character of this stream at other points during the year.

#### *Nashua River*

The examinations and the analyses have shown an increase in pollution by industrial wastes from Fitchburg, and these wastes, together with sewage from Leominster, have been noticeable in the North Branch of the river down to its mouth. The South Branch below the Clinton sewage filters has shown an increase

in pollution, and at Groton the main stream is not in a satisfactory condition for recreational uses largely because of the pollution of the North Branch. Satisfactory progress has been made during the year in the construction of the sewage treatment works for the city of Leominster under plans approved by the Department. This is a very satisfactory E.R.A. project. With the removal of Leominster sewage from the river it is increasingly desirable that action be taken by suitable legislation or otherwise to remove the foul industrial wastes from the seriously polluted North Branch of the river.

#### *Neponset River*

The Neponset River below Walpole has had an oily scum and considerable color at times, and the analyses have shown a slight increase in pollution below East Walpole. There also has been a slight increase in pollution in Mother Brook at its mouth. Otherwise the improvement of the last two years effected by the new sewerage systems in this valley has been maintained. The sewage from the Massachusetts Hospital School in this valley was removed during the year to the Canton sewerage system in a sewer constructed by the town under a P.W.A. project.

#### *North River (Salem and Peabody)*

Chapter 49 of the Resolves of 1934 directed this Department and the Department of Public Works to investigate the sewage problem in the South Essex Sewerage District and in connection with the report on this matter, which appears as House Document 1250 of 1935, the question of the pollution of the North River is discussed extensively. The results of the analyses of samples from the North River below Peabody and at its mouth in Salem show it to be the most seriously polluted stream in the State, and suitable legislation looking to the removal of the pollution of this stream should be adopted in 1935.

#### *Quinebaug River*

When examined during the past year the Quinebaug River has been badly discolored with industrial wastes and poorly purified sewage effluent. Some improvement has been effected during the year at the Southbridge sewage disposal works with Federal assistance, but until more adequate works are provided this stream will continue to be polluted by sewage from the town of Southbridge.

#### *Taunton River*

There has been a slight improvement in the Salisbury Plain River below Brockton, but the analyses of the Coweaset River below the Brockton sewage treatment plant have shown more pollution than in the previous two years, and a slight increase in pollution has been noted down stream, particularly below Taunton. After many conferences and much discussion the ammonia still liquors from the Brockton gas works were discharged into the Brockton sewers in April, 1934. The effect of this waste, amounting to only about 3,000 gallons per day, was to raise the free ammonia in the Brockton sewage effluent considerably and there has been more free ammonia in the river below this effluent than for several years. There still appears to be no reason to object to the disposal of this waste into the Brockton sewers provided it is discharged in even quantities as recommended by the Department. Further experiments by the Department this year show that this small quantity of waste when mixed with domestic sewage can be properly purified. Much progress was made during the year under a P.W.A. project in providing a sewer for the removal of sewage from Mill River in Taunton and consideration has again been given during the year to providing treatment works for the Taunton sewage in order to relieve the present objectionable conditions. Consideration was given in the latter part of the year to the construction of an intercepting sewer and sewage treatment works in Fall River in order to relieve objectionable conditions near the various sewer outlets in the Taunton River and Mt. Hope Bay. Fall River is the largest seaport city in the State without some reasonably suitable means of sewage disposal, and the many nuisances along this waterfront should be corrected.

*Ten Mile River*

The Ten Mile River has shown a slight increase in pollution below North Attleborough and Attleboro, but it is to be expected that the improvements made at the sewage disposal works of both these municipalities will shortly result in a cleaner stream.

Examinations of the other larger streams in the State have shown no material change in condition during the year.

## MUNICIPAL SEWAGE TREATMENT WORKS

In the exercise of its duties in the oversight of inland waters the Department has examined all of the sewage treatment works in the State during the past year, and samples of raw sewage, settled sewage, and the effluent have been collected and analyzed at frequent intervals. In certain instances it has been necessary for the Department to notify the local officials of objectionable conditions and a number of improvements have been carried out, chiefly as a result of funds being made available through the Federal Government.

*Attleboro*

In the city of Attleboro the program of partial reconstruction of the sewage treatment works, which was commenced during the year 1933, was practically completed. This work consisted of removing the clogged material from the surfaces of the filter beds to a depth of 6 to 8 inches and replacing it with clean sand and gravel of suitable size. So far as can be ascertained by the results of the chemical analyses, the raw sewage treated at these works during the past year was stronger than that received during the year 1933, while a larger amount of putrescible organic matter represented by albuminoid ammonia was removed in the passage of the sewage through the filters. A more satisfactory purification of the sewage at this plant could be effected by more even distribution of the sewage over the entire plant, and it is important, as recommended by the Department on November 16, 1933, that plans be prepared for preliminary treatment of the sewage and for increasing the area of the sewage beds to at least 20 acres.

*Brockton*

As in the case of previous years the sewage treatment works of the city of Brockton have been carefully controlled under the local laboratory maintained at the sewage treatment works. The results of the analyses show that the plant has been efficiently operated during the year.

*Clinton*

Considerable difficulty was encountered during the past year in the operation of the sewage treatment works at Clinton because of the large amount of distillery waste discharged into the sewerage system of that town. As a result of an investigation by this Department and with the assistance of the office of the Attorney-General, the discharge of waste into the sewerage system from one of the distilleries was discontinued during the fall under the following stipulation before the superior court:

"And now comes the respondent, Clinton Distilleries Corporation, and stipulates that its agents and servants will not discharge industrial wastes from the distilleries processes carried on at the Clinton Distilleries Corporation plant in Clinton until the suspended matters are reduced to not over five hundred parts per million, and until a method has been arranged or put in effect to so reduce the suspended matters, the present connection from the Clinton Distilleries Corporation plant to the Public Sewerage system shall be discontinued."

The analyses show a marked increase in the strength of the sewage of the town of Clinton and in general the sewage is poorly purified. The sewage effluent contains a considerable amount of organic matter and a large quantity of iron. The construction of more modern treatment works is very necessary for the disposal of the sewage of the town of Clinton if offensive conditions in the vicinity of the works and the stream into which the effluent is discharged are to be prevented.

*Concord*

During the year steps were taken by the authorities of the town of Concord for the construction of three new filter beds which when constructed will increase the area from 5.48 acres to 7.41 acres. Two of the beds had been practically completed by the end of the year and construction had been commenced on the third bed. With this additional area available, it will be possible to filter the sewage at a reasonably low rate. It is necessary that the sewage be distributed more evenly over the entire area than has been the case in the past.

*Easthampton*

At Easthampton large quantities of sewage were allowed to discharge into the Manhan River after sedimentation only. Less than half the entire quantity of the sewage of the town is filtered through the sand filter beds. At times the spring flows in the Manhan River cause the flooding of the entire area of filter beds.

*Fitchburg*

The sewage treatment works of the city of Fitchburg have as usual been operated under expert supervision and the sewage has been well purified. The construction of an additional sludge drying area which was begun in 1933 has progressed slowly during this year. General improvement of the grounds around the plant also has been carried on during the year.

*Framingham*

The sewage from the town of Framingham as discharged to the disposal works continues to show an increase in strength and the works have given unsatisfactory results during the year. The beds constructed in 1933 have been used to excess and show unsatisfactory results. In August of this year, at the request of the Town Engineer of Framingham, a special examination of the disposal plant was made over a period of 24 hours. Under a vote of the town an investigation has been in progress during the year looking to the construction of more modern works. The investigation is being made by the Town Engineer. Substantial, modern works for the treatment of Framingham sewage are necessary if a nuisance in this region is to be prevented.

*Franklin*

The sewage disposal works of the town of Franklin have received but limited attention during the year. The strength of the sewage received at the works has increased considerably, but the results of the analyses of samples of the final effluent showed a slight improvement in quality over those of last year. The reconstruction of two beds begun last year was completed, and the beds have been put in operation. These disposal works are operated at an excessive rate, and the area of the filter beds should be enlarged. The old Franklin disposal plant, located on the east side of the town, is not properly operated and is not adequate in area. This plant should be abandoned, and the sewage should be pumped to an enlarged area at the Mine Brook filter beds at Unionville.

*Gardner*

Both the Gardner area and the Templeton area have been operated about as usual during the past year. The results of the analyses of samples of the sewage at both plants show that it was somewhat weaker in 1934 and that there has been an improvement in the quality of the final effluent. These plants are at times badly crowded due to leakage and the discharge of surface drainage into the sanitary sewerage system. A suitable measuring device should be installed at the Templeton plant as previously recommended.

*Hopedale*

The sewage disposal works for Hopedale are of adequate capacity and are efficiently operated. The results of the analyses of samples of the sewage show an increase in strength, and there was a slight falling off in the quality of the final effluent.

*Hudson*

Following a special examination of the sewage filter beds at Hudson late in 1933, work was started on reconstructing the filter beds by relaying the underdrains at a slightly higher elevation and loosening the surfaces of the filters. The plant has been out of commission part of the year due to construction activities and difficulties with the pumps, and the raw sewage was discharged to the Assabet River. Since the work has been completed an improvement in the effluent has been noted.

*Leicester*

The sewage disposal works at Leicester have received more attention during the past year than usual, and with a slight increase in strength of the sewage the efficiency of the plant has been slightly better than in previous years according to the samples collected by the local attendant.

*Leominster*

Considerable progress has been made on the construction of new sewage treatment works at Leominster approved during the year by the Department. These works, consisting of screens, a grit chamber, sedimentation tanks, aeration tanks and final sedimentation tanks with covered sludge digestion tanks and sludge beds, are being constructed under an E.R.A. project, and the materials thus far used have been obtained locally at very low cost. This is one of the most satisfactory E.R.A. projects to which the attention of the Department has been called, and with the progress made during the year the works can undoubtedly be completed so that the court decree, which orders the removal of the sewage from the North Branch of the Nashua river before February 1, 1938, can readily be complied with. In connection with the work now under way the old filter beds are being made into sludge beds for the new works. It has been necessary to abandon the use of the old plant during most of the year so that practically all of the sewage has overflowed into the river without treatment.

*Marion*

The new sewage treatment plant at Marion which was constructed in 1930 has been continued in satisfactory operation during the year. More attention has been given to the operation of the plant, and the results of the analyses of samples of the sewage and effluent show a reasonable degree of purification, although the plant is operated at a high rate. Additional filter beds should be constructed at this plant at an early date.

*Marlborough*

The reconstruction of the sewage filter beds at Marlborough, begun in 1933, was completed during the year. The results of the analyses of samples of the final effluent show that the efficiency of the sewage disposal works has been satisfactory.

*Maynard*

The disposal works for Maynard are operated without expert supervision and at a low rate for an Imhoff tank-trickling filter plant, but the results of the analyses of samples of the final effluent show that the sewage has been reasonably well purified and with increased efficiency, although the treated sewage has been stronger than at any time since the plant was put into operation late in the year 1929.

*Milford*

The sewage disposal works of the town of Milford, consisting of sedimentation tanks, sand filter beds, an Imhoff tank, a trickling filter and secondary tank, continue to be operated without technical supervision, and largely because the works are inadequate the results are most unsatisfactory. Toward the end of the year 1933 an application was made for Civil Works Administration funds without results, but during this year plans were submitted to this Department for the construction of a second unit, consisting of an Imhoff tank, trickling filter, secondary tank and sludge drying beds and the plans were approved. Several conferences have been held with the Milford, State financial and Federal authorities. Toward the end of the year the town was negotiating with the Federal Emergency Relief Administration for funds to start the preliminary work in connection with the construction of the necessary additions. The matter of the appropriation of funds will presumably be considered at the next regular town meeting.

*Nantucket*

The operation of the filter beds at Nantucket is interfered with more or less by sand blown onto the beds from the surrounding country. More attention should be given this plant, and the sewage should be more evenly distributed.

*Natick*

The old sewage disposal works were still in use at the end of the year. Plans for a new sewage treatment works were submitted and recommended for adoption by this Department in August 1933, and the necessary legislation was obtained during the year. Toward the end of the past year ground was broken for the construction of the new sewage treatment works at a more isolated point. This work is being done as a P.W.A. project. The old plant is to be abandoned.

*North Attleborough*

The sewage disposal works at North Attleborough were enlarged in 1930, and the town has completely reconstructed one bed during each of the past four years. Further enlargements are necessary.

*Northbridge*

While these disposal works are still being operated at a high rate, the analyses of the final effluent show that the efficiency of the plant is being fairly well maintained, although the strength of the raw sewage has increased during the year. The excellent condition is due to the efficient handling of the works. It is recommended that a measuring device be installed at these works at an early date in order that more definite information may be available as to the quantity of sewage treated.

*Pittsfield*

The sewage disposal works at Pittsfield continue to show very unsatisfactory results even though several beds were reconstructed by removing surface material and replacing it with clean material in 1933. The Department has approved general plans for the proper treatment of the sewage of this city and has recommended, particularly in a communication dated July 28, 1933, the advisability of attempting to secure Federal funds for the improvement of the sewage treatment works. The city has not obtained the necessary funds, but during the latter part of the year a drain was laid along the southerly side of the filter beds to lower the ground water and provide an outlet for the effluent to be discharged from the new treatment works when constructed. The new works should be constructed at the earliest practicable time.

*Southbridge*

The sewage disposal works of Southbridge continue to be inadequate for the proper treatment of the sewage of that town. The plant is not efficiently operated and large quantities of sewage overflow into the Quinebaug River. In 1933 the Department recommended the enlargement of these works or the construction of more modern treatment works. During the year the town has been engaged under town and Federal funds in the reconstruction of five old beds under the direction of the town engineer. With the completion of the reconstruction of the old beds, somewhat better purification should be obtained, but the disposal works will still be inadequate to efficiently dispose of the sewage of the town and more adequate treatment works should be constructed at an early date.

*Spencer*

The sewage disposal works of the town of Spencer continue to be inadequate for the proper disposal of the sewage, and the works are not efficiently operated. Much sewage is allowed to overflow into Seven Mile River especially at times of storm. During the middle of the year the E.R.A. administrator for the town of Spencer applied to the Department for advice relative to building additional disposal works. Subsequently plans were presented and approved for the purchase of 60 acres of land east of the present sewage filter beds to be used in part for the construction of new sewage filter beds. At the end of the year stripping and excavation for the new sewage filter beds had been started.

*Stockbridge*

The inefficient operation of the disposal works of the town of Stockbridge was continued during the past year. The enlargement and reconstruction of these works should be undertaken at an early date under proper engineering supervision. The results of the analyses of samples of the final effluent have shown a steady falling off in efficiency of these works.

*Westborough*

The disposal works at Westborough have been reasonably well operated during the past year and have maintained a fairly high standard of purification of the sewage.

*Winchendon*

At Winchendon the disposal works are apparently well operated, but the results of the analyses of samples of the effluent from the filter beds show a falling off in efficiency. As no information about the quantity of sewage discharged to this plant is available, the Department in 1933 recommended the installation of a measuring device to determine the flow of sewage as discharged to the filter beds. This installation is necessary if the plant is to be properly operated.

*Worcester*

The sewage treatment works of the city of Worcester are operated under expert supervision, and the results of the analyses of samples of the final effluent as discharged to the Blackstone River show that the sewage is reasonably well purified. The authorities of the city late in 1933 submitted plans to the Department providing for two secondary sludge concentration tanks, certain gates on the trickling filter effluent lines and other improvements. The work was to be done under P.W.A. grants. The plans were approved by the Department, but partly because of unsatisfactory prices for materials very little of this work was done during 1934.

The results of the Department's analyses and records of operation of the larger municipal sewage treatment works are given in the appended tables. It will be noted that due to the dry season during a part of the year the strength of sewage of many of the municipalities has increased over previous years.

TABLE NO. 1.—Average Results of the Analyses of Monthly Samples of Sewage as received at Disposal Works. (Fats determined in about 64 per cent of the Samples)

CITY OR TOWN	RESIDUE ON EVAPORATION										AMMONIA				Chlorine	OXYGEN CONSUMED		IRON		Kjeldahl Nitrogen	Fats	
	TOTAL RESIDUE					LOSS ON IGNITION					Free	ALBUMINOID		Total		Dis-solved	Total	Dis-solved				
	Total	Dis-solved	Sus-pended	Total	Dis-solved	Sus-pended	Total	Dis-solved	Sus-pended	Total		Dis-solved	Sus-pended						Total			Dis-solved
ATTLEBORO <sup>1</sup> .	434	277	157	237	103	134	50.2	6.89	3.51	3.38	37	50.3	28.6	1.83	65	15.4	-					
BROCKTON	670	488	182	361	202	159	62.0	10.17	6.72	3.45	92	111.5	70.5	1.48	54	19.8	69					
Clinton <sup>2</sup>	1085	440	645	801	250	551	29.2	17.29	8.55	8.74	40	172.5	105.7	2.56	63	35.5	148					
Concord	241	177	64	119	63	56	18.7	3.18	1.97	1.91	21	28.9	22.2	.63	29	6.6	-					
Easthampton	428	291	137	233	116	117	40.8	6.73	4.37	2.36	40	50.5	34.2	.72	28	12.8	-					
FITCHBURG	326	247	79	164	103	61	23.4	3.54	2.14	1.40	33	37.7	28.3	2.55	1.00	8.3	32					
Frammingham <sup>1</sup>	613	400	213	346	176	170	41.0	9.65	7.17	2.48	42	71.7	43.4	1.99	.78	18.8	75					
Frammingham <sup>2</sup>	1046	522	524	636	221	415	37.0	10.26	6.98	3.28	52	100.3	58.4	3.14	.83	22.6	142					
Franklin	872	715	157	259	130	129	27.1	5.21	2.99	2.22	276	57.9	36.7	1.49	.51	12.2	-					
GARDNER (Gardner Area)	678	399	279	424	196	228	43.8	9.50	6.08	3.42	40	92.3	65.5	1.63	.66	23.5	85					
GARDNER (Templeton Area)	600	388	212	359	166	193	52.3	9.78	6.39	3.39	53	85.8	53.1	1.46	.56	19.6	80					
Hopedale	1022	485	537	706	252	454	42.4	12.03	7.95	4.08	48	123.7	82.0	5.77	.66	25.3	-					
Hudson	637	395	242	387	177	210	68.3	11.97	7.87	4.10	52	89.7	55.3	1.87	.54	25.0	97					
Leicester	354	260	94	186	105	81	6.20	4.26	1.94	1.94	27	37.6	26.4	1.61	.21	15.5	-					
Marion	406	234	172	260	104	156	27.1	3.56	2.40	1.16	36	37.3	22.2	1.43	.65	8.1	-					
MARLBOROUGH	578	390	188	340	189	151	37.5	8.33	5.63	2.70	46	61.8	37.5	1.42	.48	16.9	71					
Maynard	707	391	316	457	178	279	53.2	22.52	13.23	9.29	57	81.1	52.5	2.41	.39	39.7	-					
Milford	392	232	160	196	107	89	33.2	5.23	3.05	2.18	39	40.7	26.3	1.03	.41	10.6	-					
Natick <sup>2</sup>	384	347	237	328	136	192	45.3	8.74	4.55	4.19	48	67.0	37.5	1.43	.54	17.0	83					
North Attleborough	321	225	96	162	84	78	18.7	4.34	2.62	1.72	23	34.5	19.6	.90	.40	9.0	-					
Northbridge	450	267	183	280	120	160	49.1	10.10	6.08	4.02	37	60.1	35.6	1.25	.36	21.1	-					
Pittsfield <sup>2</sup>	405	304	101	210	126	84	42.4	5.48	3.62	1.86	29	37.7	25.1	1.74	.34	12.0	27					
Southbridge	545	203	342	331	121	210	43.6	7.77	4.18	3.59	44	74.8	45.1	1.58	.54	17.6	115					
Spencer	380	283	97	228	144	84	21.2	6.65	4.24	2.41	27	57.2	39.2	1.17	.53	13.1	50					
Stockbridge	287	232	55	141	94	47	22.3	2.84	2.24	.60	15	25.5	17.9	.47	.24	6.4	-					
Westborough	596	297	299	373	140	233	40.6	8.74	5.49	3.25	34	68.7	38.7	1.61	.42	19.2	91					
Winchendon	487	318	169	281	142	139	41.5	7.60	5.39	2.21	38	57.7	37.9	2.67	1.13	16.0	-					
WORCESTER	833	509	324	323	112	211	22.3	5.30	1.63	3.65	78	85.8	28.9	41.97	8.28	13.2	72					

<sup>1</sup>Entrance to Imhoff tanks, including Saxonville sewage.  
<sup>2</sup>At Pumping Station.

TABLE No. 2.—Average Results of the Analyses of Monthly Samples of Sewage as Applied to Filter Beds after Preliminary Treatment as Indicated. (Fats determined in about 64 Per Cent of the Samples.)

(Parts per Million)

CITY OR TOWN	Form of Preliminary Treatment	RESIDUE ON EVAPORATION						AMMONIA				CHLORINE		OXYGEN CONSUMED		IRON		Kjeldahl Nitrogen	Fats
		TOTAL RESIDUE		LOSS ON IGNITION		Free	ALBUMINOID			Chlorine	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total		
		Dissolved	Suspended	Total	Dissolved		Suspended	Dissolved	Suspended										
		Dissolved	Suspended	Total	Dissolved	Suspended	Dissolved	Suspended	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total		
ATTLEBORO	None	434	157	237	103	134	50.2	6.89	3.51	3.38	37	50.3	28.6	1.83	.65	15.4	-	60	
BROCKTON	Sedim'n Tanks	532	73	241	178	63	51.1	8.13	5.77	2.36	85	85.3	65.5	1.04	.58	15.6	-	42	
Clinton	Sedim'n Basins	480	64	306	249	57	23.5	8.38	6.46	1.92	34	101.4	83.0	1.93	.79	17.3	-	42	
Concord	None	241	177	64	119	63	18.7	3.18	1.97	1.21	21	28.9	22.2	.63	.29	6.6	-	-	
Easthampton	Sedim'n Tanks	368	271	97	185	86	38.7	5.06	3.35	1.71	36	44.3	31.7	.65	.28	10.4	-	-	
FRANCISBURG	Imhoff Tanks	274	242	32	123	101	18.8	2.82	1.97	.85	30	33.4	26.6	1.82	.97	6.5	22	22	
FRAMMINGHAM	Imhoff Tanks	496	360	66	199	145	41.0	5.74	4.40	1.34	44	45.8	33.7	1.44	.75	11.8	41	41	
FRANKLIN	Sedim'n Tanks	528	509	38	146	116	30	3.10	2.07	1.03	153	35.8	25.2	.98	.54	7.3	-	-	
GARDNER (Gardner Area)	None	678	399	279	424	196	43.8	9.50	6.08	3.42	40	92.3	63.5	1.63	.66	23.5	85	85	
GARDNER (Templeton Area)	Sedim'n Tanks	360	289	71	178	117	39.5	5.06	3.65	1.40	39	47.3	32.2	1.21	.68	11.0	51	51	
Hopedale	Septic Tanks	312	270	42	164	127	43.2	5.15	3.55	1.60	35	43.0	33.5	1.00	.62	12.6	-	59	
Hudson	Sedim'n Tanks	449	335	114	240	141	44.8	6.39	3.90	2.49	45	54.1	35.0	1.63	.61	14.1	-	-	
Leicester	None	354	260	94	186	105	34.6	6.20	4.26	1.94	27	37.6	26.4	.61	.21	15.5	-	-	
Marion	Sedim'n Tanks	244	221	23	114	94	20	25.0	1.90	.85	36	26.6	20.5	1.14	.70	6.4	-	-	
MARLBOROUGH	Sedim'n Tanks	489	363	126	256	145	43.0	6.52	4.27	2.25	46	47.3	33.9	1.15	.59	12.9	49	49	
Maynard	Imhoff Tank	329	278	51	153	106	48.1	4.72	3.22	1.50	47	38.8	30.7	.88	.51	9.5	-	-	
Milford	Sedim'n Tanks	410	353	57	186	143	41.5	5.02	3.59	1.43	53	41.1	33.0	1.16	.61	10.1	-	-	
Milford	Imhoff Tank	302	261	41	119	87	32	29.1	3.68	1.00	41	27.1	17.5	.79	.42	7.6	-	-	
Nauick	None	584	347	237	328	136	192	45.3	8.74	4.55	49	67.0	37.5	1.43	.41	17.0	83	83	
North Attleborough	Sedim'n Tanks	213	189	24	86	69	16.5	1.98	1.40	.58	21	19.9	14.2	.78	.41	5.3	-	-	
Northbridge	Sedim'n Tanks	183	147	85	57	28	23.9	3.31	2.03	1.28	23	21.4	14.6	.69	.37	7.7	27	27	
PITTSFIELD	Sedim'n Tank	339	303	56	176	132	44	23.7	2.94	1.81	37	35.9	26.5	1.07	.37	9.8	27	27	
Southbridge	Sedim'n Tanks	457	326	131	257	142	41.7	5.12	2.87	2.25	40	56.0	38.5	1.84	1.04	12.9	81	81	
Spencer	None	380	283	97	228	144	21.2	6.65	4.24	2.41	27	27.2	39.2	1.17	.53	13.1	50	50	
Stoekbridge	None	287	232	55	141	94	22.3	2.84	2.24	.60	15	25.5	17.9	.47	.24	6.4	-	-	
Westborough	None	596	297	373	140	233	40.6	8.74	5.49	3.25	34	68.7	38.7	1.61	.42	19.2	91	91	
Winchendon	Sedim'n Tanks	225	206	19	86	71	15	20.3	2.52	1.79	30	20.1	14.8	2.20	1.32	5.4	-	-	
WORCESTER	Imhoff Tanks	568	453	115	172	101	26.4	3.31	1.71	1.60	80	49.7	26.6	19.33	4.11	8.3	-	37	

TABLE NO. 3.—Efficiency of Settling Tanks and Other Forms of Preliminary Treatment as Indicated by the Foregoing Tables.

CITY OR TOWN	Form of Preliminary Treatment	SUSPENDED SOLIDS			TOTAL ALBUMINOID AMMONIA			OXYGEN CONSUMED			FATS			CHLORINE	
		Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage	Per Cent removed	Raw Sewage	Settled or treated Sewage
BROCKTON	Sedimentation Tanks	182.	73.	60.	10.17	8.13	20.	111.5	85.3	23.	69.	60.	13.	92.	85.
Clinton	Sedimentation Basins	645.	64.	90.	17.29	8.38	52.	172.5	101.4	41.	148.	42.	72.	40.	34.
Easthampton	Sedimentation Tanks	137.	97.	29.	6.73	5.06	25.	50.5	44.3	12.	—	—	—	40.	36.
Fitchburg	Imhoff Tanks	79.	32.	59.	3.54	2.82	20.	37.7	33.4	11.	32.	22.	31.	33.	30.
Framingham	Imhoff Tanks	213.	66.	69.	9.65	5.74	41.	71.7	45.8	36.	75.	41.	45.	42.	44.
Franklin	Sedimentation Tanks	157.	38.	76.	5.21	3.10	40.	57.9	35.8	38.	—	—	—	276.	153.
GARDNER (Templeton Area)	Sedimentation Tanks	212.	71.	67.	9.78	5.05	48.	85.8	41.9	51.	80.	51.	36.	53.	39.
Hopedale	Septic Tanks	537.	42.	92.	12.03	5.15	57.	123.7	43.0	65.	—	—	—	48.	35.
Hudson	Sedimentation Tanks	242.	114.	53.	11.97	6.39	47.	89.7	54.1	40.	97.	59.	39.	52.	45.
Marion	Sedimentation Tanks	172.	23.	87.	3.56	2.75	23.	37.3	26.6	29.	—	—	—	36.	36.
MARLBOROUGH	Sedimentation Tanks	188.	126.	33.	8.33	6.52	22.	61.8	47.3	23.	71.	49.	31.	46.	46.
Maynard	Imhoff Tank	316.	51.	84.	22.52	4.72	79.	81.1	38.8	52.	—	—	—	57.	47.
Milford	Sedimentation Tanks	110.	57.	48.	5.23	5.02	4.	40.7	41.1	—	—	—	—	39.	53.
Milford	Imhoff Tank	110.	41.	63.	5.23	3.68	30.	40.7	27.1	33.	—	—	—	39.	41.
North Attleborough	Sedimentation Tanks	96.	24.	75.	4.34	1.98	54.	34.5	19.9	42.	—	—	—	23.	21.
Northbridge	Sedimentation Tanks	183.	36.	80.	10.10	3.31	67.	60.1	21.4	64.	—	—	—	37.	23.
Pittsfield	Sedimentation Tank	101.	56.	45.	5.48	4.75	13.	37.7	35.9	5.	27.	27.	0.	29.	27.
Southbridge	Sedimentation Tanks	242.	131.	46.	7.77	5.12	34.	74.8	56.0	25.	115.	—	30.	44.	40.
Winchendon	Sedimentation Tanks	169.	19.	89.	7.60	2.52	67.	57.7	20.1	65.	—	—	—	38.	30.
WORCESTER	Imhoff Tanks	324.	115.	65.	5.30	3.31	38.	85.8	49.7	42.	72.	37.	49.	78.	80.

TABLE NO. 4 — Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.  
 (Parts per Million)  
 Brockton

	RESIDUE ON EVAPORATION						AMMONIA				Chlorine	NITROGEN AS —		OXYGEN CONSUMED		Kjeldahl Nitrogen	Fats	REMARKS
	TOTAL RESIDUE			LOSS ON IGNITION			Free	ALBUMINOID				Nitrates	Nitrites	Total	Dissolved			
	Total	Dissolved	Suspended	Total	Dissolved	Suspended		Total	Dissolved	Suspended								
Settled sewage as applied to trickling filter.	532.	459.	73.	241.	178.	63.	51.1	8.13	5.77	2.36	85.	—	—	85.3	65.5	15.6	60.	Trickling filter has an area of 2.9 acres and a depth of 10 feet of stone from 1.5 to 3 inches in size. One half of filter used alternately. The average rate of operation was about 1,217,000 gallons per acre per day.  Period of sedimentation averaged about 2 hours. Tanks cleaned 52 times.
Effluent from trickling filter.	491.	428.	63.	193.	143.	50.	28.4	3.81	2.04	1.77	89.	14.92	.27	46.0	26.1	7.9	15.	
Per cent removed	8.	7.	14.	20.	20.	21.	44.	53.	65.	25.	—	—	—	46.	60.	49.	75.	
Settled effluent from trickling filter.	455.	420.	35.	160.	137.	23.	27.5	2.94	1.62	1.32	90.	16.10	.32	38.3	23.3	6.1	13.	
Per cent removed by secondary settling tank.	7.	2.	44.	17.	4.	54.	3.	23.	21.	25.	—	—	—	17.	11.	23.	13.	
Per cent removed by trickling filter and secondary settling tank.	14.	8.	52.	34.	23.	63.	46.	64.	72.	44.	—	—	—	55.	64.	61.	78.	

TABLE No. 4.—Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.—Continued.

(Parts per Million)

Fitchburg

	RESIDUE ON EVAPORATION						AMMONIA			NITROGEN AS —		OXYGEN CONSUMED		Kjeldahl Nitrogen		REMARKS		
	TOTAL RESIDUE			LOSS ON IGNITION			Free	ALBUMINOID		Nitrates	Nitrites	Total	Dissolved	Kjeldahl Nitrogen	Fats			
	Total	Dissolved	Suspended	Total	Dissolved	Suspended		Total	Dissolved								Suspended	
							Chlorine			Chlorine								
Inhoff tank effluent as applied to trickling filter.	274.	242.	32.	123.	101.	22.	18.8	2.82	1.97	.85	30.	—	—	33.4	26.6	6.5	22.	Trickling filter has an area of 2.14 acres and a depth of 10 feet of stone from 1 to 3 inches in size. The average rate of operation was about 1,749,000 gallons per acre per day for area used (1.86 acres).
Effluent from trickling filter.	275.	233.	42.	124.	98.	26.	7.1	1.66	.81	.85	29.	11.61	.21	17.4	10.9	4.1	—	Period of sedimentation about 6.6 hours.
Per cent removed. Settled effluent from trickling filter as discharged to Nashua River.	251.	225.	26.	109.	91.	18.	62.	41.	59.	.77	3.	9.57	.15	48.	59.	37.	—	Tanks cleaned 6 times.
Per cent removed by secondary settling tanks.	9.	3.	38.	12.	7.	31.	8.4	2.03	1.26	—	—	18.	29.	7.	—	15.	—	
Per cent removed by trickling filter and secondary settling tanks.	8.	7.	19.	11.	10.	18.	55.	28.	36.	9.	3.	—	—	52.	56.	46.	—	

## Maynard

Imhoff tank effluent as applied to trickling filter.	329.	278.	51.	153.	106.	47.	48.1	4.72	3.22	1.50	47.	-	-	38.8	30.7	9.5	-	Trickling filter has an area of .25 of an acre and a depth of 7 feet of stone from 1½ to 2½ inches in size. The average rate of operation was about 324,000 gallons per acre per day.
Effluent from trickling filter.	371.	333.	38.	167.	138.	29.	23.4	2.82	1.74	1.08	51.	.33	17.56	25.7	18.1	6.6	-	
Per cent removed	-	-	25.	171.	145.	38.	51.	40.	46.	28.	58.	-	17.23	34.	41.	31.	-	
Settled effluent from trickling filter as discharged to As-sabet River.	393.	365.	28.	171.	145.	26.	29.0	2.88	2.00	.88	58.	.55	25.6	22.0	22.0	5.9	-	
Per cent removed by secondary settling tank.	-	-	26.	-	-	10.	-	-	-	19.	-	-	2.	0	-	11.	-	Period of sedimentation about 17.9 hours.
Per cent removed by trickling filter and secondary settling tank.	-	-	45.	-	-	45.	40.	39.	38.	41.	-	-	-	34.	28.	38.	-	Tanks cleaned 3 times.

## Milford

Imhoff tank effluent as applied to trickling filter.	302.	261.	41.	119.	87.	32.	29.1	3.68	2.68	1.00	41.	.92	-	27.1	17.5	7.6	-	Trickling filter has an area of .25 of an acre and a depth of 6 feet of stone from 1 to 1½ inches in size.
Effluent from trickling filter.	393.	346.	47.	172.	133.	39.	13.4	2.59	1.42	1.17	49.	14.93	-	24.1	14.8	5.5	-	
Per cent removed	-	-	29.	141.	119.	22.	54.	30.	47.	-	51.	-	18.52	11.	15.	28.	-	
Settled effluent from trickling filter as discharged to Charles River.	361.	332.	29.	141.	119.	22.	15.5	1.92	1.22	.70	51.	.59	18.52	17.1	11.5	4.4	-	
Per cent removed by secondary settling tank.	8.	4.	38.	18.	11.	44.	-	26.	14.	40.	-	-	-	29.	22.	20.	-	
Per cent removed by trickling filter and secondary settling tank.	-	-	29.	-	-	31.	47.	48.	54.	30.	-	-	-	37.	34.	42.	-	

TABLE NO. 4.—Average Results of the Analyses of Monthly Samples of Sewage applied to the Trickling Filters at Brockton, Fitchburg, Maynard, Milford and Worcester, and their Effluents, etc., Per Cent Removed, etc.—Concluded  
(Parts per Million)

Worcester

	RESIDUE ON EVAPORATION				AMMONIA				Chlorine	NITROGEN AS —		OXYGEN CONSUMED		Kjeldahl Nitrogen	Fats	REMARKS		
	TOTAL RESIDUE		LOSS ON IGNITION		Free	ALBUMINOID				Nitrates	Nitrites	Total	Dissolved					
	Total	Dissolved	Suspended	Total		Dissolved	Suspended											
Imhoff tank effluent as applied to trickling filters.	568.	453.	115.	172.	101.	71.	26.4	3.31	1.71	1.00	80.	—	—	49.7	26.6	8.3	37.	Trickling filters have an area of 13.68 acres and a depth of 10 feet of stone from 1¼ to 3 inches in size. The average rate of operation was about 1,570,000 gallons per acre per day.
Effluent from trickling filters	477.	406.	71.	120.	74.	46.	11.6	1.64	.63	1.01	77.	6.11	.32	27.2	11.6	4.1	13.	
Per cent removed	16.	10.	38.	30.	27.	35.	56.	50.	63.	37.	4.	—	—	45.	56.	51.	65.	
Settled effluent from trickling filters as discharged to Blackstone River.	446.	398.	48.	105.	78.	27.	10.8	1.14	.49	.65	76.	5.56	.27	21.1	10.8	3.2	11.	
Per cent removed by secondary settling tanks.	6.	2.	32.	13.	—	41.	7.	30.	22.	36.	1.	9.	16.	22.	7.	22.	15.	Period of sedimentation averaged about 2.0 hours.
Per cent removed by trickling filters and secondary settling tanks	21.	12.	58.	39.	23.	62.	59.	66.	71.	59.	5.	—	—	58.	59.	61.	70.	

Two samples

TABLE NO. 5.—Average Results of Analyses of Monthly Samples of Effluent from Sand Filters

[Parts per Million]

CITY OR TOWN	Free Ammonia	Total Albuminoid Ammonia	Chlorine	NITROGEN AS —		Iron
				Nitrates	Nitrites	
ATTLEBORO . . . . .	16.8	1.09	37.	4.68	.40	5.38
BROCKTON . . . . .	10.9	.71	82.	17.96	.17	3.23
Clinton . . . . .	5.8	.74	32.	2.88	.15	12.88
Concord . . . . .	1.4	.16	23.	9.65	.19	.08
Easthampton . . . . .	9.6	.65	25.	7.65	.17	3.75
Framingham (new beds)	17.1	1.03	46.	9.34	.17	6.28
Framingham (old beds)	23.0	.97	44.	3.87	.12	8.62
Franklin . . . . .	9.4	.69	151.	10.59	.06	2.57
GARDNER (Gardner Area)	25.4	1.75	49.	11.04	.34	3.65
GARDNER (Templeton Area)	23.3	1.06	38.	8.62	.33	6.85
Hopedale . . . . .	16.4	2.07	31.	14.61	.16	.29
Hudson . . . . .	21.2	1.22	35.	2.95	.13	8.55
Leicester . . . . .	8.0	.62	17.	5.76	.33	.69
Marion . . . . .	4.2	.37	33.	12.83	.04	.60
MARLBOROUGH . . . . .	14.8	.88	40.	9.43	.18	3.25
Milford . . . . .	35.7	1.15	52.	1.00	.03	7.44
Natick . . . . .	22.8	1.31	45.	4.36	.12	3.82
North Attleborough	6.5	.30	18.	2.37	.08	3.13
Northbridge . . . . .	5.1	.53	21.	9.29	.18	.96
PITTSFIELD . . . . .	13.8	1.13	26.	2.21	.20	2.93
Southbridge . . . . .	28.5	.71	36.	.45	.01	7.92
Spencer . . . . .	11.7	.42	26.	.30	.00	13.33
Stockbridge . . . . .	3.8	.43	14.	4.18	.14	.95
Westborough . . . . .	8.1	1.08	24.	6.97	.21	2.22
Winchendon . . . . .	8.7	.50	29.	6.66	.10	.66

TABLE NO. 6.—Efficiency of Sand Filters (Per Cent of Free and Albuminoid Ammonia Removed)

[Parts per Million]

CITY OR TOWN	FREE AMMONIA			TOTAL ALBUMINOID AMMONIA			CHLORINE		Rate of Operation with Even Distribution. (Gallons per Acre per Day)
	Applied Sewage	Effluent	Per Cent Removed	Applied Sewage	Effluent	Per Cent Removed	Applied Sewage	Effluent	
ATTLEBORO . . . . .	50.2	16.8	67.	6.89	1.09	84.	37.	37.	56,000
BROCKTON . . . . .	51.1	10.9	79.	8.13	.71	91.	85.	82.	—
Clinton . . . . .	23.5	5.8	75.	8.38	.74	91.	34.	32.	57,000
Concord . . . . .	18.7	1.4	93.	3.18	.16	95.	21.	23.	107,000
Easthampton . . . . .	38.7	9.6	75.	5.06	.65	87.	36.	25.	—
Framingham (new beds)	41.0	17.1	58.	5.74	1.03	82.	44.	46.	38,000
Framingham (old beds)	37.0	23.0	38.	10.26	.97	91.	52.	44.	
Franklin . . . . .	28.7	9.4	67.	3.10	.69	78.	153.	151.	79,000
GARDNER (Gardner Area)	43.8	25.4	42.	9.50	1.75	82.	40.	49.	—
GARDNER (Templeton Area)	39.5	23.3	41.	5.05	1.06	79.	39.	38.	—
Hopedale . . . . .	43.2	16.4	62.	5.15	2.07	60.	35.	31.	49,000
Hudson . . . . .	44.8	21.2	53.	6.39	1.22	81.	45.	35.	72,000
Leicester . . . . .	34.6	8.0	77.	6.20	.62	90.	27.	17.	—
Marion . . . . .	25.0	4.2	83.	2.75	.37	87.	36.	33.	59,000
MARLBOROUGH . . . . .	43.0	14.8	66.	6.52	.88	87.	46.	40.	51,000
Milford . . . . .	41.5	35.7	14.	5.02	1.15	77.	53.	52.	46,000
Natick . . . . .	45.3	22.8	50.	8.74	1.31	85.	48.	45.	58,000
North Attleborough	16.5	6.5	61.	1.98	.30	85.	21.	18.	92,000
Northbridge . . . . .	23.9	5.1	79.	3.31	.53	84.	23.	21.	74,000
PITTSFIELD . . . . .	29.7	13.8	54.	4.75	1.13	76.	27.	26.	113,000
Southbridge . . . . .	41.7	28.5	32.	5.12	.71	86.	40.	36.	75,000
Spencer . . . . .	21.2	11.7	45.	6.65	.42	94.	27.	26.	—
Stockbridge . . . . .	22.3	3.8	83.	2.84	.43	85.	15.	14.	—
Westborough . . . . .	40.6	8.1	80.	8.74	1.08	88.	34.	24.	39,000
Winchendon . . . . .	20.3	8.7	57.	2.52	.50	80.	30.	29.	—

TABLE No. 7.—Summary of Efficiency of Sewage Disposal Works. (Per Cent Removal from Raw Sewage to Final Effluent).

CITY OR TOWN	SUSPENDED SOLIDS				FREE AMMONIA				TOTAL ALBUMINOID AMMONIA				OXYGEN CONSUMED				CHLORINE		Rate of Operation with Even Distribution. (Gallons per Acre per Day)
	Raw Sewage	Final Effluent	Per Cent Removal		Raw Sewage	Final Effluent	Per Cent Removal		Raw Sewage	Final Effluent	Per Cent Removal		Raw Sewage	Final Effluent	Per Cent Removal		Raw Sewage	Final Effluent	
ATTLEBORO																			56,000
BROCKTON	182.	35.	81		50.2	16.8	67		6.89	1.09	84		111.5	38.3	65		37.	90.	
Clinton					27.5	5.8	81		10.17	2.94	71						92.		57,000
Concord					30.2	1.4	93		23.54	.74	97						41.		107,000
Easthampton					18.7	9.6	76		3.18	.16	95						21.		
					40.8				6.73	.65	80						40.		
FRYEBURG																			
Frammingham (New Beds)	79.	26.	67		23.4	8.4	64		3.54	2.03	43		37.7	16.1	57		33.	29.	
Frammingham (Old Beds)					41.0	17.1	58		9.65	1.03	89						42.	46.	
Franklin					37.0	23.0	38		10.26	.97	91						52.	44.	
GARDNER (Gardner Area)					27.1	9.4	65		5.21	.69	87						276.	151.	
					43.8	25.4	42		9.50	1.75	82						40.	49.	
GARDNER (Templeton Area)																			
Hopedale					52.3	23.3	55		9.78	1.06	89						53.	38.	
Hudson					42.4	16.4	61		12.03	2.07	83						48.	31.	
Leicester					68.3	21.2	69		11.97	1.22	90						52.	35.	
Marion					24.6	8.0	77		6.20	.62	90						27.	17.	
					27.1	4.2	85		3.56	.37	90						36.	33.	
MARLBOROUGH																			
Maynard					37.5	14.8	61		8.33	.88	89						46.	40.	
Milford (Sand)	316.	28.	91		85.2	29.0	66		22.52	2.88	87		81.1	25.6	68		57.	58.	
Milford (Imhoff)					33.2	35.7			5.23	1.15	78						39.	52.	
					33.2	15.5	53		5.23	1.92	63		40.7	17.1	58		39.	51.	
Natick					45.3	22.8	50		8.74	1.31	85						48.	45.	
North Attleborough																			
Northbridge					18.7	6.5	65		4.34	.30	93						23.	18.	
Prattsville					49.1	5.1	90		10.10	.53	95						37.	21.	
Southbridge					42.4	13.8	68		5.48	1.13	79						29.	26.	
Spencer					43.6	28.5	35		7.77	.71	91						44.	36.	
					21.2	11.7	45		6.65	.42	94						27.	26.	
Stockbridge																			
Westborough					22.3	3.8	83		2.84	.43	85						15.	14.	
Windchendon					40.6	8.1	80		8.74	1.08	88						34.	24.	
WORCESTER	324.	48.	85		22.3	10.8	52		5.30	1.14	78		85.8	21.1	75		38.	29.	
																	78.	76.	

TABLE No. 8.—Extent of Sewerage Works, Rate of Operation of Filters

CITY OR TOWN	Population, Census of 1930	Approximate Length of Sanitary Sewers (Miles)	Approximate Number of House Connections	ESTIMATED QUANTITY OF SEWAGE TREATED (GALLONS PER DAY)			Estimated Quantity of Sewage per Con- nection	Net Area of Filter Beds (Acres)	Estimated Rate of Operation with Even Dis- tribution, (Gallons per Acre per Day)
				Average for Year	Average for Month of Maximum Flow	Average for Month of Minimum Flow			
ATTLEBORO	21,769	37.31	1,851	863,000	1,543,000	454,000	466	15.50	56,000
BROCKTON	63,797			3,092,000 <sup>1</sup>	4,972,000	2,023,000	780	26.23	57,000
Clinton	12,817	25.49	1,928	1,303,000 <sup>2</sup>	2,010,000	1,323,000	786	5.48	107,000
Concord	7,577	17.47	746	586,000	936,000	360,000	—	2.20	—
Easthampton	11,323	24.87	1,258	—	—	—	—	—	—
FITCHBURG	40,692	66.65	—	3,271,000	4,600,000	2,400,000	326	30.89	38,000
Framingham	22,210	45.80	3,609	1,165,000	1,757,000	935,000	298	3.24	79,000
Franklin	7,028	14.49	855	255,000	410,000	86,000	—	16.50	—
GARDNER	19,399	37.72	2,546	—	—	—	—	3.79	49,000
Hopedale	2,973	7.08	370	187,000 <sup>3</sup>	223,000	136,000	506	—	—
Hudson	8,469	14.73	1,160	649,000 <sup>4</sup>	763,000	608,000	559	9.00	72,000
Marion	1,638	4.14	223	114,000	255,000	55,000	512	1.93	59,000
MARLBOROUGH	15,587	36.81	2,653	1,033,000	1,792,000	455,000	389	20.19	51,000
Maynard	7,156	8.33	361	81,000	123,000	62,000	224	—	—
Milford	14,741	25.57	1,818	429,000 <sup>5</sup>	696,000	327,000	—	9.30	46,000
Nantucket	3,678	22.00	1,622	703,000 <sup>6</sup>	928,000	545,000	434	4.00	176,000
Natick	13,989	14.07	1,679	698,000	1,270,000	569,000	416	12.00	58,000
North Attleborough	10,197	17.99	1,046	804,000	—	664,000	768	8.75	92,000
Northbridge	9,713	—	—	892,000	960,000	720,000	—	12.00	74,000
Pittsfield	49,677	81.58	6,843	4,605,000	5,521,000	4,129,000	673	41.15	113,000
Southbridge	14,264	23.00	1,725	932,000	1,392,000	428,000	540	12.50	75,000
Westborough	6,409	9.11	611	257,000	583,000	167,000	421	6.62	39,000
Winchendon	6,202	13.00	350	—	—	—	—	4.00	—
WORCESTER	193,311	242.09 <sup>7</sup>	—	21,380,000	27,830,000	17,490,000	—	—	—

<sup>1</sup>Includes an average of 2,433,000 gallons per day to trickling filter and 659,000 gallons to sand filters.

<sup>2</sup>Entire quantity of sewage not treated.

<sup>3</sup>New development not included in average.

<sup>4</sup>Sewage not pumped during summer months.

<sup>5</sup>Records questionable. Amount to sand filters only.

<sup>6</sup>No underdrains. Filters drain direct to ocean.

<sup>7</sup>Includes 70.1 miles of combined sewers.

TABLE NO. 9—General Features

CITY OR TOWN	Year of Construction of and Additions to Works	Depth of Under-drains (feet)	Distance of Under-drains (Feet)	Filtering Material	Attention given to Disposal Works
ATTLEBORO	1912, 1913	4-7	35	Sand and gravel; found in place	One man all the time; others when necessary.
BROCKTON	1893, 1905, 1908, 1912	5.5	30	Sand and gravel; found in place; trickling filter.	One chemist in charge, foreman, day and night man; more when necessary.
Clinton	1898, 1899	8	60-70	Sand and gravel; found in place	Two men all the time; others when necessary.
Concord	1899, 1928, 1934	none	-	Sand underlaid with gravel; found in place	One man once a day.
Easthampton	1908	3.5	20-40	Sand and gravel; largely found in place	One man all the time; others when necessary.
FITCHBURG	1914	-	-	Trickling filter—10 feet deep	Chemist in charge; 1 foreman, 1 day and 2 night men.
Framingham	1890, 1924, 1933	-	-	Sand and gravel	One man all the time; others when necessary.
Franklin	1915	4.5	26	Sand and gravel	Very little attention; one man once in a while.
GARDNER (Gardner Area)	1891	5	20	Sand; handled in construction	One man all the time; others when necessary.
GARDNER (Templeton Area)	1901, 1909, 1931	3-4	20-30	Sand; handled in construction	One man all the time; others when necessary.
Hopedale	1900, 1923	3	35-60	Material—sand and gravel	One man all the time; others when necessary.
Hudson	1904, 1910	5-6	50-100	Sand and gravel; found in place	One man all the time; others when necessary.
Leicester	1894, 1928	4	8	Sand; handled in construction	Very little attention.
Marion	1906, 1930	5	-	Sand; largely found in place	One man every day in summer, every other day in winter.
MARLBOROUGH	1891, 1908, 1909, 1910, 1911	4.5-6	30-50	Sand; found in place	One man all the time; others when necessary
Maynard	1907, 1924	-	-	Trickling filter, 7 feet deep	One man all the time.
Milford	1930	5	40	Sand; found in place; trickling filter	One man every day; others when necessary.
Nantucket	1896	6	36	Sand and gravel; found in place	One man when necessary.
Natick	1909, 1910, 1931	5-6.5	55	Sand; found in place	One man all the time; others when necessary.
North Attleborough	1906, 1907, 1920	4	50-75	Sand and gravel; found in place	One man every day; others when necessary.
Northbridge	1901, 1915	4	35	Sand and gravel; mostly handled	One man all the time; others when necessary.
PITTSFIELD	1908, 1925, 1926	4	40	Sand; mostly found in place	One man all the time; others when necessary.
Southbridge	1908	4	-	Sand and gravel; considerable quantity handled, some found in place.	One man all the time.
Spencer	1897, 1923	1	-	Sand and gravel; largely found in place	One man all the time; others when necessary.
Stockbridge	1899, 1921, 1922	{ 3-4.5 3.4-5	23 30	Sand filters	One man all the time.
Westborough	1892, 1911	5	30-40	Irrigation area, sand	One man all the time; others when necessary.
Winchendon	1928	5	-	Sand and gravel; handled in construction	One man part time.
WORCESTER	1898, 1925	4-6	35-50	Sand and gravel; found in place Trickling filters, sand area not in use	Chemist in charge; several men all the time.

<sup>1</sup>Only three beds underdrained. <sup>2</sup>Year of first construction of sand filters. Many additions  
<sup>3</sup>Sedimentation tanks and sand beds abandoned 1925. Imhoff tanks, trickling filters and secondary tanks installed.

## EXAMINATION OF SEWER OUTLETS DISCHARGING INTO THE SEA

Special examinations were made during the year of the main sewer outfall of the South Essex Sewerage District called for under Chapter 49 of the Resolves of 1934, and in connection with this investigation consideration was given to the disposal of sewage through the outfall sewers at Gloucester, Manchester and Marblehead. Late in the year the Department extended the time for the completion of the Brant Rock sewer outlet at Marshfield.

## INVESTIGATIONS RELATIVE TO SHELLFISH

As has been the practice in recent years, the Department has considered the various applications and petitions received relative to the removal of restrictions on the taking of shellfish at certain areas along the sea coast and has removed the restrictions from Long Beach in Swansea, Stony Beach in Hull and from a portion of Hingham Harbor.

There has been considerable activity relative to the approval of certificates for the shipment of shellfish into this State from other producing states and provinces, and 328 out-of-state shellfish certificates have been approved. In connection with the shipment of certain shucked stock it became necessary in the latter part of the year to communicate with the authorities of a southern state because of shipments of polluted shucked oysters from certain shellfish dealers in that state. Later examinations of shucked oysters from that state have shown them to be in a satisfactory condition and information available to this Department would indicate that, in part at least, because of the objections raised by this Department, more rigid supervision of shucked shellfish has been exercised in the state in question. Ten cases have been tried against dealers handling polluted shellfish, and in all but one instance convictions have been obtained. Representatives of the Department have attended various hearings held by the Supervisor of Marine Fisheries relative to the cancellation of certificates because of improper use of these certificates and because of insanitary shucking facilities. Under the new law enacted in 1933 (Chapter 329) all persons dealing in shellfish commercially are required to have certificates issued by the Supervisor of Marine Fisheries in connection with which inspections are now made by this Division before certificates for shucked stock are issued. In accordance with the agreement between the Supervisor of Marine Fisheries and this Division, nearly 600 inspections have been made of shucking plants, and the Supervisor has been notified when the shucking plants are in proper sanitary condition in order that the necessary certificates might be issued. This has been the first full year when the Department has had the opportunity to supervise shellfish shucking establishments, and this is believed to be one of the most important steps thus far taken in improving such establishments. The continuation of this work by those primarily interested in matters of sanitation appears to be essential if the State is to have proper sanitary control of this food product.

The Department has continued its general supervision of shellfish chlorinating plants. The plants at Newburyport and Plymouth have been in operation throughout the year and the plant at Scituate was in operation from July 13 to October 22. A total of some 36,000 barrels of soft shell clams were treated at the three plants during the year.

## SPECIAL INVESTIGATIONS

The Engineering Division has assisted in three special investigations during the past year, viz: under Chapter 12 of the Resolves of 1934, relative to the use of certain lands and waters in the Commonwealth for recreational purposes which was made jointly with the Department of Conservation and the Metropolitan District Commission; under Chapter 32 of the Resolves of 1934, relative to the condition of Lake Quinsigamond which was made jointly with the Department of Public Works; and under Chapter 49 of the Resolves of 1934 relative to the South Essex Sewerage District which was also made jointly with Department of Public Works. The reports required under these resolves have been submitted to the Legislature.

PUBLIC WORKS, CIVIL WORKS AND FEDERAL EMERGENCY  
RELIEF ADMINISTRATION PROJECTS

Much of the time of the Division has been taken up during the year 1934 with

the investigation of various construction projects undertaken through Federal agencies, viz: the Public Works Administration, the Civil Works Administration and the Federal Emergency Relief Administration. In this connection the following water, sewerage and sewage disposal works have been approved for construction by the Federal authorities in accordance with their program:

### *Construction under PWA*

<i>Town or City</i>	<i>State Institutions</i>	
Canton . . . . .	Massachusetts Hospital School	Sewers connecting with the Canton sewerage system
Lakeville . . . . .	Lakeville State Sanatorium	Sewage disposal works
Monson . . . . .	Monson State Hospital	Sewage disposal works
Norfolk . . . . .	State Prison	Dug well and tank
Norwell . . . . .	State Police Barracks	Water supply and sewage disposal
Rutland . . . . .	Rutland State Sanatorium	Sewers and drains
Tewksbury . . . . .	State Infirmary	New water supply
Topshfield . . . . .	State Police Barracks	Water supply and sewage disposal
Waltham . . . . .	Walter E. Fernald State School	Sewers
Westfield . . . . .	Westfield State Sanatorium	Sewage disposal works
Yarmouth . . . . .	State Police Barracks	Water supply and sewage disposal
Total Estimated Cost . . . . .		\$308,300

### *Cities and Towns*

Chelmsford . . . . .	East Chelmsford Water District	Public water supply
Georgetown . . . . .	Public water supply	
Great Barrington . . . . .	Fire and Water District	Additional water supply
Haverhill . . . . .	Construction of sewers	
Lowell . . . . .	Construction of sewers	
Marlborough . . . . .	Improvement in sewage disposal works	
Methuen . . . . .	Construction of sewers	
Natick . . . . .	Sewage disposal works	
Newburyport . . . . .	Water filters	
North Adams . . . . .	Trunk sewers and sewage disposal works	
Paxton . . . . .	Public water supply	
Sterling . . . . .	Public water supply	
Taunton . . . . .	Construction of trunk sewer	
Townsend . . . . .	Public water supply	
Weymouth . . . . .	Water filters	
Williamstown* . . . . .	Construction of sewers	
Winthrop . . . . .	Sewage pumping station	
Worcester . . . . .	Improvement in sewage disposal works	
Total Estimated Cost . . . . .		\$1,830,000

### *Construction under CWA or FERA*

Amherst . . . . .	Sewers	
Attleboro . . . . .	Improvements at sewage disposal works	
Bridgewater . . . . .	State Farm—sewage disposal works and reconstruction of water filters	
Concord** . . . . .	Improvements at sewage disposal works	
Foxborough . . . . .	Sewers	
Hudson . . . . .	Improvement at sewage disposal works	
Leominster . . . . .	Sewage disposal works and water filters	
North Attleborough . . . . .	Improvements at sewage disposal works	
Palmer . . . . .	Sewers	
Pittsfield . . . . .	Improvement at sewage disposal works	
Southbridge . . . . .	Improvements at sewage disposal works	
Spencer . . . . .	Sewage disposal works	
Salem and Beverly . . . . .	Water filters	
Tewksbury . . . . .	State Infirmary—sewage disposal works	
Total Estimated Cost . . . . .		\$1,361,000

\*Not accepted by town. Constructed under town appropriation.

\*\*No plans submitted.

### EXAMINATIONS OF RECREATION CAMPS AND ROADSIDE STANDS

Matters of water supply and sewerage, garbage and refuse disposal, etc., at recreation camps and roadside stands were investigated, so far as practicable, by this Division during the past year, but the number of examinations was limited because of the large amount of new work required of the Division.

### CIVILIAN CONSERVATION CORPS CAMPS

During the year 29 examinations of Civilian Conservation Corps Camps were made by representatives of the Engineering Division and special advice given by the Department in matters of water supply, sewerage and sewage disposal. Under arrangements made with the Corps Surgeon of the First Corps Area of the U. S. Army, 536 samples of water from these camps have been examined bacterially at frequent intervals by this Department, and the results communicated to him.

The following table shows the location of the Civilian Conservation Corps Camps established in this State, the sources of water supply and the bacterial condition of the water. Sewage disposal is generally by means of latrines or cesspools.



## EXAMINATION OF BATHING PLACES

A limited number of examinations were made in connection with certain bathing places throughout the State. In most instances the waters were found to be of reasonably satisfactory quality for this purpose. The following bathing places were examined and replies from the Department forwarded relative thereto:

*Advice Relative to Bathing Places and Swimming Pools*

Abington . . . .	Island Grove Pond
Agawam . . . .	Mill Pond at Agawam Center
Amesbury . . . .	Amesbury Park (swimming pool)
Amherst . . . .	Stream passing proposed playground
Andover . . . .	Pomp's and Husseys ponds
Arlington . . . .	Spy Pond and Reservoir at Arlington Heights
Ashland . . . .	Construction swimming pool and filter
Ashland . . . .	Swimming Pool at Camp Bob White
Ashland . . . .	Swimming Pool at Golden Ring Camp
Beverly . . . .	Swimming Pool at Y.W.C.A.
Beverly . . . .	Dane Street Beach
Billerica . . . .	Concord River at Camp Naomi
Boston . . . .	North End Beach
Boxford . . . .	Stiles Pond at Camp Rotary
Braintree . . . .	Weymouth Fore River at Watson Field near East Braintree
Braintree . . . .	Swimming pool at Norfolk County Sanatorium
Chelmsford . . . .	Crystal Lake and Hart Pond
Chelsea . . . .	Chelsea Creek near Marginal Street
Concord . . . .	Sudbury River at Camp of Henry S. Thompson
Danvers . . . .	Putnams Pond
Danvers . . . .	Porter River at High School
Dartmouth . . . .	Noquochoke Lake
Dartmouth . . . .	Jones Park and Anthony's Beach
Dighton . . . .	Taunton River
East Longmeadow . . . .	Pool, westerly side Shaker Road
Foxborough . . . .	Sunset Lake
Framingham . . . .	Learned Pond
Haverhill . . . .	Little River
Holden . . . .	Swimming pool, Dawson Village
Lowell . . . .	Swimming pool at Rogers Hall
Lynn . . . .	Sluice and Flax ponds
Natick . . . .	None Such Pond at Camp Mary Day
Natick . . . .	Dug Pond and Charles River at South Natick
Needham . . . .	Rosemary Lake
Newburyport . . . .	Merrimack River
New Salem . . . .	Little Speck Pond at Morgan Memorial Fresh Air Camp
Newton . . . .	Crystal Lake
Norwood . . . .	Hawes Brook
Peabody . . . .	Wading pool at Perkins Park
Peabody . . . .	Brown's Pond
Plymouth . . . .	Boot Pond
Plymouth . . . .	Hedges Pond at Emmanuel Camp
Plymouth . . . .	Darby Pond at Camp Annawon
Quincy . . . .	Blacks Creek
Rutland . . . .	Swimming Pool at Rufus Memorial Park
Rutland . . . .	Eagle Lake (bathing facilities)
Saugus . . . .	Saugus River at Stocker Playground, East Saugus
Southbridge . . . .	Cohasse Brook at Elm Street (and Wells Pond)
South Hadley . . . .	Pond on Batchelor Brook (Camp Lewis Perkins)
Stow . . . .	Swimming pool at Stow Golf Club
Wakefield . . . .	Quannapowitt Lake
Walpole (East) . . . .	Swimming pool at Francis William Park
Waltham . . . .	Charles River at Peterson icehouse
Waltham . . . .	Charles River at Forest Grove

Ware . . . .	Swimming pool on Muddy Brook (reconstruction)
Watertown . . . .	Charles River Basin near Perkins Institute
Weymouth . . . .	Whitman's Pond
Wilmington . . . .	Silver Lake
Windsor . . . .	Windsor Pond
Winthrop . . . .	Winthrop Harbor

#### VENTILATION STANDARDS

On September 20, 1932, the Public Health Council adopted certain ventilation standards to be used by the Department of Public Safety in the exercise of their duties under the General Laws in matters of ventilation at places used for human occupancy, and in all buildings in which ventilation requirements are to be established. These standards read as follows:

APPROVED BY DEPARTMENT OF PUBLIC HEALTH ON SEPTEMBER 20, 1932

#### PROPOSED VENTILATION STANDARDS FOR SPACES INTENDED FOR HUMAN OCCUPANCY IN ALL BUILDINGS FOR WHICH VENTILATION REQUIREMENTS ARE TO BE ESTABLISHED.

After conference with those informed in the various aspects of the science of ventilation, the Public Health Council of the Massachusetts Department of Public Health approves the following ventilation standards for spaces intended for human occupancy to assist the Department of Public Safety in promulgating rules for ventilation in all buildings for which ventilation requirements are to be established.

##### SECTION I—AIR TEMPERATURE AND HUMIDITY

The condition of the air in such occupied spaces in which the only source of contamination is the occupant shall be maintained at all times during occupancy at a comfortable "effective temperature."

The effective temperature shall range between 64 degrees and 69 degrees when heating or humidification is required, and between 69 degrees and 73 degrees when cooling or dehumidification is required. It is desirable that the relative humidity shall not be less than 30 per cent nor more than 60 per cent in any case.

These effective temperatures shall be maintained at a level of 36 inches above the floor.

##### SECTION II—AIR QUALITY

The air in such occupied spaces shall be at all times free from toxic or disagreeable gases and fumes and shall not contain odors and dust in objectionable amounts.

##### SECTION III—AIR MOTION

The air in such occupied spaces shall be in sufficient motion to maintain a reasonable uniformity of temperature and humidity, but not such as to cause objectionable drafts in any occupied portion of such spaces. (An air motion of more than 50 feet per minute within the range of effective temperature prescribed is ordinarily considered objectionable.)

##### SECTION IV—AIR DISTRIBUTION

The air in all rooms and enclosed spaces shall, under the provisions of these requirements, be distributed with reasonable uniformity.

##### SECTION V—AIR QUANTITY

The quantity of air used to ventilate the given space during occupancy shall always be sufficient to maintain the standards of air temperature, air quality, air motion and air distribution as herein required. Sufficient air to meet the above standards shall be taken from an unpolluted outdoor source through a window or other opening supplied with air of suitable quality unless effective means for the removal of objectionable odors and impurities are used. Nothing in this section shall be construed as preventing occasional flushing of rooms with outside air.

##### SECTION VI—DEFINITIONS

*Effective Temperature and its Measurement*—Effective temperature, sometimes known as the thermal index of atmospheric conditions, is an experimentally deter-

mined index of the degree of warmth or cold felt by the human body in response to temperature, humidity and the movement of the air. It is a composite index which combines the readings of temperature, humidity and air motion in a single value and may be determined from thermometric charts, copies of which may be obtained by making application to the Department of Public Safety, Room 24, State House, Boston. (The Department of Public Safety should be equipped with copies of charts similar to those published in the American Society of Heating and Ventilating Engineers Guide, 1932, page 392.)

*Relative Humidity*—Relative humidity is the measure of the per cent saturation of the air with water vapor. It is the ratio of the actual amount of water vapor in a unit volume or unit weight of air at any given temperature to the maximum amount of water vapor which the air would hold at the same temperature when fully saturated with moisture. It may be determined from the dry and wet bulb temperatures, readings taken with a sling psychrometer, and using the Carrier psychrometric chart for computation.

*Air Motion*.—Air motion is the velocity of air current in rooms and should include not only the linear movement of the air but also the turbulence or eddying currents produced by air changes. The air movement or turbulence in occupied rooms should be determined by means of the Kata thermometer. (The velocity of the air is not likely to fall below 10 feet per minute which is adequate even in tightly sealed rooms if there is a temperature or pressure difference between the air inside and outside the room.)

These standards have never been adopted by the Department of Public Safety but a committee was appointed by General Daniel Needham, former Commissioner of Public Safety, in September, 1934, to consider the question of making changes in the regulations of the Department of Public Safety in matters of heating and ventilation of public buildings. This committee consists of the following:

Arthur D. Weston, Chairman

Francis V. Bulfinch	Hollis French
G. Houston Burr	Burr F. Jones
Morris W. Maloney	Fayette K. Congdon
Alfred Kellogg	Ernest Stephens
Leslie Clough	C. Harold Berry
Ralph S. Franklin	James Holt
P. A. L. Foulds	Jeremiah J. Carey

#### EFFECT OF POLLUTED WATERS FOR PURPOSES OF HUMIDIFICATION

Recent research work under William F. Wells of the Harvard School of Public Health relative to the bacterial content of air warranted this Division making further studies in connection with the use of water at certain industrial plants for humidifying purposes. No extensive studies in such matters have been made by the Department since the year 1912 when a report was made by Messrs. Clark and Gage of the Lawrence Experiment Station. The applications of humidification to industrial operations have meanwhile been greatly extended and have also become a basic factor in air conditioning.

Research work of Mr. Wells on the viability of pathogenic organisms introduced into the atmosphere by evaporating droplets has awakened considerable interest, and these experiments might indicate possible contamination of the air of textile mills through humidifying processes. The facilities of the Harvard School of Public Health afforded an exceptional opportunity for a cooperative study and arrangements were accordingly made for the services of Mr. Wells and one of his assistants during the summer of 1934. These studies included tests in textile mills and tests in the laboratory at the Harvard School of Public Health.

The preliminary studies at the School of Public Health showed that in experimental air conditioning enormous numbers of *B. coli* introduced into water used for humidification were thrown into an air-conditioned room in the basement and that the waste air from that room carried large numbers of these bacteria to various parts of the building. *B. coli* atomized into the room disappeared at a much higher rate when the humidifier was in operation than when the conditioner was re-circulating the air without the use of the spray. Further tests showed that the reduction

in the number of bacteria did not take place in the spray chamber but after the air had returned to the room and indicate that humidity might increase the death rate of the *B. coli* in the air.

The work of Clark and Gage published in the Annual Report of this Department of the year 1912 showed that, while the high bacterial content of the air in textile mills comes largely from the bacteria laden dust thrown up by mechanical operations, numbers are also found where polluted water is used in the humidification system. One of the objects of Mr. Wells' recent work was to determine the degree each contributed to the bacterial contamination of the mill air, and so far as possible to judge the danger from breathing the air. Some distinctions can be made between the types of organisms derived from the different sources even though it was not practical to isolate and identify particular organisms which might have pathogenic significance. Supplementary evidence from Mr. Wells' work disclosed the fact that the nuclei from evaporating droplets from the spray do not settle rapidly on agar plates but can be recovered by centrifuging the air. Bacteria laden particles from the mechanical operations, however, settle relatively rapidly onto plates. By carrying out both these procedures it was possible to indicate the proportion contributed from each source. In this way he was able to demonstrate that contaminated water used in humidification was the principal source of bacteria in heavily humidified weaving rooms. In spinning rooms where the air is humidified to a lesser degree a smaller proportion of bacteria from this source was indicated, while in the dusty operations in carding, breaking and sorting rooms, which usually are not humidified, most of the bacteria were associated with dust particles.

The atmosphere outside of factories also showed a very large proportion of rapidly settling dust laden bacteria, contrasting sharply with the atmosphere in the vicinity of the laboratory. Greater numbers of *B. coli* also were found in weaving than in spinning rooms, being readily recovered in small numbers under sprays of polluted water. Since higher numbers were also found in the dusty non-humidified rooms, they may apparently be obtained from either source.

It was gratifying to learn from the studies recently made that the air in cotton mills was in a much better condition than was found in the studies of Clark and Gage so far as the bacterial count from both sources is concerned. The woolen mills did not show as much improvement as did the cotton mills, but it was evident, however, that efforts to control dust and to secure pure water for humidification have resulted in an improved bacterial condition of the air in such industries. Further improvement is possible, especially in providing unpolluted sources of water supply in humidifying systems.

#### *Relation to Sanitary Ventilation*

It may not be out of place here to mention how this study has fitted into a broader sanitary investigation of air supplies. The application of the methods to the problems of general ventilation have been continued at the Harvard School of Public Health, and Mr. Wells has since demonstrated that thousands of droplets containing *Streptococcus viridans* and *Micrococcus catarrhalis* are expelled by sneezing into the atmosphere, and these can be largely smothered by the use of a handkerchief. In the air of crowded rooms he finds these organisms prevalent, along with large numbers of general types, and it now appears that the methods of bacterial analysis of air used in the study may serve in the development of air supply control as has sanitary water analysis in the sanitary control of water supplies.

**WATER AND SEWAGE LABORATORIES  
AND  
LAWRENCE EXPERIMENT STATION**

The activities of the Water and Sewage Laboratories and the Lawrence Experiment Station are divided between analytical work and research. Methods are developed and many investigations concerning water, sewage, industrial wastes, shellfish, and many other sanitary problems are made by means of laboratory and field work, the operation of various kinds of filters, tanks and other apparatus. During the year 1934 an unusually large volume of work was accomplished by both units and is briefly described in the following pages.

**WATER AND SEWAGE LABORATORIES**

The work of the Water and Sewage Laboratories consists mainly in carrying out the routine analyses of drinking water supplies and sewages. There are, however, many special analyses made which are necessitated by a wide range of investigations, such as the composition of deposits, of incrustations and sediments in pipe lines and of waters used in connection with certain commercial operations.

Among the experimental studies made during the year was one having to do with the appearance of blue water in porcelain bowls and bathtubs. Using three waters, having colors of 0, 17 and 140 parts per million, respectively, the concentration of copper was noted at the first appearance of blue water, with and without the addition of soap, and the results are summarized in the following table:—

(Parts per Million)

Color	CONCENTRATION OF COPPER	
	Without Soap	With Soap
0	10-20	0.5- 1.0
17	25-50	0.7- 1.0
140	-	2.6-20.0

This work was carried on in a white porcelain dish, 12 inches in diameter and with a depth of water of 2½ inches. With a greater depth of water, such as in a bathtub, the concentration would decrease proportionately.

Studies were begun in regard to a comparison of three methods of determining free ammonia in municipal sewages and effluents, using sodium carbonate giving a pH of over 9.0, phosphate buffer of pH 7.4, and direct nesslerization. Results thus far obtained would indicate in most cases that the largest amount of free ammonia is obtained through the use of sodium carbonate; but the differences between the three methods are small and may not be greater than the error of the determination.

Another study had to do with the comparison of three methods of determining suspended solids in sewages, namely, alundum crucible, Gooch crucible, and by filter paper. The work thus far carried out indicates that while the crucible methods compare favorably with each other, the results obtained by the filter paper method are dependent upon the particular type of filter paper used. Further work is being done along this line.

The following table gives a summary of the analytical work carried on in the State House laboratories:

*Water and Sewage Laboratories, State House*

Samples from public water supplies:	
Surface waters	2,418
Ground waters	1,401
Special samples:	
Surface waters	171
Ground waters	672
Samples from rivers	1,357
Samples from sewerage systems and sewage disposal works	1,332
Samples of wastes and effluents from factories	66
Samples of sea water	13
Samples analyzed in connection with the Salem Harbor investigation	284

Samples analyzed in connection with the Lake Quinsigamond investigation	67
Miscellaneous samples (partial analyses)	227
Special examinations of water (including field work) for manganese, lead, copper, zinc, residual alum, oil, alkalinity, fats, dissolved oxygen, carbonic acid, and hydrogen ion	2,823
Microscopical examinations	2,858

#### LAWRENCE EXPERIMENT STATION

During the year 1934 much field work was done by the staff of the Lawrence Experiment Station in connection with the examination of rivers, water supplies, swimming pools, and sewage filtration areas. Considerable attention was paid to the condition of shellfish and shellfish areas, and a bacteriologist from the Station was in court thirteen times to testify in shellfish prosecutions by the Department. Many reports were made in regard to sewage and trade wastes disposal, water purification, chlorine treatment, the condition of water supplies, swimming pools, bathing beaches, the removal of free carbon dioxide from water supplies, and the results of other field work of various kinds.

Studies were continued relative to the disposal of ammonia-still waste from a gas plant, and sand and trickling filters were operated at the Experiment Station with such waste mixed with domestic sewage. The final conclusion of this work was that when this waste is mixed with sewage in the proper proportion, it may be permitted to enter sewers without ill effect on the operation of municipal filtration plants.

Further work was carried on in regard to the removal of caustic lime from the wastes of the Salem-Peabody industrial plants handling leather, felt, and gelatin, as this type of waste forms a progressively thickening scale of calcium carbonate in the sewers. As during the year 1933, the work during the year 1934 in this regard was largely to learn how much caustic lime is removed from the wastes at the industrial plants where such wastes are carbonated with flue gas. The results of this work show the effectiveness of these carbonating devices and that only occasionally does caustic lime reach the outfall sewer of the South Essex Sewerage District.

The Experiment Station assisted in an extensive investigation of the sewerage works of the South Essex Sewerage District, under Chapter 49 of the Resolves of 1934, by studying and analyzing the trade wastes entering the Salem-Peabody sewers. An experimental plant was operated for about three months near the Salem-Peabody sewage pumping station to study the removal of fats by skimming and sedimentation of suspended solids. Many analyses were made of grease balls found along the Salem and Beverly shores.

Much research work on methods of sewage purification and water treatment was carried on at the Experiment Station and in this connection the study of the relative efficiency of aeration and chlorination of sewage, as preliminary treatment before filtration, was continued. A study was started of the disposal of a distillery waste; relative stability tests were made on the effluents from many of the municipal sewage disposal areas; a large amount of research work was carried on in connection with certain corrosion studies with the assistance of the engineers; and B.O.D. tests were made on the Merrimack River water and plans were consummated for extending these tests to a number of rivers and sewage disposal areas.

As slow sand filtration has proved to be an effective and important method of sewage disposal in Massachusetts and as properly constructed and operated filters of this type are very efficient, studies have been made at the Lawrence Experiment Station during the past three years to demonstrate the results of intelligent and unintelligent operation of such filters. In connection with this work, seven filters are in operation at the Station, each one receiving an equal volume of sewage but in varying ways. The first filter is flooded daily; the second, every second day with twice the dose of the first filter, and so on. The seventh filter, which is flooded only every seventh day, receives on this day the same volume of sewage as the filter flooded daily receives in seven days. As is to be expected, the effluents from the first to the seventh filter are progressively poorer in quality. Further work along this line, to show the varying efficiency of filters of different depths, has been continued.

The important study, which was begun five years ago, in regard to the purification of the very polluted Merrimack River water by storage was continued throughout the year 1934. In this study the river water is passed through underground tanks, containing seven compartments, at such a rate that during the year it received, theoretically, thirty days' storage. By this storage, the number of bacteria of the coli-aerogenes group has been reduced from 3,600 to 8 per 100 cubic centimeters, thus showing the great efficiency of purification by storage for a water even as polluted as that of the Merrimack River.

A study also was started to determine the amount of iron taken up by water in passing through different materials. This is of interest in connection with ground water supplies.

As has been the custom for the past forty-one years, the Experiment Station force has maintained a general oversight of the operation and the bacterial efficiency of the Lawrence city filters, both by inspection of the chlorine plant and by the almost daily bacterial examination of samples of the water before and after filtration. This has been necessary as during all these years the city has never employed a trained operator at the filters or established a laboratory there. In addition, all water and sewage bacterial work, including such work in connection with the general oversight of inland waters, has been done at the Lawrence Experiment Station.

The State House laboratories and the Lawrence Experiment Station, as usual, have been visited during the year by many persons interested in water and sewage purification, analytical and other work, including representatives of various colleges. A number of these visitors were from foreign countries.

The analytical work carried on at the Station is summarized in the following table and a resumé of some of the research work is submitted in the following pages:

#### *Lawrence Experiment Station*

Chemical examinations on account of investigations concerning the disposal of domestic sewage and factory wastes, filtration and other treatment of water supplies, swimming pools, and the investigation of the Merrimack and other rivers	2,668
Mechanical and chemical examinations of sands . . . . .	326
Bacterial examinations of water supplies, rivers, sewage and filter effluents, ice, swimming pools, and wastes . . . . .	7,505
Bacterial examinations in connection with methods of purification of sewage and water . . . . .	633
Bacterial examinations of shellfish and sea waters . . . . .	653

#### SHELLFISH

During the year, 523 samples of shellfish and 130 samples of sea water were examined. One hundred and forty-three of the shellfish samples were from the Food and Drug Division, necessitating thirteen appearances in court of a bacteriologist in prosecutions concerning polluted shellfish. As a part of the experimental work, quahogs with a shellfish score of 14 were planted for three days near a sewer outlet on the Newburyport flats. The score of these shellfish after planting was 140 but after twenty-four hours in the tanks at the Newburyport shellfish purification plant, the score was reduced to 23 and in forty-eight hours, to 14.

#### TANNERY WASTES

Many determinations were made of lime and various forms of alkalinity in wastes from Salem and Peabody tanneries and allied industries to check the efficiency of the carbonating plants. Caustic lime in the wastes from some of these plants, unless converted to calcium carbonate by blowing flue gas through the wastes, causes deposits of calcium carbonate in the sewers and in the outfall sewer. As a part of the investigation of the sewerage system of the South Essex Sewerage District, as required under Chapter 49 of the Resolves of 1934, 704 samples were examined. The results of this work are contained in a special report to the Legislature.

## WASTE FROM THE MANUFACTURE OF ILLUMINATING GAS

For the purpose of advising a municipality relative to the discharge of gas wastes into the sewerage system which has an outlet in sewage disposal works, studies were made during 1932 and 1933 of the treatment of gas wastes when mixed with sewage and a part of these studies was continued in 1934.

The waste used was the residue from the ammonia-still, containing on an average over 5,000 parts per million of organic matter (shown by loss on ignition), 1,000 parts per million of free ammonia and 6,000 parts per million of oxygen consumed. One-half of one per cent of this waste mixed with Lawrence sewage was applied to a sand filter and to a trickling filter. This amount was twice the proportion of this waste that would be mixed with the domestic sewage at the municipal sewage treatment works under consideration if all the ammonia-still liquor from the gas plant in question were discharged into the sewer.

One sand filter, No. 591, containing 3½ feet in depth of sand of an effective size of .25 millimeter was operated as a control with Lawrence sewage at a rate of 50,000 gallons per acre daily. Filter No. 592, of similar construction, received the mixture of sewage and waste at the same rate. Two small trickling filters, containing 10 feet in depth of crushed stone, were operated also in connection with the treatment of this waste: No. 614 as a control and No. 615 with the mixture of sewage and waste, both being operated at a rate of 1,400,000 gallons per acre daily.

At this municipal plant, it is the practice during the warmer months to refilter the settled trickling filter effluent on sand filters, flooding each one about every third day. Consequently, two small sand filters were operated at the Experiment Station with the settled effluent of trickling Filter No. 615. The first, No. 618, was flooded every day at a rate of 75,000 gallons per acre daily, and the second, No. 619, received 225,000 gallons every third day. Another filter, No. 617, received the settled effluent of trickling Filter No. 614 at a rate of 75,000 gallons.

The effluent of the trickling filter receiving waste was somewhat higher in color and organic matter than that from the control filter but was still of good quality. The sand filter flooded daily with this settled effluent produced a greater reduction in color and organic matter than the filter flooded only every third day but showed a somewhat lower reduction than the corresponding filter receiving no waste.

From the results of three years' operation of filters at the Experiment Station, it is evident that the discharge of this waste into the sewers at a uniform rate will have no ill effect on the operation of either trickling or sand filters. The effluents may contain a little more organic matter but it will be in an unobjectionable form.

*Average Analyses of Samples of Sewage and Sewage Effluents Relative to the Treatment of Gas Waste (Ammonia-Still Liquor) with Domestic Sewage*

(Parts per Million)

Color	AMMONIA			Chlorine	NITROGEN AS—		Oxygen Consumed
	Free	ALBUMINOID			Nitrates	Nitrites	
		Total	In Solution				
<i>Settled Sewage applied to Slow Sand Filter No. 591 (no gas waste added)</i>							
—	38.6	6.7	3.8	57	—	—	39.9
<i>Effluent from Slow Sand Filter No. 591 (no gas waste added)</i>							
12	.26	.21	—	54	30.8	.015	2.1
<i>Settled Sewage and Gas Waste (0.5%) applied to Slow Sand Filter No. 592</i>							
—	51.4	7.3	4.4	63	—	—	66.9
<i>Effluent from Slow Sand Filter No. 592 (0.5% gas waste added)</i>							
17	.83	.29	—	67	32.9	.011	2.9
<i>Settled Sewage applied to Trickling Filter No. 614 (no gas waste added)</i>							
—	38.2	7.8	4.8	56	—	—	44.6
<i>Effluent from Trickling Filter No. 614 (no gas waste added)</i>							
53	11.4	2.4	1.0	55	23.8	.386	14.1
<i>Settled Sewage and Gas Waste (0.5%) applied to Trickling Filter No. 615</i>							
—	48.4	8.8	5.7	72	—	—	81.5

<i>Effluent from Trickling Filter No. 615 (0.5% gas waste added)</i>							
91	14.8	2.7	1.2	67	21.7	.239	19.6
<i>Effluent from Slow Sand Filter No. 617 receiving Settled Effluent from Trickling Filter No. 614</i>							
15	.15	.10	-	57	26.6	.077	2.3
<i>Effluent from Slow Sand Filter No. 618 receiving Settled Effluent from Trickling Filter No. 615.—Flooded Every Day</i>							
18	.24	.25	-	69	31.3	.176	2.5
<i>Effluent from Slow Sand Filter No. 619 receiving Settled Effluent from Trickling Filter No. 615.—Flooded Every Third Day at Same Rate as Sand Filter No. 618</i>							
25	.31	.38	-	68	31.8	.166	3.5

CHARACTER OF THE SEWAGE USED FOR THE INVESTIGATIONS UPON SEWAGE PURIFICATION AT THE LAWRENCE EXPERIMENT STATION

The sewage for the various filters is pumped from the Osgood Street sewer to the Experiment Station through about 1,850 feet of pipe. It is a fairly strong domestic sewage free from trade wastes, with the coarser suspended matter excluded by a strainer on the end of the pipe in the sewer.

The following tables present the average analyses of sewage used during the year 1934. "Regular sewage" is the sewage as pumped to the Station; "settled sewage" is the same sewage after passing through Imhoff Tank No. 545 and receiving a slight additional settling in a large tank used for supplying all the filters at the Station, except Nos. 1, 4 and 9A which receive the effluent of Imhoff Tank No. 545.

IMHOFF TANK

One Imhoff Tank was operated during the year. It is of concrete, 20 feet deep, with a settling compartment 7 feet 4 inches long by 1 foot wide and has gas vents 1 foot square at each end. The bottom of the settling compartment has a slope of 45 degrees toward the center where there is a slot opening. The digestion compartment has a capacity of 357 gallons; the settling compartment, 715 gallons, giving a theoretical storage of about one and one-half hours during the seven to eight hours that the sewage is being pumped. Settleable solids were removed during the year at the rate of 691 pounds of dry matter per million gallons of sewage. The digested sludge as drawn was usually entirely inoffensive, black in color, contained an average of 3.2 per cent dry matter and had a pH of around 7.0. On one or two occasions, the sludge drawn seemed to be hardly digested at all and this may have been due to fresh sludge settling into a depression left in the old sludge at the previous drawing. The average composition of the dry sludge drawn was,—fats, 15 per cent; nitrogen, 3.92 per cent; loss on ignition, 71.1 per cent. One hundred and thirty-eight pounds of dry matter, including some from the gas vents, were withdrawn and 793 pounds were added. This tank would undoubtedly digest a larger amount of fresh solids if they were available. The tank has given no trouble during the year from foaming or acid conditions.

Average Analyses  
(Parts per Million)

Free	AMMONIA ALBUMINOID		KJELDAHL NITROGEN		Chlorine	Oxygen Consumed	Fats	Bacteria per Cubic Centimeter 4 Days—20°C.
	Total	In Solution	Total	In Solution				
<i>Regular Sewage</i>								
35.3	12.1	6.7	22.0	12.4	58	79.7	55	2,200,000
<i>Sewage After Passing Through Imhoff Tank No. 545</i>								
40.1	7.7	5.5	14.2	10.6	52	41.7	32	1,780,000
<i>Settled Sewage</i>								
43.0	6.6	4.3	11.7	8.2	55	36.1	32	2,090,000

*Average Solids*  
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
<i>Regular Sewage</i>								
705	458	247	519	325	194	186	133	53
<i>Sewage after Passing Through Imhoff Tank No. 545</i>								
524	302	222	421	234	187	103	68	35
<i>Settled Sewage</i>								
473	251	222	374	180	194	99	71	28

OPERATION OF HOUSEHOLD SEPTIC TANKS

Two small concrete septic tanks, Nos. 507 and 508, have been operated at the Experiment Station since June, 1920. Tank No. 507 is 4 feet long, 2 feet wide and 40 inches deep, with a sloping bottom and has a capacity of 185 gallons. Tank No. 508 contains two compartments of the same size as the first and has a capacity of 370 gallons. Sewage enters each tank through trapped inlets and discharges through a pipe reaching 15 inches below the surface of the sewage in the tank. A baffle, located one-third of the distance from the inlet to the outlet, reaches to within 8 inches of the bottom of the tank. Tank No. 507 receives practically fresh household sewage and Tank No. 508 receives Lawrence sewage, which is comparatively stale. Both tanks are so operated that theoretically the sewage is held within each for two days; that is, the amount of sewage added daily is equal to one-half the capacity of the tanks, disregarding the effect of the accumulated sludge. During a large part of the period of operation, the effluents from both tanks have been remarkably clear and comparatively odorless. Besides settling out suspended solids, these tanks have effected a considerable reduction of soluble albuminoid ammonia.

In December, the tanks were opened for sludge measurements and analysis. Tank No. 507 was 77.5 per cent filled with sludge, an increase of 7.5 per cent in two years. The first compartment of Tank No. 508 was 75 per cent filled, an increase of 5 per cent; and the last compartment, 47.5 per cent filled, an increase of 12.5 per cent. Of the suspended organic solids deposited in Tank No. 507, from August, 1927, to December, 1934, 88 per cent had been destroyed, and in Tank No. 508, 75 per cent. Dry sludge from Tank No. 507 contained 3.0 per cent nitrogen, 3.7 per cent fats and 55 per cent loss on ignition. Dry sludge from Tank No. 508 contained 2.71 per cent nitrogen, 4.6 per cent fats and 48 per cent loss on ignition.

*Average Analyses*  
(Parts per Million)

Free	AMMONIA		KJELDAHL NITROGEN		Chlorine	Oxygen Consumed	Fats	Bacteria per Cubic Centimeter 4 Days-20°C
	Total	In Solution	Total	In Solution				
<i>Fresh Sewage applied to Closed Septic Tank No. 507</i>								
130.0	23.0	11.0	41.0	20.6	97	114.0	196	3,000,000
<i>Effluent from Closed Septic Tank No. 507</i>								
101.5	8.2	5.3	14.9	9.8	79	46.8	23	1,225,000
<i>Regular Sewage applied to Closed Septic Tank No. 508</i>								
41.3	10.8	6.2	19.6	11.5	61	60.3	55	1,525,000
<i>Effluent from Closed Septic Tank No. 508</i>								
54.5	4.3	2.9	7.8	5.1	62	24.5	15	2,100,000

*Average Solids*  
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
<i>Fresh Sewage applied to Closed Septic Tank No. 507</i>								
1022	703	319	547	281	266	475	422	53
<i>Effluent from Closed Septic Tank No. 507</i>								
541	267	274	437	189	248	104	78	26
<i>Regular Sewage applied to Closed Septic Tank No. 508</i>								
647	392	255	434	231	203	213	161	52
<i>Effluent from Closed Septic Tank No. 508</i>								
409	180	229	348	142	206	61	38	23

ACTIVATED SLUDGE

*Tank No. 485 operated with Compressed Air.—Tank No. 590 by Agitation*

Experiments on the aeration of sewage have been carried on at the Lawrence Experiment Station continuously since 1911, and descriptions and results of this work have been published in the annual reports of the Department. Activated sludge Tank No. 485 which was started in 1917, is still in operation and has three compartments 75 inches deep, each holding 230 gallons. The overflow from the last compartment, comprising the purified sewage and considerable sludge, passes through two settling tanks with capacities of 600 and 160 gallons, respectively, allowing about five and one-half hours' sedimentation during which the activated sludge settles out and is then pumped back to the first compartment. Air is applied at the bottom of each compartment through a filter plate, clamped to the top of an iron box, at a rate approximating .33 cubic feet of air per hour per gallon of sewage. The tank is operated at the rate of 7,433,000 gallons per acre daily on the basis of the aerating tanks and settling tanks, or 13,150,000 gallons on the basis of the aerating tanks alone. Late in the year, the rate was increased about 14 per cent. The amount of sludge retained in the tank was considerably less than the 20 per cent by volume formerly used. Excess sludge, equivalent to 146 pounds per million gallons of sewage treated, was pumped to waste. This sludge contained, on a dry basis, 6.73 per cent nitrogen and 4.1 per cent fats.

In all the various aeration tanks at the Experiment Station until 1931, aeration had been obtained by compressed air but at a number of places in this country and abroad, aeration by mechanical means has been carried on successfully. There is yet no agreement as to which method of aeration is more efficient and economical. In 1931 a small tank was put in operation at the Station to study mechanical aeration. This tank, No. 590, is of concrete, of an effective depth of 7 feet 9 inches and is 3 feet by 4 feet at the top, but one side slopes at such an angle 15 inches from the top that the tank is only 4 feet by 6 inches at the bottom. Built on one side of the tank at the top is a circular compartment or trough of 6-inch radius, in which a close-fitting paddle revolves at 60 revolutions a minute. A slot, 2 inches wide and 4 feet long, is built in the side of the tank and connects the bottom of the tank with the bottom of the trough. When the paddle is revolved, the sewage in the trough is thrown over a low dividing wall into the main tank and is well distributed over the surface. As the liquid is thrown from the trough, more comes up from the bottom of the tank through the slot and circulation of the mixture of sewage and sludge is continuous. Tank No. 590 is operated at the same rate as Tank No. 485 and has a similar arrangement of settling tanks and sludge return. The settled effluent of each has contained an average of 5.7 parts per million of dissolved oxygen and has been similar in appearance, clear and bright, with a very small amount of suspended matter. Chemical analyses of their effluents are similar, although the effluent of Tank No. 485 is of very slightly better quality. No reliable power costs can be obtained from such small-scale experiments.

*Average Analyses*  
(Parts per Million)

APPEARANCE		AMMONIA			KJELDAHL NITROGEN		Chlorine	NITROGEN AS—		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days-20° C.
Turbidity	Color	Free	ALBUMINOID		Total	In Solution		Nitrates	Nitrites		
			Total	In Solution							
<i>Sewage applied to Activated Sludge Tank No. 485 and Mechanically Aerated Activated Sludge Tank No. 590</i>											
-	-	43.8	7.9	4.5	13.9	8.5	58	-	-	38.0	2,090,000
<i>Effluent from Activated Sludge Tank No. 485</i>											
3	47	9.5	1.6	1.0	2.9	1.9	56	12.0	.404	11.2	148,000
<i>Effluent from Mechanically Aerated Activated Sludge Tank No. 590</i>											
3	49	9.2	1.8	1.2	3.1	2.1	58	9.7	.508	11.1	263,000

*Average Solids*  
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
<i>Sewage applied to Activated Sludge Tank No. 485 and Mechanically Aerated Activated Sludge Tank No. 590</i>								
483	250	233	364	163	201	119	87	32
<i>Effluent from Activated Sludge Tank No. 485</i>								
356	134	222	336	122	214	20	12	8
<i>Effluent from Mechanically Aerated Activated Sludge Tank No. 590</i>								
340	142	198	321	129	192	19	13	6

TRICKLING FILTERS

In 1890, an intermittent filter of coarse gravel was operated at the Experiment Station. This was the forerunner of the present trickling filter, and was probably the first filter of this type anywhere. Since then, there always has been a number of these filters in operation at the Experiment Station for the study of various problems in connection with their use.

The oldest, No. 135, has been in operation thirty-five years and is constructed of 10 feet in depth of walnut-size crushed stone. This size stone has been found to be rather small. While this filter has given a very good effluent, there has been a tendency toward clogging of the upper portion.

Four other filters, Nos. 452 to 455, inclusive, contain 4, 6, 8, and 10 feet in depth, respectively, of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. They were operated to show the greater efficiency of deeper filters, and their effluents have been of approximately the same quality. For each foot in depth of material, they have filtered 199,000, 265,000, 373,000, and 393,000 gallons of sewage per acre daily, respectively. Filter No. 475 contains 10 feet in depth of stone passing a 2½-inch screen and retained by a 1½-inch screen.

Filters Nos. 571, 572, and 573 are identical in construction, being 1/20,000 of an acre in area and containing 10 feet in depth of crushed stone that will pass a 1½-inch screen and be retained by a ¾-inch screen. During 1934 the average rate of operation was 1,437,000 gallons per acre daily. At depths of 4, 6, and 8 feet, half-round sections of ¾-inch iron pipe are inserted to the center of the filters to collect small portions of the liquid passing through the filter. During 1934, samples were collected at different depths from Filter No. 571 only. The results of the analyses show progressive purification down through the filter.

The three filters have been operated mainly to study the value of chlorination and aeration as preliminary treatments of the sewage applied to the filters. Filter

No. 571 was used as a control. The sewage applied to No. 572 received 10 parts per million available chlorine from hypochlorite. The sewage was allowed to stand until the chlorine was used up before being applied to the filter. The sewage applied to Filter No. 573 contained an average of 5.7 parts per million of dissolved oxygen.

The results of three years' operation show no benefit from the use of chlorine. The effluent from Filter No. 572 is of very slightly poorer quality than that of control Filter No. 571. Filter No. 573, receiving the aerated sewage, gave an effluent of consistently better quality than the other two filters. Aerating the applied sewage relieves the filter of part of its burden. In the other two filters, a portion of the upper material is used for aerating the sewage, which has to be done before active purification can begin.

*Average Analyses*

*Effluents from Tricking Filters Nos. 135, 452, 453, 454, 455, and 475.*

(Parts per Million)

FILTER NUMBER	Quantity Applied Gallons per Acre Daily	AMMONIA			Kjeldahl Nitrogen	Chlorine	NITROGEN AS —		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days-20°C
		Free	ALBUMINOID				Nitrates	Nitrites		
			Total	In Solution						
135	1,475,000	16.5	3.7	2.1	6.4	65	16.0	.143	23.5	397,000
452	795,000	16.1	5.0	2.8	8.5	57	16.6	.180	27.1	480,000
453	1,590,000	25.8	5.0	2.6	8.5	57	8.2	.793	25.7	320,000
454	2,981,000	20.3	4.0	2.4	7.6	56	17.2	.205	23.5	600,000
455	3,934,000	20.4	4.3	2.4	7.7	57	10.8	.188	27.9	370,000
475	2,960,000	22.8	4.9	2.8	9.2	57	9.2	.245	29.4	620,000

*Average Solids*

*Effluents from Tricking Filters Nos. 135, 452, 453, 454, 455, 475, 571, 572 and 573.*

(Parts per Million)

FILTER NUMBER	UNFILTERED			FILTERED			IN SUSPENSION		
	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
135	473	225	248	381	175	206	92	50	42
452	523	265	258	420	204	216	103	61	42
453	433	187	246	319	132	187	114	55	59
454	434	212	222	366	173	193	68	39	29
455	434	210	224	337	152	185	97	58	39
475	474	209	265	345	146	199	129	63	66
571*	532	270	262	416	199	217	116	71	45
572*	574	290	284	447	215	232	127	75	52
573*	551	280	271	443	219	224	108	61	47

\*10-foot effluent.

*Average Analyses of Effluents from Tricking Filters collected at Different Depths*

(Parts per Million)

Depth (Feet)	AMMONIA			Kjeldahl Nitrogen	Chlorine	NITROGEN AS —		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days-20°C
	Free	ALBUMINOID				Nitrates	Nitrites		
		Total	In Solution						
<i>Filter No. 571</i>									
4	30.1	5.5	3.7	10.2	58	5.8	.301	34.0	—
6	23.5	5.8	3.3	10.4	57	10.1	.467	31.8	—
8	22.3	5.2	2.7	9.4	56	15.3	.258	28.5	—
10	18.1	5.0	2.3	8.9	54	19.4	.291	27.6	475,000
<i>Filter No. 572</i>									
10	19.4	4.6	2.4	8.6	71	21.6	.241	27.1	260,000
<i>Filter No. 573</i>									
10	19.0	4.4	2.2	7.9	56	27.2	.263	25.5	140,000

## OPERATION OF CONTACT FILTERS

Contact filters are practically obsolete, but one filter of this type (No. 175) is kept in operation as an example of this method of sewage purification. It was put in operation in 1901, is 1/20,000 of an acre in area and contains 39 inches in depth of coke passing a 1-inch screen and retained on a 1/4-inch screen. During 1934 the filter was operated one five-hour cycle daily at a rate of 389,000 gallons per acre with sewage which had passed through an Imhoff tank and received a small amount of settling in a storage supply tank. It was allowed to rest one week six times during the year. Since 1901, it has been necessary to remove and wash the filtering material three times,—in 1911, in 1920, and late in 1934. At the end of the year, the open space had decreased 10 per cent.

*Average Analyses**Effluent from Contact Filter No. 175*

(Parts per Million)

QUANTITY APPLIED Gallons per Acre Daily	AMMONIA			Kjeldahl Nitrogen	Chlorine	NITROGEN AS—		Oxygen Consumed	Bacteria per Cubic Centimeter 4 Days-20° C.
	Free	ALBUMINOID				Nitrates	Nitrites		
		Total	In Solution						
389,000	14.9	3.3	2.2	6.1	56	3.1	.258	18.9	900,000

*Average Solids**Effluent from Contact Filter No. 175*

(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
367	159	208	317	131	186	50	28	22

## INTERMITTENT SAND FILTERS

The first intermittent sand filter at the Experiment Station was started in 1887 and since then two hundred and three have been operated with sewage, besides many others with various kinds of trades wastes. Unlike the water filter, where it is undesirable, the presence of air in the interstices of the sand is absolutely necessary for successful operation. This means that the surface sand must be in such condition that part at least of the air in the sand can be displaced by the applied sewage. Unless the sand is unduly fine, so that the lower foot or so remains saturated with water and acts as a seal, some air will be pushed through the sand to the outlet by the applied sewage. As the sewage passes down into the filter, fresh air is drawn in after it. The necessity for changing the air in a filter is due to the fact that the oxygen of the air is more or less exhausted by the oxidation of carbonaceous matters to carbon dioxide and by the formation of nitrates.

If the surface sand to a depth of six inches or more becomes heavily impregnated with suspended matter strained from the sewage, a filter is likely to give a poor effluent and be unable to handle as much sewage as when the sand is clean. The organic matter, especially when wet, fills the open space of the sand and prevents free circulation of air. Experiments illustrating this will be described later.

In a certain sewage disposal area the underdrains were laid at such a level that for a considerable portion of the year water from a near-by river backed up into the filter to the depth of a foot or so. Experiments showing the effect of such conditions will be described later.

*Studies of Overdosing*

The correct method of operating an intermittent sand filter is to apply sewage every day in one dose as rapidly as practical so as to cover uniformly the whole surface of the filter. If the sewage is applied slowly at one or more points on the bed, the entire surface will not be covered, the air in the sand will not be changed, and those portions of the bed receiving the sewage will be operating as continuous instead of intermittent filters, all of which make for poor results.

The filter area every unit of which receives sewage every day is the exception rather than the rule. It is unfortunately the practice at many treatment works, for a number of reasons, to apply during a few hours an amount of sewage equivalent to what should be applied in many days' doses.

To show the effect of this improper method of flooding filters, a series of small filters has been operated at the Experiment Station. These filters contain 4 feet in depth of sand of an effective size of .25 millimeter. Filter No. 593 is operated as a control and flooded once daily; Filter No. 594 is flooded every two days; Filter No. 595, every three days; Filter No. 596, every four days; Filter No. 597, every five days; Filter No. 598, every six days; Filter No. 599, every seven days; but each filter receives an equal volume of sewage each week unless the surface becomes clogged. During the year 1933 each filter was raked as often as was necessary to enable it to take its dose of sewage. During the year 1934 the surface of control Filter, No. 593, was raked whenever necessary and the others were raked only at the same time. This was to show the effect of the method of flooding on the rate of filtration as well as the quality of the effluent. The only filter whose rate was seriously affected was No. 599, which is flooded every seventh day. Its rate was reduced 29.3 per cent below that of the control filter which was 63,700 gallons per acre daily. With the rest of the filters, the bulk of the sewage passed through in twenty-four hours or less. At most of the municipal areas, the size of the sand is not so well adapted for filtration as is the sand in this series of filters. It is believed that the ill effect of improper flooding on the filters of this series will become increasingly evident in time.

An examination of the analyses shows that with the exception of some individual determinations, the general quality, both chemical and bacterial, is progressively poorer as the intervals between floodings are increased.

Filter No. 600 is a duplicate of Filter No. 593, except that 25 per cent of the material consists of stone between 1 and 2 inches in diameter. This material resembles unscreened sand such as is used in some institution or municipal filters. In 1933, the effluent from Filter No. 600 was about equal to that of Filter No. 593 but during 1934 it was of considerably poorer quality.

#### *Effect of a Water-seal at the Outlet of a Filter and of Dirty Sand*

A small filter, No. 624, started December 11, 1933, containing  $3\frac{1}{2}$  feet in depth of sand of an effective size of .25 millimeter, was provided with a trapped outlet so that the lower seven inches of the filter was always filled with liquid. It received Lawrence sewage at a rate of 50,000 gallons per acre daily. The effluent was as good as that of a control filter, No. 591. The surface sand being relatively clean and of a suitable size, the applied sewage had no difficulty in forcing enough air to the surface of the filter to maintain aerobic conditions. This shows that a filter can be operated successfully even though the lower section is continually water-sealed, provided the sand is of suitable size and the surface layer not overloaded with organic matter. Another filter, No. 627, started March 28, shows what happens under similar conditions when the surface layer of sand is very dirty. This filter contained 5 feet in depth of sand representing a cross section through Filter No. 1. This latter filter had been in operation forty-six years and the upper foot of sand was quite dirty, containing an average of 705 parts per million of albuminoid ammonia. The sand below this depth was comparatively clean.

For the first six months the effluent of Filter No. 627 contained no nitrates, was high in color, free and albuminoid ammonia. During July, August, and September, the surface of the filter was covered about one-third of the time. The trap or water-seal was removed for about a month and the upper foot of sand thoroughly dug over. Since then, with the trap restored, the filter has handled its dose but has given an effluent rather high in free and albuminoid ammonia and low in nitrates.

Two more filters were operated to show the effect of dirty sand on the ordinary operation of filters. Filter No. 625, started in January, contained 5 feet in depth of clean sand taken from Filter No. 1 below the upper foot of dirty sand. No. 626, like No. 627, contained 5 feet in depth, representing a cross section of Filter No. 1. All of these filters received Lawrence sewage at a rate of 50,000 gallons per acre daily.

Filter No. 625 gave a very good effluent while that of No. 626 was high in color, free and albuminoid ammonia, and low in nitrates. These filters show very strikingly the bad effect of the layer of dirty sand on the surface of filters. An accumulation of organic matter in the upper portion of sand filters is unavoidable but if the filter is operated properly, the accumulation is very gradual. This, of course, indicates the advantage of very thorough settling of sewage before application to sand filters.

#### *Filters Nos. 1, 4 and 9A*

Filters Nos. 1, 4, and 9A are each 1/200 of an acre in area, and at the end of 1934, Filter No. 1 and Filter No. 4 had been operated forty-seven years and Filter No. 9A, forty-four years. For the past nine years, the sewage applied to them has passed through an Imhoff tank where some suspended solids have been removed. These three filters contain 5 feet in depth of sand of an effective size of .48, .04 and .17 millimeter, respectively, and during the year were operated at average rates of 48,700, 20,300 and 49,200 gallons per acre daily, respectively. The surfaces of Filters Nos. 1 and 9A are trenched and ridged late in the fall, while the surface of Filter No. 4 is permanently arranged in circular trenches, 14 inches wide, filled to a depth of 12 inches with coarse sand of an effective size of .48 millimeter. Sewage is applied to the trenches while grass is allowed to grow on the rest of the filter.

The surface of Filter No. 1 has not been scraped during the past forty-one years. The only surface treatment has consisted of raking and since 1904, ridging and trenching during the winter. In 1892 and 1893, due to the excessive rate of operation, it was found advisable to scrape off some of the clogged, dirty sand.

The operation of Filter No. 625, with all clean sand, and of Filter No. 626, with 4 feet of clean sand and 1 foot of dirty sand, indicated that Filter No. 1 would give better results if the 1 foot of dirty surface sand were removed. It was impossible to find sand of the same grade and it not being desirable to replace the dirty sand with sand of another grade, the filter was reduced in area and the clean sand from the abandoned portion used to replace the dirty sand on the remainder of the filter. This resulted in a somewhat better effluent but as yet not as good as was expected.

#### *Depth of Intermittent Sand Filters*

With all the intermittent sand filters that have been operated at the Experiment Station, there has been no direct comparison of the effectiveness of filters of different depths. There is no uniformity in the depth of sand of municipal and institution filtration areas. Where the existing soil is merely underdrained, the depth is not of much importance from a cost point of view; but where the sand has to be brought from a distance, the depth is an important consideration.

With this point in view, four filters have been operated at the Experiment Station for over a year at a rate of about 60,000 gallons per acre daily. They are Nos. 620, 621, 622 and 623, and contain 2, 3, 4, and 5 feet in depth, respectively, of sand of an effective size of .25 millimeter. Nitrification is nearly the same in all four. The amount of organic matter is somewhat lower in the effluents from the two deeper filters. If the 2-foot filter can maintain the same degree of purification over a period of years, it would indicate that this depth of sand would be sufficient in many places where effluents are discharged into relatively polluted streams.

#### *Average Analyses*

(Parts per Million)

Filter Number	TEMPERATURE (DEGREES F.)		AMMONIA		Chlorine	NITROGEN AS —		Oxygen Consumed	Alkalinity
	Applied	Effluent	Free	Albuminoid		Nitrates	Nitrites		
1	53	54	9.03	1.12	54	23.1	.608	8.4	25
4	53	56	.51	.27	48	26.8	.049	3.1	-5
9A	53	55	1.07	.34	42	23.4	.010	3.6	0

## Average Analyses

(Parts per Million)

Filter Number	Color	Number of Days Between Flooding	AMMONIA		Chlorine	NITROGEN AS —		Oxygen Consumed
			Free	Albuminoid		Nitrates	Nitrites	
593	16	1	1.05	.34	53	32.8	.081	2.5
594	18	2	2.02	.53	53	33.7	.313	4.3
595	15	3	1.48	.64	52	33.8	.085	7.0
596	24	4	1.24	.83	53	35.6	.294	5.3
597	27	5	1.27	1.06	51	28.6	.562	8.2
598	26	6	1.31	1.08	53	32.2	.311	8.6
599	51	7	4.88	1.20	55	47.8	.216	11.5
600	57	1	6.20	.48	52	28.3	.148	4.3

## Average Analyses

(Parts per Million)

Filter Number	Depth (Feet)	Color	AMMONIA		Chlorine	NITROGEN AS —		Oxygen Consumed
			Free	Albuminoid		Nitrates	Nitrites	
620	2	26	2.52	.74	52	31.7	.571	6.2
621	3	27	1.37	.53	52	30.6	.484	4.3
622	4	18	.58	.40	52	38.2	.547	3.0
623	5	11	1.51	.40	53	32.5	.543	3.0

## Average Analyses

(Parts per Million)

Filter Number	Color	AMMONIA		Chlorine	NITROGEN AS —		Oxygen Consumed
		Free	Albuminoid		Nitrates	Nitrites	
624	9	.10	.18	59	28.2	.237	1.6
625	29	.39	.38	58	38.4	.861	4.1
626	171	2.75	1.23	56	16.8	1.300	13.8
627	995	41.30	5.27	60	10.6	.670	65.6

## Average Bacterial Analyses

Filter Number	BACTERIA PER CUBIC CENTIMETER			Coli-Aerogenes Group in 100 cc.
	4 Days 20°C.	24 Hours—37°C.		
		Total	Red	
1	313,600	11,100	7,760	422,000
4	10,100	170	30	400
9A	16,600	660	450	19,000
593	3,430	140	10	300
594	27,300	420	82	2,000
595	50,900	2,110	1,160	15,500
596	58,200	2,770	470	6,000
597	54,700	2,200	1,830	31,700
598	16,300	2,680	1,605	45,900
599	122,000	1,220	840	15,400
600	12,700	260	100	1,400
620	50,800	850	350	6,000
621	43,400	860	290	13,900
622	9,900	250	95	2,600
623	6,400	300	20	200
625	23,500	550	110	400
626	69,500	1,840	430	23,500
627	398,000	21,600	11,600	17,200

## BIOCHEMICAL OXYGEN DEMAND OF RIVER WATER

The B.O.D. and dissolved oxygen of the Merrimack River were determined monthly from June to November, inclusive, at the same stations as during the five previous years. The B.O.D.'s at all stations above Lawrence were about the same

as in other years. At the station just below Lawrence, the B.O.D. was much lower than in previous years and the effect of this was shown at all the stations below.

STATION	B.O.D. (Parts per Million)	Dissolved Oxygen Per Cent of Saturation
At Tyngsborough . . . . .	2.6	79.4
Above Lowell . . . . .	2.9	78.2
Below Lowell . . . . .	3.0	76.1
Above Lawrence . . . . .	2.2	71.6
Below Lawrence . . . . .	11.0	62.4
Above Haverhill . . . . .	3.7	86.3
At Groveland . . . . .	4.1	72.1
Above Amesbury . . . . .	3.1	78.9
Above Newburyport . . . . .	3.4	74.1

PURIFICATION OF POLLUTED WATER BY STORAGE

The study of the effect of storage in water purification, begun in 1930, has been continued. Two covered concrete tanks, 16 feet in diameter and holding 3 feet 9 inches in depth of water, are used. A small door in each tank allows diffused light to enter during the warmer months but during the winter the doors are closed. The first tank is divided by concrete walls into three sectors, one about twice as large as the other two. The second tank is divided into four equal sectors. These seven compartments are connected in series, the inlet in each case being at the bottom and the outlet near the top. River water is passed into the first compartment continuously at such a rate that it is thirty days passing through the two tanks. During the year, there was no apparent reduction of color by storage, due probably to errors in sampling. Bacteria of the coli-aerogenes group were reduced 99.72 per cent, and of the 20°C. bacteria, 91.81 per cent was removed. Storage also removed all suspended matter and reduced the free, total and soluble albuminoid ammonia. A sand filter, No. 577, was operated at a rate of 2,500,000 gallons per acre daily with the stored water, and a duplicate filter, No. 576, was operated with river water such as entered the storage tank. Both of these filters contain 4 feet in depth of sand of an effective size of .25 millimeter. The low bacterial efficiency of the filter receiving the stored water is typical of the results when a water free from suspended or easily coagulable matter is filtered through a slow sand filter.

Average Chemical Analyses  
(Parts per Million)

	Color	AMMONIA			Chlorine	NITROGEN AS --		Oxygen Consumed	Hardness
		ALBUMINOID				Nitrates	Nitrites		
		Free	Total	In Solution					
Filter No. 576:									
Raw river water applied to	45	.160	.183	.147	3.6	.243	.007	4.6	14
Effluent from	28	.041	.088	-	3.6	.356	.004	3.2	14
Filter No. 577:									
Stored river water applied to	46	.060	.137	.126	3.5	.389	.010	4.5	29*
Effluent from	38	.026	.110	-	3.5	.463	.002	3.9	29*

\*Increased hardness due to use of concrete storage tanks.

Average Bacterial Analyses

	BACTERIA PER CUBIC CENTIMETER				Coli-Aerogenes Group in 100 cc.
	4 Days 20°C.	24 Hrs.—37°C.		Total	
		Total	Red		
River water before storage . . . . .	4,200	170	55	4,200	
River water after 30 days' storage . . . . .	345	15	0	8	
Effluent from Filter No. 576 . . . . .	110	7	1	35	
Effluent from Filter No. 577 . . . . .	80	9	0	2	

LAWRENCE CITY FILTERS

As usual this report presents data in regard to the operation during the past year of the slow sand filters for the purification of the water supply of Lawrence. Lawrence has taken its water supply from the Merrimack River since 1875, and since 1893 it has been filtered. Since 1918, the filtered water has been treated with

chlorine as an added factor of safety. Three filters are in use. The oldest, 2.2 acres in area, is divided into three sections, one of which is covered; the second, 0.75 of an acre in area, was built in 1907 and is covered; the third filter, also covered, was completed early in 1926 and is 0.75 of an acre in area. The average volume of water filtered during 1934 was 5,442,000 gallons per day. Liquid chlorine was applied as a solution at the pump-well at the average rate of 1.40 parts per million. This amount of chlorine is very high compared with what is used with other supplies but is no higher than has been found to be necessary to adequately treat the water of the Merrimack River. The chlorinated water is pumped direct to a storage reservoir holding about 41,500,000 gallons, from which the greater part of the city is supplied by the low service system. This arrangement allows a larger residual chlorine than if the water were pumped directly into the distribution system. No attempt is made to maintain any definite residual chlorine. Daily bacterial samples are collected of the water after chlorination and the amount of chlorine to be added is governed by the bacterial analyses. It is seldom necessary to change the rate of chlorination. In 1931 an electrically driven pump was installed to supply water for the high service system from the reservoir. The bacterial efficiency of the various filters has averaged better than 99 per cent but the B. coli index, or the number of bacteria of the coli-aerogenes group in 100 cubic centimeters, is still higher than now allowed by the U. S. Treasury standard. After chlorination, however, the average number is less than one. There has been some increase in the 20°C. bacteria count in the water of the storage reservoir, due partly to an "after growth" following chlorination and partly to contamination by dust. All the filters, except the west covered, are provided with Venturi meters. There are no provisions for collecting samples from the former. For some time the recordings of the meters have been open to grave doubts as to their accuracy.

*Average Bacterial Analyses of Water collected in connection with the  
Lawrence City Filters*

BACTERIA PER CUBIC CENTIMETER			PER CENT OF BACTERIA REMOVED			PER CENT OF SAMPLES CONTAINING COLI-AEROGENES GROUP IN					Coli-Aerogenes Group in 100 cc.
4 Days 20°C.	24 Hrs.-37°C.		4 Days 20°C.	24 Hrs.-37°C.		.001 cc.	.01 cc.	0.1 cc.	1.0 cc.	10 cc.	
	Total	Red	Total		Red						
<i>Merrimack River — Intake of the Filters</i>											
12,800	1,070	328	-	-	-	8	74	100	100	100	14,800
<i>Effluent from the Lawrence City Filter (Old Filter, East Open Section)</i>											
105	5	0	99.2	99.5	100.0	-	-	0	3	37	7
<i>Effluent from the Lawrence City Filter (Old Filter, East Covered Section)</i>											
190	7	1	98.5	99.3	99.7	-	-	0	19	49	23
<i>Effluent from the Lawrence City Filter (Old Filter, West Open Section)</i>											
95	6	1	99.3	99.4	99.7	-	-	0	12	43	14
<i>Effluent from the Lawrence City Filter (North Filter)</i>											
180	10	3	98.6	99.1	99.0	-	0	6	23	64	80
<i>Mixed Effluents as pumped to the Distributing Reservoir after Chlorine Treatment</i>											
12	2	0	99.9	99.8	100.0	-	-	0	0	0	*
<i>Water from the Outlet of the Distributing Reservoir</i>											
210	41	1	98.3	96.2	99.7	-	-	0	0	5	*
<i>Water from a Tap at Lawrence City Hall</i>											
190	2	0	98.5	99.8	100.0	-	-	0	0	2	*
<i>Water from a Tap at the Lawrence Experiment Station</i>											
140	21	0	98.9	98.0	100.0	-	-	0	0	5	*
<i>Water from a Tap on the High Service System</i>											
190	32	0	98.5	97.0	100.0	-	-	0	0	4	*

\*Less than 1.

*Average Chemical Analyses of Water collected in connection with the  
Lawrence City Filters*  
(Parts per Million)

Temperature (Deg. F.)	APPEARANCE		AMMONIA			Chlorine	NITROGEN AS		Oxygen Consumed	Iron	Hardness
	Turbidity	Color	Free	ALBUMINOID			Nitrates	Nitrites			
				Total	In So- lution						
<i>Merrimack River—Intake of the Filters</i>											
50	3	46	.166	.251	.184	3.9	.208	.007	5.4	.55	15
<i>Effluent from the Lawrence City Filter (Old East Filter)</i>											
50	0	45	.181	.107	-	4.2	.327	.005	3.8	1.19	17
<i>Effluent from the Lawrence City Filter (North Filter)</i>											
50	0	32	.026	.108	-	4.1	.313	.004	3.9	.21	16
<i>Water from the Outlet of the Distributing Reservoir</i>											
50	0	39	.074	.107	-	5.5	.326	.003	3.8	.70	16
<i>Water from a Tap at Lawrence City Hall</i>											
53	0	36	.064	.104	-	5.6	.366	.002	3.7	.69	16
<i>Water from a Tap at the Lawrence Experiment Station</i>											
51	0	35	.042	.097	-	5.6	.344	.003	3.4	.74	16

*Average Solids in Samples of Water collected in connection with the  
Lawrence City Filters*  
(Parts per Million)

UNFILTERED			FILTERED			IN SUSPENSION		
Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed	Total	Loss on Ignition	Fixed
<i>Merrimack River—Intake of the Filters</i>								
62.3	24.8	37.5	52.5	21.6	30.9	9.8	3.2	6.6
<i>Effluent from the Lawrence City Filter (Old East Filter)</i>								
55.0	20.3	34.7	-	-	-	-	-	-
<i>Effluent from the Lawrence City Filter (North Filter)</i>								
50.1	18.0	32.1	-	-	-	-	-	-
<i>Water from the Outlet of the Distributing Reservoir</i>								
54.2	20.4	33.8	-	-	-	-	-	-
<i>Water from a Tap at Lawrence City Hall</i>								
52.5	19.4	33.1	-	-	-	-	-	-
<i>Water from a Tap at the Lawrence Experiment Station</i>								
54.5	20.8	33.7	-	-	-	-	-	-

STUDIES OF LOSS OF HEAD AND MAXIMUM RATES OF FLOW OF WATER  
THROUGH FILTERS OF SAND AND OTHER MATERIALS

During the early work of the Experiment Station, many researches were made concerning the value, in either water or sewage filtration, of sands of various grades, peat, garden soil, and other material. Especial studies were made from time to time of the maximum rates of flow of water through these different materials and articles summarizing some of this work were published in the annual reports of the State Board of Health for 1892 and 1894. In the annual report of the Experiment Station for 1892, page 458, a table is given showing with other data the effective size of many of these materials and the maximum rate of flow of water through them. Recently, on account of certain questions now arising, considerable further work of this nature has been carried on, largely in regard to the relation between the depth of filter, the loss of head and the maximum rate of flow allowed by different materials.

For the first study, three filters, 10 inches in diameter and containing 10, 6 and 2 feet, respectively, in depth of sand of an effective size of .26 millimeter and a uniformity coefficient of 3.1, were put in operation. Two feet of clear water was main-

tained over each filter and the rate kept at 2,500,000 gallons per acre daily, the loss of head being read each day. The water used was tap water, practically free from suspended matter; hence any loss of head was due to air-binding in the filter. When the rate could no longer be maintained, the filters were slowly back-filled to expel air, and during thirty-one months of operation it was necessary to back-fill the 10-foot filter five times; the 6-foot, three times; and the 2-foot filter, four times. The average loss of head for each filter for thirty-one months was as follows: For the 10-foot filter, thirty-five inches; the 6-foot filter, thirty inches; for the 2-foot filter, fifteen inches.

For studies of the maximum rates of certain very fine materials, filters 10 inches in diameter and 4 feet deep were put in operation, two feet of clear water being maintained over the sand. The material of the first filter, No. 603, is hardpan, that is, clay mixed with coarser material, and its effective size is .04 millimeter and its uniformity coefficient, 4.9. The material of Filter No. 604 is river silt, the effective size of which is .05 millimeter and the uniformity coefficient, 2.6. The material of Filter No. 605 is a clayey gravel, somewhat similar to the material in Filter No. 603, except that there is a greater proportion of coarse material. The effective size of this material is .05 and its uniformity coefficient, 11.5. The material of Filter No. 606 is loam from a cultivated garden, with all roots and fibers screened out, and has an effective size of .04 millimeter and a uniformity coefficient of 6.2. These four materials, as will be noted, have nearly the same effective size but differ in uniformity coefficient, chemically and in other respects. The filters were operated with their outlets wide open and the rates read daily. The average monthly rates at four-month intervals are shown in the following table. Undoubtedly the shape of the particles, concerning which no information is given by the mechanical analyses, has much to do with the compacting or reduction of the open space of the material and increasing the resistance to the passage of water through the filters.

The wide variations in rates can only be explained by attributing them to variations in the amounts of air in the filters.

*Average Rates*  
(Gallons per Acre Daily)

Months after Start	Filter No. 603 (Hardpan)	Filter No. 604 (River Silt)	Filter No. 605 (Clayey Gravel)	Filter No. 606 (Loam)
8	304,000	3,280,000	944,000	608,000
12	161,000	1,472,000	608,000	378,000
16	152,000	2,352,000	424,000	1,200,000
20	186,000	1,776,000	704,000	528,000
24	152,000	4,320,000	432,000	3,296,000
28	152,000	1,472,000	432,000	864,000
32	254,000	1,221,000	476,000	916,000
36	402,000	4,736,000	703,000	703,000
40	233,000	3,508,000	593,000	593,000

#### TAKING UP OF IRON DURING PASSAGE OF WATER THROUGH CERTAIN MATERIALS

Outside of pollution, iron is one of the most undesirable constituents of a ground water supply. The amount to be expected cannot be predicted before a well is driven and, after a well is in operation, there is no certainty that the amount of iron will not increase. It is generally true that the iron will increase if the well is overworked.

The amount of iron in the water pumped depends on a number of factors, probably the most important of which is the chemical composition of the iron in the soil. It may be present as an integral part of the soil particles, combined with organic matter, or as an hydroxide precipitated about the soil particles. The dissolved oxygen, free carbon dioxide, and pH of the water passing through the soil also affect the amount of iron taken up. Organic matter may also have some effect by reducing the dissolved oxygen and increasing the carbon dioxide. In a general way, absence of dissolved oxygen and presence of free carbon dioxide tend to increase the extraction of iron from soil.

Early in the summer some test wells were being driven in Georgetown, the water from which was comparatively high in iron. It was decided to make the laboratory tests with material washed out during the driving of these wells. The wells were

driven to varying depths, averaging around 30 feet. An average sample of material from the upper section had an effective size of .05 millimeter and a uniformity coefficient of 4.7, and a sample of the lower had an effective size of .13 millimeter and a uniformity coefficient of 9.1.

Three filters, 12 feet deep, were constructed of 4-inch akron pipe set in concrete bases and with cemented joints. On account of the depth of these filters, it was found necessary, in order to make them water-tight, to encase them in concrete. Filter No. 628 contained 6 feet 4 inches of the coarser sand and over this, 4 feet of the finer sand from Georgetown. Filter No. 629 contained the same depths of sand with the addition of a top layer of 1½ feet of peat such as is found above most of the Georgetown wells. The third filter, No. 633, contained 10 feet in depth of bank sand from Lawrence with an effective size of .32 and a uniformity coefficient of 2.7.

Acid soluble iron in the sand was determined by digesting with strong hydrochloric acid several hours on the water bath. In order to get the total iron, it would be necessary to grind the sand to an impalpable powder and fuse with sodium carbonate to break up the silicates. It is doubtful if the total iron would have been of any more value because it is the acid soluble iron that would be acted upon by water. Albuminoid ammonia was also determined as a measure of the organic matter. Loss on ignition would have been a better way of determining this if it were not for the fact that the sands would lose several times as much chemically combined water as there was organic matter. Results of analyses are shown in the following table:

	Ferric Oxide (Per Cent)	Albuminoid Ammonia (Parts per Million)
Fine sand from Georgetown	1.20	8.0
Coarse sand from Georgetown	2.16	-
Bank sand from Lawrence	1.12	10.0

During the process of driving these wells, the sand was forced up and out of the casing by a stream of water. During this operation much fine, reddish material, probably ferric oxide, was lost, so that the sand used in Filters Nos. 628 and 629 contained much less iron than the soil in which the wells were driven. The Lawrence sand in Filter No. 633 did not contain this fine material. The Georgetown sand is much finer than that from Lawrence and so has more surface exposed to the action of water. The organic matter in the two is about the same.

The three filters were kept full of ordinary distilled water which contained an average of 3.0 parts per million of free carbon dioxide and 5.4 parts per million of dissolved oxygen. No attempt was made to operate them continuously; instead enough water was drawn from each, once a day, to allow a theoretical 15-day contact between the water and sand. It was intended to imitate to some extent the action of ground water rather than the ordinary filtration. Results, averaged by months, are shown in the following table:

*Average Analyses of Effluents of Filters containing Georgetown Sand or Lawrence Sand*  
(Parts per Million)

MONTH	Filter No. 628 with Coarse and Fine Sand from Georgetown				Filter No. 629 with Coarse and Fine Sand and Peat from Georgetown				Filter No. 633 with Lawrence Sand		
	Color	Iron	Carbon Dioxide	Dissolved Oxygen	Color	Iron	Carbon Dioxide	Dissolved Oxygen	Color	Iron	Dissolved Oxygen
June . . . . .	16	.50	-	0.8	16	.39	-	0.8	-	-	-
July . . . . .	43	2.12	4	0.5	35	1.46	4	0.7	-	-	-
August . . . . .	29	1.17	3	0.7	27	1.02	4	0.7	11	.05	3.5
September . . . . .	23	.66	7	0.7	21	.64	6	0.7	6	.15	5.0
October . . . . .	15	.33	2	0.7	18	.46	3	0.7	5	.20	8.8
November . . . . .	17	.31	2	1.3	26	.78	3	1.3	2	.14	9.0
December . . . . .	16	.37	1	0.6	36	.75	1	0.6	2	.11	9.5

The concrete bases of the filters, even after seven months' operation, continued to give off caustic alkalinity. Carbon dioxide determinations were made on the last portion of the effluent drawn, but are not reliable, being probably too low.

There was an average reduction of dissolved oxygen of at least 4.6 parts per million in the water passing through Filters Nos. 628 and 629, while in Filter No. 633, there was an increase. The dissolved oxygen of the applied distilled water was determined before it was applied to the filter, and as the water stood on top of the filter, it took on more dissolved oxygen. It is not certain what absorbed the dissolved oxygen in Filters Nos. 628 and 629. It seems as though it must have been absorbed by organic matter and converted to carbon dioxide, but this cannot be checked because of the caustic alkalinity from the base of the filter. Another explanation would be that it might have been absorbed by ferrous iron in the sand. The presence of the layer of peat in Filter No. 629 apparently had no effect, as the dissolved oxygen was no lower than in Filter No. 628.

In both filters, the color and iron reached a maximum after two months. After four months, these became fairly constant in Filter No. 628. In Filter No. 629, there was a slight upward tendency after five months. The effluent of Filter No. 633 contained comparatively little iron or color and usually had no turbidity, or at the most, only a slight amount. The effluents from Filters Nos. 628 and 629 were quite turbid, resembling the water from the test wells after standing.

These experiments show that distilled water can remain in contact for fifteen days with some sands without taking up appreciable amounts of iron, while with other sands, the amount of iron taken up unfits the water for use unless the iron is removed. These tests were made under aerobic conditions and with a water low in carbon dioxide, resembling rain water. The tests are to be repeated with water containing dissolved oxygen and increased amounts of carbon dioxide, and with water free from dissolved oxygen.

The cause of the different action of the two sands can only be surmised, but it seems probable that the Georgetown sands contained hydroxides of iron that were more readily acted on than is the iron in the Lawrence sand.

#### RIPENING OF WATER FILTERS

Before a sand filter can do effective work, it must become "ripened." This process requires a number of weeks, the time depending on temperature and the nature of the water filtered. The more organic matter the water contains, the quicker the ripening. The sand grains of a ripened filter are covered with a thin film of gelatinous material, derived from the water, and consisting of both dead and living matter. This film is heaviest in the upper portion of the sand, but extends to some depth. There are times when it would be desirable to hasten the ripening of a filter. So far as known, there is no way of doing this.

To study this, three filters, 10 inches in diameter and containing 5 feet in depth of sand of an effective size of .32 millimeter, were started at the Experiment Station. The first was run as a control. On the surface of the second, a thin mat of aluminum hydroxide was formed by precipitating alum, at the rate of 1,850 pounds per acre, with a slight excess of soda ash. The third was loaded with aluminum hydroxide by mixing sufficient magnesium oxide in the sand to precipitate sixty-five tons per acre of alum. All three filters received Merrimack River water at the rate of 2,500,000 gallons per acre daily. They were started in June when the water was warm, and all three behaved abnormally. Instead of having large numbers of bacteria of the coli-aerogenes group in the effluents for some time, practically as soon as started the effluents of all three had a B.coli index as low as, or lower than, the Lawrence city filters. The 4-day 20°C. counts were considerably higher, however. There was no significant difference between the results of the experiments on the three filters.

## REPORT OF DIVISION OF TUBERCULOSIS

ALTON S. POPE, M.D., *Director*

LOUIS N. PHANEUF, *Assistant Director*

DAVID ZACKS, M.D., *Chief of Clinics*

I have the honor to submit the fifteenth annual report of the Division of Tuberculosis. This report includes an outline of the principal activities of the Division, the annual reports of the four State Sanatoria and the Pondville Cancer Hospital, for the fiscal year ending November 30, 1934, together with certain developments in tuberculosis control in the State at large.

It is gratifying to note that in spite of the continued economic stringency and unemployment the usual reduction of some 200 deaths from tuberculosis was maintained in 1934. For the first time deaths from pulmonary tuberculosis in the Commonwealth fell below the two thousand mark, and the death rate from tuberculosis, all forms, below 50 per 100,000. At the same time a slight increase in total cases reported suggests that the general improvement in diagnostic facilities throughout the State is beginning to stimulate earlier case finding.

### TUBERCULOSIS DEATHS AND DEATH RATES PER 100,000

*Massachusetts 1925-1934*

YEAR	PULMONARY		OTHER FORMS		TOTAL	
	Deaths	Rate	Deaths	Rate	Deaths	Rate
1925	2,883	69.3	576	13.9	3,459	83.4
1926	2,961	71.0	555	13.3	3,516	84.3
1927	2,774	66.2	429	10.2	3,203	76.4
1928	2,690	63.9	433	10.3	3,123	74.2
1929	2,561	60.5	361	8.5	2,922	69.1
1930	2,423	56.9	311	7.3	2,734	64.3
1931	2,306	53.6	248	5.8	2,554	59.7
1932	2,041	47	261	6.1	2,302	53.5
1933	2,058	47	222	5.1	2,280	52.8
1934	1,902	43.8	214	4.9	2,116	48.7

### STATE SANATORIA

During the year the four State Sanatoria have furnished 416,372 days of treatment for 2,119 patients. Of these 1,142 were in the institutions at the beginning of the year and 977 represent admissions. The cases were divided as follows: Rutland, 755 cases of pulmonary tuberculosis; North Reading and Westfield, 889 children with adult or childhood forms of the disease; Lakeville, 475 patients with extra-pulmonary forms of tuberculosis. Thirty-seven less patients were treated than last year and 1,784 less days of treatment were provided. This slight decrease is explained by the unwillingness of certain towns to hospitalize diagnosed cases of childhood tuberculosis, and the increasing emphasis laid by the Department upon the discovery of the adult type of tuberculosis in adolescents.

On account of the gradual rise in commodity prices the weekly per capita costs at the State Sanatoria have averaged slightly higher than last year. At Rutland the gross cost was \$14.89; at North Reading \$16.30; at Westfield \$18.04; and at Lakeville \$17.42. The excess in per capita costs at Westfield is due to a decreased average population together with additions to the staff on account of the take-over of school clinic work in the western part of the State.

The increasing use by physicians and boards of health of the diagnostic facilities of our State Sanatoria has been one of the most gratifying features of the year's work. Through their out-patient departments and consultation clinics the four Sanatoria examined 5,640 patients in 1934; an increase of 276 examinations over the previous year.

The important role which thoracic surgery now plays in the treatment of pulmonary tuberculosis has made it necessary to provide for this essential service on a more permanent basis. Through the interest and efforts of Dr. Churchill, our surgical consultant, we have been able to secure phrenic nerve surgery at the

sanatoria and to transfer patients needing thoracoplasty to the Massachusetts General Hospital. In such cases the board of health has paid the hospital at the same rate it had been paying the sanatorium. As this involves a loss to the hospital of approximately three dollars a day for each patient admitted and the present ward facilities are not sufficient to insure prompt admission of the sanatorium cases, it has become necessary to make a more comprehensive plan for providing major thoracic surgery for our patients. A tentative arrangement has been worked out with the hospital by which a sufficient number of beds will be made available for sanatorium patients at ward rates, plus a very modest fee for the surgeon, and the Department is asking for an appropriation sufficient to meet the anticipated charges under such an arrangement.

In order to relieve the long waiting list at Middlesex County Sanatorium, and to make tuberculosis beds in State Sanatoria more freely available to patients in all parts of the Commonwealth, the statute fixing the rate at Rutland was amended by the 1934 Legislature to permit a charge to cities and towns of less than the actual cost of maintenance. A rate of \$10.50 per week was subsequently set by the Department. This has made it possible to admit promptly a considerable number of patients urgently in need of treatment, both from Middlesex County and other parts of the State.

For some years it has been obvious that more adequate facilities would have to be provided for the treatment of tuberculosis in the western part of the State. The institutions now serving that territory have neither the capacity nor the equipment necessary for the modern treatment of tuberculosis, and as a result patients are reluctant to accept hospitalization, to their own detriment and to that of their communities. To meet this need the Commissioner of Public Health has recommended the construction of a 250-bed unit for adult patients with pulmonary tuberculosis on the grounds of the Westfield State Sanatorium. By utilizing the existing facilities a sanatorium could be constructed on that site at a minimum cost and would be very accessible to the territory served. Such an institution, by replacing the present inadequate sanatoria in Springfield, Holyoke and Chicopee, and the Hampshire County Sanatorium at Haydenville, would permanently solve the sanatorium problem in the four western counties of the State. It is proposed that this sanatorium be constructed and operated by the State on the same basis as the three district sanatoria now under construction in New York State.

#### PONDVILLE CANCER HOSPITAL

Through the Emergency Public Works Commission funds have been made available for a much-needed service and surgical building and a 25-bed wing at Pondville. The contracts were let July 11, 1934, and there is every prospect that the new buildings will be ready for occupancy by August, 1935. Besides furnishing a thoroughly modern operating unit, increasing the capacity of the hospital and relieving the present congestion in the out-patient department, the new buildings will provide a convenient, well equipped service unit that is essential to the efficient operation of every hospital.

Although there has been a continued growth in all services at Pondville during the year, it is evident that additional service to cancer patients must wait for the completion of the new buildings now under construction. There were 1,222 admissions, 19 more than last year, and the out-patient visits rose to a new total of 4,619. The average length of hospitalization was further reduced from 37.1 to 33.8 days in an attempt to shorten the waiting list for admission, but we believe that any further reduction in the average period of hospital treatment of cancer patients is not desirable from the standpoint of the patient.

The increase in all branches of medical work has necessitated the addition of one physician and three nurses to the resident staff. Operations increased 14 per cent and autopsies 12 per cent during the year.

The vacancy caused by the resignation of Dr. George M. Sullivan after four years of outstanding service as Superintendent has been filled by the appointment of Dr. George L. Parker, Assistant Superintendent of the Wrentham State School. Dr. Parker was previously Assistant Superintendent of the Lakeville State Sanatorium and comes to Pondville well qualified by his institutional experience.

The opening of the new service building and ward will seriously complicate the

present crowded housing conditions at Pondville. The need for additional employees' quarters was recognized by the engineers of the Emergency Planning Board, who recommended a separate dormitory building rather than living quarters in the service building. A request for a 100-bed dormitory has accordingly been included in the 1935 budget.

#### COUNTY SANATORIA

The Middlesex County Sanatorium is still faced with a waiting list which in part nullifies its excellent work in case finding. Since a request for authorization to raise funds for a 150-bed addition was refused by the 1934 Legislature it is hoped that Middlesex County towns will further avail themselves of the new rates at Rutland to reduce the waste of time and human life incidental to delay in the hospitalization of tuberculosis.

The quality of medical service in the county institutions has shown steady improvement. The proportion of patients receiving pneumothorax has increased appreciably, and in the county and state sanatoria 55 per cent received some form of collapse therapy in 1934. All of the sanatoria now also have some regular affiliation for thoracic surgery. The extension of diagnostic work through out-patient departments and consultation clinics in adjoining towns has been very gratifying and may well be responsible for the increased ratio of reported cases to deaths during the year.

#### SOCIAL SERVICE

The social workers have continued to give service to sanatorium patients referred by the superintendents and others, and in the case of every child admitted, to study the home situation. This is done as soon as possible after the children's admission, and social action when indicated is thus initiated promptly.

Because of the relationship between tuberculosis and social and economic conditions, social service could be effective in a large proportion of the tuberculous families and the actual need for this service continued to be greater than we can meet adequately—in spite of the addition of the third worker last year.

The social problems dealt with are as varied as ever, but the outstanding one is inadequacy of income for proper nourishment, clothing, and medical care for the family.

The general economic situation makes it difficult for many patients to make an occupational adjustment after discharge. In a number of such cases it has been possible for the social workers to make a suitable plan in another state where the patient has relatives or friends, and to arrange for transportation.

Consultation service has been carried on regularly in the Nashoba and Southern Berkshire areas and is increasing in volume. The social workers are also frequently called upon for consultation service by individuals in the communities they visit. The monthly staff conferences have been attended regularly at each of the sanatoria, and have been very helpful in the adjustment of patients' social problems.

During 1934 the workers made 1,926 home visits. Medical and social agents were contacted 2,588 times and 172 different cities and towns were visited.

#### THE SCHOOL CLINIC PROGRAM

Decentralization of the school clinic program has begun very satisfactorily. Most of the county sanatoria have started or are arranging to start examinations soon, and some of the larger cities have already begun. The state sanatoria are dividing the work with the counties according to geographical location and the three western counties without sanatoria are being covered by Westfield. Children already on the lists of the Chadwick Clinic are being followed and re-examined annually by the state clinic group, which is also assisting some of the county and municipal sanatoria in organizing their clinic work. By another year it would appear that adequate service on this basis will be available throughout the State.

With the completion of the Ten Year Program in Massachusetts, it seems fitting to submit a complete summary of the work done and some estimate of the results accomplished. This is by far the largest tuberculosis case-finding project in children yet undertaken, and while it will be some years before the end results can be accurately appraised, some accounting to the public is certainly warranted.

For purposes of comparison the following summary of the tenth year's work of the Chadwick Clinics is submitted:

SUMMARY OF TENTH YEAR OF CHADWICK CLINICS  
1933-1934

Total school population of towns visited . . . . .	103,956
Number given Von Pirquet test . . . . .	66,878
Number of reactors . . . . .	13,799
Number X-rayed . . . . .	14,861
Number examined . . . . .	2,797
Number diagnosed as pulmonary tuberculosis . . . . .	16
Number diagnosed as pulmonary tuberculosis suspects . . . . .	22
Number diagnosed as hilum tuberculosis . . . . .	637
Number diagnosed as hilum tuberculosis suspects . . . . .	576

A statistical summary of the ten years' work is given in the following tables. The first table represents examinations for the whole period but, because during the first five years of the program only selected groups in the schools were tested, the last five years results have been tabulated separately as more truly representative of the school population as a whole. This is followed by a less technical statement of findings and a table giving the incidence of tuberculosis in contacts and non-contacts.

In explanation it should be said that all tuberculin tests were made with the Pirquet technique, with a comparable grade of old tuberculin. Diagnosis of tuberculosis was based on roentgenological findings and practically all interpretations were made by one physician. Statistically, hilum (childhood type) and latent hilum cases should be combined, as childhood type of tuberculosis rarely gives symptoms or physical signs.

CHADWICK CLINIC RESULTS

Grand Totals

1924-1934

Enrollment of tested schools . . . . .	991,113
Number given tuberculin (Von Pirquet) test . . . . .	400,591
Per cent tested of school enrollment . . . . .	40.0
Number of positive reactors to test . . . . .	100,025
Per cent positive reactors of number tested . . . . .	25.0
Number X-rayed . . . . .	103,462
Number given physical examination . . . . .	117,777
Number of adult type (pulmonary) cases found . . . . .	261
Per cent adult type cases of number tested . . . . .	0.065
Per cent adult type cases of positive reactors . . . . .	(1-1500) 0.261
Number of childhood type (Hilum) cases found . . . . .	(1-380) 5,620
Per cent childhood type cases of number tested . . . . .	1.40
Per cent childhood type cases of positive reactors . . . . .	5.62
Number of suspect cases found . . . . .	12,323
Per cent suspect cases of number tested . . . . .	3.08

Note: The ratios written in parentheses above and in the tables hereafter are convenient approximations only and are not intended to be as accurate as the percentage figures they follow.

GRADE AND HIGH SCHOOL GROUPS

1930-1934

	Grade	High	Total
Enrollment of tested schools . . . . .	308,765	88,198	396,963
Number given tuberculin (Von Pirquet) test . . . . .	201,725	49,925	251,650
Per cent tested of school enrollment . . . . .	65.3	56.7	63.4
Number of positive reactors to test . . . . .	42,016	18,640	60,656
Per cent positive reactors of number tested . . . . .	20.8	37.3	24.1
Number X-rayed . . . . .	43,580	18,875	62,455
Number given physical examination . . . . .	11,143	3,057	14,200
Number of adult type (pulmonary) cases found . . . . .	60	72	132
Per cent adult type cases of number tested . . . . .	0.030	0.144	0.052
Per cent adult type cases of positive reactors . . . . .	(1-3300) 0.143	(1-690) 0.386	(1-1900) 0.218
Number of childhood type (Hilum) cases found . . . . .	(1-700) 2,104	(1-260) 580	(1-460) 2,684
Per cent childhood type cases of number tested . . . . .	1.04	1.16	1.07
Per cent childhood type cases of positive reactors . . . . .	5.01	3.11	4.43
Number of adult type suspect cases found . . . . .	56	37	93
Per cent adult type suspect cases of number tested . . . . .	0.028	0.074	0.037
Number of childhood type suspect cases found . . . . .	(1-3600) 4,765	(1-1400) 1,020	(1-2700) 5,785
Per cent childhood type suspect cases of number tested . . . . .	2.36	2.04	2.30

Notes: The last four years' figures only were used in compiling this table since uniform methods of examining and recording for both grade and high schools were employed during that period alone.

In this table and those following in which childhood type (Hilum) cases and childhood type suspect cases are compared in the grade and high schools the figures given do not show the true incidence of such childhood type involvement in the high school. Early in the Clinics there was established the policy of placing varying importance upon similar X-rays in this childhood type group according to the age and the physical and social condition of the child. Thus, a grade school pupil with childhood type disease by X-ray was definitely reported as such, while a high school pupil with a similar X-ray but with a negative physical

examination and good home conditions was not necessarily so classified. Therefore, the figures given here for this group indicate in the high school a part only of the childhood type of tuberculosis as shown by X-ray.

### Contact and Non-Contact Groups 1932-1934

	Contact	Non-contact	Total
Number given tuberculin (Von Pirquet) test	2,305	116,818	119,123
Grade	1,827	90,469	92,296
High	478	26,349	26,827
Number of positive reactors to test	1,418	28,610	30,028
Grade	1,045	18,502	19,547
High	373	10,108	10,481
Per cent positive reactors of number tested	61.5	24.5	25.2
Grade	57.2	20.5	21.2
High	78.0	38.3	39.1
Number X-rayed	2,382	29,109	31,491
Grade	1,887	18,972	20,859
High	495	10,137	10,632
Number given physical examination	2,318	4,128	6,446
Grade	1,844	3,085	4,929
High	474	1,043	1,517
Number of adult type (pulmonary) cases found	16	26	42
Grade	4	9	13
High	12	17	29
Per cent adult type cases of number tested	0.694	0.022	0.035
Grade	(1-140)	(1-4500)	(1-2900)
High	0.219	0.010	0.014
	(1-460)	(1-10,000)	(1-7100)
	2.51	0.065	0.108
		(1-1500)	(1-930)
Per cent adult type cases of positive reactors	1.13	0.091	0.140
Grade	0.383	0.049	0.066
High	(1-260)	(1-2000)	(1-1500)
	3.21	0.168	0.277
		(1-600)	(1-360)
Number of childhood type (Hilum) cases found	290	948	1,238
Grade	242	699	941
High	48	249	297
Per cent childhood type cases of number tested	12.6	0.812	1.04
Grade	13.2	0.774	1.02
High	10.0	0.945	1.11
		(1-110)	
Per cent childhood type cases of positive reactors	20.4	3.31	4.12
Grade	23.2	3.78	4.81
High	12.9	2.46	2.83
Number of adult type suspect cases found	8	31	39
Grade	4	19	23
High	4	12	16
Per cent adult type suspect cases of number tested	0.347	0.027	0.033
Grade	(1-290)	(1-3700)	(1-3000)
High	0.219	0.021	0.025
	(1-460)	(1-4800)	(1-4000)
	0.836	0.046	0.060
	(1-120)	(1-2200)	(1-1700)
Number of childhood type suspect cases found	351	1,509	1,860
Grade	296	1,185	1,481
High	55	324	379
Per cent childhood type suspect cases of number tested	15.2	1.29	1.56
Grade	16.2	1.31	1.60
High	11.5	1.23	1.41

Note: These figures are those obtained in the clinics for nine months of the 1932-1933 school year and for the full ten months of the 1933-1934 school year.

### First Five Years

	1924-1925	1925-1926	1926-1927	1927-1928	1928-1929
Enrollment of tested schools	57,483	184,091	163,411	47,626	53,260
Number given tuberculin (Von Pirquet) test	10,016	18,601	19,194	26,052	25,699
Per cent tested of school enrollment	17.4	10.1	11.7	54.8	48.3
Number of positive reactors to test	2,927	5,314	5,188	7,219	7,423
Per cent positive reactors of number tested	29.2	28.5	27.0	27.7	28.9
Number X-rayed	3,008	5,730	5,803	7,670	7,519
Number given physical examination	10,648	19,073	19,527	26,177	25,693
Number of adult type (pulmonary) cases found	31	19	29	8	11
Per cent adult type cases of number tested	0.310	0.102	0.151	0.031	0.043
	(1-320)	(1-980)	(1-660)	(1-3200)	(1-2300)
Per cent adult type cases of positive reactors	1.06	0.358	0.558	0.111	0.148
		(1-280)	(1-180)	(1-900)	(1-680)
Number of childhood type (Hilum) cases found	561	621	524	376	415
Per cent childhood type cases of number tested	5.61	3.33	2.73	1.44	1.61
Per cent childhood type cases of positive reactors	19.1	11.7	10.1	5.21	5.59
Number of suspect cases found	1,114	1,399	1,112	896	848
Per cent suspect cases of number tested	11.1	7.53	5.79	3.44	3.30

Notes: The Clinics for the first five years tested grade school pupils only. In the first three years of the Clinics the cases examined were from three selected groups: known contacts, underweights, and suspects referred by local physicians and school nurses. During the remaining seven years all children without selection were tested. Likewise, early in the Clinics more stress was laid on physical examination as a diagnostic procedure than later. In these facts lies the explanation of the higher percentage of disease found and the relatively greater number of physical examinations done during the first three years.

## LAST FIVE YEARS

	1929-1930	1930-1931	1931-1932	1932-1933	1933-1934
Enrollment of tested schools . . . . .	88,279	99,472	101,455	92,080	103,956
Grade . . . . .		81,509	80,695	69,321	77,240
High . . . . .		17,963	20,760	22,759	26,716
Number given tuberculin (Von Pirquet) test . . . . .	49,379	57,412	68,899	58,461	66,878
Grade . . . . .		48,681	55,962	44,769	52,313
High . . . . .		8,731	12,937	13,692	14,565
Per cent tested of school enrollment . . . . .	56.0	57.8	68.0	63.5	64.3
Grade . . . . .		59.7	69.4	64.7	67.8
High . . . . .		48.6	62.3	60.2	54.5
Number of positive reactors to test . . . . .	11,298	16,426	13,254	17,177	13,799
Grade . . . . .		12,663	9,245	11,187	8,921
High . . . . .		3,763	4,009	5,990	4,878
Per cent positive reactors of number tested . . . . .	22.9	28.6	19.2	29.4	20.6
Grade . . . . .		26.0	16.5	25.0	17.0
High . . . . .		43.2	31.0	43.8	33.6
Number X-rayed . . . . .	11,277	16,612	13,396	17,586	14,861
Grade . . . . .		12,814	9,339	11,549	9,878
High . . . . .		3,798	4,057	6,037	4,983
Number given physical examination . . . . .	2,459	3,476	3,865	4,062	2,797
Grade . . . . .		2,961	2,945	3,038	2,199
High . . . . .		515	920	1,024	598
Number of adult type (pulmonary) cases found . . . . .	31	33	55	22	22
Grade . . . . .		14	32	7	7
High . . . . .		19	23	15	15
Per cent adult type cases of number tested . . . . .	0.063	0.057	0.080	0.038	0.033
Grade . . . . . (1-1600)		0.029	0.057	0.016	0.013
High . . . . . (1-3400)		0.218	0.178	0.110	0.103
Per cent adult type cases of positive reactors . . . . .	0.274	0.201	0.415	0.128	0.159
Grade . . . . . (1-360)		0.110	0.346	0.063	0.078
High . . . . . (1-910)		0.505	0.575	0.250	0.307
Number of childhood type (Hilum) cases found . . . . .	439	625	750	672	637
Grade . . . . .		512	602	494	496
High . . . . .		113	148	178	141
Per cent childhood type cases of number tested . . . . .	0.890	1.09	1.09	1.15	0.953
Grade . . . . . (1-110)		1.05	1.07	1.10	0.949
High . . . . .		1.29	1.14	1.30	0.969
Per cent childhood type cases of positive reactors . . . . .	3.89	3.80	5.66	3.91	4.61
Grade . . . . .		4.04	6.51	4.42	5.56
High . . . . .		3.01	3.69	2.97	2.89
Number of adult type suspect cases found . . . . .	11	20	32	25	16
Grade . . . . .		13	20	17	6
High . . . . .		7	12	8	10
Per cent adult type suspect cases of number tested . . . . .	0.022	0.035	0.046	0.043	0.024
Grade . . . . . (1-4500)		0.027	0.036	0.038	0.011
High . . . . . (1-3700)		0.080	0.093	0.058	0.069
Number of childhood type suspect cases found . . . . .	1,065	1,654	2,086	1,499	576
Grade . . . . .		1,482	1,663	1,141	479
High . . . . .		172	423	328	97
Per cent childhood type suspect cases of number tested . . . . .	2.16	2.88	3.03	2.51	0.862
Grade . . . . .		3.05	2.97	2.55	0.916
High . . . . .		1.97	3.27	2.40	0.666
					(1-150)

Note: The 1929-1930 Clinic examined 7,318 high school pupils, but separate records were not kept of them.

Attention is called particularly to the much higher incidence of pulmonary tuberculosis in the high school than in the elementary school group (approximately three times) and the frequency of the adult type of the disease among children actually in contact with tuberculosis in their homes. It is in accordance with these findings that our school program has been modified.

As a means of finding cases of pulmonary tuberculosis, routine examination of school children with tuberculin test and X-ray is unquestionably expensive. As a preventive measure, however, its usefulness is far more comprehensive than that alone. Before the beginning of regular school examinations in Massachusetts, pulmonary tuberculosis in children under eighteen was practically never diagnosed until it had reached an advanced stage, and as a result treatment was of little avail.

Of the first 400 cases admitted to Westfield only 5 per cent were in a minimal stage of the disease on admission and when checked in 1932 only 45 living could be located and 75 per cent were known to be dead. For the past five years over 50 per cent of the pulmonary cases admitted to Westfield have been in a minimal stage, with an optimum chance for recovery.

Much is yet to be learned about the relationship of childhood type of tuberculosis to the adult pulmonary disease but we have been able to demonstrate its practical importance. Thus, in a group of school children found to have childhood tuberculosis between 1924 and 1927, the subsequent incidence of pulmonary tuberculosis has been five times that of a similar group, positive to the tuberculin test but without demonstrable signs of childhood tuberculosis.

What is perhaps the greatest contribution of the Ten Year Program to the control of tuberculosis in Massachusetts is the least tangible—effective dissemination of public health information about tuberculosis. There is little prospect that tuberculosis will be controlled by immunization or environmental measures. Prevention is peculiarly an individual problem and to get people to utilize the measures now available we must have an understanding of the essentials of infection, diagnosis and treatment by the general public to a far greater degree than is necessary in most communicable diseases. The examination of 400,000 children in practically every city and town in the Commonwealth, together with the personal contacts with parents, teachers, nurses and doctors has, we believe, created a consciousness of the problems of tuberculosis which is bound to be of the greatest value in the application of further control measures.

#### SUBSIDY

The State subsidy to cities and towns for the hospitalization of tuberculous patients in sanatoria approved by the Department of Public Health has again risen from \$450,590.00 in 1933 to \$461,419.37 in 1934. This increase is due largely to the fact that the new Worcester County Sanatorium has been in operation for the entire year of 1934. As all of the county and all of the approved city sanatoria have been operated at practically full capacity for the year, there should be little further increase in the subsidy unless more beds are added to some of the present institutions.

### LAKEVILLE STATE SANATORIUM

#### RESIDENT OFFICERS

LEON A. ALLEY, M.D., *Superintendent.*  
 JOHN J. DECKER, M.D., *Assistant Superintendent.*  
 ARTHUR KANSERSTEIN, M.D., *Senior Physician.*  
 LOUIS ALPERT, M.D., *Assistant Physician.*  
 RAPHAEL N. JOSEPH, M.D., *Assistant Physician.*  
 CHIN S. CHANG, M.D., *Assistant Physician.*  
 EMANUEL KLINE, D.M.D., *Dentist.*  
 CAROLINE T. WHITE, R.N., *Superintendent of Nurses.*  
 GRACE DALEY, *Head Teacher.*  
 MARION N. ATWOOD, *Head Occupational Therapist.*  
 SUSAN M. MURPHY, *Head Housekeeper.*  
 CHESTER TAYLOR, *Steward.*  
 ROBERT A. KENNEDY, *Chief Power Plant Engineer.*  
 T. FRANK MAHONY, *Head Farmer.*  
 FLORENCE S. MONROE, *Treasurer.*

#### NON-RESIDENT OFFICERS

ZABDIEL B. ADAMS, M.D., *Senior Physician, Orthopedist.*  
 LOUIS A. O. GODDU, M.D., *Senior Physician, Orthopedist.*  
 ROGER C. GRAVES, M.D., *Senior Physician, Urologist.*  
 FLETCHER H. COLBY, M.D., *Senior Physician, Urologist.*  
 WILLIAM P. BEETHAM, M.D., *Senior Physician, Ophthalmologist*  
 GEORGE A. MOORE, M.D., *Senior Physician, Surgeon.*

## Report of the Superintendent

TO HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health.*

I have the honor to submit the twenty-fifth annual report of the Lakeville State Sanatorium for the year ending November 30, 1934.

### FINANCIAL STATEMENT

During the year there has been expended \$258,477.56 for maintenance, a gross weekly per capita cost of \$17.42. There has been collected from miscellaneous sources (the total of all collections) \$135,796.88. Deducting this amount from the gross maintenance expenses leaves a net expense of \$122,680.68 and a net weekly per capita cost of \$9.15. There has been collected from private sources \$3,779.00, from cities and towns \$130,621.13, from the State Board of Retirement \$114.00, and from sales \$1,281.75, plus \$1.00 paid by Plymouth County for land damages in widening road by our water supply.

There were 9 patients supported wholly or in part by private funds, 189 by cities and towns, 4 state wards, 41 wholly by state, and 40 on whom settlement has not been determined.

As authorized by Chapter 162, Acts of 1934 (\$6,700.00 for Lamp Treatment Room and Equipment, Men's Ward) \$6,638.98 was expended during 1934. Not completed. As authorized by Chapter 162, Acts of 1934 (\$6,700.00 for Lamp Treatment Room and Equipment, Women's Ward) \$6,665.18 was expended during 1934. Not completed. As authorized by Chapter 162, Acts of 1934 (\$4,000.00 for X-ray Machine and Fluoroscope) \$58.35 was expended during 1934. Under Emergency Public Works Commission Construction Docket 1354 Mass. State Project H-1 \$5,000 was appropriated for two Sewage Filter Beds; \$3,627.48 was expended during 1934. Not completed.

### POPULATION

There were 271 patients in the sanatorium at the beginning of the year, December 1, 1933, and 283 patients at the close, November 30, 1934. The largest number present at any one time was 298 and the smallest 271. The daily average number of patients was 285.27, children 170.08, adults 115.19. There were 204 patients admitted during the year. For the classification of patients admitted, your attention is called to Table 6. The average age of patients admitted was 26 years. Including deaths there were 192 patients discharged, and the average duration of residence was 426 days. Of those discharged 130 gained 2,289.25 pounds, an average gain of 17.6 pounds per person. Of those discharged there were 86 arrested, 7 apparently arrested, 19 quiescent, 26 improved, 3 unimproved, 24 deaths, 8 not considered (duration of treatment being less than one month) and 19 non-tuberculous. There were 104,124 hospital days of treatment, 913 more than last year. The average number of employees and officers during the year was 180.58.

### MEDICAL REPORT

Because of the seriousness of renal tuberculosis as shown by the high mortality rate in this group, the absolute necessity of an early diagnosis is constantly impressed upon us if we are to prevent the extensive destruction of kidney tissue and the extension to other parts of the genito-urinary system. Our observations and end results show that, unless the diagnosis is made early in these cases and while the disease may still be unilateral, the prognosis is poor. Early diagnosis resulting in early nephrectomy in those unilateral cases where there is no demonstrable disease on the other side presents the best possibility for an arrest or cure. We have made a careful study during the year of patients who have shown albumen in the urine where previous examinations had been negative. Of twenty-nine urines examined fourteen have shown the presence of tubercle bacilli. Guinea pig inoculation of all urines of this nature is now practiced routinely as it appears to be our most valuable guide to an early positive diagnosis of renal tuberculosis, especially in those cases where the patient is symptom free.

The policy of operating earlier on new patients has been adopted where their condition, both general and local, seemed to warrant this procedure, and has, we believe, contributed somewhat in shortening the length of residence. The value of

prolonged post-operative general sanatorium treatment in these cases cannot be overestimated.

More frequent biopsies have resulted in earlier diagnoses in both the tuberculous and non-tuberculous cases. Non-tuberculous cases have, as a result, been transferred to the proper hospitals for treatment following the pathological study made possible by this procedure.

A child admitted with tuberculosis of the spine was found to be also suffering from diphtheria. No other case of contagious disease appeared during the year.

Nine and three-tenths per cent of the 204 patients admitted during the year showed evidence of pulmonary infection.

#### INSTITUTIONAL ACTIVITIES

The teaching activities by the medical staff were continued in the form of lectures to the following groups and organizations: Boston University students, Middlesex College of Medicine and Surgery, Massachusetts Medical Society—Plymouth District, District Health Officers, Massachusetts Association of Boards of Health, theological students, and American College of Surgeons.

The number of theological students training in the sanatorium was increased from three to five this year. The results have been encouraging and this work will undoubtedly continue and expand depending largely, of course, on the number of scholarships available for this type of training from the theological school.

The preliminary work in connection with the examination of school children, in the southern parts of Bristol and Plymouth counties, that is to be taken care of by the staff at this institution, has already resulted in requests being received from the boards of health and school committees of several communities.

#### PERSONNEL CHANGES

Dr. Richard C. Cooke resigned as assistant physician on September 30, 1934, to accept a position with the Federal Government. Dr. C. Winthrop Houghton resigned October 17, 1934, to accept an appointment at the State Infirmary at Tewksbury. Dr. Raphael N. Joseph was appointed assistant physician to succeed Dr. Cooke and Dr. Peter Ferrini, who previously served three years as senior physician at this institution, has accepted a reappointment to succeed Dr. Houghton.

It is with the deepest regret that we note the death of our former head occupational therapist, Miss Katharine Nute, who died at her home in Fall River in March, 1934. Miss Marion N. Atwood of Middleboro was appointed head occupational therapist, assuming her duties with the department on July 5, 1934.

Miss Mary C. O'Connell, head school teacher since November, 1928, resigned in March, 1934, and Miss Grace Daley, who has been an assistant teacher here for several years was promoted to succeed Miss O'Connell.

#### IMPROVEMENTS AND CHANGES

C.W.A. projects made possible new ceilings in the children's east ward, a heavier power line to the men's ward and the replacement of considerable open wiring in the men's ward thus eliminating a serious fire hazard. A much-needed addition to the occupational therapy workshop was also provided in this way. This addition with considerable new equipment has increased the working facilities so that during the year 634 shop classes were held. Many acres of the water shed at Clear Pond were cleared of brush and 10,000 seedling pines set out.

A P.W.A. project made possible two additional eighty-foot-square filter beds in addition to our existing filter beds.

As authorized by the Legislature under Chapter 162, Acts 1934, two new lamp rooms were constructed and equipped and artificial heliotherapy made possible in November in these two new buildings, connecting with the men's and women's wards. This should further shorten the length of residence of patients as it will be possible to treat many strictly bed patients who previously could not be transported to the lamp room on the children's west ward. It is interesting that our figures show that the length of residence of patients discharged has been shortened by 106 days and it does not seem unreasonable to expect that the facilities for artificial heliotherapy now available will shorten the duration of treatment even more.

The new X-ray equipment also authorized by the above Chapter and Acts has been installed.

#### RECOMMENDATIONS

We have again requested, in the budget for the coming year, appropriations for additional ice boxes and separate electrical refrigerating equipment to be installed in the basement of the Administration Building. The present boxes are inadequate for our needs and the old refrigerating machinery in the power plant is heavily overtaxed during the warm months of the year.

While requests have not been made in the budget for the following items, existing conditions call for their early consideration:

1. A new fireproof male employees' building. The present one is the one that was made possible by remodeling the barn in 1925. The inside construction is such that it requires constant repairing. The building is crowded and several male employees are housed in unsuitable quarters in other parts of the institution.

2. At present, members of the resident medical staff are housed in small apartments in the upper story of the Administration Building. For those married and with children the quarters are inadequate and poorly located. Staff houses would contribute much to the comfort of the staff and their families and encourage longer lengths of service of valuable, trained physicians.

3. A new laundry building with equipment. The laundry of the sanatorium is now being done, and has been done for several years, at the State Farm at Bridgewater. This is unsatisfactory and expensive for both institutions.

4. A new greenhouse is needed to replace the present one which is much too small for the starting of many of the farm crops. The condition of the existing greenhouse is such that further repairs are hardly justified.

5. A new modern children's hospital building of fireproof construction should be erected to replace the old children's building known as Children's East. The present building consists of open wards with no single rooms which are badly needed for the sick cases. No space is now available for play rooms or recreational facilities for the small ambulatory patients.

#### ACKNOWLEDGMENTS

To all the clergymen in attendance during the year, I express the sincere appreciation of all the patients and employees. The religious services each week have been most helpful and the Sunday School for the children has been most valuable.

To those patients and employees who, through their friends, have made entertainments of all kinds available, I express the thanks of everyone who has been privileged to enjoy them.

It would be amiss not to mention and thank those who made possible the excellent decorations in the wards at Christmas, also those through whose generosity each child felt that Santa Claus did not forget.

My thanks and appreciation I extend to those loyal and faithful employees who have helped to carry on the work during the past year. They merit your public approval.

To you and other members of the Department I express my appreciation for the continued confidence and helpful cooperation.

## SURGICAL REPORT

*Operations*

The following operations were performed during the year:

Appendectomies . . . . .	3	Incision and drainage:	
Arthrodeses:		Supra pubic abscess . . . . .	1
Elbow . . . . .	2	Hip . . . . .	1
Hip . . . . .	7	Fistula in ano . . . . .	1
Knee . . . . .	3	Abscess chest wall . . . . .	1
Spine . . . . .	2	Laparotomies . . . . .	2
Tibio-astragaloid . . . . .	1	Mastoidectomy . . . . .	1
Amputation of finger . . . . .	1	Nephrectomies . . . . .	4
Amputation of hand . . . . .	1	Incision and drainage of kidney . . . . .	1
Biopsies:		Osteotomy knee . . . . .	2
Hip . . . . .	1	Osteotomy and bifurcation of hip . . . . .	1
Knee . . . . .	1	Skin graft . . . . .	1
Cervical glands . . . . .	3	Section of two dorsal nerve	
Tibia . . . . .	1	roots . . . . .	1
Wrist . . . . .	1	Resection of bursa from hip . . . . .	1
Cecostomies . . . . .	2		
Cauterization of cervix . . . . .	1	Cystoscopies . . . . .	35
Cauterization of gangrenous tissue		Tonsillectomies and adenoidec-	
of hip . . . . .	1	tomies . . . . .	40
Curettage of hip . . . . .	1	Infected hands and fingers . . . . .	4
Curettage of humerus . . . . .	1	Lacerations including those requir-	
Curettage of radius and ulna . . . . .	2	ing sutures . . . . .	11
Curettage of sinus tracts . . . . .	2	Boil on neck . . . . .	2
Dissection of sinuses . . . . .	2	Removal of cyst . . . . .	1
Epididymovasectomies . . . . .	2	Removal of external semiluna car-	
Hemorrhoidectomy . . . . .	1	tilage from knee . . . . .	1
Herniotomies . . . . .	3	Removal of polyp from nose . . . . .	1

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*Casts*

Plaster casts for the year were as follows (types classified):

Anterior shells . . . . .	17	Jackets with double short spica . . . . .	39
Posterior shells . . . . .	17	Jackets with long spica . . . . .	15
Buckets . . . . .	2	Jackets with straps . . . . .	101
Cylinder to arm . . . . .	13	Short spica . . . . .	43
Cylinder to knee . . . . .	53	Long and short spica . . . . .	36
Cylinder to wrist . . . . .	8	Double long spica . . . . .	3
Cylinder with boot . . . . .	15	Moulds for feet . . . . .	2
Jackets . . . . .	68	Moulds for neck . . . . .	4
Jackets with helmet . . . . .	15	Splints to arms . . . . .	4
Jackets with shoulder spica . . . . .	8	Splints to legs . . . . .	6
Jackets with single short spica . . . . .	23		

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*Consultation Examinations*

	Positive	Suspicious	Negative	Extra- Pulmonary	Re- Exam.	Ex- Patients	Totals
Out-patients . . . . .	6	8	59	5	12	54	144
Employees . . . . .	—	—	140	—	—	—	140
	<hr/> 6	<hr/> 8	<hr/> 199	<hr/> 5	<hr/> 12	<hr/> 54	<hr/> 284

## LABORATORY REPORTS

*Laboratory, X-ray and Photographic Report*

<i>Clinical Microscopy</i>		Number
Blood	Hemoglobin determination . . . . .	967
	Red blood cell counts . . . . .	967
	White blood cell counts . . . . .	973
	Differential counts . . . . .	545
	Blood culture . . . . .	9
	Blood grouping . . . . .	7
	Coagulation time . . . . .	42
	Bleeding time . . . . .	42
<i>Chemical Analysis:</i>		
	Blood sugar . . . . .	15
	Non-protein nitrogen . . . . .	212
	Guaiac test for occult blood . . . . .	129
	Gastric contents . . . . .	4
	Van den Bergh test . . . . .	3
	Icterus . . . . .	2
Sputum	{ Positive T.B. . . . .	3
	{ Negative T.B. . . . .	491
<i>Urine Analysis</i>		5,163
Spinal fluid	{ Positive T.B. . . . .	1
	{ Negative T.B. . . . .	4
<i>Feces</i>		147
<i>Pleural fluid</i>		4
 <i>Bacteriological and Serological Tests.</i>		
Nose and throat cultures	{ Negative K.L. . . . .	288
	{ Positive K.L. . . . .	12
<i>Smears and cultures</i>		3,275
<i>Isolation of tubercle bacilli</i>		747
<i>Phenolsulphonphthalein tests</i>		268
<i>Typhoid agglutination tests (Widal)</i>		94
<i>Milk plate counts</i>		2
<i>Blood drawn for Wassermann and Hinton tests</i>		309
Von Pirquet test	{ Positive . . . . .	176
	{ Negative . . . . .	6
Mantoux tests	{ Positive . . . . .	3
	{ Negative . . . . .	17
<i>Injections of material into guinea pigs</i>		342
Autopsies:	{ Positive T.B. . . . .	117
	{ Negative T.B. . . . .	225
 <i>Pathology.</i>		
<i>Surgical specimens</i>		43
<i>Biopsies</i>		3
<i>Post-mortem cases</i>		12
<i>Tissue sections (celloidin)</i>		334
<i>Tonsils</i>		19
 <i>Preparation of Media (each month).</i>		
<i>Glycerine bouillon</i>		11
<i>Glycerine agar potato</i>		2
<i>Blood agar plate</i>		8
<i>Petroff's medium</i>		12
<i>Leoeffler's blood medium</i>		17
<i>Eosin methylene blue agar</i>		1

*Pathological Diagnosis.*

Histological tuberculosis . . . . .	7
Chronic inflammation . . . . .	12
Appendicitis . . . . .	4

*Proven Tuberculosis.*

Diagnosis (by guinea pig)	
Tuberculous abdomen . . . . .	3
Tuberculous ankle . . . . .	2
Tuberculous chest wall . . . . .	3
Tuberculous colitis . . . . .	1
Tuberculous elbow . . . . .	1
Tuberculous empyema . . . . .	1
Tuberculous epididymitis . . . . .	5
Tuberculous foot . . . . .	1
Tuberculous gland . . . . .	9
Tuberculous hip . . . . .	10
Tuberculous kidney . . . . .	42
Tuberculous knee . . . . .	4
Tuberculous meningitis . . . . .	3
Tuberculous rib . . . . .	1
Tuberculous sacro-iliac . . . . .	2
Tuberculous shoulder . . . . .	2
Tuberculous skin . . . . .	2
Tuberculous spine . . . . .	16
Tuberculous trochanter . . . . .	1
Tuberculous vulva . . . . .	1
Tuberculous wrist . . . . .	1

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*Examinations for other hospitals.*

Urine . . . . .	3
Guinea pig test . . . . .	5
Tonsils . . . . .	14
Smear for G.C. . . . .	3
Throat culture . . . . .	3
Pathological examination . . . . .	3
Blood count . . . . .	2
Blood grouping . . . . .	4
Non-protein nitrogen . . . . .	2
Blood sugar . . . . .	3

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*X-rays*

Number of X-rays taken from December 1, 1933, to November 30, 1934 . . . . . 2,315

*Photographs*

Number of photographs taken from December 1, 1933, to November 30, 1934 . . . . . 391

## DENTAL REPORT

*From December 1, 1933, to November 30, 1934*

Examinations . . . . .	616	Radiographs . . . . .	236
Prophylactic treatments . . . . .	459	Irrigations . . . . .	218
Fillings:		Vincent's Infection treatments . . . . .	12
Permanent teeth . . . . .	701	Root canal treatments . . . . .	26
Deciduous teeth . . . . .	77	Pulpectomy . . . . .	2
Extractions:		General Anesthesia:	
Permanent teeth . . . . .	219	Ether . . . . .	2
Deciduous teeth . . . . .	215	Ethyl chloride . . . . .	2
Treatments . . . . .	830	Local anesthesia:	
Restorations:		Novocaine . . . . .	224
Dentures:		Ethyl chloride . . . . .	64
Full . . . . .	15	Topical . . . . .	148
Partial . . . . .	1	Oral surgical operations . . . . .	17
Repair . . . . .	5	Orthodontia treatments . . . . .	41
Clamps—Davis . . . . .	2		
Bridges:			4,133
Repair . . . . .	1		
Visits . . . . .			2,151
New patients . . . . .			219
Dismissals . . . . .			388

Tomato juice has been continued throughout the year with all the patients in both children's wards. The observations noted following the use of tomato juice with control groups for three years, checking the teeth as an index of its value as a source of vitamins, led us to the adoption of the above procedure. The large number of arrested caries and low incidence of new caries has been most striking.

## SCHOOL REPORT

The educational activities have shown a definite increase during the year. Fifty-one patients have been enrolled in University Extension correspondence courses, twenty-one in the Home Hygiene Class, nine graduated from the class in Americanization, and twelve patients have worked regularly on the monthly issue of the sanatorium paper, "The Interpreter." This fall a Girl Scout Troop was organized with fifteen members. This activity was made possible by the Middleboro Council of the Girl Scouts of America.

Our graded school work has been carried on with one hundred and sixteen children enrolled, with the result that the children discharged during the year have in most instances been able to return to their proper classes upon their return to school.

Respectfully submitted,

LEON A. ALLEY, M.D.

*Superintendent.*

Statistical Tables

TABLE 1.—Admissions and Discharges

	ADULTS		CHILDREN		Totals
	Males	Females	Males	Females	
Patients in the Sanatorium Nov. 30, 1933	66	46	90	69	271
Patients admitted Dec. 1, 1933, to Nov. 30, 1934	71	45	43	45	204
Patients discharged Dec. 1, 1933, to Nov. 30, 1934	70	53	33	36	192
Patients remaining in Sanatorium, Nov. 30, 1934	69	40	98	76	283
Daily average number of patients	68.5068	46.6849	95.0821	74.9972	285.2710
Deaths (included in number discharged)	13	3	4	4	24

TABLE 2.—Civil Condition of Patients Admitted

	Males	Females	Males	Females	Totals
Single	35	19	43	45	142
Married	34	21	—	—	55
Widowed	2	—	—	—	2
Divorced	—	3	—	—	3
Separated	—	2	—	—	2
Total	71	45	43	45	204

TABLE 3.—Age of Patients Admitted

Age Group	Males	Females	Males	Females	Totals
Under 5 years	—	—	10	3	13
5 to 9 "	—	—	5	14	19
10 to 14 "	—	—	12	10	22
15 to 19 "	—	—	12	18	30
20 to 29 "	32	10	4	—	46
30 to 39 "	16	18	—	—	34
40 to 49 "	13	10	—	—	23
50 to 59 "	5	2	—	—	7
60 to 69 "	4	5	—	—	9
70 and over	1	—	—	—	1
Total	71	45	43	45	204
Average Age 26 years.					

TABLE 4.—Nativity and Parentage of Patients Admitted

PLACE OF NATIVITY	ADULTS						CHILDREN						TOTALS					
	MALES			FEMALES			MALES			FEMALES			Patient	Father	Mother			
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother						
United States:																		
Massachusetts	26	10	8	16	3	4	36	8	16	41	23	21	119	44	49			
Other New England States	10	5	4	6	5	3	2	3	3	2	1	2	20	14	12			
Other States	6	4	2	4	3	4	1	5	2	1	2	4	12	14	12			
	42	19	14	26	11	11	39	16	21	44	26	27	151	72	73			
Other Countries:																		
Armenia	1	1	1	—	—	—	—	—	—	—	—	—	1	1	1			
Bulgaria	1	—	1	—	—	—	—	—	—	—	—	—	1	—	1			
Czechoslovakia	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1			
Canada	5	8	9	9	15	15	2	9	2	1	2	2	17	34	28			
England	2	1	2	1	2	1	—	—	—	—	1	1	3	4	4			
Finland	—	—	—	1	—	1	—	—	—	—	—	—	1	—	1			
Germany	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1			
Greece	2	3	3	—	—	—	—	—	—	—	2	2	2	5	5			
Hawaiian Islands	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1			
India	—	—	—	—	—	—	—	—	—	—	2	—	—	2	—			
Ireland	—	5	7	1	5	5	—	2	2	—	—	1	3	12	15			
Italy	6	11	11	—	1	1	1	6	7	—	4	4	7	22	23			
Latvia	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—			
Lithuania	1	1	2	—	—	—	2	2	—	—	—	—	1	3	4			
Newfoundland	1	—	1	—	—	—	—	1	—	—	—	—	1	1	1			
Poland	—	3	3	—	—	—	—	—	—	—	1	1	—	4	4			
Portugal	4	6	6	2	2	2	1	4	3	—	5	3	7	17	14			
Russia	2	7	7	2	4	4	—	1	1	—	—	—	4	13	12			
Scotland	1	1	—	1	1	2	—	—	—	—	—	—	2	2	2			
Sweden	—	—	—	—	—	—	—	—	—	—	—	2	—	—	2			
Syria	1	1	1	1	1	1	—	1	1	—	1	1	2	4	4			
Turkey	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—			
Unknown	—	2	3	1	3	2	—	1	2	—	—	—	1	6	7			
	71	71	71	45	45	45	43	43	43	45	45	45	204	204	204			

TABLE 5.—Residence of Patients Admitted

	Adults	Children	Totals		Adults	Children	Totals
Amesbury . . . . .	1	—	1	Methuen . . . . .	1	—	1
Andover . . . . .	1	1	2	Middleboro . . . . .	1	—	1
Attleboro . . . . .	1	1	2	Middleton . . . . .	1	—	1
Avon . . . . .	1	—	1	Millis . . . . .	—	1	1
Boston . . . . .	34	26	60	Montague . . . . .	1	—	1
Boylston . . . . .	—	1	1	New Bedford . . . . .	6	5	11
Bradford . . . . .	—	1	1	Newton . . . . .	—	3	3
Braintree . . . . .	—	2	2	North Adams . . . . .	1	—	1
Bridgewater . . . . .	1	—	1	Norwood . . . . .	1	1	2
Brockton . . . . .	1	1	2	Pittsfield . . . . .	—	2	2
Brookline . . . . .	1	—	1	Quincy . . . . .	5	2	7
Cambridge . . . . .	9	2	11	Reading . . . . .	1	—	1
Chelsea . . . . .	4	3	7	Revere . . . . .	2	—	2
Chicopee . . . . .	1	—	1	Richmond . . . . .	2	—	2
Dartmouth . . . . .	1	—	1	Salem . . . . .	1	3	4
Easton . . . . .	1	—	1	Saugus . . . . .	—	1	1
Everett . . . . .	4	—	4	Sharon . . . . .	1	—	1
Fall River . . . . .	2	1	3	Shirley . . . . .	—	1	1
Falmouth . . . . .	—	1	1	Somerville . . . . .	2	4	6
Frammingham . . . . .	2	—	2	Southboro . . . . .	—	2	2
Hingham . . . . .	—	1	1	Springfield . . . . .	1	2	3
Holliston . . . . .	1	—	1	Sutton . . . . .	—	1	1
Lawrence . . . . .	4	3	7	Swampscott . . . . .	—	1	1
Leominster . . . . .	1	—	1	Taunton . . . . .	1	2	3
Lexington . . . . .	1	—	1	Waltham . . . . .	3	—	3
Lowell . . . . .	2	—	2	Wellesley . . . . .	1	1	2
Lynn . . . . .	1	3	4	Wellfleet . . . . .	—	1	1
Malden . . . . .	3	2	5	Westboro . . . . .	—	1	1
Manchester . . . . .	1	—	1	Westfield . . . . .	—	1	1
Marblehead . . . . .	1	—	1	Westwood . . . . .	1	—	1
Marlboro . . . . .	1	—	1	Woburn . . . . .	—	1	1
Maynard . . . . .	—	1	1				
Medford . . . . .	—	2	2				
Melrose . . . . .	2	—	2				
					116	88	204

TABLE 6.—Diagnosis on Admission

	ADULTS		CHILDREN		Totals	Per- centages
	Males	Females	Males	Females		
<i>One Lesion</i>						
Tb. abscess chest wall . . . . .	1	—	—	—	1	.49
Tb. adenitis, cervical . . . . .	—	6	4	4	14	6.86
Tb. adenitis, mesenteric . . . . .	2	—	1	3	6	2.94
Tb. ankle . . . . .	2	—	1	—	3	1.47
Tb. colitis . . . . .	—	1	—	—	1	.49
Tb. dactylitis . . . . .	—	1	—	—	1	.49
Tb. elbow . . . . .	—	—	1	—	1	.49
Tb. epididymitis . . . . .	1	—	—	—	1	.49
Tb. fibula . . . . .	—	—	1	—	1	.49
Tb. hip . . . . .	6	1	3	5	15	7.35
Tb. knee . . . . .	1	—	3	1	5	2.45
Tb. nephritis . . . . .	6	2	—	—	8	3.92
Tb. ophthalmia . . . . .	1	2	—	2	5	2.45
Tb. peritonitis . . . . .	2	2	3	3	10	4.90
Tb. pleura . . . . .	1	—	—	—	1	.49
Tb. rib . . . . .	—	—	1	—	1	.49
Tb. sacro-iliac . . . . .	1	—	—	—	1	.49
Tb. shoulder . . . . .	—	—	2	—	2	.98
Tb. skin . . . . .	—	2	—	—	2	.98
Tb. spine . . . . .	8	2	7	6	23	11.27
Tb. symphysis pubis . . . . .	2	—	—	1	3	1.47
Tb. tibia . . . . .	—	—	1	—	1	.49
Tb. greater trochanter . . . . .	1	—	—	—	1	.49
Tb. uterus . . . . .	—	1	—	—	1	.49
Tb. wrist . . . . .	1	—	—	1	2	.98
	36	20	28	26	110	—
<i>One Lesion with X-Ray Evidence of Pulmonary Infection</i>						
Tb. adenitis, cervical . . . . .	—	1	—	—	1	.49
Tb. adenitis, axillary . . . . .	—	—	1	—	1	.49
Tb. ankle . . . . .	—	—	1	—	1	.49
Tb. hip . . . . .	—	—	—	1	1	.49
Tb. knee . . . . .	—	1	—	—	1	.49
	—	2	2	1	5	—
<i>One Lesion with Evidence of Pulmonary Tuberculosis Inactive</i>						
Tb. adenitis, cervical . . . . .	—	1	—	—	1	.49
Tb. foot . . . . .	—	1	—	—	1	.49
Tb. spine . . . . .	1	2	—	—	3	1.47
Tb. wrist . . . . .	1	—	—	—	1	.49
	2	4	—	—	6	—

TABLE 6.—*Diagnosis on Admission*—(Continued)

	ADULTS		CHILDREN		Totals	Per- centages
	Males	Females	Males	Females		
<i>One Lesion with Pulmonary Tuberculosis Active</i>						
Tb. adenitis, cervical . . . . .	1	—	—	—	1	.49
Tb. hip . . . . .	1	—	1	—	2	.98
Tb. spine . . . . .	1	—	—	—	1	.49
	3	—	1	—	4	—
<i>Two Lesions</i>						
Tb. adenitis, cervical and axillary . . . . .	1	2	—	—	3	1.47
Tb. adenitis, cervical, bilateral . . . . .	—	—	—	1	1	.49
Tb. adenitis, cervical, Tb. dactylitis, arrested . . . . .	—	—	1	—	1	.49
Tb. adenitis, cervical and inguinal . . . . .	—	—	1	—	1	.49
Tb. adenitis, cervical, Tb. ophthalmia . . . . .	—	1	—	1	2	.98
Tb. adenitis, mesenteric, Tb. rib, arrested . . . . .	—	—	1	—	1	.49
Tb. adenitis, mesenteric, Tb. enteritis . . . . .	1	—	—	—	1	.49
Tb. colitis, Tb. peritonitis . . . . .	1	—	—	—	1	.49
Tb. epididymitis, bilateral . . . . .	2	—	—	—	2	.98
Tb. knee, Tb. hip, arrested . . . . .	—	1	—	—	1	.49
Tb. nephritis, bilateral . . . . .	—	1	—	—	1	.49
Tb. nephritis, Tb. colitis . . . . .	2	1	1	—	4	1.96
Tb. ophthalmia, bilateral . . . . .	1	1	—	2	4	1.96
Tb. peritonitis, Tb. adenitis cervical, arrested . . . . .	—	—	1	—	1	.49
Tb. peritonitis, Tb. adenitis mesenteric . . . . .	1	—	1	—	2	.98
Tb. spine, Tb. knee . . . . .	1	—	—	—	1	.49
Tb. spine, Tb. nephritis, arrested . . . . .	1	—	—	—	1	.49
Tb. spine, Tb. peritonitis . . . . .	—	1	—	1	2	.98
T. spine, Tb. sacro-iliac . . . . .	—	—	1	—	1	.49
	11	8	7	5	31	—
<i>Two Lesions with X-Ray Evidence of Pulmonary Infection</i>						
Tb. nephritis, Tb. cystitis . . . . .	1	—	—	—	1	.49
Tb. ophthalmia, bilateral . . . . .	—	1	—	—	1	.49
Tb. spine, Tb. nephritis . . . . .	—	—	—	1	1	.49
	1	1	—	1	3	—
<i>Three Lesions</i>						
Tb. adenitis, cervical, inguinal and mesenteric . . . . .	—	—	—	1	1	.49
Tb. adenitis, mesenteric, cervical and axillary . . . . .	—	—	—	2	2	.98
Tb. epididymitis, bilateral, Tb. nephritis . . . . .	2	—	—	—	2	.98
Tb. nephritis, Tb. epididymitis, Tb. spine . . . . .	1	—	—	—	1	.49
Tb. ophthalmia, left, Tb. adenitis, cervical and axillary . . . . .	—	—	—	1	1	.49
Tb. peritonitis, Tb. pyo-hydro-nephrosis, Tb. entro-colitis . . . . .	—	1	—	—	1	.49
Tb. spine, Tb. hip, Tb. abscess sterno-clavicular . . . . .	1	—	—	—	1	.49
Tb. spine, Tb. nephritis, Tb. elbow, arrested . . . . .	1	—	—	—	1	.49
Tb. spine, Tb. sacro-iliac, bilateral . . . . .	1	1	—	—	2	.98
Tb. spine, Tb. greater trochanter, Tb. lesser trochanter . . . . .	1	—	—	—	1	.49
	7	2	—	4	13	—
<i>Four Lesions</i>						
Tb. spine, Tb. adenitis, cervical axillary and inguinal . . . . .	—	—	—	1	1	.49
	—	—	—	1	1	—
<i>Four Lesions with Evidence of Pulmonary Tuberculosis, inactive</i>						
Tb. cystitis, Tb. nephritis, Tb. epididymitis, bilateral, Pul. . . . .	1	—	—	—	1	.49
	1	—	—	—	1	—

TABLE 6.—*Diagnosis on Admission—(Concluded)*

	ADULTS		CHILDREN		Totals	Per- centages
	Males	Females	Males	Females		
<i>Fine Lesions</i>						
Tb. adenitis, cervical, Tb. wrist, Tb. ankle, Tb. fibula, Tb. spine	-	-	1	-	1	.49
	-	-	1	-	1	-
<i>Six Lesions</i>						
Tb. adenitis, mesenteric, cervi- cal, mediastinal, inguinal and axillary, Tb. hip	-	1	-	-	1	.49
	-	1	-	-	1	-
<i>Non-tuberculous</i>						
Abscess in back	1	-	-	-	1	.49
Adenitis, cervical	-	-	-	1	1	.49
Arthritis	2	1	-	1	4	1.96
Colitis	1	-	-	-	1	.49
Duodenal ulcer (Tb. sacro-iliac, arrested)	1	-	-	-	1	.49
Enteritis	1	-	-	-	1	.49
Femur	1	-	-	-	1	.49
Foot	-	-	-	1	1	.49
Genito-urinary tract	-	1	-	-	1	.49
Hip	-	-	-	1	1	.49
Hodgkins disease	-	-	1	-	1	.49
Hydrocephalus	-	-	1	-	1	.49
Lymphoma	-	1	-	-	1	.49
Osteomyelitis	-	-	-	1	1	.49
Pyo-nephrosis, renal calculi	-	1	-	-	1	.49
Spine	-	-	-	1	1	.49
Wrist	1	-	-	-	1	.49
Unclassified	2	3	2	1	8	3.92
	10	7	4	7	28	-

TABLE 7.—*Condition on Discharge*

	ADULTS		CHILDREN		Totals	Per- centages
	Males	Females	Males	Females		
Arrested	22	20	21	23	86	44.79
Apparently arrested	1	3	2	1	7	3.64
Quiescent	9	10	-	-	19	9.90
Improved	11	11	2	2	26	13.54
Unimproved	2	1	-	-	3	1.56
Deaths	13	3	4	4	24	12.50
Not considered	3	2	1	2	8	4.17
Non-tuberculous	9	3	3	4	19	9.90
	70	53	33	36	192	-

TABLE 8.—*Deaths*

DURATION OF DISEASE	ADULTS		CHILDREN		Totals	LENGTH OF RESIDENCE IN SANATORIUM				
	Males	Fe- males	Males	Fe- males		ADULTS		CHILDREN		Total
						Males	Fe- males	Males	Fe- males	
Less than 1 month	-	-	-	-	-	1	1	-	1	3
1 to 2 months	-	-	-	-	-	1	-	-	-	1
2 to 3 "	-	-	-	-	-	2	-	-	1	3
3 to 4 "	-	-	-	-	-	2	-	-	-	2
4 to 5 "	-	-	-	-	-	1	-	-	-	1
5 to 6 "	-	-	-	-	-	-	-	-	-	-
6 to 7 "	1	-	-	-	1	1	-	-	-	1
7 to 8 "	-	-	-	-	-	-	-	-	-	-
8 to 9 "	-	-	-	-	-	-	1	-	-	1
9 to 10 "	-	-	-	-	-	-	-	-	-	-
10 to 12 "	-	-	-	-	-	1	-	1	1	3
12 to 18 "	2	-	-	-	2	2	-	1	-	3
18 to 24 "	1	-	-	2	3	1	-	-	-	1
Over 2 years	9	3	4	2	18	1	1	2	1	5
	13	3	4	4	24	13	3	4	4	24

TABLE 9.—*Causes of Death*

	ADULTS		CHILDREN		Totals
	Males	Females	Males	Females	
Tb. colitis, Tb. adenitis, mesenteric . . . . .	—	1	—	—	1
Tb. hip with draining sinus and ulcerations . . . . .	—	—	—	1	1
Tb. hip, Tb. nephritis, Tb. epididymitis . . . . .	1	—	—	—	1
Tb. hip, Tb. sacro-iliac . . . . .	1	—	—	—	1
Tb. nephritis . . . . .	1	—	—	—	1
Tb. nephritis, Tb. cystitis . . . . .	1	—	—	—	1
Tb. nephritis, Tb. cystitis, miliary Tb. . . . .	—	—	1	—	1
Tb. osteomyelitis, chronic suppurative . . . . .	—	—	1	—	1
Tb. peritonitis, Addison's disease, amyloidosis . . . . .	—	—	—	1	1
Tb. peritonitis, Tb. pyo-hydro nephrosis, Tb. entero-colitis . . . . .	—	1	—	—	1
Tb. shoulder, Tb. adenitis, cervical, Tb. hand . . . . .	1	—	—	—	1
Tb. spine . . . . .	4	—	1	—	5
Tb. spine, amyloidosis . . . . .	1	—	—	1	2
Tb. spine, hilum Tb. . . . .	—	—	1	—	1
Tb. spine, lobar pneumonia . . . . .	—	—	—	1	1
Tb. spine, Tb. nephritis, Tb. hip . . . . .	—	1	—	—	1
Tb. spine, Tb. nephritis, Tb. meningitis, amyloidosis . . . . .	1	—	—	—	1
Tb. trochanter, Tb. hip, amyloidosis . . . . .	1	—	—	—	1
Subacute pancreatitis, paralytic ileus, myocardial insufficiency, Tb. knees . . . . .	1	—	—	—	1
	13	3	4	4	24

## Financial Report, Lakeville State Sanatorium, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1934.

### STATEMENT OF EARNINGS

Board of patients:			
Private		\$3,550 00	
Cities and towns		130,841 31	
			\$134,391 31
Personal services:			
Reimbursement from Board of Retirement			\$114 00
Sales:			
Food		\$118 39	
Furniture and household supplies		11 85	
Medical and general care		61 45	
Farm		913 92	
Garage, stable and grounds		128 69	
Repairs, ordinary		26 50	
Miscellaneous—junk		28 95	
			\$1,289 75
Miscellaneous:			
Rents, land claim		1 00	
			\$1.00
Total earnings for the year			\$135,796 06
Total cash receipts reverting and transferred to the State Treasurer			\$135,796 88
Accounts receivable outstanding Dec. 1, 1933		\$38,476 74	
Accounts receivable outstanding Nov. 30, 1934		38,475 92	
Accounts receivable decreased			\$ .82

### MAINTENANCE APPROPRIATION

Balance from previous year, brought forward			\$5,312 94
Appropriation, current year		\$253,095 00	
Chapter 213, Act 1934		5,500 00	
Chapter 213, Act 1934		4,231 00	
			\$262,826 00
Total			\$268,138 94
Expenditures as follows:			
Personal services		\$56,381 30	
Food		32,003 87	
Medical and general care		10,552 16	
Farm		13,994 16	
Heat, light and power		13,625 16	
Garage, stable and grounds		2,372 21	
Travel, transportation and office expenses		3,598 52	
Religious instruction		1,281 90	
Clothing and materials		770 05	
Furnishings and household supplies		16,381 84	
Repairs, ordinary		3,608 11	
Repairs and renewals		3,538 71	
Grounds		407 56	
			\$258,515 55
Balance of maintenance appropriation, Nov. 30, 1934			9,623 39
Estimated outstanding liabilities, Nov. 30, 1934			\$6,721 45

### SPECIAL APPROPRIATIONS

Balance December 1, 1934, brought forward			22,400 00
Appropriations for current year			22,400 00
			\$44,800 00
Total			\$22,400 00
Expended during the year (see statement below)		\$16,989 99	
Reverting to Treasury of Commonwealth		*	
(Star balances below that are reverting)			
Balance November 30, 1934, carried to next year			\$5,410 01

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Lamp Room Equip. (Men's)	1934-162	\$6,700 00	\$6,638 98	\$6,638 98	\$61 02
Lamp Room Equip. (Women's)	1934-162	6,700 00	6,665 18	6,665 18	34 82
X-ray machine and fluoroscope	1934-162	4,000 00	58 35	58 35	3,941 65
Sub total of specials		\$17,400 00	\$13,362 51	\$13,362 51	\$4,037 49
P.W.A. Docket 1354 Mass. State Project H-1	1934	5,000 00	3,627 48	3,627 48	1,372 52
<b>Totals</b>		<b>\$22,400 00</b>	<b>\$16,989 99</b>	<b>\$61,989 99</b>	<b>\$5,410 01</b>

PER CAPITA

During the year the average number of patients has been . . . . .		285.2711
Total cost of maintenance . . . . .	\$258,515 55	
Equal to a weekly per capita cost of (52 weeks to year) . . . . .	17,427.11	
Total receipts for the year . . . . .	135,796 88	
Equal to a weekly per capita of . . . . .	9.1543	
Total net cost of maintenance for year . . . . .	258,515 55	
	135,796 88	
(Total maintenance less total receipts) . . . . .		\$122,718 67
Net weekly per capita . . . . .	8.27275	

Respectfully submitted,

FLORENCE S. MONROE,  
*Treasurer.*

Inventory, Lakeville State Sanatorium

GRAND SUMMARY SHEET

November 30, 1934

REAL ESTATE

Land, 251.61 acres . . . . .	\$18,065 00	
Buildings . . . . .	533,892 26	
Betterments (additions and improvements) . . . . .	167,710 78	
Total, Real Estate . . . . .		\$719,668 04

PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses . . . . .	\$381 74	
Food . . . . .	2,719 34	
Clothing and materials . . . . .	281 84	
Furnishings and household supplies . . . . .	1,784 09	
Medical and general care . . . . .	1,963 74	
Heat, light and power . . . . .	399 93	
Farm . . . . .	597 54	
Garage, stable and grounds . . . . .	78 08	
Repairs . . . . .	2,574 64	
Total . . . . .		\$10,780 94

PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses . . . . .	\$2,135 91	
Clothing and materials . . . . .	692 61	
Furnishings and household supplies . . . . .	46,994 72	
Medical and general care . . . . .	13,500 74	
Heat, light and power . . . . .	81 55	
Farm . . . . .	27,304 42	
Garage, stable and grounds . . . . .	3,712 67	
Repairs . . . . .	2,327 50	
Total . . . . .		\$96,750 12

GRAND SUMMARY

Real Estate—Total . . . . .	\$719,668 04	
Personal Property—Undistributed Supplies, Total . . . . .	10,780 94	
Personal Property—Distributed Supplies, Total . . . . .	96,750 12	
Total . . . . .		\$827,199 10

NORTH READING STATE SANATORIUM

RESIDENT OFFICERS

- CARL C. MACCORISON, M.D., *Sanatorium Superintendent.*
- EARLE C. WILLOUGHBY, M.D., *Assistant Superintendent.*
- GERALD H. CARON, M.D., *Assistant Physician.*
- ANNA H. MAXWELL, M.D., *Assistant Physician.*
- RUFUS F. LITTLE, M.D., *Assistant Physician.*
- JAMES H. POWERS, D.M.D., *Dentist.*
- ETHEL M. KNIGHT, *Institution Treasurer.*
- ELLEN E. BENT, R.N., *Principal, School of Nursing.*
- ELIZABETH HASLETT, *Head Housekeeper.*
- BEULAH F. PHILBROOK, *Head School Teacher.*
- J. ELLIS DOUCETTE, *Sanatorium Steward.*
- DANIEL J. SCOTT, *Chief Power Plant Engineer.*
- EDWARD J. LEARY, *Head Farmer.*

## NON-RESIDENT OFFICERS

EDWARD D. CHURCHILL, M.D., *Consultant, Thoracic Surgeon*  
 ZABDIEL ADAMS, M.D., *Consultant, Orthopedic Surgeon.*  
 HALSEY B. LODER, M.D., *Consultant, General Surgeon.*  
 HAROLD L. HIGGINS, M.D., *Consultant, Pediatrician.*  
 THOMAS ODONEAL, M.D., *Consultant, Ophthalmologist.*  
 CHARLES W. DEWOLFE, M.D., *Consultant, Laryngologist.*

## Report of the Superintendent

TO HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor of submitting the twenty-fourth annual report of the North Reading State Sanatorium for the year ending November 30, 1934.

## FINANCIAL STATEMENT

During the year there has been expended for maintenance \$216,051.04, a gross weekly per capita cost of \$15.89. There has been nothing expended for Special Appropriations during 1934.

There has been collected from miscellaneous sources \$80,644.03 (the total of all collections). Deducting this amount from the gross maintenance expenses leaves a net expense of \$135,407.01. The net weekly per capita cost was \$10.02. There has been collected from private funds \$3,110.00; from cities and towns, \$76,879.57. Twenty cases (including twelve from the Division of Child Guardianship) were supported by private funds; 347 by cities and towns and ninety-two wholly by the state.

## POPULATION

There were 269 patients at the beginning of the fiscal year and 246 at the close. The largest number present at any one time was 277 and the smallest number present at any one time was 241. The daily average number of patients was 259.9 as against 269.95 last year. There were 228 patients admitted during the year, thirty-seven less than last year.

There were 182 cases admitted from cities and towns over 25,000 population, and 46 cases from cities and towns under 25,000 population. The average age of patients was 9.75. Although the average age remains practically the same, there was an increased number of children admitted between the ages of 14 and 19 with pulmonary type tuberculosis. Including deaths, there were 251 cases discharged, and the average duration of residence was 12 months and 1 day. Of those discharged, 210 patients gained 2,465 $\frac{3}{4}$  lbs., an average gain of 11.7 lbs. per person.

Of the discharges there were 25 apparently well, 118 arrested, 39 apparently arrested, 7 quiescent, 22 improved, 22 unimproved, 2 not considered—the duration of treatment being less than thirty days. There were 16 deaths, the same number as last year.

There were 94,862 hospital days.

Average number of officers and employees: Males, 55.76; females, 74.057; total, 129.818.

## MEDICAL REPORT

During the year the Sanatorium has made greater use of pneumothorax treatment and surgical aid in the treatment of children suffering from adult type of disease. At the end of the year, 17 patients were receiving pneumothorax treatment, 36 children in all received artificial pneumothorax during the year and 603 refills were given. Twenty-two of these refills were given to a discharged Rutland patient and two employees (graduate nurse and assistant physician.)

Pneumolysis was performed on three patients, and three other patients had a phrenic nerve operation. Four patients had a thoracoplasty, and lobectomy was done on three patients.

At the end of the fiscal year, 80 of the 246 cases showed the adult type disease; 44 of these, however, had the inactive type of disease and the majority were attending school.

The latter part of October, the Sanatorium took over the school clinic work in Haverhill, Methuen, Lawrence, North Reading, Wakefield, Reading, Cambridge and Lowell. At the end of the fiscal year, 2,485 children in 22 schools of Lawrence,

in grades 6, 9 and 11 were tested, the reactors X-rayed, and the majority examined. Dr. Caron has been detailed to this work.

Last year, 1,278 patients were examined in our out-patient clinic and 254 examinations were made in the consultation clinics held in Lawrence and Haverhill. It is gratifying to note that there is a steady increase in the number of patients applying for examination in the out-patient department and in the consultation clinics.

Dr. Cooper, our consultant from the Department of Mental Diseases, together with her psychologist, Miss Culbert, has held 14 clinics at the Sanatorium and has examined 45 children.

Thirteen eye, ear, nose and throat clinics were held by our consultants, Doctors Odoneal and DeWolfe. One hundred and seventeen children were referred to these clinics. Fifty-five were fitted to glasses, and tonsils and adenoids removed from 26 patients. In addition, Dr. DeWolfe did bronchoscopic examinations on four patients. Dr. Edward Churchill, our consultant in chest surgery, held three clinics during the year and 45 patients were referred.

During the past year there were ten cases of whooping cough beginning in January, 1934, and fifteen cases of chicken pox. A diagnosis of scarlet fever was made on one patient, and also one patient was diagnosed as measles.

In November, 1934, all employees who came in contact with children were Dick tested and are being immunized against scarlet fever. One hundred and six employees were Dick tested and 19, or 18 per cent, were positive reactors.

#### INSTITUTIONAL ACTIVITIES

The following programs, consisting of lectures, clinics, etc., were held at the Sanatorium:

January 16, 1934: Annual meeting of the Southern Middlesex Health Association.

March 21, 1934: Senior class of the New England Sanatorium Training School.

March 23 and 29, 1934: Special class of Dr. Robert H. Nichols.

May 1, 1934: Southern Middlesex Health Association, Health Day.

July 20, 1934: Dr. Harold L. Higgins of the Massachusetts General Hospital and his class in pediatrics.

October 11, 1934: Dr. Wilson G. Smillie of the School of Public Health, Harvard University, and his class in Public Health Administration.

November 22, 1934: Second year class of the training school of the Malden Hospital.

In addition, the staff have given talks on tuberculosis, illustrated by moving pictures, at the Lawrence Lion's Club, Lawrence Tuberculosis Association, Training School for Nurses at the Essex County Sanatorium and the North Reading Grange.

#### PERSONNEL

Dr. Rufus F. Little was appointed on the staff as assistant physician July 10th.

I regret to report the resignation of the Rev. J. L. McCorison in October.

#### IMPROVEMENTS AND CHANGES

The three old engines in the power plant were repaired at a cost of \$1,175. Additional hydrants have been installed to take care of the south side of the Administration Building; also the nurses' hall, medical building, Pavilions B East and C East. The contract has been signed for the extension of the sprinkler system in the attic of the nurses' hall. A garage holding thirty-one cars has been built for the rental of employees, part of the work being done by the CWA and the ERA.

The wood verandas on Pavilion B West and C East have been replaced with cement.

The school house was painted inside and out, labor being furnished by CWA and ERA.

The small water tank by the power plant was painted and put in good condition.

Murals were painted in Wards 2 and 4, dining room of Ward 2, waiting room of our out-patient department, and the kindergarten class room at the school, as a CWA project.

#### RECOMMENDATIONS

This coming year our old 25,000 gallon wood stave tank, which supplies the

sprinkler heads throughout the institution, should be replaced by a new wooden tank.

A new hydrant should be installed near the new garages which were constructed this last year.

Additional sprinkler heads have been recommended by the engineering division for the attics of the wards and pavilions and dormitories. They have also recommended a new 6 inch compound uniflow meter, four test wells, the installation of an irrigating pump and extension of the irrigating system. Our present irrigating pump is too small to handle the work and we have been compelled to use our larger fire pump several times daily during the past summer to take care of the load.

The installation of an irrigating pump will bring about a marked saving in the cost of electricity.

Our old laundry presses are in very bad condition and will have to be replaced this coming year.

We believe it to be economical to install oil burners in the kitchen and bakeshop ovens.

We are badly in need of new dental equipment.

In order to give greater comfort to the employees living in the upper floor of the Administration Building, I would recommend that the attic be insulated.

#### ACKNOWLEDGMENTS

I wish to thank the Rev. Father Brandley and his assistants, Rev. J. L. McCorison, Rev. George H. Gage, Rev. Warren Landers and Rabbi Zeldner, who have so faithfully conducted the religious services at the Sanatorium and taken care of the spiritual needs of our little patients.

I am greatly indebted to the many friends who have contributed so generously of their time and talents in entertaining the children and for the numerous gifts that have been donated from time to time.

I wish to thank the heads of departments and employees for their loyalty and cooperation during the past year.

#### LABORATORY REPORT

The following examinations were made in our laboratory:

Sputum examinations: Positive . . . . .	233	
Negative . . . . .	731	964
Urine analyses . . . . .		1,715
White blood counts . . . . .		417
Red blood counts . . . . .		312
Differential blood counts . . . . .		408
Hemoglobin estimations . . . . .		340
Blood sedimentation tests . . . . .		47
Babcock tests . . . . .		39
Bacterial counts for milk . . . . .		39
Throat cultures . . . . .		64
Other cultures and smears . . . . .		81
Widal tests . . . . .		61
Spinal fluids . . . . .		2
Blood coagulation tests . . . . .		14

#### DENTAL REPORT

The following table is a summary of the work done this year:

Prophylactic treatments . . . . .	471
Fillings (permanent teeth) . . . . .	644
Fillings (temporary teeth) . . . . .	281
Extractions (permanent teeth) . . . . .	417
Extractions (temporary teeth) . . . . .	719
Treatments . . . . .	281
Restorations . . . . .	3
X-rays . . . . .	337
Irrigations . . . . .	213
Visits . . . . .	893
New patients . . . . .	276
Dismissals . . . . .	296

## SCHOOL REPORT

Owing to the large number of pupils in the combined fifth and sixth grades, it became necessary to separate them. To meet this requirement, a temporary appointment was made. Mrs. Leary was released from the first grade and Miss Brink took her place. At present there are forty-three in the combined fifth and sixth grades and one in the hospital, who will enter in a few days. It would be impossible to teach forty-four pupils at one time in our short session of two hours and twenty minutes and also when children are continually coming and going as they are here. Not only is Miss Brink's service necessary in the above mentioned capacity but also it has proved very beneficial to the children immediately below regular school age, as she is able to conduct kindergarten activities with them in the forenoon. These little people are much happier throughout the day because they are taught, and play together. Their songs and games carry over into their afternoon playtime and there is a marked improvement in their behavior. Miss Brink's work is very valuable to the lives of these little children and it is hoped that her appointment may be made permanent.

An important development of the work for the year has been the introduction of bedside instruction in the wards. This work was carried on daily throughout the summer months. It was found to be so interesting and helpful to these young people, that it has been continued with gratifying results. For some time it was observed that many conscientious boys and girls, who were too ill to attend school, were concerned because their classmates were getting ahead of them. We have found that this instruction occupies their minds and tends to keep them contented and happy.

Our usual summer school was conducted this summer during a period of seven weeks. The total enrollment for the summer was approximately seventy-five. Not all continued through the season. As quickly as they individually completed their work, they were excused. It was found that some of the boys and girls required the time for making up their work to retain their class standing. There were others who elected the work with the desire to make extra grades. For example, Joseph Farina is now sixteen years of age. He entered the first grade three years ago, but on account of his age and size, he felt greatly out of place. He was delighted to have an opportunity to make up his work. Each year he has completed two years of grade work and is now in the eighth grade. He is somewhat retarded but is associating with boys of his own size and is very happy.

In our high school section, we have the largest number of students in its history. In the early fall we had an enrollment of thirty-four. One student has gone through all the grades of our school. Much time and careful attention have been given to the development of a curriculum for the high school grades.

The curriculum at present includes the following courses: English, French, typewriting, shorthand, bookkeeping, economic geography, music appreciation, physical training, manual training, practical arts, and sewing. Twenty units of credits comprise one year's work. Fourteen of our students are carrying full requirement and eight of these are carrying additional subjects.

The extra-curricula department offers a wide range of activities. As the children select various projects, a careful study is being made of their individual aptitudes and abilities. They are encouraged to continue in the work best suited to their condition. Two lathes and a power jig saw have been added to our equipment. These machines are very beneficial to the older boys who are not physically able to use the hand wood-working tools. Mr. Holmes instructs them one forenoon fortnightly and Mr. Walsh helps them one forenoon weekly.

*School Statistics*

	Average Daily Attendance	Per Cent of Attendance	Total Enrollment
Kindergarten . . . . .	20.85	95.7	48
Grade I . . . . .	17.00	93.25	47
Grade II . . . . .	17.96	94.99	55
Grades III and IV . . . . .	33.46	96.5	81
Grades V and VI . . . . .	48.72	97.69	69
Grades VII and VIII . . . . .	27.56	96.84	72
High School . . . . .	21.35	97.99	50
Entire School . . . . .	186.90	96.14	422

Respectfully submitted,

CARL C. MACCORISON, M.D.

*Superintendent.*

**Statistical Tables**

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in Sanatorium Dec. 1, 1933 . . . . .	140	129	269
Patients admitted from Dec. 1, 1933, to Nov. 30, 1934, incl. . . . .	99	129	228
Patients discharged from Dec. 1, 1933, to Nov. 30, 1934, incl. . . . .	113	138	251
Patients remaining in Sanatorium November 30, 1934 . . . . .	126	120	246
Daily average number patients . . . . .	130.03	129.87	259.90
Deaths (included in number discharged) . . . . .	9	7	16

TABLE 2.—*Classification on Application Blanks and on Admissions.*

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1933	1934	1933	1934	1933	1934
Minimal . . . . .	30	38	10	23	3.77	10.09
Moderately advanced . . . . .	24	28	16	11	6.04	4.82
Advanced . . . . .	17	11	26	22	9.81	9.65
Unclassified . . . . .	9	23	4	1	1.50	.44
Childhood type tuberculosis . . . . .	165	114	165	150	62.26	65.79
Malnutrition . . . . .	0	0	14	10	5.28	4.39
No disease . . . . .	0	0	13	8	4.90	3.50
Pleurisy with effusion . . . . .	1	2	—	—	—	—
Bronchiectasis . . . . .	0	0	3	0	1.13	—
Acute bronchitis . . . . .	0	0	1	0	.38	—
Empyema (chronic) . . . . .	1	0	1	0	.38	—
Lung abscess . . . . .	0	0	1	0	.38	—
Pulmonary tuberculosis . . . . .	2	2	0	0	—	—
Observation . . . . .	14	8	0	0	—	—
Deferred . . . . .	0	0	5	0	1.89	—
Tbc. cervical adenitis . . . . .	1	0	0	0	—	—
Resolving broncho-pneumonia . . . . .	0	0	0	1	—	.44
Pyro-pneumothorax . . . . .	0	0	1	0	.38	—
Convalescent pyro pneumo- thorax . . . . .	0	0	1	0	.38	—
Glandular tuberculosis . . . . .	1	0	0	0	—	—
Convalescing pneumonia . . . . .	0	0	1	0	.38	—
Atelectasis . . . . .	0	0	1	0	.38	—
Bronchial asthma . . . . .	0	0	1	0	.38	—
Tuberculous spine . . . . .	0	0	1	0	.38	—
Tuberculous pneumonia . . . . .	0	1	0	0	—	—
Tuberculosis of peritoneum . . . . .	0	1	0	1	—	.44
Pyelitis . . . . .	0	0	0	1	—	.44
	265	228	265	228		

TABLE 3.—*Civil Condition of Patients Admitted*

	Males	Females	Total
Single . . . . .	99	129	228
Total . . . . .	99	129	228

TABLE 4.—*Age of Patients Admitted*

	Males	Females	Total	Per Cent
Under 5 years . . . . .	18	11	29	12.7
5 to 9 years . . . . .	33	29	62	27.2
10 to 14 years . . . . .	41	68	109	47.8
15 to 19 years . . . . .	7	21	28	12.3
20 years and over . . . . .	0	0	0	—
Average age . . . . .	8.48	10.72	9.75	—
Total . . . . .	99	129	228	100.0

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACE OF NATIVITY	MALES			FEMALES			TOTAL		
	Patient	Father	Mother	Patient	Father	Mother	Patient	Father	Mother
United States:									
Massachusetts . . . . .	89	33	34	118	41	54	207	74	88
Other New England States . . . . .	2	7	8	1	8	4	3	15	12
Other States . . . . .	3	5	5	5	6	9	8	11	14
	94	45	47	124	55	67	218	100	114
Other Countries:									
Albania . . . . .	0	1	1	0	1	1	0	2	2
Armenia . . . . .	0	0	0	0	2	2	0	2	2
Austria . . . . .	0	0	2	0	0	0	0	0	2
Azores . . . . .	0	0	0	0	1	1	0	1	1
Canada . . . . .	1	13	14	4	16	10	5	29	24
Cuba . . . . .	0	1	0	0	0	0	0	1	0
England . . . . .	1	2	3	0	1	1	1	3	4
Finland . . . . .	0	1	1	0	3	2	0	4	3
France . . . . .	0	0	1	0	0	0	0	0	1
Germany . . . . .	0	1	0	0	1	0	0	2	0
Greece . . . . .	0	0	0	0	3	2	0	3	2
Holland . . . . .	0	0	0	0	1	1	0	1	1
Ireland . . . . .	0	4	5	0	9	10	0	13	15
Italy . . . . .	0	13	9	1	17	10	1	30	19
Jamaica . . . . .	0	1	1	0	0	0	0	1	1
Lithuania . . . . .	2	2	4	0	1	1	2	3	5
Newfoundland . . . . .	0	1	0	0	2	4	0	3	4
Norway . . . . .	0	1	1	0	0	1	0	1	2
Poland . . . . .	0	2	0	0	1	2	0	3	2
Portugal . . . . .	0	1	0	0	5	3	0	6	3
Russia . . . . .	1	4	4	0	0	0	1	4	4
Scotland . . . . .	0	2	1	0	1	4	0	3	5
Spain . . . . .	0	0	0	0	0	1	0	0	1
Sweden . . . . .	0	0	0	0	1	0	0	1	0
Syria . . . . .	0	0	0	0	3	3	0	3	3
Turkey . . . . .	0	0	0	0	2	3	0	2	3
West Indies . . . . .	0	1	2	0	1	0	0	2	2
Unknown . . . . .	0	3	3	0	2	0	0	5	3
Total Foreign . . . . .	5	54	52	5	74	62	10	128	114
Grand Total . . . . .	99	99	99	129	129	129	228	228	228

TABLE 6.—*Residence of Patients Admitted*

Amesbury . . . . .	3	Haverhill . . . . .	3	Millis . . . . .	1	Salisbury . . . . .	1
Arlington . . . . .	5	Lawrence . . . . .	6	Natick . . . . .	1	Saugus . . . . .	5
Beverly . . . . .	2	Leicester . . . . .	1	Newburyport . . . . .	2	Somerville . . . . .	8
Boston . . . . .	60	Littleton . . . . .	1	Newton . . . . .	4	Stoughton . . . . .	2
Cambridge . . . . .	26	Lowell . . . . .	3	North Reading . . . . .	1	Swampscott . . . . .	1
Chelsea . . . . .	9	Lynn . . . . .	7	Peabody . . . . .	1	Tewksbury . . . . .	1
Cohasset . . . . .	1	Malden . . . . .	4	Quincy . . . . .	21	Waltham . . . . .	1
Concord . . . . .	1	Manchester . . . . .	2	Reading . . . . .	7	Watertown . . . . .	5
Dracut . . . . .	1	Maynard . . . . .	1	Revere . . . . .	8	Weymouth . . . . .	5
Everett . . . . .	4	Medford . . . . .	4	Rockport . . . . .	1	Woburn . . . . .	1
Gloucester . . . . .	4	Milford . . . . .	1	Salem . . . . .	2	Total . . . . .	228

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Total	Percentage
Childhood tuberculosis . . . . .	72	78	150	65.79
Minimal . . . . .	8	15	23	10.00
Moderately advanced . . . . .	3	8	11	4.82
Advanced . . . . .	1	21	22	9.65
Malnutrition . . . . .	6	4	10	4.39
No disease . . . . .	6	2	8	3.50
Tuberculosis of peritoneum . . . . .	0	1	1	.44
Resolving broncho-pneumonia . . . . .	1	0	1	.44
Pyelitis . . . . .	1	0	1	.44
Unclassified . . . . .	1	0	1	.44
Total . . . . .	99	129	228	100.00

TABLE 8.—Condition on Discharge

	Males	Females	Total	Percentage
Apparently well . . . . .	17	8	25	9.96
Arrested . . . . .	67	51	118	47.01
Apparently arrested . . . . .	13	26	39	15.54
Quiescent . . . . .	1	6	7	2.79
Improved . . . . .	7	15	22	8.77
Unimproved . . . . .	4	18	22	8.77
Died . . . . .	3	13	16	6.36
Not considered . . . . .	1	1	2	.80
<b>Total . . . . .</b>	<b>113</b>	<b>138</b>	<b>251</b>	<b>100.00</b>

TABLE 9.—Deaths

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
Under 1 month . . . . .	0	0	0	1	2	3
1 to 2 months . . . . .	0	0	0	0	0	0
2 to 3 months . . . . .	0	0	0	2	1	3
3 to 4 months . . . . .	0	1	1	0	2	2
4 to 5 months . . . . .	0	0	0	0	0	0
5 to 6 months . . . . .	0	0	0	0	1	1
6 to 7 months . . . . .	0	0	0	0	1	1
7 to 8 months . . . . .	0	0	0	0	1	1
8 to 9 months . . . . .	0	2	2	0	0	0
9 to 10 months . . . . .	1	0	1	0	0	0
10 to 11 months . . . . .	0	0	0	0	1	1
11 to 12 months . . . . .	0	1	1	0	0	0
12 to 18 months . . . . .	1	3	4	0	2	2
18 to 24 months . . . . .	0	2	2	0	0	0
Over 2 years . . . . .	1	4	5	0	2	2
<b>Total . . . . .</b>	<b>3</b>	<b>13</b>	<b>16</b>	<b>3</b>	<b>13</b>	<b>16</b>

TABLE 10.—Causes of Death

	Males	Females	Total
Tuberculosis of lungs . . . . .	3	12	15
Tuberculosis of peritoneum . . . . .	0	1	1
<b>Total . . . . .</b>	<b>3</b>	<b>13</b>	<b>16</b>

## Financial Report, North Reading State Sanatorium, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1934.

### STATEMENT OF EARNINGS

Board of patients:			
Private . . . . .	\$3,123	00	
Cities and towns . . . . .	71,139	02	
			\$74,262 02
Personal services:			
Reimbursement from Board of Retirement . . . . .			\$99 00
Sales:			
Food . . . . .	\$20	68	
Clothing and materials . . . . .	149	69	
Furniture and household supplies . . . . .	53	58	
Medical and general care . . . . .	58	26	
Heat, light and power . . . . .	3	80	
Farm . . . . .	23	20	
Garage, stable and grounds . . . . .	69	16	
Repairs, ordinary . . . . .	5	95	
Miscellaneous—junk . . . . .	61	32	
			\$445 64
Total sales . . . . .			\$445 64
Miscellaneous:			
Rents . . . . .			
Garages . . . . .	\$154	25	
			\$154 25
Total, miscellaneous . . . . .			\$154 25
<b>Total earnings for the year . . . . .</b>			<b>\$74,960 91</b>
Total cash receipts reverting and transferred to the State Treasurer . . . . .			\$80,644 03
Accounts receivable outstanding Dec. 1, 1933 . . . . .		\$26,509	62
Accounts receivable outstanding Nov. 30, 1934 . . . . .		20,826	50
Accounts receivable decreased . . . . .			5,683 12

**MAINTENANCE APPROPRIATION**

Balance from previous year, brought forward . . . . .		\$10,969 84
Appropriation, current year . . . . .	\$216,670 00	\$216,670 00
<b>Total . . . . .</b>		<b>\$227,639 84</b>
Expenditures as follows:		
Personal services . . . . .	\$135,499 24	
Food . . . . .	36,250 93	
Medical and general care . . . . .	6,998 73	
Farm . . . . .	2,747 50	
Heat, light and power . . . . .	13,075 57	
Garage, stable and grounds . . . . .	2,115 65	
Travel, transportation and office expenses . . . . .	2,769 49	
Religious instruction . . . . .	1,475 47	
Clothing and materials . . . . .	2,259 85	
Furnishings and household supplies . . . . .	5,037 98	
Repairs, ordinary . . . . .	3,022 84	
Repairs and renewals . . . . .	4,802 12	
<b>Total maintenance expenditures . . . . .</b>		<b>\$216,055 37</b>
Balance of maintenance appropriation, Nov. 30, 1934 . . . . .		11,584 47
Estimated outstanding liabilities, Nov. 30, 1934 . . . . .		\$5,486 70

**SPECIAL APPROPRIATIONS**

Balance December 1, 1933, brought forward . . . . .		\$3,120 41
Appropriations for current year . . . . .		
<b>Total . . . . .</b>		<b>\$3,120 41</b>
Expended during the year (see statement below)		
Reverting to Treasury of Commonwealth . . . . .	*\$3,120 41	
(Star balances below that are reverting)		3,120 41
<b>Balance November 30, 1934, carried to next year . . . . .</b>		

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Employees' Building . . . . .	115-1930 } 170-1932 }	\$75,000 00	-	\$72,406 08	\$2,593 92*
Certain Filter Beds . . . . .	69-1932	17,000 00		16,473 51	526 49*
		\$92,000 00		\$88,879 59	\$3,120 41

**PER CAPITA**

During the year the average number of patients has been . . . . .		259.9
Total cost of maintenance . . . . .	\$216,055 37	
Equal to a weekly per capita cost of (52 weeks to year) . . . . .	15.986	
Total receipts for the year . . . . .	80,644 03	
Equal to a weekly per capita of . . . . .	5.967	
Total net cost of maintenance for year (total maintenance less total receipts) . . . . .		\$135,411 34
Net weekly per capita . . . . .	10.019	

Respectfully submitted,

ETHEL M. KNIGHT,  
*Treasurer.*

**Inventory: North Reading State Sanatorium**

**GRAND SUMMARY SHEET**

November 30, 1934.

**REAL ESTATE**

Land, 112.81 acres . . . . .	\$9,495 22
Buildings . . . . .	641,425 14
Betterments (additions and improvements) . . . . .	142,233 66
<b>Total, Real Estate . . . . .</b>	<b>\$793,154 02</b>

**PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES**

Travel, transportation and office expenses . . . . .	\$306 23
Food . . . . .	4,528 13
Clothing and materials . . . . .	3,034 88
Furnishings and household supplies . . . . .	2,296 48
Medical and general care . . . . .	646 81
Heat, light and power . . . . .	1,606 10
Farm . . . . .	372 53
Garage, stable and grounds . . . . .	98 34
Repairs . . . . .	71 65
	<b>\$12,961 15</b>

## PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses . . . . .	\$4,597 54
Clothing and materials . . . . .	5,504 98
Furnishings and household supplies . . . . .	79,503 35
Medical and general care . . . . .	28,427 44
Heat, light and power . . . . .	76 50
Farm . . . . .	6,855 47
Garage, stable and grounds . . . . .	6,779 19
Repairs . . . . .	7,694 13
Total . . . . .	\$139,438 60

## GRAND SUMMARY

Real Estate—Total . . . . .		\$793,154 02
Personal Property—Undistributed Supplies, Total . . . . .	12,961 15	
Personal Property—Distributed Supplies, Total . . . . .	139,438 60	
		\$945,553 77

## RUTLAND STATE SANATORIUM

## RESIDENT OFFICERS

ERNEST B. EMERSON, M.D., *Superintendent.*  
 PAUL DUFAULT, M.D., *Assistant Superintendent.*  
 ARMAND LAROCHE, M.D., *Senior Physician.*  
 GABRIEL NADEAU, M.D., *Senior Physician.*  
 CHARLES K. MCCARTHY, M.D., *Assistant Physician.*  
 ISRAEL KAHALAS, M.D., *Assistant Physician.*  
 RUBY DELPHINA MCCARTHY, M.D., *Assistant Physician.*  
 GULLI LINDH MULLER, M.D., *Assistant Physician (Pathologist).*  
 DELYA E. NARDI, R.N., *Principal of the School of Nursing.*  
 RENA BLANCHE NAUSS, R.N., *Assistant Principal of the School of Nursing.*  
 MARGUERITE McNAMARA, *Dietitian.*  
 PHILIP G. ZARAMBA, *Steward.*  
 MARY A. BOYLE, *Institution Treasurer.*  
 HARRY U. WENDELL, *Chief Power Plant Engineer.*  
 JOSEPH A. CARROLL, *Head Farmer.*  
 NORA G. O'CONNELL, *Head Housekeeper.*

## NON-RESIDENT OFFICERS

FRANK H. WASHBURN, M.D., *Senior Physician.*  
 EDWARD D. CHURCHILL, M.D., *Senior Physician.*  
 G. ARNOLD RICE, M.D., *Senior Physician.*  
 SHIELDS WARREN, M.D., *Senior Physician (Pathologist).*  
 WILLIAM J. O'CONNOR, D.M.D., *Dentist.*

## Report of the Superintendent

TO DR. HENRY D. CHADWICK, *Commissioner, Department of Public Health:*

I have the honor to submit the thirty-eighth annual report of the Rutland State Sanatorium for the year ending November 30, 1934.

## FINANCIAL STATEMENT

During the year there has been expended \$272,710.91 for maintenance, a gross weekly per capita cost of \$14.89. There has been expended from Special Appropriation authorized by Chapter 162, Acts 1934, Sprinklers, \$5.55; from Emergency Public Works Commission, Construction Massachusetts State Projects, Docket 1354-H 2, Reconstruction Sewer Lines, \$6,471.12; Docket 2275, H 3, New Boilers, \$21,140.55.

There has been collected from miscellaneous sources (the total of all collections) \$192,270.83, an increase of \$854.97 over the collection of last year. Deducting this amount from the gross maintenance expense leaves a net expense of \$80,440.08, a net weekly per capita cost of \$4.39. There has been collected from private sources \$31,797.00, the largest collection since 1925; from cities and towns \$76,649.54; from Worcester County \$1,829.59; from the Tubercular Hospital District of Chelsea, Revere and Winthrop \$80,727.25, and by the Attorney General \$110.00.

Eighty-five cases were supported wholly or in part from private funds; ninety-

eight cases by cities and towns; eighty-six wholly by the State; forty-four by the Tubercular Hospital District of Chelsea, Revere and Winthrop, and one by Worcester County. There were forty-three cases on which settlement had not been determined.

#### POPULATION

There were 360 patients in the sanatorium at the beginning of the year and 357 at the close. The largest number present at one time was 371 and the smallest 329. The daily average number of patients was 352.08, an increase of 10.52 over last year. There were 395 patients admitted during the year, 38 more than last year; 31 minimal, 128 moderately advanced, 203 far advanced, 15 unclassified, 4 childhood type, 3 bronchiectasis, 2 pleurisy with effusion, 1 pleurisy and anemia, 3 lung abscess, 2 bronchial asthma, 1 multiple lung abscesses and empyema, 1 cancer of lung, and 1 empyema. There were 256 admitted from cities and towns of over 25,000 population and 139 from cities and towns under 25,000 population. The average age of patients admitted was 31.81, an increase of .88. Including deaths there were 398 patients discharged, 33 more than last year. The average duration of residence was 388 days, 1 more than last year. Of those discharged, 230 gained 2,151 $\frac{3}{4}$  pounds, an average gain of 9.36 pounds per person. Of the discharged, there were 14 apparently arrested cases, 4 more than last year; 165 quiescent cases, 5 more than last year; 63 improved; 55 unimproved; 1 bronchiectasis; 18 not considered, the duration of treatment being less than one month. There were 16 discharged non-tuberculous. There were 2 on which no diagnoses were made. There were 64 deaths, 2 more than last year. There were 128,510 days of treatment, 3,841 days more than last year.

Average number of employees and officers during the year: males, 121.18; females, 82.01; total, 203.19.

Further statistical details are shown in the tables which are a part of this report.

#### MEDICAL REPORT

Consultation clinics have been held monthly in Athol, Gardner, Southbridge and Milford.

These clinics and the out-patient service at the sanatorium show an increase in the number of patients examined as noted in the accompanying tables.

These clinics have established a point of contact between the physician, the laity and the sanatorium, which has resulted in an early diagnosis, and early treatment in many instances. I feel that a spirit of cooperation has developed that can lead only to further and more effective work in the field of tuberculosis.

The pathological service, established last year, has shown a steady and most satisfactory development and has been a lively stimulus for more and better work.

There has been a considerable increase in the use of collapse therapy.

Eighty-two more cases were given artificial pneumothorax than last year. The results perhaps have not been particularly striking inasmuch as the procedure has in many instances been carried out as a last resort measure and in cases hitherto considered unsuitable for collapse. We believe, however, that some of these cases have been helped, that others have derived no benefit, and that no one has been jeopardized.

It goes without saying that if pneumothorax is to be given as a last resort measure to the hopeless, or near-hopeless cases generally considered unsuitable, the results of this treatment cannot compare with the results obtained in the selected cases hitherto collapsed. It may be a question whether the results in this group be included in the general results of the whole number or be classified by themselves. The statistics may be misleading either way.

Regardless of whatever statistics one might like to build up, I believe that we should continue giving pneumothorax as a last resort measure with the expectation that an occasional case will be helped and that none will be subjected to a hazard that outweighs the chances for improvement.

The increase in the number of pneumothorax cases is an index of the increasing amount of nursing and medical care required in the present day treatment of tuberculosis: During the year, 1,389 more pneumothorax treatments were given; there were 18 more oleothorax cases with 56 more treatments; and 8 more general surgical cases.

With all this there is a corresponding increase in the amount of post-operative care, laboratory, X-ray, and clerical work.

The papers published by the staff during the year are listed at the end of the Commissioner's report.

The following papers, not yet published, were read at a meeting of the Worcester District Medical Society at the sanatorium:

"What We Have Learned From One Hundred Intra Pleural Pneumolyses," Frank H. Washburn, M.D.

"Roentgenological Odds and Ends," Paul Dufault, M.D.

The following papers, not yet published, were read at the meeting of the Eastern Section of the American Sanatorium Association:

"When Should Pneumothorax be Discontinued," Paul Dufault, M.D.

"What Information May Be Gained by Blood Studies in Artificial Pneumothorax," Gulli Lindh Muller, M.D.

#### INSTITUTIONAL ACTIVITIES

The Training School is in its twenty-seventh year.

Lectures and demonstrations have been given by the medical staff and special instruction by the following: Mrs. Helen Hackett, Consultant, Public Health Nursing; Dr. N. A. Nelson, Gonorrhoea and Syphilis; Dr. George Arnold Rice, Special Senses.

The hospital affiliations are:

Cooley-Dickinson Hospital . . . . .	8 months
Boston City Hospital . . . . .	1 year
Boston Floating Hospital . . . . .	3 months
North Reading State Sanatorium . . . . .	3 months

Graduation exercises were held October 19, 1934. The address was given by Prof. Herman F. Brase, State Teachers College, Lowell, Massachusetts.

The following were awarded diplomas: Agnes Geraldine Locker, Marguerite Theresa LaFosse, Helen Maria McCarty, Anne Isobel Whitney, Louise Tetlow.

The following have been awarded diplomas after completing the six months' postgraduate course: Elizabeth Susan Carr, a graduate of the Brantwood Hospital, Oxford, North Carolina; Rose Anna Houston, a graduate of Long Island Hospital, Long Island, New York; Hazel M. Bonzey, a graduate of Worcester City Hospital, Worcester, Massachusetts.

There are 30 student nurses: 13 seniors, 8 juniors and 9 preliminaries.

The April meeting of the Wachusett Medical Improvement Society was held at the sanatorium.

Dr. Robert H. Nichols and Dr. Paul Dufault conducted two postgraduate clinics.

Farm: The unusually severe weather of 1934 winter killed approximately 50 acres of alfalfa—with an estimated loss of 200 tons of this feed. Oats and peas were planted for a quick crop. There was also a reduction in the hay crop. It will probably be necessary to purchase about 40 tons of hay to carry through the year.

The herd is tuberculosis free.

There were 674,204 pounds of milk produced with an average of 11,309 pounds per cow.

#### PERSONNEL CHANGES

The medical staff remains the same as last year.

However calamitous the depression may be, the institution has fared well during these years with an improved personnel and continuity of service both of which are reflected in the morale and work done.

Following the decease of Olin C. Blaisdell, Philip G. Zaramba was promoted to the position of steward.

#### IMPROVEMENTS AND CHANGES

C.W.A. Project No. 2698—For inside and outside repairs, there was expended \$1,403.00, giving employment to 11 men for variable periods of time, a total of 2,062 hours.

Under this project there was also expended for materials charged to the maintenance appropriation \$1,377.72, a total of \$2,780.72.

Repairs and extensions were made to the staff dining room, to the lamp room and to the piggery.

C.W.A. Project No. 2697—For clearing brush and stones, there was expended \$1,243.75, giving employment to 11 men for variable periods of time.

Tools and materials used in this project were charged to the maintenance appropriation.

New boilers and oil-burning equipment authorized under Emergency Public Works Commission, Construction Massachusetts State Projects, Docket No. 2275, —H-3, are now under construction.

The Project, Docket No. 1354,—H-2, reconstruction of sewers, has been completed.

The filter beds were abandoned and the sewerage turned into the Metropolitan Sewer Nov. 7, 1934.

RECOMMENDATIONS

The increase in the surgical and nursing work noted above is more than an incident of the past year; it marks the high point of a progressive increase, over a period of several years, which will likely continue. I am, therefore, recommending the appointment of one head nurse and two attendant nurses as permanent employees.

Many patients suffer from defective vision, or eye strain, and in some instances from conditions directly due to tuberculosis. These patients have been seen and treated at the sanatorium, or referred to an oculist without any official connection with the sanatorium. These conditions require treatment as much as any other complicating disease. I, therefore, recommend the appointment of an oculist to the staff, subject to 24 calls a year at a salary of \$600.

Another junior clerk and stenographer is necessary if adequate records are to be kept. Prior to this year, much of this work has been done by convalescent patients with the expectation or hope that later they might be qualified for a position; but with the depression a Civil Service list has been established and there has been little incentive for the type of patient desired to come into the office. At best, it is a questionable policy.

An X-ray technician is recommended. This work is now done either by a physician alone, or with the assistance of a patient; again, this source of assistance is uncertain; furthermore, a physician's time should not be utilized developing and filing X-ray films.

For fire protection: a sum of \$8,300.00 for the construction of a main loop around buildings, approximately 1,660 feet of 6 inch and 8 inch cast iron pipe and the extension of a 6 inch domestic and fire service main to the farm buildings, approximately 2,080 feet.

For water supply: a sum of \$13,280.00 for the installation of a 150,000 gallon steel tank for additional domestic and fire service.

For surfaced road from Central Tree Road: a sum of \$15,000.00.

For lightning protection: a sum of \$1,360.00 for buildings not already protected.

Under 1935 Budget Item No. 12—Repairs and Renewals, I recommend the following items:

Post office boxes . . . . .	\$500.00
Repairs of verandas . . . . .	3,100.00
Repair of hay barn . . . . .	1,900.00
Remodeling old coal pit for vegetable cellar . . . . .	450.00
Outside stairway to bull pen . . . . .	275.00
Repairs to old milk house . . . . .	200.00
Masonry repairs . . . . .	1,000.00
Oil burning equipment for barns and houses . . . . .	3,000.00

\$10,425.00

The upkeep of buildings has lagged during the years of depression and further delay of necessary repairs will not, to say the least, decrease the expense.

ACKNOWLEDGMENTS

It is with a deep sense of personal loss that I record the death of Olin C. Blaisdell,

September 7, 1934, after nineteen years of service to this institution, the last thirteen years of which he served as steward.

Not only respected but loved by those with whom he came in daily contact, his going came as a grievous shock following an illness of less than forty-eight hours.

No one can appreciate better than I his sterling qualities, his sincerity, loyalty, devotion to duty and ideals, after seventeen years of business and social relations. Yet I but voice the feelings of all who knew him. The Commonwealth has lost a "good and faithful servant."

The Rev. Father McNamara, the Rev. Father Sullivan, the Rev. Robert French, the Rev. Father Smith and Rabbi Zeldner have ministered to the spiritual needs of all—not in a mere perfunctory manner but in a way to bring comfort and peace to those racked in body and spirit.

The medical staff, nurses and employees have again given me their loyalty, support and cooperation; they have made possible whatever measure of service has been rendered.

In closing, may I express my appreciation of your confidence and support throughout the year.

Respectfully,

ERNEST B. EMERSON, M.D.

*Superintendent.*

SURGICAL REPORT

The following is a list of the surgical operations performed at the sanatorium:

Alcohol injection of sacral nerve . . . . .	1
Appendectomy . . . . .	14
Biopsy . . . . .	7
Bronchoscopy . . . . .	90
Adenectomy . . . . .	3
Circumcision . . . . .	1
Cystoscopy . . . . .	5
Dilatation and curettage . . . . .	4
Dilatation and insertion of Chamber's Pessary . . . . .	2
Epididymectomy . . . . .	1
Fistula-in-ano . . . . .	2
Reduction of fracture . . . . .	2
Pan hysterectomy . . . . .	1
Pelviolithotomy . . . . .	1
Phrenicectomy . . . . .	55
Phrenic interruption . . . . .	16
Intrapleural pneumolysis . . . . .	63
Salpingectomy . . . . .	1
Scalenotomy . . . . .	20
Thoracoscopy . . . . .	2
Thoracotomy . . . . .	3
Tonsillectomy . . . . .	8
Trachelorrhaphy . . . . .	1
Transfusion . . . . .	1
Excision of neoplasm—lipoma . . . . .	1
Baldy-Webster operation . . . . .	3
Oophorectomy . . . . .	1
Orchidectomy, right and left . . . . .	1
<b>Total . . . . .</b>	<b>310</b>
Oleothorax cases . . . . .	24
Oleothorax treatments . . . . .	112
Artificial pneumothorax cases . . . . .	333
Artificial pneumothorax cases (out-patient) . . . . .	38
Artificial pneumothorax treatments . . . . .	6,228
Aspirations (chest) . . . . .	274

There were 29 thoracoplasties performed at the Massachusetts General Hospital.

## LABORATORY

Urine examinations:	
Routine chemical . . . . .	1,027
Microscopic . . . . .	1,026
Qualitative sugar determination . . . . .	1,700
Quantitative sugar determination . . . . .	3
Acetone . . . . .	1,711
Benzidin test for occult blood . . . . .	53
Mosenthal test . . . . .	6
Total chloride . . . . .	9
Kidney function (P.S.P.) test . . . . .	18
Sputum examinations: (increase over 1933, 888)	
Routine for tubercle bacilli . . . . .	6,804
Concentration method for tubercle bacilli . . . . .	9
Blood examinations:	
Culture . . . . .	4
Red cell count . . . . .	1,368
White cell count . . . . .	1,714
Differential count with modified Schilling index . . . . .	1,695
Hemoglobin determination (Hellige) . . . . .	1,843
Icterus index . . . . .	1,557
Reticulocyte count . . . . .	333
Hematocrit . . . . .	1,754
Erythrocyte sedimentation test . . . . .	1,788
Coagulation time . . . . .	178
Bleeding time . . . . .	2
Van den Bergh test . . . . .	1
Blood typing . . . . .	5
Sugar (Folin's method) . . . . .	68
Non-protein nitrogen . . . . .	11
Widal reaction . . . . .	105
Feces examinations:	
Benzidin test for occult blood . . . . .	13
Ova, tubercle bacilli, etc. . . . .	22
Pleural fluid examinations:	
Culture . . . . .	100
Smear . . . . .	52
Spinal fluid examinations:	
Cell count . . . . .	6
Chemical . . . . .	4
Milk examinations:	
Bacteria count . . . . .	22
Percentage of fat . . . . .	38
Water examinations:	
Bacteria count . . . . .	22
B. coli . . . . .	33
Miscellaneous examinations:	
Culture . . . . .	81
Smear . . . . .	207
Test for amyloid disease (intravenous injection of Congo red) . . . . .	1
Guinea pig inoculations and autopsies . . . . .	125
Preparation of autogenous vaccine . . . . .	4
Standardization of disinfectant . . . . .	2
Preparation of microscopical sections . . . . .	1,149
Total number of examinations (increase of 1933, 6,082) . . . . .	26,673

Specimens sent from laboratory to Boston:

Cultures from urine and feces for B typhosus . . . . .	67
Blood for Wassermann and Hinton tests . . . . .	380
Spinal fluid for Wassermann and Gold Sol tests . . . . .	5

Lectures in bacteriology to nurses' training school . . . . . 24

Of the total number of patients in the sanatorium November 30, 1934 (357) 81.6% have had a positive sputum; 4.5% reported no sputum; tubercle bacilli were not found in 13.9%. Of the total number of patients whose sputum was examined 85.5% were positive. Autopsies 34 (51.5%). Surgical specimens 52.

Smallpox vaccinations, 241. Typhoid and Paratyphoid A and B inoculations, 226.

X-ray plates of chest, stomach, etc., 2,637, and dental X-rays, 438; total, 3,075.

The following tables indicate the work of the consultation service, clinics, out-patient and others:

*Consultation Clinics:*

Number of patients examined at the Gardner, Milford, Southbridge and Athol clinics, 750.

*Diagnosis:*

Tuberculosis . . . . .	51	Childhood type . . . . .	50
Tuberculosis, re-examination . . . . .	20	Childhood type, re-examination . . . . .	29
Non-tuberculous . . . . .	209	Tuberculous pleurisy . . . . .	1
Non-tuberculous, re-examination . . . . .	5	Bronchiectasis . . . . .	8
Observation . . . . .	351		

Consultation cases to the number of 724 (193 more than last year) were referred for 878 examinations (272 more than last year) and 26 ex-patients (2 less than last year) reported for 35 follow-up examinations (the same as last year) making a total of 913 examinations (272 more than last year) at the consultation clinics.

Number of patients examined once, 658; twice, 100; four times, 5.

Number of ex-patients examined once, 19; twice, 6; four times, 1.

Number of physicians referring patients, 105 (3 less than last year).

There were 9 patients admitted to the sanatorium following examinations at the consultation clinics.

*Sanatorium Out-Patient Clinic:*

Patients referred by physician . . . . .	278
Patients examined at own request . . . . .	126
	<hr/>
Ex-patients examined at own request . . . . .	404
	194
	<hr/>
Total . . . . .	598

*Diagnosis:*

Non-tuberculous . . . . .	158	Childhood type, re-examination . . . . .	5
Tuberculosis . . . . .	55	Bronchiectasis . . . . .	3
Tuberculosis, re-examination . . . . .	4	Lung abscess . . . . .	1
Observation . . . . .	139	Tuberculous pleurisy . . . . .	5
Observation, re-examination . . . . .	4	Tuberculous pleurisy, re-examination . . . . .	1
Childhood type . . . . .	29		

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This year 404 patients (64 more than last year) reported for 425 examinations (58 more than last year), and 194 ex-patients (35 more than last year) reported for 215 examinations (8 more than last year) making a total of 640 examinations at the sanatorium.

Number of patients examined once, 340; twice, 16; three times, 15; four times, 2.

Number of ex-patients examined once, 156; twice, 22; and three times, 5.

Number of physicians referring patients to the sanatorium, 122.

There were 17 patients admitted to the sanatorium following examinations at the sanatorium.

The total of all examinations made during the year exclusive of routine work was 1,553, 338 more than last year.

### DENTAL REPORT

The following is a summary of the dental work done during the year:

Examinations . . . . .	277	Prophylaxis . . . . .	79
New patients . . . . .	305	Fillings . . . . .	492
Office visits . . . . .	2,685	Impressions . . . . .	23
Bed visits . . . . .	26	Altering plates . . . . .	11
Extractions in bed . . . . .	14	Repairing plates . . . . .	18
Extractions . . . . .	388	Removing bridges . . . . .	9
Post-extractions . . . . .	270	Re-cementing bridges . . . . .	2
Impacted extractions . . . . .	12	Removing gold crowns . . . . .	6
Emergency cases . . . . .	6	Fitting plates . . . . .	23
Root canal filling . . . . .	4	Trimming plates . . . . .	44
Socket curetted . . . . .	6	Mouth washes . . . . .	382
Osteomyelitis cases . . . . .	4	Stomatitis treatments . . . . .	15
Epulis tumor . . . . .	1	Exostosis treatments . . . . .	5
Pericementitis . . . . .	12	Cellulitis . . . . .	1
Gangrene stomatitis . . . . .	2	Hemorrhages checked . . . . .	2
Ankylosis . . . . .	3	Restorations . . . . .	23
Treatments . . . . .	820	X-rays . . . . .	438
Vincent's treatment . . . . .	22	Irrigations . . . . .	15
Gingivitis treatment . . . . .	119	Gold inlays . . . . .	3
Pyorrhoea treatment . . . . .	63	Gold crowns . . . . .	1
Gum treatment . . . . .	113	Tightening clasps . . . . .	14
Abscess cases . . . . .	42	Vulcanite stomatitis . . . . .	4
Lancing gums . . . . .	16	Trismus . . . . .	1
Sealing teeth . . . . .	51	Hypertrophy gum cases . . . . .	6
Removing bony process . . . . .	4		

### Statistical Tables

TABLE 1.—*Admissions and Discharges*

	Males	Females	Totals
Patients in sanatorium November 30, 1933	178	182	360
Patients admitted December 1, 1933, to November 30, 1934, inclusive	197	198	395
Patients discharged December 1, 1933, to November 30, 1934, inclusive	203	195	398
Patients remaining in sanatorium November 30, 1934	172	185	357
Daily average number of patients	182.06	170.02	352.08
Deaths (included in number discharged)	38	26	64

TABLE 2.—*Classification on Admission*

	Classification on Application Blanks		Our Classification on Admission		Percentage	
	1933	1934	1933	1934	1933	1934
Minimal . . . . .	61	55	34	31	9.52	7.85
Moderately advanced . . . . .	194	216	144	128	40.31	32.41
Far advanced . . . . .	68	83	152	203	42.60	51.40
Unclassified . . . . .	30	36	10	15	2.80	3.80
Childhood type . . . . .	4	5	5	4	1.40	1.02
Tuberculous pleurisy . . . . .	—	—	4	—	1.13	—
Chronic bronchiectasis . . . . .	—	—	2	3	.56	.76
Non-tuberculous . . . . .	—	—	2	—	.56	—
Lung abscess . . . . .	—	—	2	3	.56	.76
Empyema . . . . .	—	—	1	1	.28	.25
Hodgkin's disease . . . . .	—	—	1	—	.28	—
Pleurisy with effusion . . . . .	—	—	—	2	—	.50
Pleurisy and anaemia . . . . .	—	—	—	1	—	.25
Bronchial asthma . . . . .	—	—	—	2	—	.50
Multiple lung abscesses and empyema . . . . .	—	—	—	1	—	.25
Cancer of lung . . . . .	—	—	—	1	—	.25
	357	395	357	395		

TABLE 3.—Civil Condition of Patients Admitted

	Males	Females	Totals
Single . . . . .	95	108	203
Married . . . . .	93	75	168
Widowed . . . . .	7	11	18
Divorced . . . . .	2	4	6
	197	198	395

TABLE 4.—Age of Patients Admitted

	Males	Females	Totals	Percentages
Under 20 years . . . . .	13	19	32	8.11
20 to 29 years . . . . .	62	117	179	45.32
30 to 39 years . . . . .	65	33	98	24.81
40 to 49 years . . . . .	32	19	51	12.91
50 to 59 years . . . . .	19	5	24	6.07
60 to 69 years . . . . .	6	4	10	2.53
70 years and over . . . . .	—	1	1	.25
Average age . . . . .	34.29	29.32	31.81	—
Total . . . . .	197	198	395	

TABLE 5.—Nativity and Parentage of Patients Admitted

PLACES OF NATIVITY	MALES			FEMALES			TOTALS		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts . . . . .	120	36	50	122	36	42	242	72	92
Other New England States . . . . .	11	14	9	17	13	13	28	27	22
Other States . . . . .	15	9	12	13	15	7	28	24	19
Total Native . . . . .	146	59	71	152	64	62	298	123	133
Other Countries (20)									
Total Foreign . . . . .	51	130	123	46	130	129	97	260	252
Unknown . . . . .	—	8	3	—	4	7	—	12	10
Grand Totals . . . . .	197	197	197	198	198	198	395	395	395

TABLE 6.—Residences of Patients Admitted

Place	No.	Place	No.	Place	No.	Place	No.
Amherst . . . . .	1	Great Barrington . . . . .	2	Newton . . . . .	10	Stoneham . . . . .	1
Arlington . . . . .	6	Hartford, Conn. . . . .	2	North Adams . . . . .	5	Sudbury . . . . .	1
Ashland . . . . .	4	Hazardville, Conn. . . . .	1	Northampton . . . . .	2	Tewksbury . . . . .	1
Athol . . . . .	1	Holyoke . . . . .	32	North Brookfield . . . . .	1	Thompsonville, Ct. . . . .	1
Attleboro . . . . .	1	Hopedale . . . . .	1	Orange . . . . .	2	Townsend . . . . .	2
Belchertown . . . . .	1	Hopkinton . . . . .	1	Palmer . . . . .	6	Wakefield . . . . .	2
Belmont . . . . .	4	Hudson . . . . .	1	Pittsfield . . . . .	2	Walpole . . . . .	1
Boston . . . . .	74	Leicester . . . . .	1	Providence, R. I. . . . .	1	Waltham . . . . .	6
Brookline . . . . .	3	Leominster . . . . .	2	Putnam, Conn. . . . .	1	Watertown . . . . .	11
Cambridge . . . . .	10	Lexington . . . . .	3	Quincy . . . . .	1	Wayland . . . . .	1
Chelsea . . . . .	10	Lowell . . . . .	11	Reading . . . . .	3	Webster . . . . .	2
Chicopee . . . . .	6	Ludlow . . . . .	3	Revere . . . . .	18	Westfield . . . . .	4
Concord . . . . .	2	Lynn . . . . .	2	Rutland . . . . .	4	West Springfield . . . . .	2
Dalton . . . . .	1	Malden . . . . .	4	Salem . . . . .	3	Weymouth . . . . .	1
Dedham . . . . .	2	Manchester, Conn. . . . .	1	Seekonk . . . . .	1	Wilmington . . . . .	2
Easthampton . . . . .	3	Maynard . . . . .	1	Sherborn . . . . .	1	Winchester . . . . .	2
Everett . . . . .	6	Melrose . . . . .	12	Shrewsbury . . . . .	2	Winthrop . . . . .	7
Fall River . . . . .	3	Melrose . . . . .	3	Somerville . . . . .	20	Woburn . . . . .	9
Foxboro . . . . .	1	Montague . . . . .	1	Southbridge . . . . .	2	Worcester . . . . .	3
Framingham . . . . .	5	Natick . . . . .	4	South Hadley . . . . .	1	Wrentham . . . . .	1
Gardner . . . . .	2	New Bedford . . . . .	2	Springfield . . . . .	13		
						Total . . . . .	395

TABLE 7.—Stage of Disease on Admission

	Males	Females	Totals	Percentages
Minimal . . . . .	8	23	31	7.85
Moderately advanced . . . . .	60	68	128	32.41
Far advanced . . . . .	114	89	203	51.40
Unclassified . . . . .	7	8	15	3.80
Childhood type . . . . .	2	2	4	1.02
Bronchiectasis . . . . .	1	2	3	.76
Pleurisy with effusion . . . . .	2	—	2	.50
Pleurisy and anaemia . . . . .	—	1	1	.25
Lung abscess . . . . .	1	2	3	.76
Bronchial asthma . . . . .	1	1	2	.50
Multiple lung abscesses and empyema . . . . .	—	1	1	.25
Cancer of lung . . . . .	1	—	1	.25
Empyema . . . . .	—	1	1	.25
	197	198	395	

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested . . . . .	6	8	14	3.52
Quiescent . . . . .	90	75	165	41.46
Improved . . . . .	25	38	63	15.83
Unimproved . . . . .	24	31	55	13.82
Dead . . . . .	38	26	64	16.08
Non-tuberculous . . . . .	6	10	16	4.02
Not considered . . . . .	13	5	18	4.52
Bronchiectasis . . . . .	1	—	1	.25
No diagnosis . . . . .	—	2	2	.50
	203	195	398	

TABLE 9.—*Deaths*

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
Under 1 month . . . . .	2	—	2	7	1	8
1 to 2 months . . . . .	1	—	1	4	2	6
2 to 3 months . . . . .	1	1	2	2	2	4
3 to 4 months . . . . .	1	—	1	4	—	4
4 to 5 months . . . . .	1	2	3	—	—	—
5 to 6 months . . . . .	—	1	1	2	—	2
6 to 7 months . . . . .	1	1	2	—	3	3
7 to 8 months . . . . .	—	—	—	3	2	5
8 to 9 months . . . . .	—	—	—	2	—	2
9 to 10 months . . . . .	1	1	2	1	1	2
10 to 12 months . . . . .	3	1	4	1	2	3
12 to 18 months . . . . .	8	1	9	4	3	7
18 to 24 months . . . . .	3	2	5	3	3	6
Over 2 years . . . . .	16	15	31	5	7	12
	38	26	64	38	26	64

TABLE 10.—*Causes of Death*

	Males	Females	Totals
Pulmonary tuberculosis . . . . .	33	25	58
Pulmonary tuberculosis and tuberculosis of spine . . . . .	1	—	1
Tuberculous enteritis, tuberculous peritonitis and amyloid disease of kidney . . . . .	1	—	1
Cancer of lung . . . . .	1	—	1
Purpura hemorrhagica . . . . .	1	—	1
Multiple abscesses of left lung, and empyema . . . . .	—	1	1
Carcinoma of pancreas with metastasis . . . . .	1	—	1
	38	26	64

## Financial Report, Rutland State Sanatorium, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1934.

### STATEMENT OF EARNINGS

Board of patients: . . . . .			
Private . . . . .	\$33,164	00	
Cities and towns . . . . .	79,166	87	
Worcester County . . . . .	1,031	52	
Chelsea, Revere and Winthrop T.B. District . . . . .	37,825	98	
			\$151,188 37
Personal services: . . . . .			
Reimbursement from Board of Retirement . . . . .			\$131 00
Sales: . . . . .			
Travel, transportation and office expenses . . . . .	\$12	52	
Food . . . . .	139	66	
Furniture and household supplies . . . . .	5	00	
Medical and general care . . . . .	342	61	
Heat, light and power . . . . .	4	24	
Farm . . . . .	95	33	
Garage, stable and grounds . . . . .	126	27	
Repairs, ordinary . . . . .	7	20	
Total sales . . . . .			\$732 83
Miscellaneous: . . . . .			
Interest on bank balances . . . . .	\$1	54	
Rents . . . . .	120	00	
Total, miscellaneous . . . . .			\$121 54
Total earnings for the year . . . . .			\$152,173 74
Total cash receipts reverting and transferred to the State Treasurer . . . . .			\$192,095 71
Accounts receivable outstanding Dec. 1, 1933, adjusted . . . . .		125,210	56
Accounts receivable outstanding Nov. 30, 1934 . . . . .		85,288	59
Accounts receivable decreased . . . . .			39,921 97

MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		\$932 76
Appropriation, current year	\$278,320 00	
Partial salary restoration	4,537 00	
	<u>282,857 00</u>	
Total		\$283,789 76
Expenditures as follows:		
Personal services	\$157,802 73	
Food	45,125 55	
Medical and general care	13,103 16	
Farm	10,812 33	
Heat, light and power	22,844 06	
Garage, stable and grounds	2,726 20	
Travel, transportation and office expenses	3,575 64	
Religious instruction	1,752 17	
Clothing and materials	197 81	
Furnishings and household supplies	7,927 76	
Repairs, ordinary	5,465 78	
Repairs and renewals	1,377 72	
	<u>\$272,710 91</u>	
Total maintenance expenditures		\$272,710 91
Balance of maintenance appropriation, Nov. 30, 1934		11,078 85
Estimated outstanding liabilities, Nov. 30, 1934		\$7,640 72

SPECIAL APPROPRIATIONS

Balance December 1, 1933, brought forward		\$0,000 00
Appropriations for current year		108,890 00
		<u>\$108,890 00</u>
Total		\$108,890 00
Expended during the year (see statement below)	\$27,617 22	
Reverting to Treasury of Commonwealth	*	
(Star balances below that are reverting)		27,617 22
		<u>\$81,272 78</u>
Balance November 30, 1934, carried to next year		\$81,272 78

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
Sprinklers	1934 Ch. 162	\$3,600 00	5 55	\$5 55	\$3,594 45
Sewer Connections	Ch. 162	60,790 00	-	-	60,790 00
Emergency Public Works Commission-Construction Mass. State Projects-					
Docket 1354-H-2					
"Reconstruction Sewer Lines"	-	7,500 00	6,471 12	6,471 12	1,028 88
Docket 2275-H-3					
"New Boilers"	-	37,000 00	21,140 55	21,140 55	15,859 45
Totals	-	\$108,890 00	\$27,617 22	\$27,617 22	\$81,272 78

PER CAPITA

During the year the average number of patients has been		352 08
Total cost of maintenance	\$272,710 91	
Equal to a weekly per capita cost of (52 weeks to year)	14 89	
Total receipts for the year	192,095 71	
Equal to a weekly per capita of	10 49	
Total net cost of maintenance for year (total maintenance less total receipts)		\$80,615 20
Net weekly per capita	4.40	

Respectfully submitted,

MARY A. BOYLE,

Treasurer.

Inventory: Rutland State Sanatorium

GRAND SUMMARY SHEET

November 30, 1934

REAL ESTATE

Land, 364.727 acres	\$12,575 00
Buildings	675,623 09
Betterments (additions and improvements)	163,504 12
Total, Real Estate	\$851,702 21

## PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses . . . . .	\$430 87	
Food . . . . .	4,227 10	
Clothing and materials . . . . .	824 38	
Furnishings and household supplies . . . . .	2,035 01	
Medical and general care . . . . .	2,975 85	
Heat, light and power . . . . .	5,097 70	
Farm . . . . .	3,878 91	
Garage, stable and grounds . . . . .	99 39	
Repairs . . . . .	3,937 58	
	<hr/>	\$23,506 79

## PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses . . . . .	\$1,442 97	
Clothing and materials . . . . .	129 83	
Furnishings and household supplies . . . . .	33,044 42	
Medical and general care . . . . .	10,439 92	
Heat, light and power . . . . .		
Farm . . . . .	29,849 50	
Garage, stable and grounds . . . . .	713 35	
Repairs . . . . .	1,287 92	
	<hr/>	
Total . . . . .		\$76,907 91

## GRAND SUMMARY

Real Estate—Total . . . . .	\$851,702 21	
Personal Property—Undistributed Supplies, Total . . . . .	23,506 79	
Personal Property—Distributed Supplies, Total . . . . .	76,907 91	
	<hr/>	\$952,116 91

## WESTFIELD STATE SANATORIUM

## RESIDENT OFFICERS

ROY MORGAN, M.D., *Superintendent.*  
 HEMAN B. CHASE, M.D., *Assistant Superintendent.*  
 BERNARD GOLDBLATT, M.D., *Senior Physician.*  
 ELIOT H. LUTHER, M.D., *Senior Physician.*  
 HOWARD W. NEWELL, M.D., *Assistant Physician*  
 CHARLES E. GILL, M.D., *Assistant Physician.*  
 GEORGE E. CROWELL, D.M.D., *Dentist.*  
 BESSIE MACDONALD, R.N., *Superintendent of Nurses and Matron.*  
 JOSEPHINE E. FRENCH, *Treasurer.*  
 JOHN E. KINSELLA, *Steward.*  
 BENJAMIN J. SANDIFORD, *Chief Engineer.*  
 WILLIAM G. ATKINSON, *Head Farmer.*

## NON-RESIDENT OFFICERS

\*MARSHALL M. MENZIES, M.D., *Consultant in Diseases of the Eyes, Ears,  
Nose and Throat.*  
 \*JOHN PALLO, M.D., *Consultant in Diseases of the Eyes, Ears, Nose and  
Throat.*  
 A. D. ROOD, M.D., *Consultant in Bronchoscopy.*

\* Six months each.

## Report of the Superintendent

TO HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the twenty-fifth annual report of the Westfield State Sanatorium for the year ending November 30, 1934.

## FINANCIAL STATEMENT

During the year there has been expended \$228,374.24 for maintenance, a gross weekly per capita cost of \$18.04. There has been expended from Special Appropriation—P.W.A. Docket No. 1354-H-4 for Filter Beds—\$6,767.57.

There has been collected from miscellaneous sources (the total of all collections) \$77,562.62. Deducting this amount from the gross maintenance expense leaves a net expense of \$150,811.62, a net weekly per capita cost of \$11.91. There has been collected from private sources \$2,158.00; from cities and towns \$73,309.00.

Four cases were supported wholly or in part from private funds; 98 cases by cities and towns; 21 wholly by the State, and 9 by the Department of Public Welfare, Division of Child Guardianship. There were 18 cases on which settlements had not been determined.

#### POPULATION

There were 242 patients in the sanatorium at the beginning of the year and 218 at the close. The largest number of patients at any one time was 268 and the smallest number 212. The daily average number of patients was 243.5. There were 150 patients admitted during the year and 174 were discharged. Seventy-one cases were admitted from cities and towns of over 25,000 population and 79 from cities and towns of less than 25,000. The average age of patients was 10.5 years. The average length of stay of patients discharged, including deaths, was 570.24 days. Of the 174 discharged cases, 22 were apparently well, 102 apparently arrested, 21 improved, 21 unimproved, 1 quiescent and 7 deaths. Of the discharged patients, 160 gained 3,174 pounds. Hospital days of patients was 88,876. The average number of employees and officers during the year was 145.

#### MEDICAL REPORT

Our medical treatment has not changed during the year, except that we are using collapse therapy more than ever. Artificial pneumothorax has been used in 38 cases, 650 injections being given. Pneumolysis was performed on 1 case; thoracoplasty on 1; and thoracoscopy on 1. We have also continued treatment on 16 cases discharged from Rutland, 198 injections being given to these cases.

During the year we have had the following cases of contagious diseases: measles 26, scarlet fever 1, and whooping cough 2. The measles cases were remarkably mild, due apparently to the prophylactic use of Normal Human Serum and Placental Extract.

The consultation clinics at Great Barrington and Greenfield have been continued. In addition, a monthly clinic was opened in North Adams during the year.

Our out-patient work again shows an increase over the previous year. This service has come to be one of our major activities and it is being utilized by the physicians within a radius of 30 to 50 miles.

The figures for these activities are shown in the following tables:

	NEGATIVE		SUSPICIOUS		POSITIVE		TOTAL
	New	Re-exam	New	Re-exam	New	Re-exam	
Consultation . . . . .	595	74	84	9	18	127	907
Out-Patient . . . . .	1,174	299	233	121	129	315	2,271

We have continued furnishing medical service to the Hampden County Tuberculosis Association in their County Clinics and have also furnished medical service for their Summer Camp. Tuberculin tests were given to the children in the Camp, followed by X-ray and physical examination wherever indicated. In the schools, 1,730 tuberculin tests were given in 13 cities and towns, followed by 690 chest films and 319 physical examinations.

The tuberculosis case-finding work among the school-age population, until the present school year carried on by the Chadwick Clinics of the State Department of Public Health, has been continued in Berkshire, Franklin, and Hampden counties by the staff of this institution. During the first three months of the current school year (September, October and November), tuberculin testing was done in the public and parochial schools of forty-five towns and cities of these three counties. Of the eighty-one towns and cities in the three counties, only seven have thus far withheld their formal approval for this work to be continued in their communities. Tuberculin-testing was done on 5,705 children among the 13,653 enrolled in the grades tested, a consent response of 42 per cent. On the basis of the work done in thirty-one towns and cities where the surveys are complete in every detail, the reaction-rate was 15 per cent, with a range of 0-28 per cent. A total of 1,778 X-ray films of the chest were taken, this figure including 680 films taken of children on the follow-up list of the Chadwick Clinics. Physical examinations to the number of fifty-nine have been completed in thirty-one communities. The findings were as

follows: adult-type pulmonary cases, 1; adult-type pulmonary observation cases, 2; childhood-type pulmonary cases, 28; childhood-type pulmonary observation cases, 20. Final and individual reports have been prepared and forwarded to our co-workers in 31 communities, and 14 reports are held pending the completion of the field work in those communities.

Twenty lectures on tuberculosis have been given by members of the staff during the year before various Parent-Teacher Associations and Womens' Clubs in Springfield and vicinity, and one lecture was given before the University Club of Springfield.

#### INSTITUTION ACTIVITIES

The regular annual meeting of the Western Massachusetts Health Officials was held at the Institution on May 28th. Lectures and demonstrations on childhood tuberculosis were given on January 11th and January 18th to a special class of the Harvard School of Public Health, and on October 17th to the Mother's Council of Springfield.

#### PERSONNEL CHANGES

Dr. J. Ernest Landry resigned on May 1, 1934, after six years of service. His place was taken by Dr. Howard Newell. Dr. Charles Gill came to us on August 1st to take charge of the new School Clinic work, and Miss Mary Hatton was employed on August 1st to handle the clerical work of the school clinics. Dr. Gill and Miss Hatton were both transferred to us from the Chadwick Clinic. Otherwise, there has been no important change in our personnel.

#### IMPROVEMENTS AND CHANGES

The riser column of our water tank has been rebuilt and a new circulating pipe installed. The wells were washed out and a new water main was laid to the Engineer's Cottage. Partly by Federal aid, considerable underbrush was cleared from the grounds, the coal trestle was repaired and four new filter beds were constructed. All other improvements have been of a minor nature.

#### RECOMMENDATIONS

Our staff dining room is very crowded and should be enlarged. A request for \$1,500 for this purpose is included in our budget. The two small boilers should be equipped with automatic stokers. For this, an item of \$4,200 has been included in the budget.

A special appropriation of \$8,035 has been requested for certain improvements in water supply and fire protection. This has been approved by the Engineering Division.

#### ACKNOWLEDGMENTS

I am deeply indebted to our clergymen and to the entire personnel of the institution for their loyal and efficient support during the year. I also wish to thank you and the other members of the Department for your support and cooperation.

#### SURGICAL REPORT

The following operations have been performed at the sanatorium: Tonsillectomy and adenectomy, 13; artificial pneumothorax treatments, 848; and thoracentesis, 3. The following were done at the Massachusetts General Hospital: Pneumolysis, 1; thoracoplasty, 1; and thoracoscopy, 1.

The following was done at the Noble Hospital in Westfield: Mastoidectomy, 1.

The following was done at the Shrine Hospital in Springfield: Excision of accessory bones of feet, 1.

#### LABORATORY REPORT

Urine examinations, 442; sputum examinations, 162; blood counts, 205; animal inoculations, 28; bleeding and clotting time, 9; blood culture, 1; sputum culture, 3.

#### DENTAL REPORT

The following table shows the work done in the dental clinic during the year: Prophylactic treatments, 410; fillings—permanent teeth, 1,251; fillings—temporary

teeth, 119; extractions—permanent teeth, 125; extractions—temporary teeth, 102; treatments, 27; restorations, 3; X-rays, 10; surgical extractions, 5; examinations, 921; root canal treatments completed, 2. Total, 2,975.

Office and bedside visits, 1,673; dismissals, 377.

SCHOOL REPORT

Average daily attendance from December 1, 1933, to November 30, 1934:

Grade I . . . . .	21.43	Grade VI . . . . .	16.80
Grade II . . . . .	15.95	Grade VII . . . . .	13.90
Grade III . . . . .	14.96	Grade VIII . . . . .	12.01
Grade IV . . . . .	19.01	Manual Training . . . . .	13.07
Grade V . . . . .	23.02		
Total average attendance . . . . .			150.15
Total enrollment . . . . .			275.

Respectfully submitted,  
 ROY MORGAN, M.D.  
*Superintendent.*

Statistical Tables

TABLE 1.—Admissions and Discharges

	Males	Females	Totals
Patients in sanatorium November 30, 1933	117	125	242
Patients admitted December 1, 1933, to November 30, 1934, inclusive	74	76	150
Patients discharged December 1, 1933, to November 30, 1934, inclusive	90	84	174
Deaths (included in number discharged)	2	5	7
Patients remaining in sanatorium November 30, 1934	101	117	218
Daily average number of patients	115.00	128.5	243.5

TABLE 2.—Classification on Admission

	Classification on Application Blanks		Our Classification on Admission		Per Cent	
	1933	1934	1933	1934	1933	1934
Advanced . . . . .	6	3	10	7	7.14	4.67
Asthma . . . . .	—	—	1	—	.71	—
Bronchiectasis . . . . .	—	—	—	2	—	1.33
Cervical adenitis . . . . .	—	—	2	—	1.42	—
Childhood tuberculosis . . . . .	81	102	84	97	60.00	64.67
Childhood tuberculosis, abdominal . . . . .	—	—	—	1	—	.66
Childhood type (pulmonary) . . . . .	—	—	—	5	—	3.33
Chronic otitis media . . . . .	—	—	—	1	—	.66
Diabetes . . . . .	—	—	1	—	.71	—
Malnutrition . . . . .	—	—	9	12	6.44	8.00
Miliary tuberculosis . . . . .	—	1	—	1	—	.66
Minimal . . . . .	24	17	8	6	5.71	4.00
Moderately advanced . . . . .	14	13	14	7	10.00	4.67
No disease . . . . .	—	—	4	5	2.87	3.33
Non pulmonary . . . . .	—	1	—	—	—	—
Osteomyelitis . . . . .	—	1	—	—	—	—
Pott's disease . . . . .	—	—	1	—	.71	—
Pleurisy with effusion . . . . .	1	—	1	1	.71	.67
Pulmonary abscess . . . . .	—	—	1	—	.71	—
Tabes mesenterica . . . . .	—	1	—	—	—	—
Tuberculosis of left elbow . . . . .	—	—	—	1	—	.67
Tuberculous laryngitis . . . . .	1	—	—	—	—	—
Tuberculosis of the spine . . . . .	—	—	—	1	—	.67
Tuberculous mesenteric glands . . . . .	—	—	—	1	—	.67
Tuberculous peritoneal glands . . . . .	—	—	—	1	—	.67
Unclassified . . . . .	13	11	4	1	2.87	.67
	140	150	140	150	100.00	100.00

TABLE 3.—Civil Condition of Patients Admitted

	Males	Females	Totals
Single . . . . .	74	76	150

TABLE 4.—Ages of Patients Admitted

	Males	Females	Totals	Percentages
Under 5 years . . . . .	4	3	7	4.7
5 to 9 years . . . . .	29	32	61	40.6
10 to 14 years . . . . .	26	27	53	35.3
15 to 19 years . . . . .	15	13	28	18.7
20 years and over . . . . .	0	1	1	.7
	74	76	150	100.00

Average age 10.5 years.

TABLE 5.—*Nativity and Parentage of Patients Admitted*

PLACES OF NATIVITY	MALES			FEMALES			TOTALS		
	Patients	Fathers	Mothers	Patients	Fathers	Mothers	Patients	Fathers	Mothers
United States:									
Massachusetts . . . . .	63	26	30	67	25	21	130	51	51
Other New England States . . . . .	3	8	11	4	10	18	12	18	29
Other States . . . . .	2	8	3	4	5	6	6	13	9
Total Native . . . . .	73	42	44	75	40	45	148	82	89
Foreign Countries:									
Albania . . . . .	0	0	0	0	1	1	0	1	1
Austria . . . . .	0	1	0	0	0	0	0	1	0
Canada . . . . .	0	14	11	0	9	8	0	23	19
England . . . . .	1	1	2	1	2	3	2	3	5
Greece . . . . .	0	0	0	0	3	2	0	3	2
Holland . . . . .	0	1	1	0	0	0	0	1	1
Ireland . . . . .	0	1	2	0	2	3	0	3	5
Italy . . . . .	0	5	4	0	7	4	0	12	8
Lithuania . . . . .	0	1	1	0	1	1	0	2	2
Newfoundland . . . . .	0	0	1	0	0	0	0	0	1
Poland . . . . .	0	5	4	0	7	7	0	12	11
Portugal . . . . .	0	0	0	0	1	1	0	1	1
Russia . . . . .	0	1	1	0	0	0	0	1	1
Scotland . . . . .	0	1	2	0	0	1	0	1	3
Total, Foreign . . . . .	1	31	29	1	33	31	2	64	60
Unknown . . . . .	0	1	1	0	3	0	0	4	1
Total . . . . .	1	32	30	1	36	31	2	68	61
Total Native . . . . .	73	42	44	75	40	45	148	82	89
Grand Total . . . . .	74	74	74	76	76	76	150	150	150

TABLE 6.—*Residence of Patients Admitted*

Adams . . . . . 3	Enfield . . . . . 1	Malden . . . . . 2	Somerville . . . . . 2
Amherst . . . . . 1	Fitchburg . . . . . 16	Melrose . . . . . 1	Southborough . . . . . 1
Arlington . . . . . 1	Franklin . . . . . 1	Milford . . . . . 2	Southbridge . . . . . 2
Ashland . . . . . 3	Gardner . . . . . 3	Natick . . . . . 3	Spencer . . . . . 1
Athol . . . . . 14	Golden Bridge, N.Y. 1	Newton . . . . . 2	Springfield . . . . . 14
Auburn . . . . . 1	Grafton . . . . . 2	North Adams . . . . . 1	Sturbridge . . . . . 3
Boston . . . . . 5	Granville . . . . . 1	Northampton . . . . . 1	Sutton . . . . . 1
Brookton . . . . . 1	Holden . . . . . 2	Northboro . . . . . 1	Taunton . . . . . 1
Brookfield . . . . . 1	Holyoke . . . . . 12	Northbridge . . . . . 1	Uxbridge . . . . . 1
Canton . . . . . 1	Hopkinton . . . . . 1	Orange . . . . . 2	West Boylston . . . . . 1
Chicopee . . . . . 4	Hudson . . . . . 1	Pittsfield . . . . . 6	West Bridgewater . . . . . 1
Clinton . . . . . 2	Lenox . . . . . 1	Revere . . . . . 1	Worcester . . . . . 4
Deerfield . . . . . 1	Leominster . . . . . 5	Rutland . . . . . 3	
Easthampton . . . . . 3	Ludlow . . . . . 2	Shirley . . . . . 1	
East Longmeadow . . . . . 1			Total . . . . . 150

TABLE 7.—*Stage of Disease on Admission*

	Males	Females	Totals	Percentages
Advanced . . . . .	2	5	7	4.67
Bronchiectasis . . . . .	1	1	2	1.33
Childhood tuberculosis . . . . .	49	48	97	64.67
Childhood tuberculosis (abdominal) . . . . .	0	1	1	.66
Childhood type (pulmonary) . . . . .	1	4	5	3.33
Chronic otitis media . . . . .	1	0	1	.66
Malnutrition . . . . .	6	6	12	8.00
Miliary tuberculosis . . . . .	0	1	1	.66
Minimal . . . . .	3	3	6	4.00
Moderately advanced . . . . .	4	3	7	4.67
No disease . . . . .	3	2	5	3.33
Pleurisy with effusion . . . . .	1	0	1	.67
Tuberculosis of left elbow . . . . .	1	0	1	.67
Tuberculosis of the spine . . . . .	1	0	1	.67
Tuberculous mesenteric glands . . . . .	0	1	1	.67
Tuberculous peritoneal glands . . . . .	1	0	1	.67
Unclassified . . . . .	0	1	1	.67
	74	76	150	100.00

TABLE 8.—*Condition on Discharge*

	Males	Females	Totals	Percentages
Apparently arrested . . . . .	53	49	102	58.62
Apparently well . . . . .	10	12	22	12.64
Died . . . . .	2	5	7	4.02
Improved . . . . .	11	10	21	12.07
Unimproved . . . . .	14	7	21	12.07
Quiescent . . . . .	0	1	1	.58
	90	84	174	100.00

TABLE 9.—Deaths, by Length of Residence, at Sanatorium

DURATION OF DISEASE	Males	Females	Totals	LENGTH OF RESIDENCE AT SANATORIUM		
				Males	Females	Totals
Under 1 month . . . . .	0	0	0	0	1	1
5 to 6 months . . . . .	0	1	1	0	0	0
10 to 12 months . . . . .	0	0	0	1	0	1
12 to 18 months . . . . .	0	0	0	0	1	1
18 to 24 months . . . . .	0	2	2	1	2	3
Over 2 years . . . . .	2	2	4	0	1	1
	2	5	7	2	5	7

TABLE 10.—Causes of Death

	Males	Females	Totals
Pulmonary tuberculosis . . . . .	2	5	7

## Financial Report, Westfield State Sanatorium, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this institution for the fiscal year ending November 30, 1934.

## STATEMENT OF EARNINGS

Board of patients:			
Private . . . . .	\$1,110 00		
Cities and towns . . . . .	68,737 00		
		\$69,847 00	
Personal services:			
Reimbursement from Board of Retirement . . . . .		\$103 00	
Sales:			
Food . . . . .	\$78 59		
Clothing and materials . . . . .	560 26		
Furniture and household supplies . . . . .	7 00		
Medical and general care . . . . .	83 25		
Heat, light and power . . . . .	5 99		
Farm . . . . .	1,011 95		
Garage, stable and grounds . . . . .	3 75		
Arts and crafts sales . . . . .	240 94		
Total sales . . . . .		\$1,991 73	
Miscellaneous:			
Patronage dividend . . . . .	\$ .89		
Total, miscellaneous . . . . .		\$ .89	
Total earnings for the year . . . . .			\$71,942 62
Total cash receipts reverting and transferred to the State Treasurer . . . . .			\$77,562 62
Accounts receivable outstanding Dec. 1, 1933 . . . . .		\$23,832 50	
Accounts receivable outstanding Nov. 30, 1934 . . . . .	18,212 50		
Accounts receivable decreased . . . . .			\$5,620 00

## MAINTENANCE APPROPRIATION

Balance from previous year, brought forward . . . . .			\$4,554 26
Appropriation, current year . . . . .	\$229,990 00		
Supplementary budget . . . . .	2,600 00		
For salary adjustment . . . . .	3,462 00		
			236,052 00
Total . . . . .			\$240,606 26
Expenditures as follows:			
Personal services . . . . .	\$142,336 43		
Food . . . . .	29,006 85		
Medical and general care . . . . .	6,334 03		
Farm . . . . .	10,079 15		
Heat, light and power . . . . .	15,918 52		
Garage, stable and grounds . . . . .	2,186 46		
Travel, transportation and office expenses . . . . .	4,205 16		
Religious instruction . . . . .	987 95		
Clothing and materials . . . . .	3,708 26		
Furnishings and household supplies . . . . .	5,806 04		
Repairs, ordinary . . . . .	4,118 03		
Repairs and renewals . . . . .	3,689 88		
Total maintenance expenditures . . . . .			\$228,376 76
Balance of maintenance appropriation, Nov. 30, 1934 . . . . .			12,229 49
Estimated outstanding liabilities, Nov. 30, 1934 . . . . .			\$7,572 34

**SPECIAL APPROPRIATIONS**

Balance December 1, 1933, brought forward . . . . .		
Appropriations for current year . . . . .		\$8,000 00
<b>Total</b>		<b>\$8,000 00</b>
Expended during the year (see statement below) . . . . .		\$6,767 57
Reverting to Treasury of Commonwealth (Star balances below that are reverting)	*	
<b>Balance November 30, 1934, carried to next year . . . . .</b>		<b>\$1,232 43</b>

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at end of Year
\$8,000 00	1934	\$8,000 00	\$6,767 57	\$6,767 57	\$1,232 43
P.W.A. Docket No. 1354					
Mass. State Project H-4					

**PER CAPITA**

During the year the average number of patients has been . . . . .		243.5
Total cost of maintenance . . . . .	\$228,376 76	
Equal to a weekly per capita cost of (52 weeks to year) . . . . .	18,036	
Total receipts for the year . . . . .	77,562 62	
Equal to a weekly per capita of . . . . .	6.125	
Total net cost of maintenance for year (total maintenance less total receipts) . . . . .		\$150,811 62
Net weekly per capita . . . . .	11.91	

Respectfully submitted,  
**JOSEPHINE E. FRENCH,**  
*Treasurer.*

**Inventory: Westfield State Sanatorium**

**GRAND SUMMARY SHEET**

November 30, 1934

**REAL ESTATE**

Land, 263.06 acres . . . . .	\$11,021 00
Buildings . . . . .	420,980 58
Betterments (additions and improvements) . . . . .	11,556 31
<b>Total, Real Estate . . . . .</b>	<b>\$443,557 89</b>

**PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES**

Travel, transportation and office expenses . . . . .	\$100 00
Food . . . . .	3,797 39
Clothing and materials . . . . .	3,780 67
Furnishings and household supplies . . . . .	2,875 97
Medical and general care . . . . .	780 88
Heat, light and power . . . . .	1,059 50
Farm . . . . .	1,830 70
Garage, stable and grounds . . . . .	107 35
Repairs . . . . .	12 63
	<b>\$14,345 09</b>

**PERSONAL PROPERTY DISTRIBUTED SUPPLIES**

Travel, transportation and office expenses . . . . .	\$3,774 51
Clothing and materials . . . . .	732 28
Furnishings and household supplies . . . . .	39,388 67
Medical and general care . . . . .	43,493 63
Heat, light and power . . . . .	4,129 88
Farm . . . . .	31,685 92
Garage, stable and grounds . . . . .	8,006 90
Repairs . . . . .	2,771 61
<b>Total . . . . .</b>	<b>\$133,983 40</b>

**GRAND SUMMARY**

Real Estate—Total . . . . .	\$443,557 89
Personal Property—Undistributed supplies, Total . . . . .	14,345 09
Personal Property—Distributed supplies, Total . . . . .	133,983 40
	<b>\$591,886 38</b>

## PONDVILLE HOSPITAL

## RESIDENT OFFICERS

GEORGE L. PARKER, M.D., *Superintendent*.  
 RAYMOND E. MILITZER, M.D., *Assistant Superintendent*.  
 GEORGE L. MACKINNON, M.D., *Assistant Physician*.  
 WILLIAM H. ROPER, M.D., *Assistant Physician*.  
 IRA T. NATHANSON, M.D., *Assistant Physician*.  
 JESSE PARKER, M.D., *Assistant Physician*.  
 MATTHEW J. BACHULUS, M.D., *Assistant Physician*.  
 CECIL KRAKOWER, M.D., *Pathologist*.  
 DOROTHY Z. SILVER, R.N., *Principal of School of Nursing*.  
 MARION MACKENZIE, *Treasurer*.  
 NEIL FOUNTAIN, *Head Social Service Worker*.  
 FLORENCE MULLEN, *Head Housekeeper*.  
 ERNEST L. GAGE, *Chief Power Plant Engineer*.  
 DANIEL DONOVAN, *Groundskeeper*.  
 ELEANOR UPHAM, *Dietitian*.  
 JOHN LANG, *Carpenter*.

## NON-RESIDENT OFFICERS

ERNEST M. DALAND, M.D., *Surgeon and Chief*.  
 GRANTLEY W. TAYLOR, M.D., *Surgeon*.  
 HORATIO ROGERS, M.D., *Surgeon*.  
 RICHARD H. WALLACE, M.D., *Assistant Surgeon*.  
 VALMORE A. PELLETIER, M.D., *Assistant Surgeon, OPD*.  
 JOE VINCENT MEIGS, M.D., *Gynecologist*.  
 LANGDON PARSONS, M.D., *Assistant Gynecologist*.  
 ROGER C. GRAVES, M.D., *Urologist*.  
 CHARLES J. F. KICKHAM, M.D., *Assistant Urologist*.  
 JOHN S. HODGSON, M.D., *Neurological Surgeon*.  
 RICHARD H. NORTON, D.M.D., *Oral Surgeon*.  
 CARL ERNLUND, M.D., *Laryngologist*.  
 HENRY JACKSON, JR., M.D., *Physician*.  
 DUDLEY MERRILL, M.D., *Assistant Physician*.  
 MAXWELL FINLAND, M.D., *Assistant Physician*.  
 ARTHUR W. GREENWOOD, M.D., *Dermatologist*.  
 HUGO B. C. RIEMER, M.D., *Ophthalmologist*.  
 RICHARD DRESSER, M.D., *Roentgenologist*.  
 CHARLES A. DUMAS, M.D., *Assistant Roentgenologist*.  
 HARRY W. HARDING, D.M.D., *Dentist*.  
 JAMES C. HUDSON, Ph.D., *Physicist*.  
 SHIELDS WARREN, M.D., *Pathologist*.  
 F. H. L. TAYLOR, Ph.D., *Physiological Chemist*.

## Report of the Superintendent

TO HENRY D. CHADWICK, M.D., *Commissioner, Department of Public Health:*

I have the honor to submit the eighth annual report of the Pondville Hospital (Norfolk), P. O. Wrentham, Massachusetts, for the year ending November 30, 1934.

## POPULATION

There were 102 patients in the hospital on November 30, 1933. During the year, there were 1,222 admissions. Of these 398 represented readmissions. Patients were received from 167 towns and cities. Patients were also received from 9 other State Institutions. Ninety-six patients remained in the hospital at the end of the year.

Discharges during the year numbered 1,228. The condition of 177 was the same, 768 improved and 283 died. There were 173 autopsies.

The average period of hospitalization was 33.78 days. The smallest number in the hospital on any one day was 83; the largest number, 121. The average number of patients per day was 110.3.

The daily average number of officers and employees was 134.3.

### MEDICAL REPORT

During the year there has been considerable increase in the work of all hospital departments. This has necessitated the addition of three head nurses and one physician to our resident staff. The number of hospital admissions has increased 2 per cent over the previous year. The average length of hospitalization has been reduced from 37.14 days to 33.78 days. This rapid turnover has caused considerable reduction in our waiting list. The number of operations has increased 14 per cent and the number of surgical specimens handled by the pathological departments has increased proportionally. Autopsies have increased 12 per cent while the number of deaths has increased 11 per cent.

The weekly clinics at the hospital were continued through the year with 49 clinics held. Visits to the regular Thursday clinic numbered 2,736 with an average attendance of 56. Patients making their first visit to the clinic numbered 954. Out-patient visits, other than the regular Thursday clinic, numbered 1,883. Of these, 165 were new patients. The total clinic visits were 4,619. There were 381 clinic patients who subsequently were admitted to the hospital.

During the early part of the year, an epidemic of scarlet fever occurred among our patients. There were seven patients transferred to the contagious department of the Haynes Memorial Hospital in Brighton. One patient died from postoperative scarlet fever at Pondville. Throat cultures were taken of our employees. Tonsillectomies and adenoidectomies were done at the hospital on five employees having positive throat cultures and diseased tonsils and adenoids. Several employees with positive throat cultures were given leave of absence until cultures were negative. Those nurses having a positive Dick were immunized for scarlet fever and were given convalescent serum, and eight were immunized with scarlet fever toxoid.

#### *X-ray and Radium:*

Diagnostic X-ray plates taken, 3,089; fluoroscopic examinations, 504; X-ray treatments given, 3,822; radium treatments given, 541.

### SURGICAL REPORT

Operations: Major, 427; minor, 662; biopsies, 427; esophagoscopies, 4; laryngoscopy, 1; cystoscopies, 184; proctoscopies, 65; bronchoscopies, 7; urethroscopy, 1.

An anesthetic was given 1,165 times.

### LABORATORY REPORT

Surgical specimens, 1,143; frozen sections, 89; laboratory tests, 17,686.

### DENTAL REPORT

Prophylactic treatments, 123; extractions (permanent teeth), 999; treatments, 316; x-ray examinations, 129; examinations, 715. Total, 2,282. Total number of visits, 1,186; total number of new patients, 715; total number of dismissals, 319.

### INSTITUTIONAL ACTIVITIES

In addition to the staff meetings, the following programs consisting of clinics and meetings were held at the hospital:

April 11—State-wide Cancer Clinic.

June 25—Cancer Clinic Workers.

October 16 and October 19—Special Clinics—American College of Surgeons.

November 7—Massachusetts Cancer Education Committees.

Through the courtesy and cooperation of our clergy, numerous musical programs by choirs and local brass bands were rendered for the patients.

Good fellowship among the employees has been stimulated by the activities of our local baseball team, tennis matches, motion pictures and dances. Through the courtesy of the superintendent of the Wrentham State School, our employees have utilized the bowling alleys of that institution weekly.

### PERSONNEL CHANGES

The following additions and changes were made during the year: Dr. George M. Sullivan resigned as superintendent and his position was filled by the present superintendent. Dr. Cecil Krakower was appointed resident pathologist to succeed Dr. Theodore P. Eberhard, resigned. Dr. Jesse Parker and Dr. Ira Nathanson were appointed assistant physicians to succeed Dr. Henry Clarke and Dr. Thomas Anglem, resigned. Dr. Matthew Bachulus was appointed assistant physician. Miss

Leola Ames was appointed assistant social worker to succeed Mrs. Myrtle Roberson, resigned. Mrs. Florence Mullen was appointed head housekeeper to succeed Mrs. Mae Donovan who resigned from that position because of ill health. Miss Gertrude McGuane was transferred from the social service department to the business office to succeed Mrs. Zeliah Leland, resigned. Miss Olive McAndrew was transferred to the business office to fill the additional position of junior clerk and stenographer in that department. Miss Thelma Locke and Miss Ann Broe were appointed as junior clerks and stenographers to fill the vacancies in the social service department caused by the transfers. Miss Alberta Potter was appointed pathological laboratory technician to succeed Miss Bettina Blunt, resigned.

#### IMPROVEMENTS AND CHANGES

Following are the improvements and changes made during the year:

CWA projects consisted of the recovering with asbestos of the steam lines from the power house to the hospital buildings and the removal of dead brush from the hospital property adjacent to the employees' cottages.

Through the cooperation of the Public Works Department plans were formulated for a new entrance and a road from the main highway to the administration building and enlargement of the automobile parking space. From FERA funds and the material obtained from the excavation of our new buildings, the foundations have been laid for both of these projects.

A new road has been developed in front of the superintendent's house.

Changes in the administration building were as follows:

Relocation and enlargement of the medical record office.

The business office and treasurer's office were relocated and enlarged.

Removal of the chemical laboratory to larger quarters in the basement in the north hospital wing and enlargement of the pathological laboratory.

Relocation of superintendent's office.

A centrally located waiting room for the patients' relatives has been established on the main floor of the administration building.

A public telephone pay station has been more conveniently located.

Provision has been made for a future bacteriological laboratory.

The connecting porches between the administration building and the north and south wings have been glassed in.

The linen and sewing rooms have been moved to larger quarters and the chief engineer's office has been relocated.

The superintendent's house has been renovated and weather-stripped.

#### RECOMMENDATIONS

Following the completion of our two new buildings in the spring, the regrading and reseeding of our lawns will be necessary. In order to prevent the obstruction of our surface drainage system, a cement retaining wall should be put in the rear of the new service building. Winter protection for patients occupying the new building will necessitate the glassing-in of the porches.

It is earnestly hoped that the deplorable condition of our roads and sidewalks may be rectified this next year and that adequate lighting facilities may be provided at our road entrances and in the new parking space.

The housing accommodations for our employees have not expanded with the hospital and following the completion of our new buildings this will be a serious problem. A 100-bed dormitory would solve our immediate housing problem and would allow us to demolish the "white house" which is in poor condition and a serious fire hazard.

Our incinerator accommodations are inadequate and objectionally located and I strongly recommend the installation of suitable equipment in a proper location.

A fire hazard in the employees' cottages would be eliminated by locating stationary ironing equipment in the basement of each cottage.

Because of the addition of beds to our hospital, it is advisable to add two junior clerks and stenographers to our medical record staff.

It is advisable to enlarge our necropsy room and add another physician to our pathological department because of increased work in that department.

The pharmacy should be relocated in order to provide extra bed space in Ward A.

Our present garage accommodates only a few cars and I recommend that a larger garage be built to provide space for the many cars owned by employees which are now scattered about the grounds.

ACKNOWLEDGMENTS

I wish to express my appreciation to the Reverend Father Mitchell and his assistants and to the Reverend Mr. Shafer for their cooperation and good work in ministering to the spiritual needs of our patients.

To the members of the Social Service Committee and to the Ladies' Society of the Wrentham Congregational Church who have given so freely of their time and resources in maintaining the happiness of our patients, I am deeply indebted.

I wish to thank the Tabernacle Society, Convent of Notre Dame, for the vestments which they made and donated to the hospital.

To the American Legion Band of Norwood, the Franklin and North Attleboro Bands and the numerous groups of choir singers who have rendered musical programs for our patients, I am deeply grateful.

I wish to express my appreciation to the members of the Public Works Department for their splendid cooperation in developing our new road and parking space.

I am deeply grateful for the support, cooperation and loyalty given me by the medical staff, the nurses and all other employees.

I wish to express my sincere appreciation to the Director and other members of the Department for their assistance through the year.

Respectfully submitted,

GEORGE L. PARKER, M.D.

*Superintendent.*

Statistical Tables

The following tables are based on the number of new patients admitted.

TABLE 1.—Admissions and Discharges

	Males	Females	Totals
Patients in hospital December 1, 1933 . . . . .	58	44	102
Patients admitted from December 1, 1933, to November 30, 1934, inclusive . . . . .	590	632	1,222
Patients discharged from December 1, 1933, to November 30, 1934, inclusive . . . . .	593	635	1,228
Patients remaining in hospital November 30, 1934 . . . . .	55	41	96
Daily average number of patients . . . . .	59.89	50.41	110.30
Deaths (included in number discharged) . . . . .	177	106	283

TABLE 2.—Readmissions

	Males	Females	Totals
Total patients treated . . . . .	648	676	1,324
Less old patients readmitted first time since December 1, 1933 . . . . .	66	95	161
Less other readmissions . . . . .	126	111	237
Less patients in hospital December 1, 1933 . . . . .	58	44	102
Number new patients admitted from December 1, 1933, to November 30, 1934 . . . . .	398	426	824
Total number different patients treated December 1, 1933, to November 30, 1934 . . . . .	522	565	1,087

TABLE 3.—Civil Condition of Patients Admitted

	Males	Females	Totals
Single . . . . .	63	55	118
Married . . . . .	221	248	469
Widowed . . . . .	107	112	219
Divorced . . . . .	5	8	13
Separated . . . . .	2	3	5
Total . . . . .	398	426	824

TABLE 4.—Age of Patients Admitted

	Males	Females	Totals
Under 20 years . . . . .	7	5	12
20 to 29 years . . . . .	7	9	16
30 to 39 years . . . . .	11	59	70
40 to 49 years . . . . .	36	107	143
50 to 59 years . . . . .	99	99	198
60 to 69 years . . . . .	125	95	220
70 to 79 years . . . . .	89	46	135
80 to 89 years . . . . .	22	5	27
90 to 99 years . . . . .	2	1	3
Totals . . . . .	398	426	824

TABLE 5.—*Nativity of Patients Admitted*

	Males	Females	Totals		Males	Females	Totals
United States	204	246	450	Italy	15	17	32
Armenia	1	4	5	Latvia	1	—	1
Australia	1	—	1	Lithuania	4	4	8
Austria	1	1	2	Poland	7	5	12
Belgium	1	—	1	Portugal	5	8	13
Canada	66	66	132	Rumania	—	1	1
Czechoslovakia	—	1	1	Russia	7	5	12
Denmark	3	—	3	Scotland	7	2	9
England	23	16	39	Siam	—	1	1
Finland	4	5	9	Sweden	3	6	9
France	1	2	3	Switzerland	—	1	1
Germany	4	5	9	Syria	3	3	6
Greece	2	1	3				
Ireland	35	26	61	Totals	398	426	824

TABLE 6.—*Residence of Patients Admitted*

Abington	1	Fairhaven	2	Millbury	3	Sharon	4
Adams	1	Fall River	14	Millville	1	Sherborn	1
Agawam	1	Fitchburg	12	Milton	1	Shrewsbury	2
Amesbury	4	Foxborough	15	Monson	1	Somerville	3
Andover	1	Framingham	3	Natick	2	Southbridge	4
Arlington	2	Franklin	18	New Bedford	27	Springfield	37
Ashburnham	2	Freetown	1	Newburyport	2	Stonham	1
Ashland	1	Gardner	17	Newton	1	Stoughton	6
Athol	4	Gloucester	1	Norfolk	3	Sunderland	1
Attleboro	21	Gosnold	1	North Adams	4	Swansea	2
Auburn	1	Grafton	2	Northampton	6	Taunton	30
Ayer	1	Hanson	2	North Andover	2	Templeton	5
Barnstable	4	Harwich	1	N. Attleborough	15	Tolland	1
Bellingham	2	Haverhill	2	Northbridge	1	Townsend	1
Belmont	1	Holbrook	1	Northfield	2	Tyngsborough	1
Berlin	1	Holliston	2	Norton	4	Upton	1
Beverly	1	Holyoke	6	Norwood	7	Uxbridge	3
Blackstone	1	Hopedale	1	Oak Bluffs	2	Wakefield	1
Boston	64	Hopkinton	1	Oakham	1	Walpole	3
Bourne	2	Hubbardston	3	Orange	6	Waltham	3
Braintree	5	Lawrence	26	Oxford	4	Ware	1
Bridgewater	1	Leicester	2	Palmer	3	Wareham	2
Brimfield	1	Leominster	8	Peabody	1	Warren	1
Brockton	41	Lowell	22	Petersham	1	Watertown	3
Brookline	4	Ludlow	2	Pittsfield	3	Webster	3
Cambridge	11	Lunenburg	2	Plainville	4	Westborough	1
Canton	5	Lynn	12	Plymouth	3	W. Bridgewater	1
Carver	1	Lynnfield	1	Plympton	1	Westfield	6
Charlton	2	Malden	3	Quincy	17	Westford	1
Chelmsford	1	Mansfield	13	Randolph	3	W. Springfield	5
Chelsea	3	Marblehead	1	Raynham	2	Westwood	2
Chicopee	3	Marlborough	2	Rehoboth	2	Weymouth	4
Colrain	1	Marshfield	1	Revere	4	Whately	1
Conway	1	Medfield	3	Rochester	1	Whitman	5
Dalton	1	Medford	4	Rockland	3	Williamstown	1
Dartmouth	4	Medway	6	Rockport	1	Winchendon	3
Dedham	4	Melrose	1	Royalston	1	Woburn	2
Dighton	3	Mendon	1	Russell	2	Worcester	26
E. Bridgewater	3	Merrimac	2	Salem	2	Wrentham	7
E. Longmeadow	1	Methuen	4	Sandwich	1	Yarmouth	1
Easton	1	Middleborough	11	Scituate	1	Salem Depot, N.H.	1
Everett	4	Milford	9	Seekonk	1	State Institutions	27

TABLE 7.—*Stage of Disease of Patients Admitted*

	Males	Females	Totals
Early	62	65	127
Moderately advanced	172	142	314
Advanced	129	110	239
Non-malignant	35	109	144
Totals	398	426	824

TABLE 8.—*Condition of Patients Discharged*

	Males	Females	Totals
Same	96	81	177
Improved	320	448	768
Totals	416	529	945

TABLE 9

This table includes all new cases treated, both house patients and out-patients. In some instances, the same patient has been counted twice or more times, according to the varying conditions presented.

	Males	Females	Totals		Males	Females	Totals
<b>CARCINOMA</b>				<b>LYMPHOBLASTOMA:</b>			
Buccal cavity and pharynx:				Lymphoblastoma and Hodgkin's disease	10	13	23
Buccal cavity . . .	12	-	12	Lymphatic leukemia	1	1	2
Cheek . . .	7	-	7	Myelogenous leukemia	1	-	1
Floor of mouth . . .	4	-	4	Aleukemic leukemia	-	1	1
Lip . . .	55	1	56		12	15	27
Palate . . .	4	-	4	<b>ENDOTHELIOMA:</b>			
Pharynx . . .	3	-	3	Ilium . . .	-	1	1
Salivary gland . . .	1	1	2	Lip . . .	1	-	1
Tongue . . .	26	3	29	Lymph node . . .	-	1	1
Tonsil . . .	9	-	9	Scapula (soft tissue)	1	-	1
	121	5	126		2	2	4
<b>Digestive tract and peritoneum</b>				<b>SARCOMA:</b>			
Anus . . .	2	-	2	Fibrosarcoma:			
Bile duct . . .	1	-	1	Breast . . .	-	2	2
Cecum . . .	3	1	4	Humerus and femur . . .	1	-	1
Colon . . .	1	5	6	Interscapular region . . .	1	-	1
Duodenum . . .	2	-	2	Ovary . . .	-	1	1
Esophagus . . .	11	3	14	Prostrate . . .	1	-	1
Gall bladder . . .	2	1	3	Thigh . . .	1	1	2
Liver . . .	4	1	5	Leiomyosarcoma:			
Pancreas . . .	7	3	10	Uterus . . .	-	1	1
Rectum . . .	36	17	53	Primary site unknown . . .	-	1	1
Sigmoid . . .	4	1	5	Myxosarcoma:			
Stomach . . .	17	7	24	Ovary . . .	-	1	1
	90	39	129	Amelanotic malignant melanoma:			
<b>Respiratory system:</b>				Cheek . . .	1	-	1
Bronchus . . .	4	1	5	Foot . . .	1	-	1
Larynx . . .	26	1	27	Malignant melanoma:			
Lung . . .	4	1	5	Foot . . .	1	-	1
Nasopharynx . . .	2	-	2	Heel . . .	-	1	1
	36	3	39	Interscapular region . . .	1	-	1
<b>Female Genital Organs:</b>				Neck . . .	1	-	1
Cervix . . .	-	98	98	Temple . . .	-	1	1
Clitoris . . .	-	1	1	Thigh . . .	1	-	1
Ovary . . .	-	9	9	Multiple myeloma . . .	-	1	1
Uterus . . .	-	18	18	Osteogenic sarcoma:			
Vulva . . .	-	6	6	Femur . . .	2	-	2
	-	132	132	Ilium . . .	-	1	1
<b>Breast . . .</b>	3	119	122	Tibia . . .	-	1	1
<b>Male Genito-Urinary Organs:</b>				<b>Sarcoma (type unknown):</b>			
Bladder . . .	19	-	19	Buttock . . .	-	1	1
Kidney . . .	6	-	6	Femur . . .	1	-	1
Penis . . .	3	-	3	Leg . . .	1	-	1
Prostrate . . .	35	-	35	Retropertoneal . . .	1	1	2
Testicle . . .	3	-	3	Thigh . . .	1	-	1
	66	-	66		16	14	30
<b>Skin:</b>				<b>OTHER MALIGNANCIES</b>	3	2	5
Ear . . .	9	3	12	<b>NON-MALIGNANT TUMORS:</b>			
Eyelid . . .	4	2	6	Adenofibromas . . .	-	5	5
Face . . .	41	42	83	Adenomas . . .	3	1	4
Nose . . .	25	12	37	Angiomas . . .	-	1	1
Scalp . . .	1	2	3	Cysts . . .	2	7	9
Skin (other sites)	16	19	35	Cystadenomas . . .	1	4	5
Temple . . .	5	4	9	Fibroids . . .	1	42	43
	101	84	185	Fibromas . . .	6	1	7
<b>Other or Unspecified Organs:</b>				Fibromyomata . . .	-	1	1
Antrum . . .	6	1	7	Giant-cell tumors (benign) . . .	1	1	2
Bladder (female)	-	2	2	Hemangiomas . . .	12	21	33
Kidney (female)	-	1	1	Lipomas . . .	6	12	18
Neck (primary site unknown)	3	1	4	Neurofibromas . . .	2	-	2
Parotid . . .	1	2	3	Osteochondromas . . .	2	-	2
Thyroid . . .	3	3	6	Osteomas . . .	-	1	1
Urethra (female)	-	1	1	Papillomas . . .	13	14	27
Miscellaneous . . .	3	1	4	Polyps . . .	15	39	54
	16	12	28	Tumors (nature unknown) . . .	2	6	8
				Other non-malignant tumors . . .	4	1	5
					70	157	227

TABLE 9—Continued

	Males	Females	Totals		Males	Females	Totals
RHEUMATIC DISEASES, NUTRITIONAL DISEASES, ETC. . . . .	25	69	94	Stomach . . . . .	13	5	18
DISEASES OF THE BLOOD AND BLOOD-MAKING ORGANS . . . . .	10	8	18	Intestines . . . . .	49	40	89
DISEASES OF THE NER- VOUS SYSTEM AND ORGANS OF SPECIAL SENSE:				Liver . . . . .	5	8	13
Nervous system . . . . .	16	18	34	Gall bladder and biliary passages . . . . .	12	36	48
Organs of vision . . . . .	3	4	7	Peritoneum . . . . .	6	9	15
Ear and mastoid process . . . . .	1	1	2		156	133	289
	20	23	43	DISEASES OF GENITO- URINARY SYSTEM:			
DISEASES OF THE CIR- CULATORY SYSTEM:				Kidneys and ureters . . . . .	52	34	86
Circulatory system (general) . . . . .	90	81	171	Bladder . . . . .	7	19	26
Lymphatic system . . . . .	1	1	2	Urethra, urinary ab- scesses, etc. . . . .	1	6	7
	91	82	173	Prostate . . . . .	32	-	32
DISEASES OF THE RES- PIRATORY SYSTEM:				Male genital organs . . . . .	4	-	4
Nasal fossae and annexae . . . . .	2	1	3	Female genital organs . . . . .	-	182	182
Larynx . . . . .	1	2	3	Cysts of the ovary . . . . .	-	12	12
Bronchus . . . . .	8	2	10	Breast . . . . .	-	40	40
Lungs . . . . .	97	40	137		96	293	389
Pleura . . . . .	10	5	15	DISEASES OF THE SKIN AND THE CELLULAR TISSUE:			
	118	50	168	Keloids . . . . .	2	3	5
DISEASES OF DIGES- TIVE SYSTEM:				Keratoses . . . . .	53	41	94
Buccal cavity and annexae, pharynx and tonsils . . . . .	34	24	58	Sebaceous cysts . . . . .	12	11	23
Esophagus . . . . .	1	1	2	Verruca . . . . .	4	12	16
Ulcer of stomach and duodenum . . . . .	36	10	46	Other diseases . . . . .	10	15	25
					81	82	163
				DISEASES OF THE BONES AND ORGANS OF LOCO- MOTION . . . . .	8	5	13
				OTHER CONDITIONS . . . . .	81	104	185
				NO DISEASE . . . . .	3	11	14
				NO DIAGNOSIS . . . . .	19	27	46

## Financial Report, Pondville Hospital at Norfolk, 1934

To the Department of Public Health:

I respectfully submit the following report of the finances of this Institution for the fiscal year ending November 30, 1934.

### STATEMENT OF EARNINGS

Board of patients:		
Private	\$24,689 46	
Cities and towns	52,324 50	
Out-patient department	1,153 50	
Accident cases	22 30	
	\$78,189 76	
Personal services:		
Reimbursement from Board of Retirement		\$71 00
Sales:		
Food	\$67 90	
Medical and general care	9 15	
Garage and grounds	126 00	
Repairs, ordinary	8 25	
Miscellaneous—junk	29 55	
Board, special nurses	83 00	
	\$323 85	
Miscellaneous:		
Rents	\$120 00	
	\$120 00	
Total earnings for the year		\$78,704 61
Total cash receipts reverting and transferred to the State Treasurer		\$100,076 66
Accounts receivable outstanding Dec. 1, 1933	\$101,087 72	
Accounts receivable outstanding Nov. 30, 1934	79,715 67	
Accounts receivable decreased		\$21,372 05

### MAINTENANCE APPROPRIATION

Balance from previous year, brought forward		\$575 56
Appropriation, current year:		
Radium	\$8,500 00	
Other maintenance	228,527 00	
	\$237,027 00	
Total		\$237,602 56
Expenditures as follows:		
Personal services	\$129,257 77	
Food	34,157 00	
Medical and general care	17,671 91	
Heat, light and power	12,796 76	
Garage and grounds	1,402 48	
Travel, transportation and office expenses	8,660 38	
Religious instruction	1,106 70	
Clothing and materials	638 35	
Furnishings and household supplies	15,024 51	
Repairs, ordinary	1,852 19	
Repairs and renewals	2,697 25	
Radium	5,180 33	
	\$230,445 63	
Balance of maintenance appropriation, Nov. 30, 1934		\$7,156 93
Estimated outstanding liabilities, Nov. 30, 1934		\$2,703 24

### SPECIAL APPROPRIATIONS

Balance December 1, 1933, brought forward		None
Appropriations for current year:		
Special	\$5,000 00	
P.W.A.	284,825 00	
	\$289,825 00	
Total		\$289,825 00
Expended during the year (see statement below)	\$69,942 15	
Reverting to Treasury of Commonwealth	* 46 43	
(Star balances below that are reverting)		69,988 58
Balance November 30, 1934, carried to next year		\$219,836 42

APPROPRIATION	Act or Resolve	Total Amount Appropriated	Expended during Fiscal Year	Total Expended to Date	Balance at End of Year
X-ray machine and equipment	1934	\$5,000 00	\$4,953 57	\$4,953 57	\$46 43*
Massachusetts State Project H-6 P.W.A. Docket 4200	1934	87,425 00	20,839 95	20,839 95	66,585 05
Massachusetts State Project H-5 P.W.A. Docket 4476	1934	197,400 00	44,148 63	44,148 63	153,251 37

Estimated outstanding liabilities, November 30, 1934. P.W.A. projects \$3 92

## PER CAPITA

During the year the average number of patients has been . . . . .		110.28
Total cost of maintenance . . . . .	\$230,445 63	
Equal to a weekly per capita cost of (52 weeks to year) . . . . .	40 18	
Total receipts for the year . . . . .	100,076 66	
Equal to a weekly per capita of . . . . .	17 45	
Total net cost of maintenance for year (total maintenance less total receipts) . . . . .		\$130,368 97
Net weekly per capita . . . . .	22 73	

Respectfully submitted,

MARION MACKENZIE,

*Treasurer.*

## Inventory: Pondville Hospital at Norfolk

## GRAND SUMMARY SHEET

November 30, 1934

## REAL ESTATE

Land, 324.2 acres . . . . .	\$9,250 00	
Buildings . . . . .	479,774 03	
Betterments (additions and improvements) . . . . .	71,814 40	
Total, Real Estate . . . . .	\$560,838 43	
Less 3% depreciation on buildings . . . . .	16,547 65	
		\$544,290 78

## PERSONAL PROPERTY UNDISTRIBUTED SUPPLIES

Travel, transportation and office expenses . . . . .	\$1,201 28	
Food . . . . .	1,809 15	
Clothing and materials . . . . .	2,301 96	
Furnishings and household supplies . . . . .	6,068 44	
Medical and general care . . . . .	22,678 91	
Heat, light and power . . . . .	4,754 30	
Garage, stable and grounds . . . . .	111 32	
Repairs . . . . .	5,823 31	
		\$44,748 67

## PERSONAL PROPERTY DISTRIBUTED SUPPLIES

Travel, transportation and office expenses . . . . .	\$5,488 81	
Clothing and materials . . . . .	1,337 54	
Furnishings and household supplies . . . . .	53,655 48	
Medical and general care . . . . .	54,673 81	
Garage, stable and grounds . . . . .	8,073 14	
Repairs . . . . .	4,169 51	
Total . . . . .	\$127,398 29	
Less 5% depreciation . . . . .	6,369 91	
		\$121,028 38

## GRAND SUMMARY

Real Estate—Total . . . . .	\$544,290 78	
Personal Property—Undistributed Supplies, Total . . . . .	44,748 67	
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		\$710,067 83

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