

MAINE STATE LEGISLATURE

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PUBLIC DOCUMENTS OF MAINE

BEING THE

ANNUAL REPORTS

OF THE VARIOUS

Public Officers ^{and} Institutions

FOR THE YEAR

1891.

VOLUME I.

AUGUSTA:

BURLEIGH & FLYNT, PRINTERS TO THE STATE.

1892.

SIXTH ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MAINE.

For the Year Ending December 31, 1890.



AUGUSTA :

BURLEIGH & FLYNT, PRINTERS TO THE STATE.
1891.

MAINE STATE BOARD OF HEALTH.

OFFICE OF THE SECRETARY, }
Augusta, Maine, 1891. }

*To His Excellency, Edwin C. Burleigh, Governor, and the
Honorable Executive Council:*

GENTLEMEN:—I have the honor of submitting to you the Sixth
Annual Report of the State Board of Health of Maine.

Very respectfully,

A. G. YOUNG, M. D.,

Secretary.

MEMBERS OF THE BOARD.

E. C. JORDAN, C. E., <i>President</i> ,	Portland.
O. A. HERR, M. D.,	Lewiston.
J. O. WEBSTER, M. D.,	Augusta.
CHARLES D. SMITH, M. D.,	Portland.
PROF. F. C. ROBINSON,	Brunswick.
HUGH R. CHAPLIN, Esq.,	Bangor.
A. G. YOUNG, M. D., <i>Secretary</i> ,	Augusta.

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INTRODUCTORY.

Early in its existence, the State Board of Health, recognizing both its opportunities for usefulness and the limitations in that direction imposed by a moderate yearly appropriation, as compared with the amounts at the disposal of some other state public health departments, devoted itself to those fields of practical work, in which there appeared to be the most urgent need, and contented itself with doing what was possible to do in the direction of original scientific work. Our principal calling, therefore, has been the protection of the public from those causes of disease and death which can be guarded against, the awakening of the people from their spirit of resignation to the inevitableness of pestilential and epidemic prevalences, a belief worthy only of an age of less general enlightenment than our own, and to making suggestions for the improvement of our public health laws. To do creditable work in these directions, it is above all things, necessary to furnish a free and self-governing people trustworthy knowledge about public and private hygiene. They must know the need of doing certain things and of not doing certain other things, and they must know somewhat of the reasons for doing or for abstaining from doing them.

To make knowledge of this kind accessible and to popularize it, —to act as an intermediary between scientific workers and the public,—has been a large and important part of the duty of the State Board of Health. This educational work has been carried on in three ways :

- 1st. Through the annual report. The aim has been to make this yearly volume the store house of that part of our current sanitary history worthy of permanent preservation and of papers of interest and of value to private citizens, local boards of health and physicians.

2d. Through circulars and health tracts, giving plain and concise information about health matters which everybody ought to know To render some of the most important elements of sanitary knowledge as far as possible a common possession of the people, the circulars are kept permanently in type and are supplied to members of local boards of health, physicians, clergymen, or to anybody else who will judiciously distribute them, or who wish them for their own use. Exclusive of blanks supplied to local boards of health only, the following circulars have been prepared :

- Form 21. Practical Facts about Cholera.
- “ 23. Earth Closets.
- “ 26. Small-pox, its Prevention and Restriction.
- “ 27. Does Vaccination Protect?
- “ 29. Treatment of the Drowned.
- “ 30. Contagious and Parasitic Diseases of Animals.
- “ 38. Disinfectants and their Uses.
- “ 40. Rules for House Drainage.
- “ 44. Diphtheria, Its Prevention and Restriction.
- “ 45. Scarlet Fever, Its Prevention and Restriction.
- “ 46. Typhoid Fever, Its Prevention and Restriction.
- “ 47. Is Diphtheria Contagious?
- “ 48. Isolation of the Infectious Sick.
- “ 49. Motives and Methods for Sewering, Cities, Villages,
and Summer Resorts, etc.
- “ 50. Contagious Diseases and Contagion.
- “ 51. To Teachers.
- “ 53. Characteristics of the Infectious Diseases.
- “ 54. Prevention of Consumption.
- “ 60. La Scarlatine.
- “ 61. La Diphtherie.
- “ 62. La Diphtherie, est elle Contagieuse?
- “ 63. La Fievre Typhoide.
- “ 64. La Prevention de la Consomption.

3d. *The Sanitary Inspector*, published monthly by the Board. It serves as a medium of communication between the State Board on the one hand and the local boards and the public on the other. It summarizes much of the most important current sanitary news within and outside the State, and gives information which should go into every household. Circumstances render it impossible to send this to the public as an entirely free gift, but its subscription price is made as nearly merely nominal as possible.

Thanks to the universal brotherhood of the workers in the cause of public health, the investigations in the well endowed laboratories of Europe and of this country, and the results of the original work of those public health departments that have ample funds, are free and available to all who can obtain and read their works.

A survey of the part of this work which the local boards of health are doing, whether in the role of instructors, or as the agents for the execution of our public health laws, gives reason for a good degree of satisfaction. The efficiency of the local boards generally we believe has steadily increased, and a candid examination of the extracts from their annual reports, we think, will substantiate what we say. In the first place, the number of boards reporting to this Board in 1890 is 400 out of a total of 430 towns, against 378 in 1889, and 338 in 1888. Again, it may be observed that outbreaks of diphtheria, scarlet fever and typhoid fever have in almost all instances been confined to the primary cases or the first family.

In meeting and talking with members of the local boards, even when from the farms or shops of our smaller and more remote towns, we have often found a remarkably clear understanding of the duties of a local board of health and of the practical application of remedial measures to the prevention or mitigation of threatening conditions. Many of these duties require some degree of technical knowledge and skill of a kind which any intelligent person may master with a little careful attention, but the better with some practical experience in actual work. There is, therefore, a great advantage in the Maine law, which, in the normal course of events, provides that each member shall be appointed for three years, and that only one new hand shall come on the board at a time. With this optimistic view it must be admitted that there are chances enough for improvements in public health work.

Infectious Diseases. Of the three most serious infectious diseases, diphtheria, scarlet fever and typhoid fever, it appears from the reports of the local boards of health, that there was only a moderate prevalence in the State generally. There were, however, a few notable local exceptions. Of 400 local boards of health, 120 expressly state that no cases of diphtheria, scarlet fever, or typhoid fever occurred during the year, and 40 other boards do not report cases of these diseases; or a total of 160 towns in which these dis-

eases are not reported as having occurred. Last year of 378 boards reporting, 159 contained no reports of these infectious diseases.

Diphtheria. The reports show that during the year 1890, cases of diphtheria occurred in only 96 towns, as against 138 in 1889. The most serious and prolonged outbreak of this disease occurred in Eastport, apparently due to the causes set forth on pages 11-16. That any intelligent person acquainted with the studies which have been made into the nature of diphtheria in the last few years, should doubt its contagious and infectious qualities, is surprising; and that he, furthermore, should wish to influence his fellow towns-people to take risks with so fearful a disease, even if he entertains the doubt as to contagion, is still more surprising to say the very least. We feel strongly on this subject because we believe that every word of doubt, as to the communicability of diphtheria, every word which leads the people to act carelessly with diphtheria, is a great injustice to them, and often leads to lamentable consequences. The people generally are all too ready to generalize from insufficient data. They know of cases of diphtheria from which the disease, as far as can be seen, has not spread although the circumstances seemed favorable for it to do so. Abundant evidence is at hand for just this sort of reasoning to show that neither scarlet fever nor small-pox are contagious. The value of this negative kind of evidence is often unduly estimated.

As showing the present position of this question, we would say that the leading medical teachers and sanitarians of the present day who do not believe in the contagiousness of diphtheria are very few indeed. We do not know of one of eminence at home or abroad.

Diphtheria is to be steadily fought as one of the greatest enemies of child life. Children are to be guarded from its infection as one would protect them from that of small-pox. There is the more reason for doing this, in the fact that, with increasing age, the child outgrows, in a large measure, the susceptibility to the infection. This is well shown in the report made last year to the American Public Health Association, by the Committee on the Cause and Prevention of Diphtheria. Of 19,824 cases collected there were:

“Seven per cent. under one year of age; fifty-seven per cent. between one and five years; twenty-eight per cent. between five and ten years; five per cent. between ten and twenty years; two per

cent. between twenty and forty years; six-tenths per cent. between forty and sixty years; four-tenths per cent. over sixty years."

Thus ninety-two per cent. of the cases occurred in children who had not passed the tenth year.

Scarlet Fever. Scarlet fever was reported in 86 towns in 1890 as compared with 82 towns in 1889. In the great majority of outbreaks the disease appears to have been of rather a mild type, as it was in the preceding year. In the latter part of the year, our eastern border was threatened by the prevalence of scarlet fever in a serious form at some points just across the line in New Brunswick. The local board of Forest City, separated from the infection by only a narrow stream and a bridge, acted promptly, and did what it could to prevent the importation of the disease, but it was introduced in spite of its work. From the same source the infection was introduced into Brookton where a newly formed board of health did good work in stamping out the infection. The health officer of Vanceboro gives an instance in his report of criminal carelessness which resulted in an outbreak. In one town the physician attending a case of scarlet fever failed to notify the local board of health as the law plainly provides. The house, therefore, was not placarded; the child was not kept in the sick-room as long as she ought to have been, but was allowed to run out and play with other children while in an infectious condition. One of the playmates, a healthy little boy, had lately come on a visit with his mother, all unconscious of the danger so near. The boy took the disease and died. No wonder the feeling of the parents was one of bitterness for the great wrong which they felt had been done them.

Small-Pox. There was but one outbreak of this disease during the year. As is known to the residents of this State, it was imported by a sailor who it is believed contracted the disease in Porto Rico. The history of this little outbreak emphasizes anew the unreasonableness and the peril of neglecting vaccination, especially by persons who run as many chances of infection as the seafaring class. The master and owners of every ship ought to insist, as far as it is practicable, upon vaccination for their crews. One other piece of advice we think captains of vessels would do well to take willingly from motives of self interest; that is, to report to the quarantine officials at once, if, upon entering port, there is a suspicion of having on board a dangerously contagious disease. The quarantine of the present day is very different from

the old time quarantine. Instead of being held for many days for the infection to die out, at the larger ports, like New York and Boston, where facilities for rapid and efficient disinfection exist, the vessel is now retained for only a few hours, or a very few days. The vessel is then given a clean bill of her health and the trouble and suspense is done with.

Measles and Whooping Cough. Whooping cough appears to have been unusually prevalent in the State, it having been reported by sixty-six local boards. Measles was reported by only seventeen boards. As the law does not make the reporting of these diseases compulsory, it is likely that they were present in a considerably larger number of towns than the reports make it appear. These two diseases, though not among those specified in the law, nevertheless are often the cause of much trouble, and sometimes of a pretty high rate of mortality. They should not be ignored by the public and by local boards of health. When prevalent, the law for the protection of the schools should be put into operation, and, to keep the school-rooms from being the point for the diffusion of the infection the teachers should be instructed to cooperate with the board as the law provides.

Rabies and Hydrophobia. Quite a sensation was produced in the State in the spring by outbreaks of rabies among dogs in Brunswick and Lisbon, and the death of a respected citizen from hydrophobia in each of these towns was a lamented result. Each of these towns took measures to check the spread of the infection by the destruction of all rabid animals and those supposed to have been bitten by animals affected with rabies, and the muzzling and restriction of the liberty of all dogs. At the meeting of the State Board in June, the following instructions were prepared for the use of local boards of health in case of future outbreaks of rabies: "To destroy all rabid animals and to confine under competent observation all bitten animals and all under suspicion of having been bitten, or having come in contact with rabid animals until the question of their being affected with the disease can be positively determined, and to require all dogs, without exception to be securely muzzled and not permitted to run at large."

Cerebro-Spinal Meningitis. This disease is interesting to the public health officer for the reason that the question as to its contagious or infectious nature is not satisfactorily determined, and for the additional reason that it is sometimes characterized by the

terrible rapidity of its onset, a high rate of mortality, and by certain serious lesions of the nervous system often left as sequels in the survivors. The doubt as to its contagiousness would justify reasonable precautions against its spread in this way. A few cases of this disease were reported in Houlton, Sanford, St. Albans and Veazie.

Drowning Accidents. Reports from seventeen local boards of health state that drowning accidents occurred in their towns in which one or more persons lost their lives. We find it stated in none of these reports that intelligent, systematic efforts were made to resuscitate any of these drowned, or apparently drowned persons, after their bodies were recovered. Nevertheless, experience in this direction shows that, if recovered within a little while after the accident occurs, a pretty good proportion of the unfortunates may be brought back to life, if prompt and well directed efforts be made in this direction. This is the reason why the State Board in 1886 published "Circular No. 29, Treatment of the Drowned," and has distributed it more or less extensively since, but we feel that its teachings have not become so widely known as they should be. Its practical methods for saving the drowned should become known by every citizen of the State, and teachers should use the little tract as a lesson in practical hygiene. A few minutes only are needed to read it carefully. The aggregate of time thus spent would be amply paid for if it should result in the restoration to life of a few of the victims of accidents of this kind.

"The evidence" says the Secretary of the State Board of Health of Michigan, in his report for 1874, "which leads to the belief that many of these lives might have been saved through the vigorous use of the proper means for resuscitation, is strengthened by the fact that it not very infrequently happens that persons supposed to be dead from drowning are accidentally restored to life. The following are instances: A clergyman in this city tells me that such a case is within his knowledge, being that of a young man removed from the water apparently drowned, but who recovered after having been somewhat shaken up by being rapidly conveyed some little distance in a wheeled vehicle of some kind. An editor in this city mentions a similar instance which occurred in the western part of this State a few years since. Two boys were bathing in the edge of a lake, when through some means the oldest sank beyond the reach of the other, and was apparently drowned. The

remaining boy ran to the house, a distance of about twenty rods, secured the assistance of his sister, and returned to the lake. The body of the boy was then recovered, and being unable to carry it home, they placed it in a 'pounding-barrel' and proceeded to roll the barrel homeward. It will be seen by the above account that the body must have been in the water some little time. Before they reached home the boy that was apparently dead when they started had so far recovered as to vomit, and he was eventually completely restored to life. From a letter received from Dr. J. H. Beech, of Coldwater, I extract the details of another case, as follows: I have learned from an intelligent young man who was at the 'Silver Lake, Hillsdale county, disaster,' that a young lady who was given up by all present as past hope, was put in a lumber wagon and covered with blankets, for decency's sake only, and the smart jolting effected resuscitation in a drive of a mile or two. She still lives, and it is possible that if some of those left near the lake until the next day, or whose bodies were carried thence with all the tenderness that refinement dictates, had been subject to the energetic shaking of lumber wagons, better result might have surprised the horror-stricken friends."

Burning Accidents. Several severe or fatal burnings have been reported that were clearly the result of gross carelessness. One of this kind, in which a man, his wife, and three children were all severely burned by trying to clean a tin dish by boiling kerosene oil in it. We have every year made inquiry as to kerosene accidents and should feel grateful for information from any source about accidents of this kind.

Domestic Economy. The growing interest in this subject evidenced in the establishment of special schools of cookery in various places, the founding of a department of household economy in one of our leading colleges for women, and the movement to provide instruction in cooking and sewing in connection with the common schools in a few places. The importance of all this, having so intimate a connection, as it does, with healthful and happy living, can hardly be over estimated. As an unusually valuable contribution on this subject, we are glad to be able to republish in this report, "Practical Sanitary and Economic Cooking."

SECRETARY'S REPORT.

It is with pleasure that we can again begin an annual report with the statement that, in the year just passed, the State Board of Health and the local boards have had but few serious epidemics of contagious diseases to contend with; nevertheless infection in some of its dangerous forms is always near, and not a week nor hardly a day has passed without the receipt of intelligence of outbreaks of infectious diseases which, if neglected, would, in some cases, have assumed the proportions of epidemics. That these outbreaks have not more frequently spread from the houses in which they have first appeared, we feel sure is due, in a large measure, to the faithful and intelligent action of the local boards of health. On the other hand we are sorry to say that the non-observance of, or tardy compliance with, the plain provisions of the law on the part of some physicians, or local boards of health, or other persons, has sometimes provided the opportunity for the spread of the infection, and necessitated a final struggle much more troublesome and costly than it need have been.

In the office of the State Board of Health the work has steadily increased, and its demands upon the Secretary are never-ceasing. The daily correspondence with local boards of health and other persons is extensive, the calls for advice on questions of public health are frequent, the reports of outbreaks of infectious diseases have to be responded to with the supplies of the necessary circulars and other printed matter furnished by this office, unless the records indicate that they are on hand in sufficient numbers or quantities. Analyses of samples of water for the purpose of determining their suitability as drinking-water supplies have been made upon request, as far as the other work of the office would permit, for local boards of health, physicians, water companies and private citizens of the State. As usual we reproduce but

little of the correspondence necessary to carry on this work, and save as large a space as possible for matter of lasting interest and value.

The names and addresses of the Board at the end of the year with the dates at which their terms of office expire are as follows :

CHAS. D. SMITH, M. D., Portland, term expires January 31, 1891.

J. O. WEBSTER, M. D., Augusta, term expires January 31, 1892.

E. C. JORDAN, C. E., Portland, term expires January 31, 1893.

O. A. HERR, M. D., Lewiston, term expires January 31, 1894.

PROF. F. C. ROBINSON, Brunswick, term expires January 31, 1895.

HUGH R. CHAPLIN, Bangor, term expires January 31, 1896.

The sad death of the Hon. Lewis Barker of Bangor, who had been a member of the Board since its establishment, necessitated the filling of the vacancy thus caused, and Hugh R. Chaplin, Esq., of the same city was appointed by the Governor as a member of the Board to fill the unexpired term.

At the annual meeting March 31, 1890, E. C. Jordan, C. E., was unanimously elected President for the ensuing year.

The following standing committees were appointed or re-appointed for the year :

On Finance—Hon. Lewis Barker, J. O. Webster, M. D., and the Secretary.

On Publications—C. D. Smith, M. D., J. O. Webster, M. D., and the Secretary.

On Disposal of Excreta—C. D. Smith, M. D.

On Ventilation—O. A. Herr, M. D., E. C. Jordan, C. E., and the Secretary.

On Summer Resorts—E. C. Jordan, C. E., and the Secretary.

On Sewerage and Drainage—E. C. Jordan, C. E., and Prof. F. C. Robinson.

On Water and Water Supplies—Prof. F. C. Robinson, and the Secretary.

On School-Houses and School Hygiene—J. O. Webster, M. D., and the Secretary.

On Sources of Animal Vaccine—C. D. Smith, M. D.

At the quarterly meeting of the Board in December, the following resolutions were passed :

Resolved, That in the death of the Hon. Lewis Barker, the State Board of Health loses a fellow-worker who has endeared himself to every member of the Board by his genial ways, by his sympathy with the objects of the Board, and by his ready willingness to help, from his varied experience, in the solution of the many questions, legal and otherwise, that have arisen.

Resolved, That we can poorly express in words our sorrow for this loss—a loss deeply felt by the State at large.

At the annual meeting in March, Dr. Smith reported verbally to the Board the results of his examination of the animal vaccine establishments near Boston in accordance with the authorization to do so given at the last meeting of the Board. At this meeting he was instructed to make such further examinations of these establishments and of any others as he deems necessary, and to make a full report of the results to the Board.

The Secretary was instructed to request Dr. J. B. Hamilton, Supervising Surgeon-General, Marine Hospital Service, Washington, D. C., to appoint Dr. C. D. Smith of Portland and Dr. M. L. Young of Vanceboro as special inspectors in accordance with the suggestion of Dr. Hamilton in relation to the exclusion of leprosy from this country.

The Secretary was further instructed to correspond with the Chief of the Signal Service to see what arrangements could be made with that office for the establishment of a larger number of local meteorological stations in the State.

At the quarterly meeting in June it was voted to authorize the Secretary to act for the Board in making appointments for local boards of health in those towns in which the municipal officers have been requested, in accordance with chapter 227, section 1, laws of 1889, to act, and have failed to do so; this power to be exercised only in an emergency.

At this meeting it was *Resolved*, That this State Board of Health learns with great satisfaction of the work of house to house sanitary inspection prosecuted by the local boards of health of Augusta and Portland, and that this board urges upon the local health boards of other cities and towns the necessity of carrying out such inspections so far as they may be able to do so, as adding in no small degree to the efficiency of their sanitary work and contributing directly to the public welfare.

Prof. Robinson gave a verbal report of the outbreak of rabies in Brunswick and of the measures that had been taken to prevent further spread of the infection. The Secretary was advised to instruct other towns, if need be, to take the following precautionary measures for the prevention of the spread of rabies, viz: To destroy all rabid animals, and to confine under competent observation all bitten animals and all under suspicion of having been bitten, or having come in contact with rabid animals, until the question of their being affected with the disease can be positively determined, and to require all dogs, without exception, to be securely muzzled and not permitted to run at large.

It was voted that the Secretary be authorized to act for the Board at his own discretion in giving permits for the disinterment and removal of dead bodies in accordance with the provisions of Rule 8 of the 'Rules and Regulations of the Association of General Baggage Agents,' relating to such matters. These rules have been adopted by most of the railway companies in the country. They are as follows:

RULES FOR TRANSPORTATION OF DEAD BODIES.

ADOPTED BY THE

NATIONAL ASSOCIATION OF GENERAL BAGGAGE AGENTS,
AUGUST, 1889.

Rule 1. The transportation of bodies of persons dead of small-pox, Asiatic cholera, leprosy, typhus fever or yellow fever is absolutely forbidden.

Rule 2. The bodies of those who have died of diphtheria, anthrax, scarlet fever, puerperal fever, typhoid fever, erysipelas, measles, and other contagious, infectious or communicable diseases must be wrapped in a sheet thoroughly saturated with a strong solution of bichloride of mercury, in the proportion of one ounce of bichlorid of mercury to a gallon of water; and encased in an air-tight zinc, tin, copper, or lead-lined coffin, or in an air-tight iron casket, hermetically sealed, and all enclosed in a strong, tight wooden box; or the body must be prepared for shipment by being wrapped in a sheet and disinfected by solution of bichloride of mercury as above, and placed in a strong coffin or casket, and said coffin or casket encased in a hermetically sealed (soldered) zinc,

copper or tin case, and all enclosed in a strong outside wooden box of material not less than one inch and a half thick.

Rule 3. In cases of contagious, infectious or communicable diseases, the body must not be accompanied by articles which have been exposed to the infection of the disease. And in addition to permit from Board of Health or proper health authority, agents will require an affidavit from the shipping undertaker, stating how body has been prepared and kind of coffin or casket used, which must be in conformity with Rule 2.

Rule 4. The bodies of persons dead of diseases that are not contagious, infectious or communicable, may be received for transportation to local points in same state, when encased in sound coffin or metallic case, and enclosed in a strong wooden box, securely fastened so it may be safely handled. But when it is proposed to transport them out of the State to an interstate point (unless the time required for transportation from the initial point to destination does not exceed 18 hours,) they must be encased in an air-tight zinc, tin, copper or lead-lined coffin, or an air-tight iron casket, or a strong coffin or casket encased in a hermetically-sealed (soldered) zinc, copper or tin case, and all enclosed in a strong outside wooden box of material not less than one inch thick. In all cases the outside box must be provided with four iron chest handles.

Rule 5. Every dead body must be accompanied by a person in charge, who must be provided with a ticket, and also present a full first-class ticket marked "Corpse," and a transit permit from Board of Health, or proper health authority, giving permission for the removal, and showing the name of deceased, age, place of death, cause of death, (and if of a contagious or infectious nature) the point to which it is to be shipped, medical attendant and name of undertaker.

Rule 6. The transit permit must be made with a stub, to be retained by the person issuing it; the original permit must accompany the body to destination, and two coupons, the first coupon to be detached by agent at initial point and sent to the general baggage agent, and the second coupon by the last train baggageman. The stub, permit and coupons must be numbered so the one will refer to the other, and on back of permit will be a space for undertaker's affidavit, to be used in cases of contagious and infectious diseases, as required by Rules 2 and 3.

Rule 7. The box containing corpse must be plainly marked with paster, showing name of deceased, place of death, cause of death, the point to which it is to be shipped, number of transit permit issued in connection, and name of person in charge of the remains. There must also be blank spaces at bottom of paster for station agent at initial point, to fill in the form and number of passage ticket, where from, where to, and route to destination of such ticket.

Rule 8. It is intended that no dead body shall be moved which may be the means of spreading disease, therefore all disinterred bodies, dead from any disease or cause, will be treated as infectious and dangerous to the public health, and will not be accepted for transportation unless said removal has been approved by the State Board of Health, and the consent of the health authority of the locality to which the corpse is consigned has been first obtained, and the disinterred remains enclosed in a hermetically-sealed (soldered) zinc, tin or copper-lined coffin or box incased in hermetically-sealed (soldered) zinc, tin or copper cases.

At the quarterly meeting in December a communication from John S Billings, M. D., Washington, D. C., relative to the International Hygienic Congress to be held in London next August was presented, but action in the matter was deferred to a future meeting.

The Secretary called the attention of the Board to the report that the immigration from the old country to the West has been quite largely diverted from New York to the port of Halifax and the Canadian Pacific Railroad, and that, therefore, if this is true, the country will be subjected to considerable danger from imported infection, unless the inspection and quarantine service at the port of Halifax are trustworthy. The Secretary was instructed to correspond with Dr. Montezambert of Quebec, or with Dr. John B. Hamilton, Supervising Surgeon-General, Washington, D. C., to learn the truth as regards the condition of the quarantine regulations at Halifax. The following correspondence ensued :

AUGUSTA, Maine, January 15, 1891.

*Dr. J. B. Hamilton, Surgeon-General, M. H. S.,
Washington, D. C.*

DEAR SIR:—Last year I learned from report that a considerable proportion of the foreign immigration which has hitherto landed at

New York had been diverted to a line of steamers landing at Halifax, Nova Scotia, whence it journeys to the West by the way of the Canadian Pacific Railroad which now traverses this State, entering at Vanceboro on the east and leaving the State near Lake Megantic near our northwest line.

I consequently was led to consider the question of the danger of importing infection into our country through this route, and requested Dr. M. L. Young of Vanceboro, recently appointed by you as Medical Inspector under your Department, to make inquiries as regards what precautions were taken at Halifax to prevent the entrance of infectious diseases. He made some inquiries by correspondence with the Halifax officials and the railroad officials, to learn the facts in the case, but did not find the persons of whom he made enquiries very communicative and therefore did not learn much.

I would therefore, respectfully suggest the expediency of your department taking measures to learn whether the Halifax quarantine system is trustworthy or not. The great bulk of this immigration, I presume, goes to the west, and, therefore, this is a matter which concerns the western states more than it does the State of Maine.

Respectfully yours.

A. G. YOUNG, *Secretary.*

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING SURGEON-GENERAL. }
U. S. MARINE HOSPITAL SERVICE, }
WASHINGTON, January 20, 1891.

Dr. A. G. Young, Secretary State Board of Health, Augusta, Me.

DEAR SIR:—I am in receipt of your letter of the 15th instant, asking relative to precautions taken at Halifax to prevent the introduction of infectious disease by the emigrants arriving at that port, and in reply, beg leave to say that a request has been made for a consular report, on receipt of which the desired information will be given you.

Respectfully yours,

JOHN B. HAMILTON,

Supervising Surgeon-General, M. H. S.

SMALL-POX IN SEARSPORT.

June 4, a telegram came from Dr. E. Hopkins, Secretary of the local board of health of Searsport reading as follows: "Have case small-pox in town. Send one package vaccine points by mail." Ten points on hand were forwarded at once and a telegram was sent to Boston for additional points to be forwarded direct to the doctor. Further information came to this office in the following letter written by the local secretary on the 5th and received here on the 6th of June.

"Our small-pox case came from Boston per steamer Penobscot last Saturday, May 31. Left the vessel which arrived the Wednesday before from the island of Porto Rico, with cargo of molasses, 14 days passage, Friday afternoon, and went directly on board steamer, arriving here Saturday forenoon. A letter from the captain's wife informs me that a physician, who I suppose was a quarantine doctor, visited him on the vessel and examined him, and said he had a very bad humor, but saw no signs of small-pox. He was sick more or less the whole passage to Boston with fever, backache, etc., especially about the twelfth day from the time he left the island. He did not go ashore while in port, but mingled more or less with the natives that were loading the vessel, and they say they always have small-pox there on the island. We have isolated him in a small house just out of the village, and have a male nurse who has had the disease, to care for him, and are using disinfectants freely. About six or eight persons have been exposed to it more or less, but I think they are very well protected, and we have again thoroughly vaccinated them. I have received a good supply of vaccine points from Dr. Martin & Son, Roxbury, Mass., and am using them freely. I will communicate with you again if anything of importance occurs."

Immediately on the receipt of this letter a telegram was sent to Dr. Hopkins as follows:

"Please telegraph immediately, paid here, answers to the following: Name of patient, name of vessel from Porto Rico, date when eruption first appeared, stage of eruption when arrived in Searsport."

At the same time the Boston Board of Health received this information by telegraph:

“Case of small-pox in Searsport, this State; patient came from Boston, Friday, May 30th, on steamer Penobscot; arrived in Boston May 28th from Porto Rico; cargo molasses. Hope to telegraph further facts later to-day. Steamer leaves Boston this afternoon.”

Later in the day the following came from Dr. Hopkins:

“Patient’s name, Linwood A. Fowler; name vessel, schooner Lizzie Lane. Searsport; first eruption about May 28th. On arrival here out on face, upper part body, arms, and beginning to show on legs; vessel chartered to load ice at Bath, Me., and may be there now.”

These facts were telegraphed to Boston and the same afternoon the following telegram was sent to the secretary of the local board of health of Bangor:

“Case of small-pox in Searsport. Arrived from Boston last Saturday on steamer Penobscot. Take precautions.”

A letter of warning was also sent to the local board of each port at which the steamer Penobscot touches, requesting the board to learn whether any passengers had landed on that day when the small-pox patient was aboard, and, if so, to take precautions. Bath was also notified to be on the lookout for the Lizzie Lane.

As we had not learned from Boston whether the “Penobscot” had been disinfected, the following telegraphic message was sent to Bangor on the seventh.

“If steamer Penobscot was not disinfected in Boston, the infected stateroom or birth and bedding should be seen to before Monday. Small-pox patient’s name, Linwood A. Fowler, Boston to Searsport.”

On the evening of the same day information came from Boston that “the schooner Lizzie Lane has cleared from this port for Randolph, Me. We are making active search for her, and if found will be detained. She was not seen by the quarantine officer upon arrival to this port, quarantine not being on until June 1st, except with vessels having sickness aboard.”

Under date of June 8th, the Secretary of the local board of health of Bangor wrote:

“As soon as the Penobscot arrived here Saturday I went down and saw the captain and the first he heard about it was that morning, he said that a man came aboard at Boston and said he did not feel well and wanted a stateroom. He got one and did not come out until he got to Searsport. The room has not been used since, and now it has been fumigated and the bedding burned and every

precaution taken that could be. I was there to day and know that this was done, and they said that they would clean the room thoroughly and would not have it used for some time "

Two days later, June 10th, Dr Durgin, Chairman of the Board of Health of Boston wrote: "The Lizzie Lane was overtaken and held in quarantine until she was thoroughly attended to."

Meanwhile the authorities at Bath and other ports had been on the watch, for various rumors from various sources had been received as to the destination or actual whereabouts of the infected schooner. These places were at once notified of the disinfection of the vessel.

Turning again to Searsport, the unwelcome news came that Mr. Fowler, the small-pox patient died June 7. On account of ill health, Dr. Hopkins resigned his position and a new Board was formed with Dr. E. W. Gould, Secretary.

Six persons were exposed to the infection before the diagnosis of the first case was made, viz :

A. D. F., aged 54, mother of the deceased. She was vaccinated when a girl and not since that time until June 3d, 1890, which did not take. She was revaccinated on the 8th. She came down the 13th and was confined to her bed until the 20th, the eruption aborting. It was a well marked case of varioloid.

E. F., aged 30, sister of the deceased. She was vaccinated when a young child, was again vaccinated June 3d, and again on the opposite arm June 7th. Both vaccinations in June took well. She was exposed to the infection with the other five persons June 1st, developed the initiatory symptoms on the 15th, the eruption appeared on the 17th, and she was removed to the pest house. The eruption became umbilicated June 23d. This case ran a modified course.

N. S., aged 70, uncle. He was vaccinated when thirty years old, but declined vaccination in June. He complained of general malaise June 14th, took his bed two days later, with a sense of great muscular weakness. A few papules appeared on his forehead and back. June 23d the temperature and pulse were normal, the tongue was clearing, and the eruption was aborting. He made a rapid recovery. The temperature did not exceed 100 and the pulse was not above 80 per minute.

J. C., aged 78, grandfather. He was vaccinated with success June 3d, but had never been before. He did not take the disease.

J. P., aged 67, a neighbor. was successfully vaccinated June 3d. He also had a good scar as the result of vaccination when a boy. He escaped.

G. N., aged 48, a neighbor. He had been vaccinated when a young man; the vaccination in June did not take well. He did not contract the disease. It will be seen, therefore, that of the six persons who were exposed to the infection of the disease before its character was recognized, three had small-pox, and three escaped it.

Mr. Fowler, the subject of the first case, had never been vaccinated. I am indebted to Dr. Gould for the following facts:

DIPHTHERIA IN EASTPORT.

By far the most serious and protracted epidemic of diphtheria of the year has held on in Eastport. The history of it is instructive, and strongly emphasizes the need of constantly keeping up the organization of a local board of health ready to deal with the primary cases of infectious diseases.

About the middle of March (17th,) I received a letter from one of the physicians of Eastport which read as follows:

“We are having quite an epidemic of diphtheria here in town, and but very little done to prevent its spreading. We have no board of health, excepting the selectmen, and they do not seem to take much interest in the matter. Families that have diphtheria are allowed to go out and in just the same as though the disease was not there, and are allowed to come on to the streets and mingle with people the same as ever. I heard of a case of a little boy that was taken yesterday. The father asked the doctor that is attending the child if he could go out the same as usual, and he answered him, yes, they were all going out, and he might as well as the rest.

“Within the last three days we have had six new cases reported and within the last week four deaths. Now I think something ought to be done and that right away, to prevent its spread. Calais says they will quarantine us if something is not done. I wish you would attend to this at once.”

In answer to this the following letter was sent:

“DEAR DOCTOR:—I thank you very much for letting me know about the prevalence of diphtheria in your town. You need a local board of health at once, and ought to have one permanently. Please consult with the selectmen about appointing one. If your

physicians do not wish to be troubled about such duties, advise the selectmen to appoint three good, trustworthy men who are not physicians, with or without a health officer, preferably, with, to advise them. It would be better probably, for the secretary to be chosen with reference to his being the executive officer of the board, doing most of the work and, of course, having most of the pay for work necessary to be done. Unless you have a board and begin work at once you will probably be quarantined against by more than one town. Calais looks after its cases of infectious diseases sharply, and will, undoubtedly, carry out its threats, and they ought to. I send you circulars, blanks, and other papers which please give to the local board of health when appointed.

If there is any hitch on the part of the municipal officers about making appointments, the State Board of Health will appoint at its next meeting, March 31, if citizens of your town will nominate suitable persons. I think, however, the trouble with the selectmen is that they have found difficulty in finding persons to accept, or so I have been informed."

With this letter was sent a full set of the blanks and circulars needed by a local board to begin and carry on its work. A letter was also sent to the selectmen urgently requesting them to appoint a local board of health. A local board of health was appointed March 27th, and organized and began work at once. One of the first things the board did was to request information of all the physicians in the town as to the number and location of the cases of diphtheria under their treatment. A, had two cases, both convalescent; B, two cases in one family, nearly well; C, no cases, just discharged last one, have had sixteen cases; D, one mild case.

From these reports, and from the length of time the disease had prevailed with no authority to restrict it, we may well infer that the number of infected places in the village was considerable, and that consequently the local board would work under many disadvantages. The board worked under other disadvantages also: some of the citizens showed a disposition to defy the authority of the board instead of supporting it in its work for the common good. For instance, about the middle of April, a case of diphtheria was reported to the local board of health in the house of a Mr. K. The Secretary went at once to the house and adopted measures to prevent the spread of the infection. The house was placarded. Three days afterwards complaint was made that the brother of Mr.

K., was disregarding the order of the board, visiting the house freely and taking no precautions. The Secretary called upon Mr. K., the brother, in relation to the matter and he acknowledged that he was doing so daily and should continue to do so, and a few hours afterwards, he went to the infected house, removed the placard from the door, and tore it in pieces. The local board promptly and rightly filed a bill of charges against Mr. K. Eventually the case was tried before a local justice, the defendant plead guilty, and was fined twenty-five dollars and costs. The defendant appealed to the Supreme Court, and the case was settled without being brought before the jury by his paying the costs, about seventeen dollars.

In spite of the earnest work of the local board of health new cases continued to appear nearly every week until the latter part of August; then on account of the continuance of the epidemic Dr. C. D. Smith of Portland, a member of the State Board, visited the town for the purpose of advising with the local board and learning the conditions which contributed to the continuance of the prevalence of the disease. The following was the doctor's report:

PORTLAND, August 23, 1890.

Dear Doctor Young:

I have this morning returned from Eastport and will report to you while the matter is fresh in mind.

I arrived at Eastport Thursday noon, and at once made an appointment to meet the local board that evening, as all were out of town at work during the day. I busied myself until night looking about the town and conversing with different citizens as to the past and present condition of affairs, and my interview with the board during the evening only confirmed the opinion I had formed during the day. I am satisfied that the cause of the trouble is due to these facts:

1. The present board entered upon its duties last spring without receiving any records from their predecessors. It does not appear that any were ever kept. They have adopted no formal by-laws, and have been continually hampered by the idea that they could do nothing unless it were in accord with something in the town by-laws.

2. They been deceived with regard to the presence of cases of diphtheria, because I find the impression prevalent that physicians have not reported all of their cases, and this is not contradicted by

evidence ; indeed, I was assured by one physician that until last spring when the selectmen "asked" them to do so the physicians had not considered it at all worth while to report.

3. There has been and is a singular apathy in the minds of some of the people as to the danger of the disease, due to remarks freely made by some of the medical profession, creating the impression that the disease is feebly, if at all, contagious, and ridiculing the necessity of such stringent measures, as have been advised. This attitude of some of the medical profession has seriously impaired the usefulness of the board and embarrassed them and the selectmen in their endeavors to do their duty, as I believe they have honestly attempted.

4. The selectmen on their own responsibility, without consulting the board of health, appointed a Mr. Whelpley, an ex-deputy sheriff, as health officer, and the board tell me that for a fortnight at a time they would have no knowledge of where he was or what he was doing. Then the citizens rebelled against paying this man two dollars per day, and the selectmen dropped him. From what one of the physicians told me and from my conversation with prominent and reputable citizens, I have no doubt that the so-called isolation has been very feebly maintained.

During the evening I had a long conference with Mr. Clark, Secretary of the local board, and his associate Mr. Bibber, who was appointed in July to succeed Mr. Caldwell who took offense and resigned because his friend Mr. Kilby was prosecuted for tearing off a placard. I told the local board that having asked me what I considered the cause of the continuance of the disease, I should reply to them frankly. You have been working against great odds, because your local physicians have neglected to keep you fully informed of new cases, and because of prevailing false impressions as to the contagious character of the disease, and this latter has rendered your system of isolation almost of no avail.

I advised them to have a full meeting of their board to-day, and first of all adopt a system of by-laws and send it to Judge Emery for approval, making a careful record of everything done by them as a board. Then by careful and judicious inquiry keep themselves informed as to the progress of every case and the thoroughness of the isolation. They are to be careful not to interfere with any physician in the management of any case, unless satisfied that he is

deceiving them or that the measures of restriction fall short of those directed by the State Board.

I told them that when once appointed by the selectmen their duty was to administer the State health laws and their approved by-laws, entirely independent of anything or any body except their own decisions formed upon their own judgments in each particular case. That they must be the judges of their own action, and act accordingly. A question was here interposed by a physician present as to the need of certain cleansing methods in a "disease not yet proven to be contagious in all cases." I replied that I could not presume to occupy time to discuss that subject, or the question of contagion; that whatever his view or mine on that subject, one thing was plain, i. e., that the Law of Maine directed that when a case of diphtheria occurs, certain things must be done, by certain people and the duty of the local board of health was to see that such were done. That was the whole point of the diphtheria question, and there could be no other.

I discussed freely and until midnight with Mr. Clark, Secretary of the board, the various bearings of the question. I am satisfied that the board is anxious and desirous to do its whole duty and will if it has the support of the municipal officers. Mr. Clark is a young man, keen, careful and intelligent, and is surprisingly well posted on health regulations and the different circulars issued by our Board. Mr. Flagg is equally so and both will do all they can. Friday morning I had a long conversation with Mr. Norton, one of the selectmen. He confirmed my impressions regarding the cause of the trouble, and said that his board had again discontinued the services of the health officer, and that they had received the resignation of Mr. Clark, but did not wish to accept it because they had confidence in him, and in Mr. Flagg. I told Mr. Norton that I was satisfied that Mr. Clark would continue on the board, but that the board must have the support of the municipal officers and citizens and that no obstacle ought to be thrown in their way by cramping them in their necessary expenses. That if these gentlemen gave their time and received no compensation, the least the town could do was to give them the services of some one to do the work of placarding and attending to these cases of diphtheria when needful. I impressed upon him that anyone whom his board should select must act under the direction of the board of health and report to them. He assured me that all this would be done and that the selectmen would stand

behind the local board in every case. If all concerned do not now have a clear conception of their several duties in the premises it is their own fault. I am convinced that reporting all the cases, and anything like a decent quarantine would have prevented such serious trouble as they have experienced, but I was amazed to find how thoroughly disseminated were the doubts as to the contagious nature of the disease. There has been the trouble, and I am satisfied that a few judicious prosecutions would have changed the opinions of some of the people in a radical manner. I advised all whom I met, with a full understanding that the question in a small village has some features which may be ignored in the city, and think my instructions were adapted to the people and the place. I am confident that the local board can manage it if the physicians don't counteract their efforts. The board has the right idea and is anxious to do its duty to the satisfaction of the State Board.

The village seems clean and well kept, and the drainage, except about Water street, has plenty of chance to reach tide water by the natural decline of the land. On the water front there are a number of private drains. The water supply is good in quality, but somewhat limited in quantity, and it is now proposed to tap a pond some miles from the village and utilize the stand-pipe which has been built for a protection against fire. The local board is looking after the privies and the fish offal about the packing houses, and will do good work if not hindered.

Just as soon as I can get leisure I want to go to Augusta and tell you much that I can't very well write, but I have herein given you the gist of my labor which I hope will prove beneficial, and to your satisfaction.

Will you please mail to Mr. Clark, some copies for free distribution of circulars No. 38, 39, Notes on Disinfection, Abstract of Health Laws, Form 44, Form 11, and Form 12.

Very truly yours,

CHARLES D. SMITH.

This outbreak and continued prevalence of diphtheria in Eastport is another confirmation of the truths taught by the State Board that the infection of diphtheria once introduced and distributed in a village is an exceedingly hard one to eradicate, and that its introduction should everywhere and always be met by prompt measures to prevent its spread. In this case the golden opportunity for stamping out the epidemic had passed when the local board was

appointed; the further explanation why the disease still continued is given by Dr. Smith's letter.

SCARLET FEVER IN GUILFORD.

In the early part of October, I was notified by Mr. Henry Shaw, Secretary of the local board of health of Guilford, that some kind of eruptive disease prevailed in that town, and that there was a disagreement among the physicians who had seen the cases as to its nature, some contending that it was scarlet fever and some that it was not. As often happens, the citizens took side with the doctors, and, consequently, the local board of health was not supported as it ought to have been in giving the public the benefit of the doubt until the question was settled. In this emergency the local board of health appealed to the State Board for advice, and Dr. J. O. Webster visited the town. As the difference in diagnosis in connection with this outbreak is fairly typical of some other differences of opinion that have arisen in other outbreaks of this same disease, the doctor's report should be of more than local interest, and should warn against the repetition of the error of demanding absolute certainty of diagnosis before anything is done. The mere suspicion that a given case is one of scarlet fever should always lead to prompt precautions against the spread of infection if it should prove to be infectious.

AUGUSTA, October 10, 1890.

Dr. A. G. Young, Secretary:

DEAR SIR:—In accordance with your request, I visited the town of Guilford, on the 9th inst., to investigate an epidemic of an eruptive disease there prevailing among children, there being a difference of opinion among medical men in that vicinity as to its nature. I was met at the station by Mr. Straw, Secretary of the local board, and taken to see a large number of cases.

The epidemic began with one or two cases in August, but did not spread to any extent until within the past two or three weeks, when there have been about twenty-four cases. As it had evidently been propagated through the schools, they had very properly been closed. The local board had used every effort to control the disease,

but had been hampered by medical opinions averse to its being of a serious character.

I submit some brief notes of a part of the cases that I saw.

1. Frank Washburne, age 5, on October 2d complained of sore throat in the morning, had nausea and fever in the afternoon, eruption began that night on the body, there was little on face. He is now desquamating, large flakes peeling from limbs and hands, and starting on feet; he pulled a "cot" from one finger while I was present. Throat and nose quite sore.

2. Kate M. Richards, age 9, taken two weeks ago, vomited once then lay about the house two or three days and complained of sore throat, mother does not know when she broke out, eruption was fine, only on chest, now feels rough but is not yet desquamating.

Two other children in this family had slight symptoms, some sore throat, the older a fine eruption all over, the younger only on back of neck.

3. Harry Bonney was taken two weeks ago with vomiting and high fever, eruption was not noticed till the third day. It was fine with intense redness all over body, not much on face, very sore throat, had much swelling of glands and wry neck, now desquamating, neck still stiff.

4. Straw boy, taken two weeks ago, got up in the morning feeling sick and returned to bed, vomited and had high fever, throat sore, eruption appeared next morning it was fine with intense redness of skin, first on body but extended to cheeks and forehead. Now desquamating, pale and weak.

5. Hudson boy was taken with sore throat, vomiting, quite high fever, no eruption. He is supposed to have had scarlet fever when small. Sister was taken about a week later with same symptoms, a fine rash appeared in a few hours over body, not on face. Not yet desquamating, but skin is rough and looks likely to throw off scales.

I saw a good many others, some having had very little eruption or none at all, all having had fever and sore throat, and nearly every case beginning with vomiting. Several of the parents had had sore throat and a feverish condition.

Doubtless all these cases depended upon one and the same poison, and I have no hesitation in saying that it was that of scarlet fever. Although several of the cases, taken alone, would have furnished

no conclusive proof of their nature, there were enough quite typical cases to establish the diagnosis with absolute certainty.

Given an eruptive disease of children, the diagnosis lies between measles, German measles, and scarlet fever. The points relied upon for diagnosis, were as follows :

1. It began with fever and vomiting, followed by rash within—except in one case—twenty-four hours ; in measles the rash would not appear until the fourth day, while in German measles there would be no fever previous to the eruption.

2. The eruption began on the body and rarely extended to the face, never occurring about the mouth ;—in both measles and German measles the eruption is on the face from the first.

3. The eruption consisted of fine points, with redness of the intervening skin at first ; characteristic of scarlet fever, and entirely different from that of the other diseases.

4. Desquamation followed in many cases ; this does not occur in the other diseases, except a very limited branny desquamation in German measles when vesicles have formed. That found in these cases was characteristic.

5. The sore throat consisted of simple redness of the fauces and palate ; that of measles and German measles, when present, is in the form of a coarse eruption, somewhat like that on the skin, extending to the hard palate.

Although the contagion is widely disseminated through the village, I believe the local board of health will now, supported by the authority of the State Board, be able to control its further spread. They are entitled to great credit for the energy with which they have grappled with the problem of its control, notwithstanding the unfortunate way in which they have been hampered in their action.

Yours truly,

J. O. WEBSTER, M. D.,

Member of the Board.

According to information received from the Secretary of Guilford the outbreak lasted about six weeks after the visit of Dr. Webster, and he thinks that six or eight new cases occurred, but as they were not willingly reported there might have been a larger number.

WATER ANALYSIS.

The demand for analyses of samples of water and for advice as to the suitability for drinking purposes of private and public supplies, present and prospective, has continued as hitherto, and as much work as has been practicable has been done in this direction. In the summer and fall the work on the State House extension interrupted the laboratory work considerably. The whole number of samples examined during the year is 96, of which fifty-nine were from wells, eighteen from springs, one from a cistern, five from public water supplies, thirteen from proposed sources of public water supplies, and two from samples of ice. Two samples of spring waters included in the foregoing are classified also as proposed public water supplies.

The examination of samples of water is a work voluntarily assumed by the Secretary in 1887, with the approval of the Board. The examinations are willingly made, as far as the other work in the office will permit, and when there appear to be good reasons for requesting them. In addition to the lack of time always to attend to every examination as soon as the request is received, there has been the disadvantage of insufficient room to permit all the conveniences desired. This trouble it is believed will be obviated after the removal of the office into the new quarters assigned to it, one room of which is designed as the office for general work, and the other as the laboratory.

Circular No. 55 gives some information useful to those who contemplate sending samples. It reads as follows :

“TO APPLICANTS FOR WATER ANALYSES :—The general work in the office of the Secretary of the State Board of Health necessarily takes precedence of the work of water analysis, therefore a delay in reporting results is sometimes a necessity. Where there appears to be a need of it, report is made at the earliest practicable moment.

“Notify this office when you wish to send samples, and bottles for that purpose will be sent in packing boxes. Samples sent without previous notification are almost invariably unsuitable and are necessarily thrown out without examination. Bottles are sent out free by express. Applicants must prepay return express charges.

“The analyses of samples of water ordinarily made require about half a day for each, and, in the doing of our somewhat routine

work in the examination of waters for the purpose of learning whether they contain polluting or other matters unfitting them as drinking waters, we always have rather more than we ought to do with the other work in the office. As the analysis of samples for the purpose of determining their medicinal qualities would take much more time, we were obliged to draw a line and exclude all this kind of work, and therefore, the laboratory has never been fitted up for it. If, therefore, the object in sending samples is to have their medicinal qualities determined, we shall be unable to do the work for you.

“If the object of the application is help in the choice of a public water supply, we would advise, by all means, the sending of more than a single sample from each place of collection. The quality of the water furnished by some sources of supply, or proposed sources, varies much at different seasons and during different sorts of weather. When practicable to do so, it is better to extend the examinations over as many months as possible, preferably a whole year, making arrangements to send samples every one or two months.”

MISCELLANEOUS ANALYSES—Expressed in Parts per 100,000.

Number of Analysis.	Origin of Sample.	Date of collection.	Total solids.	Loss on ignition.	Hardness.	Chlorine.	Free ammonia.	Organic ammonia.	Nitrites.	Nitrates.
470	Well, Winthrop	Jan. 6	9.2	2.0	3.25	1.0	.000	.006	None.	Heavy trace
471	Spring, Belfast	" 6	12.8	5.0	9.57	.8	.000	.001	None.	Slight trace.
472	Spring, Bangor	" 6	18.4	3.2	15.63	.2	.001	.002	Trace.	V'y sl. trace.
473	Spring, Bangor	" 10	16.2	5.4	14.06	.2	.002	.005	Slight trace.	V'y sl. trace.
474	Water Supply Company, Bath	" 11	3.2	1.6	1.27	.6	.000	.008	None.	V'y sl. trace.
475	Spring, Togus	Feb. 3	7.8	3.2	2.60	.6	.004	.004	None.	Heavy trace.
476	Well, Yarmouth	" 6	5.8	1.6	2.34	1.0	.001	.006	V'y sl. trace.	Trace.
477	Well, Bucksport	"	3.2	2.2	1.27	.5	.007	.028	None.	None.
478	Spring, North Raymond	Mar. 1	3.0	1.2	2.60	.2	.000	.001	None.	V'y sl. trace.
479	Water Company, Phillips, Sandy river	" 1	2.4	1.4	1.27	.1	.000	.007	None.	None.
480	Water Company, Phillips, spring	" 2	4.0	2.0	2.60	.1	.001	.004	None.	Trace
481	Well, Sanford	" 4	18.0	11.4	7.00	2.0	.000	.002	None.	Heavy trace.
482	Well, Palmyra	" 8	56.6	15.0	14.84	8.2	.013	.038	Very much.	Very much.
483	Well, Palmyra	" 8	9.0	3.6	5.29	1.0	.000	.004	V'y sl trace	V'y sl. trace.
484	Well, Cornish	" 29	14.0	5.6	4.57	1.8	.001	.003	Trace.	Heavy trace.
485	Sebasticook river, Pittsfield	" 29	4.6	4.2	2.60	.2	.001	.017	None.	Slight trace.
486	Spring, Vinalhaven	Apr. 8	34.0	15.6	8.86	6.2	.000	.011	None.	Heavy trace.
487	Well, Liberty	May 13	48.6	14.2	23.60	4.0	.134	.030	Much.	Heavy trace
488	Well, East Livermore	" 17	29.6	6.0	8.86	3.0	.007	.027	None.	Trace.
489	Spring, East Livermore	" 17	8.0	3.8	6.00	.5	.007	.004	None.	V'y sl. trace.
490	Well, Pittsfield	" 24	30.4	13.2	16.43	4.8	.004	.012	Trace.	Heavy trace.
491	Brook, Pittsfield	" 24	5.6	3.6	2.60	.0	.002	.030	None.	None.
492	Sebasticook river, Pittsfield	" 24	3.8	2.2	1.95	.0	.002	.015	None.	None.
493	Well, Alfred	June 5	-	-	6.00					

494	Well, Portland	June	14	14.0	9.0	4.57	1.4	.001	.002	None.	Slight trace.
495	Spring, Augusta	"	23	-	-	7.14	.3	.001	.001	None.	V'y sl trace.
496	Water Company, Richmond	"	26	4.0	2.2	1.95	.1	.000	.019	None.	Trace
497	Water Company, Richmond	"	26	4.0	3.0	1.95	.1	.000	.015	None.	Trace.
498	Well, North Berwick	July	9	30.0	6.8	18.02	1.8	.003	.011	None.	Trace.
499	River, North Berwick	"	9	4.0	2.8	1.69	.2	.008	.021	None.	V'y sl trace
500	Well, Welchville	"	10	27.0	4.2	3.25	.1	.022	.008	Trace.	V'y sl trace.
501	Well, Searsport	"	16	17.0	11.8	11.80	8.4	.003	.000	Trace.	Trace.
502	Well, Augusta	"	17	15.6	4.2	9.57	1.0	.000	.001	None.	None.
503	Spring, Greenville	"	18	5.0	2.2	5.29	.1	.000	.008	None.	None.
504	Spring, Lewiston	"	23	5.2	2.4	1.95	.3	.001	.003	Slight trace	V'y sl trace.
505	Well, Buxton Center	"	21	16.0	3.8	5.29	2.2	.001	.006	Trace.	None.
506	Well, Norway	"	29	15.0	7.0	3.90	1.2	.000	.008	None.	None.
507	Well, Norway	"	29	16.8	7.8	7.43	.5	.001	.020	None.	None.
508	Well, Orr's Island	"	28	18.4	6.8	4.29	5.8	.000	.001	V'y sl trace.	None.
509	Well, Welchville	Aug.	1	6.8	3.4	2.34	.2	.030	.008	None.	V'y sl trace.
510	Well, Sebago lake	"	6	6.4	3.2	2.60	1.2	.000	.003	None.	None.
511	Chapman brook, Bethel	"	9	2.8	.8	1.69	.1	.000	.003	None.	None.
512	Chapman brook, Bethel	"	9	3.0	2.0	.48	1	.000	.005	None.	None.
513	Well, Yarmouth	"	12	13.4	3.2	9.57	1.0	.005	.001	None.	V'y sl trace.
514	Well, Gray	"	15	5.8	1.8	3.25	.8	.003	.001	None.	None.
515	Well, Augusta	"	19	10.0	4.6	6.00	.4	.001	.002	None.	None.
516	Well, Augusta	"	19	19.2	8.8	10.30	.8	.003	.005	None.	None.
517	Spring, South Portland	"	21	14.8	8.0	6.00	2.8	.000	.000	None.	Slight trace
518	Spring, South Portland	"	21	12.2	4.2	3.90	1.6	.003	.003	Slight trace	None.
519	Well, Sherman Mills	"	19	19.4	6.8	10.30	.4	.000	.021	Trace.	None.
520	Spring, Wald-boro'	"	24	5.0	1.8	.95	1.2	.001	.003	V'y sl trace.	None.
521	Well, Portland	"	24	17.4	8.2	5.00	2.0	.008	.009	Slight trace.	None.
522	Lake Wasakeag, Dexter	"	25	5.0	2.8	2.60	.2	.001	.012	None.	None.
523	Spring, Litchfield Plains	Sept.	1	6.0	2.6	3.90	.4	.000	.002	None.	None.
524	Spring, Fort Fairfield	Aug.	22	22.6	4.2	14.84	2.2	.010	.002	None.	V'y sl trace
525	Ice from Nequasset lake	"	28	1.0	.6	.00	.1	.000	.002	None.	None.
526	Ice from Goddard's pond	"	28	1.6	.8	.00	.2	.000	.000	None.	None.
527	Well, East Machias	"	24	9.6	3.2	4.29	.6	.001	.003	None.	Heavy trace
528	Chapman brook, Bethel	Sept.	3	3.0	2.6	1.11	.1	.000	.007	Slight trace	V'y sl trace.
529	East Branch, Baldwin	"	3	3.0	1.6	1.27	.1	.000	.006	None.	None.
530	Well, Augusta	"	4	32.4	7.0	15.63	3.8	.021	.015	Heavy trace	Much.
531	Spring, Boothbay Harbor	"	3	7.6	1.8	4.29	1.0	.001	.003	V'y sl trace.	Slight trace.
532	Fond, Boothbay Harbor	"	3	6.8	4.4	1.69	.8	.009	.043	None.	V'y sl trace.

MISCELLANEOUS ANALYSES—Expressed in Parts per 100,000—CONCLUDED.

Number of Analysis.	Origin of Sample.	Date of collection.	Total solids.		Loss on ignition.	Hardness.	Chlorine.	Free ammonia.	Organic ammonia.	Nitrites.	Nitrates.
533	Well, Starks	Sept. 8	27.6	7.2	17.54	1.4	.001	.003	V'y sl	trace.	Much.
534	Well, North Islesboro'	" 10	35.8	6.0	16.11	7.2	.007	.017	None.		Heavy trace.
535	Well, Islesboro'	" 9	22.4	6.2	14.37	1.4	.008	.022	V'y sl.	trace	Slight trace.
536	Well, North Islesboro'	" 9	30.8	20.8	8.57	2.8	.000	.005	None.		Much.
537	Well, Sanford	" 13	21.4	11.6	3.90	2.0	.002	.007	Slight	trace	Very much.
538	Water Company, Hallowell	" 24	6.6	2.2	4.57	.4	.013	.006	Heavy	trace.	Heavy trace.
539	Well, Hiram	" 24	3.8	1.4	2.34	.2	.003	.006	None.		Slight trace.
540	Well, Gorham	" 25	13.0	2.8	5.57	.7	.000	.015	None.		Trace.
541	Well, Portland	" 28	16.6	4.2	8.86	2.2	.073	.027	None.		Heavy trace.
542	Well, Fairfield	" 26	14.0	2.6	9.86	.6	.025	.008	Heavy	trace.	Much.
543	Well, Winslow	" 29	35.4	9.6	16.11	6.0	.002	.011	Heavy	trace.	Very much.
544	Well, Winslow	" 29	7.6	3.6	5.00	.6	.000	.000	None.		Much.
545	Well, Yarmouthville	" 30	70.4	11.8	19.13	5.2	.001	.028	None.		Much.
546	Spring, Pownal	" 30	17.1	13.8	2.86	.6	.000	.000	None.		V'y sl. trace.
547	Well, Hiram	" 19	3.1	1.2	1.27	.3	.025	.006	None.		V'y sl. trace.
548	Well, Hiram	" 19	2.4	1.0	.95	.4	.000	.002	None.		None.
549	Well, Pittsfield	" 27	42.4	7.8	16.90	2.6	.000	.007	None.		Trace.
550	Well, Pittsfield	Oct. 27	21.6	4.8	18.02	.8	.017	.003	None.		Heavy trace.
551	Well, Augusta	Nov. 3	17.2	6.0	11.05	2.0	.026	.006	V'y sl.	trace.	Heavy trace.
552	Well, Sanford	" 1	32.0	12.2	10.30	4.8	.000	.009	V'y sl.	trace.	Much.
553	Cistern, Portland	" 6	59.8	13.0	26.62	8.6	.002	.035	Very	much.	Very much.
554	Well, Portland	" 5	7.8	2.6	3.90	.4	.003	.006	None.		Trace.
555	Well, Bethel	" 5	3.8	2.0	2.34	.6	.000	.005	None.		Trace.
556	Well, Madison	" 11	73.8	26.2	19.60	9.6	2.383	.023	Very	much.	Very much.

557	Well, Pemaquid.....	Nov.	10	8.4	4.0	2.60	1.5	.005	.016	None.	Much.
558	Sebasticook river, Pittsfield.....	"	16	5.0	3.2	2.60	.1	.004	.023	None.	V'y sl. trace.
559	Well, Pittsfield.....	"	17	5.6	1.6	3.51	.5	.000	.002	None.	Slight trace.
560	Well, Pittsfield.....	"	17	6.6	2.0	3.25	.6	.000	.000	None.	None.
561	Well, Kennebunk.....	"	28	18.0	7.0	12.26	1.6	.001	.012	None.	V'y sl. trace.
562	Well, Saccarappa.....	"	29	46.8	12.4	19.29	8.2	.000	.007	None.	Very much.
563	Well, Skowhegan.....	Dec.	1	15.6	.6	12.56	.4	.013	.002	None.	Slight trace.
564	Well, Madison.....	"		9.0	3.0	2.99	1.0	.000	.005	V'y sl. trace	Much.
565	Well, Lisbon Falls.....	"	9	4.2	1.8	2.34	.4	.002	.012	None.	V'y sl. trace.

NOTES ON SOME OF THE SAMPLES OF WATER
EXAMINED IN THE LABORATORY.

No. 470. This sample was taken from an old well twenty feet deep, located 20 or 25 feet from the privy, and fifty feet from the stable. The report to the person who sent the sample said that "the sample is chemically a fairly good water. The nearness of the privy and even of the stable to the well is more suggestive of danger than the actual condition of the water as we find it now. The privy, especially, should be managed by some of the dry methods so that no soakage from it can find its way into the well."

No. 471. From a spring in the woods about a third of a mile from any buildings. This is a water very free from organic impurities, but considerably harder than the average of spring waters in the State.

No. 475. From a spring The blank accompanying the sample says that there is no privy "within thirty feet of the spring." If there is one not farther removed than this distance it undoubtedly accounts for the fact that the free and organic ammonia and even the chlorine are in excess of the average for spring waters in this State. The water cannot be considered a safe one for drinking purposes.

No. 478. From a spring issuing from a ledge. There are no sources of pollution in the vicinity. This is a very pure spring water and of a very desirable quality for drinking purposes.

Nos. 479 and 480. These two samples were sent by the Phillips Water Company for the purpose of enabling them to decide as to a suitable source for a public water supply. One sample was taken from Sandy river when the water was at medium height and the other from a spring on a hill side. The following report was made on the samples:

"I enclose blanks giving the results of the chemical examination of the two samples of water lately received from the Phillips Water Company. Looking at the results obtained, that is, judging from the chemical analysis alone, I should say that either source would furnish a good supply for drinking purposes. It is, very far from advisable, however, in choosing a source for a public supply to base the judgment upon the chemical examination alone and much

less upon the results of a single examination. I should, therefore, advise by all means the sending of other samples for examination at intervals of about four weeks and as long a time as the interval before beginning work will permit. It would especially be useful to you to have an examination made at the time of the spring freshet.

“I would say of the results of these examinations that the total solids, hardness, and free and organic ammonia, are all very satisfactory. The organic ammonia is especially low for a river water. The spring water has a little higher total solids, it is a little harder, and has a little more free and organic ammonia in it than is found in the very best of spring waters in this State, but not enough in it to justify me in calling it otherwise than a good spring water, especially without further examination of it. I would respectfully refer you to the report made last year on the examinations of the public water supplies in the State. You will perhaps be interested in comparing the results therein given with those which I give you with these two samples. I would gladly send you a copy of that report if the edition were not almost entirely sent out, and will do so, if you cannot borrow one from your local board of health.”

No. 481. From a well dug twelve feet below the bottom of a cellar in which it is located. The well is in a thickly built part of the village with the sink drain, cess-pool, and privy from twenty to thirty-five feet distant. Typhoid fever and much other sickness has occurred in the families using this water, and the doctor has been called to them much oftener than to other families close by using the aqueduct water. The following report was made: “The well is badly located and even with the care which has apparently been taken with the well the cess-pools are much too near for safety. Under such conditions, almost always, we usually get more unfavorable results than I have with this sample, yet for Maine well-waters there is an excess of chlorine and nitrates which indicate a certain amount of pollution. I should feel very sure that at certain seasons, the water from this well would give much worse results than I have got from this sample. The examinations which I have made of the water supplied by the Sanford Water Company shows it to be good. The water from this well I should not want to use, basing my judgment rather more upon the description of the surroundings of the well than upon the chemical examination.

Nos. 482 and 483. These two samples were from two wells on the same premises.—No. 482. From a well eighteen feet deep at the corner of the woodshed, seventy-five feet from the sink drain, fifty feet from the privy and stable. Three years ago a pig-pen twenty feet from the well was removed. The water was badly polluted and is not suitable for drinking purposes. No. 483. From a well from two hundred to four hundred feet from the ordinary sources of pollution, nevertheless, the well is situated within the limits of the highway and is overflowed by surface water for a short time each spring. The well is only six feet deep. The chemical results at this time of the year are good. The sample from this well gave much the better results, though the well is badly located and should be protected from surface water if it is to be used. Two cases of typhoid fever have appeared in the family on these premises.

Nos. 485, 490, 491, 492, 558, 559 and 560. The analyses of these samples from various sources were made to aid in the selection of a suitable source for a water supply for the village of Pittsfield. Nos. 485, 492 and 558 were taken from the west branch of the Sebasticook river flowing from Moose pond eight miles away. The stream has the drainage of Hartland village and of a five set woolen mill six miles up stream. No. 490 was from a well dug twenty-five feet, fifty feet from the privy and twenty from the stable. No. 491 from a brook flowing through some marshy ground. No. 559 from a well drilled forty-seven feet in solid ledge. At this depth water was struck which flowed from the top of the well. There are no sources of pollution within 200 or 300 feet. No. 560 from a dug well forty feet deep, one hundred feet from privy, fifty feet from stable, and thirty-five feet from barnyard and pig-pen. The following report was made on these samples.

“I enclose three blanks giving the figures which we obtained from the analyses of the three samples of water lately received from you. I have also had tabulated for you, in pencil, the results of the analyses of all of the samples which you have sent. The sample from the Sebasticook river just examined gives results still more unfavorable than those given by the two samples previously received from the same source, as you will see by consulting the tabulation. The brook water sent me May 24th also gave unfavorable results due to the large quantity of organic ammonia, while at the same time the free ammonia was greater than the aver-

age in our public water supplies taken from rivers and streams. You will notice also that the sample of well water sent May 24th gave very unfavorable results.

“I am glad to say that the two samples of well water which you lately sent have given very good results. They are a little harder than the samples from the stream. Notwithstanding the good results which I get from the chemical examination of the water from the dug well my judgment would be that the well is not favorably situated for a public water supply. Your description of the surroundings indicates that sources of possible pollution are too near. On the other hand, as far as I can judge from the description of the drilled well, it is favorably situated and would not be likely to be polluted from privy soakage. There are of course important engineering questions and Mr. Gowing will answer these for you.”

No. 486. A spring, or more properly, a public well, dug out eight feet deep. The ordinary sources of pollution about dwelling houses are not less than one hundred feet distant, but there is a cemetery only forty feet away, though it is said that the direct drainage from this is not toward the well. The rains all run into it from the valley above which is thickly settled. The water is polluted and is altogether unfit to be used as a drinking supply.

No. 487. The analysis was desired on account of the prevalence of typhoid fever in the house where it was used. From a well fifteen feet deep. Distance of privy twenty feet, stable and barnyard, sixteen feet, cess-pool ten feet. “The water is a bad one in every way, and is too dangerous ever to be used as a drinking water.”

No. 488. From a well only eight feet deep, distant from the privy, stable, barnyard, pig-pen and sink drain forty-seven, thirty, forty-five, and ten feet, respectively. This water is distinctly polluted. It is much too near sources of pollution.

No. 489. From a spring 195 feet away from any buildings or other source of pollution, except surface water. This is not a good spring water.

No. 493. From a well drawn through thirty-five feet of lead pipe. It was tested for lead and hardness only. It contained a trace of lead.

No. 494. From a drilled well, forty feet deep, cemented around the surface of the ledge so that no surface soakage can get in. “The water is a very good and pure one for drinking purposes.”

No. 495. A spring in a pasture forty rods from any dwelling. "If the cattle are kept away from the spring it will be a very good source for a drinking water supply."

Nos. 496 and 497. These samples were from the Richmond Water Company's supply, the one taken from the river, and the other from the tap, but there was nothing accompanying the samples to indicate which was which.

No. 498. From a well twenty-five feet deep with a ledge underneath inclining from the barn toward the well. Distance of privy from the well forty feet, stable eighty feet, and forty feet from an old barnyard. The water is polluted, though not largely so. "I should regard it as very probable that the polluting matter reaching the well, flows in on the surface of the well. I find quite often that this same condition of things carries the soakage from privies, barnyards, and similar places quite long distances and delivers it into the well."

No. 499. From a stream, the so-called Great Works river. The water is pumped into a large iron tank from which it is distributed to a number of houses. This sample contained a large excess of free ammonia and considerably more of organic ammonia than is found in the average of Maine river waters. Other samples were requested, but were not received.

No. 501. From a public well in the village. This sample has a large excess of chlorine, even for one near the seashore, and more free ammonia than it ought to have. A final report was not made as another sample and fuller information about the well were wanted.

No. 504. From a spring which furnishes the water supply of the Empire Grove campground in East Poland. It is reported that there have been various opinions as to the suitability of this water for drinking purposes; some think that it has a laxative and diuretic effect. It is a good and pure spring water containing but little mineral matter and only a slight quantity of organic matter, and is moreover very soft for a spring water. The action of the water upon the bowels and kidneys is undoubtedly due simply to the fact that it is a pure and soft water. A sample received last year from the same source gave still more favorable results: total solids, 3.8; hardness, 1.95; chlorine, .2; free ammonia, .000; organic ammonia, .001.

Nos. 511, 512, 528 and 529. These samples were sent by the Bethel Water Company to help them in making a selection of a source for a public water supply. Nos. 511 and 529 were from the East Branch of Chapman brook, and Nos. 512 and 528 from Chapman brook.

The first two samples were collected August 9th, when there had been no disturbing rainfalls, and the second two samples collected September 3d, were taken just after a heavy rainfall. The two streams are mountain brooks fed very largely by springs, and the disturbing effect of the rainfall is shown to have been but very slight indeed.

“As the figures stand for these analyses the results are rivalled by those from few of the public water supplies in this State as you can easily see by comparison with my report upon the public water supplies for 1888. If the quality of the water in those two streams remains as good for the whole year (and from your description of the conditions I do not see why it may not,) there can be no question that either would be a desirable source of drinking water supply.”

No. 520. The reasons which led to the request for the analysis of the sample were similar to those given for No. 504. The sample was taken from a spring which serves as the water supply of a summer hotel, and some of the visitors complained that its use effected the bowels and kidneys. The water is very pure and remarkably soft. As to the possibility of the water containing any medicinal qualities or contents that might account for its effect upon the kidneys, the report on the sample said: “Its total solids are so small in quantity that I should hardly think it possible; on the other hand, I should incline to the belief that the increased action of the kidneys in the users of the water, is due to the softness and purity of the water.” Nevertheless, it was deemed well to send a sample of the water to Professor Robinson of Bowdoin College, for the purpose of having an examination made of the constituents of the total solids. This was done and the Professor's results confirmed the opinion given in the foregoing.

No. 521. From a well sixteen and one-half feet deep, dug through six inches of soil and ten feet of seamy ledge then blasted six feet farther. The privy, a so-called earth closet, fifty feet distant and the cess-pool which is not a tight one only twenty-five feet away. The following is the report made of the sample:

“The enclosed blank will give you the results of the analysis of the sample of water lately received from you. The distance which separates the well from the privy and the sink drainage is too small, and possibly adding to the danger of the pollution of the well, are seams in the ledge. The chemical results are not favorable, for they show a moderate degree of pollution of the water. The discharge of the house drain into the cess-pool so near the well is not safe, and the privy should be of a kind that would absolutely insure against the soakage of it into the ground. Your earth closet if properly managed would give such protection. I should not consider the water from the well safe for drinking purposes, and if typhoid fever excreta should be discharged in the vicinity of the well, its use would be perilous. After boiling it would undoubtedly be safe.

No. 523. From a spring situated on the down-hill side from the house, but from 160 to 200 feet from the buildings and sources of pollution. Sickness has occurred in the family though not of a kind generally ascribed to impure water: “From the lay of the land, I should judge that there might be a possibility of soakage from sources of pollution into the spring, and it would be well to guard against anything of that kind. There is, however, in the results of the analysis nothing whatever to indicate pollution of the water, and the spring when this sample was taken from it at least, was furnishing a good and pure water for drinking purposes.

Nos. 525 and 526. Samples of ice sent by the local board of health of Bath. The following report was made:

“I enclose the results of the two samples of ice; nevertheless, I must caution you against drawing any conclusions from them. Ordinarily, in the process of freezing, water loses the larger part of both its dissolved and suspended matter, consequently, in the examination of samples of ice, we have to deal with very small quantities of total solids, organic matter, etc., and it might very easily happen, as the result of the different conditions under which the freezing takes place, that a sample of ice taken from the more impure of the two bodies of water would give better results than a sample of ice taken from the purer body of water. There would be many chances for self deception if one should attach too much importance to the results of examinations of single samples. I would, therefore, advise you to send samples of water from the two ponds by and by, or about the time they are cutting the ice.

No. 530. From a well near an old tenement house in a thickly built up place. The ground is flat and rather wet, and privies and other sources of pollution are altogether too near. Much sickness has prevailed among the various tenants. The water is unfit to drink and should never be used for that purpose.

Nos. 531 and 532. These analyses were made as an aid in finding a source for a village water supply. No. 531. From springs within 100 feet of a privy and stable. "From a chemical point of view this is a spring water of good quality for drinking purposes, nevertheless, sources of pollution are too near, and the danger of the soakage of polluting matter into the spring is too great to make this an advisable source for a water supply, especially for a public water supply. It is possible that the drainage could be disposed of through a perfectly tight iron drain so as to meet this objection."

No. 532. From a pond. "The results given are unfavorable to the water as a source of supply. No public water supply in the State has so large a quantity of the ammonias."

No. 533. From a well twelve feet deep, from 200 to 500 feet from sources of pollution. "It is a hard water, but otherwise chemically, there is nothing against it as a drinking water."

No. 534. From a well fifteen feet deep, dug four or five feet through a rocky loam then sunk the remaining depth by blasting into limestone ledge. Sources of pollution are from 200 to 250 feet away. The water is polluted notwithstanding its considerable distance from sources of pollution. This well is an illustration of the fact that has been frequently observed, that wells dug through a rather thin layer of soil, and then into a ledge, often furnish waters that show evidences of pollution. Compare with Nos 521 and 535. This sample and the two following ones were sent by the Secretary of the local board of health of Islesboro.

No. 535. From a well ten feet deep, "dug through about a foot of heavy soil, sub-soil gravelly, mud and clay down eight feet, and then into a ledge two feet." Sources of pollution from ninety-five to 200 feet distant.

No 536. A well fourteen and one-half feet deep, dug "four feet through loose, sandy soil, then rocky, without much clay or pan." The privy, stable and sink drain are from ten to eighteen feet distant, nevertheless, the results obtained are much more favorable than from the two preceding samples. Evidences of a slight pollution are not lacking, however.

No. 538. From the public water supply of Hallowell. The results are not so favorable as were obtained from the examinations of that supply made in 1888.

No. 541. From a well eleven feet deep dug through "sandy loam two or three feet, then soft rock in layers, and when the depth of eleven feet was reached a stream of cold, clear water poured out of the seam in the rock and gave promise of an abundant yield which has been the case, but the water has had such an odor and taste that it has not been used." There did not appear to be sources of pollution near enough to the well to explain how the pollution occurs, nevertheless, the analysis shows that the water is very impure. The only theory to account for it is that the pollution is brought from a considerable distance through seams in the ledge.

No. 542. From a well distant from the sink drain, forty, from the privy, twenty, and from the stable and barn-yard, fifty or sixty feet. The character of the soil is a gravelly loam with a ledge beneath. There had been two cases of typhoid fever in the house, and there has been much sickness in this house previous to this. The following report was made: "The water of the well from which you sent the sample is badly polluted and must be considered dangerous for drinking purposes, and now, since there are cases of typhoid fever in the house, very dangerous."

No. 543. From a well thirteen feet deep, thirty-five feet from a privy, six feet from the stable and thirty-five feet from the barn-yard. "The well is much too near sources of pollution, and the water is badly polluted and not to be recommended for drinking purposes."

No 544. From a well eight feet deep in an open field 300 feet or more from any buildings. The applicant says: "The only chance for pollution, is when the field is plowed and manure spread on the ground." Report was made as follows:

"I am glad that I am able to report favorably on this sample of water. It is of excellent quality in every way for drinking purposes and the only possible chance for polluting matter to reach the well, appears to be the one which you mention, and this I should consider very slight indeed if the well is so protected around the surface that the surface drainage cannot run in, and if you are careful not to spread the dressing within a few rods of the well. The constant running of the water from the well to the barn and house will have a tendency to improve, or rather to keep the qual-

ity good." A useful lesson may be learned by comparing No. 544 with No. 543.

No. 546. From a spring in a mowing field two hundred and fifty feet from buildings or sources of pollution. "The water is remarkably pure and free from organic matter and a good water for drinking purposes." This examination and No. 544 illustrate the fact that springs and wells in this State, when situated a considerable distance from sources of pollution, may almost always be counted upon to furnish good water for drinking.

No. 551. From a well thirty feet from the privy and stable and fifty feet from sink drainage. "The water is quite badly polluted and is not suitable for drinking. It may safely be used for cooking purposes if it is boiled in the process." A good example of a city well.

No. 552. From a well on level ground twenty-five feet deep, twenty feet from privy, four from stable, ten from pig-pen, etc "The evidences of pollution are very distinct and the water should not be used as a drinking supply. The sources of pollution are altogether too near to permit any sensible person for a moment to think of using the water." Sample sent by the Health Officer of the local board.

No. 553. Sample from a cistern ; distance from the privy twelve feet and from the sink drain and cess-pool ten or twelve feet. The cistern is sunk in the ground and so situated that surface water might run into it. The following report was made :

"The evidences of pollution in this sample are quite positive. The organic matter as indicated by the free and organic ammonia is not in excess of what is very often found in cistern waters, but the large quantity of chlorine and of nitrites and of nitrates are very unusual indeed in a cistern water, as is also the large total solids. As being of interest in this connection I would say that the nine cistern waters, the analyses of which are tabulated in the third, fourth and fifth annual reports, give an average total solids of 6.0, and of 26 as the average chlorine."

No. 554. From a well thirty feet deep through gravel underlaid with clay. The sources of pollution enumerated are the privy and stable, each 100 feet away, and the possible in-flow of surface water. Cases of typhoid fever have occurred among the users of the water. "From a chemical point of view this water is not objectionable as a drinking water, though there is a slight excess of free and organic

ammonia over what we find in the very best of well and spring waters.”

VITAL STATISTICS.

An official registration of births, marriages and deaths in such a form as to make it furnish facts available and valuable for various purposes is considered so important a work that most civilized states and nations have not omitted to provide for it. Every other New England state has a record of vital statistics, and the purpose of the present report is to consider what use is made of such statistics, and why Maine needs such a system.

1. It would in many cases be of great service to our courts of justice. Before them the questions of heritage, and the legitimacy or illegitimacy of children are often coming. One of our State senators, at that time chairman of the Committee on Legal Affairs, stated that it once cost him fifty dollars to get the date of a birth. In Massachusetts a visit to the state capitol, or a letter sent there, suffices to obtain the date of any birth, and the parentage, within the period covered by the records,—almost fifty years now.

2. In the settling of pension claims, a similar use of vital statistics is made in those states where such records have been carried on long enough. The Hon. Henry B. Peirce, Secretary of the Commonwealth of Massachusetts, told the writer a few years ago that almost daily, pension claimants and their agents made use of the records under his care.

3. In the determination of the questions of citizenship and the legal rights of suffrage, an examination of the vital statistics record would determine when and where the would-be voter was born, if the event occurred within the state.

4. Vital statistics, when properly collected and recorded tell us, not only the number of deaths which occur in the state, the county, and the town, but also show us how many have died of consumption, how many from diphtheria, how many from cancer, how many from accidents, and so on through the list of the causes of death. They therefore furnish us with the means of comparing state with state, county with county, town with town, year with year, generation with generation. Trustworthy knowledge derived in this way is of the greatest help to the public health officer in determining the points in the state where redoubled sanitary effort needs to be made. Records of this kind for the sanitarian have well been compared to

the compass for the mariner. To other persons in making various kinds of investigations, a system of vital statistics is invaluable. Frequent enquiries come to the office of the State Board of Health of Maine, from persons in our own State or from without, for information on points which only a record of births, marriages and deaths could give.

5. The records of deaths and their causes are needed by the actuary, and in the interests of persons who wish to protect their dependencies or their business through life insurance. A while ago application was made to the Secretary of the State Board of Health by one of the leading insurance companies for information relative to the prevalence of pulmonary diseases in our State. It appears that the belief is widely extended, and it was so expressed in the letter, that lung diseases are especially prevalent "down east." We have no statistics with which to show whether this is an error or not. In the summer thousands of visitors attest to the healthfulness of the Maine climate. In winter the fact that the temperature is lower than in some other places is no sufficient basis for the opinion that the winter climate is insalubrious. Norway, in spite of its extending across the Arctic circle, has a lower death-rate than any other European country. As regards consumption, the most to be dreaded of all lung diseases, our neighboring state, New Hampshire, is able to show by its vital statistics that its death-rate from that disease is very low and hardly to be equaled in any other state, and a trustworthy record would probably show that the same is true of Maine.

6. In the study of political economy, vital statistics are of great worth, and to the legislator it is hardly conceivable that the records of the movements and principle events in the lives of the human population are of inferior value.

7. The provisions of modern laws for the collection of vital statistics are not without value for the prevention and detection of crime. Save in those few cases in which a coroner's inquest is deemed necessary, the law in our State interposes no official question nor restraint between the death of a citizen and his burial. In this direction we lack those wise statutory provisions which our neighboring states have. In Massachusetts such a trial as that of the Barron case, with its intricacies and dearth of scientific data as to the cause of death, could hardly occur.

8. A plea is justly made by horsemen, cattlemen and dog fanciers for more carefully kept pedigrees of the classes of animals in which they are interested. Nevertheless, the normally constituted man, that is, the average man, should have a deeper and more abiding interest in the human, than in any other animal. Therefore the events of human lives, the genealogical relationship of man to man and families to families, and the correct chronological determination of the principal epochs in the lives of persons has ever been regarded as subjects worthy of the attention of the best of minds. Upon the availability of such data depend the accuracy and the fulness of local or general history. We take pride in some of the work done in this direction within our own State, nevertheless our local historians have contended with many difficulties which a system of vital statistics would have lightened. The Maine Genealogical Society approved the vital statistics bill presented to the Sixty-fourth Legislature and desires its passage by the Sixty-fifth.

In accordance with the law establishing the State Board of Health which provides that they shall make "such suggestions as to legislative action as they deem necessary," the Board respectfully advises the passage of the bill to which reference has been made in the preceding paragraph, to wit: House Bill No. 27, An Act to provide for the registration of Vital Statistics, a bill which the last legislative body referred to the Sixty-fifth Legislature.

This bill was prepared by the Board of Health after due deliberation as to the needs of our own State, after an extended examination of the existing laws of other states, and after as careful a consideration as possible during several sessions of the full Board, of the character and tendencies of each section.

In accordance with the recommendations of the Board, and the wishes of many citizens of the State, the bill to which reference is made in the foregoing was enacted by the legislature after some changes. The following is the law, which, on account of the lateness of going to print, we are enabled to produce :

PUBLIC HEALTH LAWS OF 1891.

Chapter 118.

An Act to provide for the Registration of Vital Statistics.

Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows :

SECTION 1. The secretary of the state board of health shall be the registrar of vital statistics for the state, and shall furnish to clergymen, and others authorized to marry, to sextons, to physicians, town clerks, clerks of the society of Friends, and to clerks of courts, a copy of this act, and suitable blanks for recording births, marriages, deaths and divorces, so printed, with appropriate headings, as readily to show the following facts and such others as may be deemed necessary to secure an accurate registration.

I. The record of a birth shall state its date and place of occurrence, full christian and surname, if named, color and sex of child, whether living or still-born, and the full christian and surnames, color, occupation, residence and birthplace of parents.

II. The record of a marriage shall state its date and place of occurrence, the name, residence, and official character of the person by whom solemnized, the full christian and surnames of the parties, the age, color, occupation, and residence of each, the condition, whether single or widowed, whether first, second or other marriage ; and the full christian and surnames, residence, color, occupation, and birthplace of their parents.

III. The record of a death shall state its date, the full christian and surname of the deceased, the sex, color, condition, whether single or married, age, occupation, place of birth, place of death, the full christian and surnames and birthplaces of parents, and the disease or other cause of death, so far as known.

SECT. 2. The attending physician, accoucheur, midwife, or other person in charge, who shall attend at the birth of any child, living or still-born, within the limits of any town or city in this State, shall report to the clerk of such town or city within six days thereafter, all the facts regarding such birth, as required in section one of this act.

SECT. 3 Every person authorized to unite persons in marriage shall make a record of every marriage solemnized before him, in conformity with the requisitions prescribed for blank records of

marriages in section one of this act, and shall within six days thereafter, deliver or forward to the clerk of each town in which the marriage intention was recorded ; a copy of such record of marriage.

SECT. 4. Whenever any person shall die, or any still-born child shall be brought forth in this state, the undertaker, town clerk, or other person superintending the burial of said deceased person, shall obtain from the physician attending at such bringing forth or last sickness, a certificate, duly signed, setting forth as far as may be, the facts required in the record of a death, according to section one of this act ; and it shall be the duty of the undertaker, or other person having charge of the burial of said deceased person, to add to said certificate the date and place of the proposed burial ; and having duly signed the same, to forward it to the clerk of the town or city and obtain a permit for burial ; and in case of any contagious or infectious disease, said certificate shall be made and forwarded immediately.

SECT. 5. In the case of any deceased person not having had the attendance of a physician in his or her last sickness, the town clerk may issue and sign the certificate of death, upon presentation of such facts as may be obtained of relatives, persons in attendance upon said deceased person during said last sickness or present at the time of death, and the permit for burial shall be issued upon such information. Said certificate and permit shall not be required before burial in cases where it is impracticable to obtain the same within a reasonable time after death, but in all such cases, said certificate shall be obtained as soon as practicable after death.

SECT. 6. Parents shall give notice to the clerk of their city or town of the births or deaths of their children ; every householder shall give notice of every birth and death happening in his house ; the eldest person next of kin shall give such notice of the death of his kindred ; the keeper of a workhouse, house of correction, prison, hospital, almshouse, or other institution, and the master or other commanding officer of a ship, shall give like notice of every birth or death happening among the persons under his charge.

SECT. 7. Except as provided in section five, no interment or disinterment of the dead body of any human being, or disposition thereof in any tomb, vault, or cemetery, shall be made without a permit as aforesaid, from the clerk of the town or city, nor otherwise than in accordance with such permit. No undertaker or other person shall assist in, assent to, or allow any such interment or dis-

interment to be made, except as provided in section five, until such permit has been given as aforesaid; and it shall be the duty of every undertaker or other person having charge of any burial place as aforesaid, who shall receive such permit, to preserve and return the same to the clerk of the town within six days after the day of burial.

SECT. 8. The town or city clerk shall appoint two suitable and proper persons, in each town or city, as sub-registrars who shall be authorized to issue burial permits based upon a death certificate, as hereinbefore provided, in the same manner as is required of the town or city clerk; and the said record of death upon which the permit is issued shall be forwarded to the town clerk within six days after receiving the same, and all permits by whomsoever issued shall be returned to the town clerk as required by section seven of this act. The appointment of sub-registrars shall be made with reference to locality, so as to best suit the convenience of the inhabitants of the town, and such appointment shall be in writing and recorded in the office of the town or city clerk.

SECT. 9. Town clerks and sub-registrars may issue burial permits to persons in contiguous towns, when by so doing it would be more convenient for those seeking a permit, but in all cases the permit shall be made returnable to the town clerk of the town in which the death occurred.

SECT. 10. The assessors shall, when taking the annual inventory, collect and return to the town clerk, before the first day of June, the births which have occurred within their respective jurisdictions, during the year ending December thirty-first next preceding, together with the names of such children.

SECT. 11. The clerk of every town shall keep a chronological record of all births, marriages, and deaths reported to him and shall annually, in the month of June, transmit a copy of the record of all births, marriages, and deaths occurring during the year ending December thirty-first next preceding such said report, to the state registrar, together with the names, residences, and official stations of all such persons as have neglected to make returns to him in relation to the subject matters of such records, which the law required them to make, all to be made upon blanks to be prepared and furnished by the state registrar.

SECT. 12. The clerks of courts for the several counties shall, annually, during the month of February, make returns to the

registrar of vital statistics in relating to libels for divorce in their respective counties for the calendar year next preceding. Such returns shall specify the following details: The number of divorces granted; and the names of the parties including the maiden name and any other former name of female, if any, when ascertainable.

SECT. 13. The state registrar shall cause the returns made to him in pursuance of the preceding sections eleven and twelve to be arranged, alphabetical indexes of all the names contained therein to be made, and the whole bound in convenient volumes and carefully preserved in his office. He shall annually make and publish a general abstract and report of the returns of the preceding year in such a form as will render them of practical utility, not more than one thousand five hundred copies of which shall be printed and bound in cloth, one copy of which shall be forwarded to every town, one copy to each senator and representative, one copy to each state and territory in the union, and the remainder to such departments, libraries, and persons as the state registrar shall direct.

SECT. 14. The sum of one thousand dollars per annum, or as much thereof as may be necessary, is hereby appropriated for printing and binding the circulars and blanks, for postage, and to defray the expenses of clerical work in carrying out the provisions of this act.

SECT. 15. The town clerk's record of any birth, marriage or death, or a duly certified copy thereof, shall be *prima facie* evidence of such birth, marriage or death, in any judicial proceeding.

SECT. 16. If any person shall willfully neglect or refuse to perform any duty imposed upon him by the provisions of this act, he shall be fined not more than one hundred dollars for each offense, for the use of the town in which the offense occurred, and it shall be the duty of the state registrar to enforce this section as far as comes within his power, and when the state registrar knows, or has good reason to believe, that any penalty or forfeiture under this act has been incurred, he shall at his discretion, forthwith give notice thereof, in writing, to the county attorney of the county in which said penalty or forfeiture has occurred, which notice shall state as near as may be, the time of such neglect, the name of the person or persons incurring the penalty or forfeiture, and such other facts relating to the default of duty as said state registrar may have been able to learn, and upon receipt of such notice the county attorney shall prosecute the defaulting person or persons.

SECT. 17. The clerk of each city or town shall be paid by such city or town for receiving, recording and returning the facts required to be recorded by this act, the sum of fifteen cents for each birth, marriage and death, and for each birth or death duly reported to the town clerk, physicians shall receive twenty-five cents from the town in which the birth or death has occurred.

SECT. 18 This act shall take effect and be in force on and after the first day of January, eighteen hundred and ninety-two, and all acts and parts of acts inconsistent with this act, are hereby repealed.

Chapter 82.

An Act to protect Waters used for Domestic Purposes.

Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows :

SECTION 1. Whoever knowingly and willfully poisons, defiles or in any way corrupts the waters of any well, spring, brook, lake, pond, river or reservoir, used for domestic purposes for man or beast, or knowingly corrupts the sources of the water supply of any water company, or of any city or town, supplying its inhabitants with water, or the tributaries of said sources of supply in such manner as to affect the purity of the water so supplied, or knowingly defiles such water in any manner, whether the same be frozen or not, or puts the carcass of any dead animal or other offensive material into said waters, or upon the ice thereof, shall be punished by a fine not exceeding one thousand dollars, or by imprisonment not exceeding one year.

SECT. 2. Whoever shall willfully injure any of the property of any water company or of any city or town used by it in supplying water to its inhabitants, shall be punished by a fine not exceeding one thousand dollars, or by imprisonment not exceeding one year; and such person shall also forfeit and pay to such water company, city or town three times the amount of actual damages sustained, to be recovered in an action of the case.

SECT. 3. The provisions of all general laws, and of all special acts inconsistent with this act, are hereby repealed.

Chapter 115.

An Act for the Prevention of Blindness.

Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows :

SECTION 1. Should one or both eyes of an infant become reddened or inflamed at any time within four weeks after birth, it shall be the duty of the midwife, nurse or person having charge of said infant to report the condition of the eyes at once to some legally qualified practitioner of medicine of the city, town or district in which the parents of the infant reside.

SECT. 2. Any failure to comply with the provisions of this act shall be punishable by a fine not to exceed one hundred dollars, or imprisonment not to exceed six months, or both.

SECT. 3. This act shall take effect on the first day of June, eighteen hundred and ninety-one.

Chapter 89.

An Act to amend section twenty-six of chapter twenty-six of the Revised Statutes, relating to Fire Escapes.

Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows :

Section twenty-six of chapter twenty-six of the revised statutes is hereby amended, so as to read as follows :

‘Section 26. Every public house where guests are lodged, and every building in which any trade, manufacture, or business is carried on, requiring the presence of workmen above the first story, and all rooms used for public assembly or amusement, and all tenement houses three stories in height where only one stairway or means of egress from the upper stories out of the building is provided, and all tenement houses of four or more stories in height, intended to be occupied by families, boarders or lodgers, above the third story, shall at all times be provided with suitable and sufficient fire escapes, outside stairs, or ladders from each story or gallery above the level of the ground, easily accessible to all inmates in case of fire or of an alarm of fire ; the sufficiency thereof to be determined as provided in the following section.’

Chapter 47.

An Act to amend section nine of chapter fifteen of the Revised Statutes, relating to Burying Grounds.

Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows :

Section nine of chapter fifteen of the revised statutes is hereby amended by inserting after the word "burying yard" in the second line, the words 'or incorporated cemetery or burying yard,' and by adding to said section the following words: 'nor shall any person, corporation or association establish, locate or enlarge any cemetery or burying ground by selling or otherwise disposing of lots, so that the limits thereof shall be extended nearer any dwelling house than twenty-five rods, against the written protest of the owner, provided, that nothing in this act shall prohibit the sale or disposition of lots within the limits of any existing cemetery or burying ground,' so that said section shall read as follows :

'Section 9. The municipal officers of any town, may on petition of ten voters, enlarge any public cemetery or burying yard or incorporated cemetery or burying yard within their town, by taking land of adjacent owners, to be paid for by the town or otherwise as the municipal officers may direct, when in their judgment public necessity requires it, provided, that the limits thereof shall not be extended nearer any dwelling house than twenty-five rods, against the written protest of the owner, made to said officers at the time of the hearing on said petition. Nor shall any person, corporation or association establish, locate or enlarge any cemetery or burying ground by selling or otherwise disposing of lots so that the limits thereof shall be extended nearer any dwelling house than twenty-five rods against the written protest of the owner, provided, that nothing in this act shall prohibit the sale or disposition of lots within the limits of any existing cemetery or burying ground.

Chapter 28.

An Act in relation to prosecutions for violations of municipal ordinances and by-laws.

Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows :

In a prosecution in any municipal or police court for a violation of an ordinance or by-law of a city or town, or of any by-law of a village corporation or local board of health, it shall not be necessary to recite such ordinance or by-law in the complaint, or to allege the offense more particularly than in prosecutions under a general statute.

ADDITIONS TO THE LIBRARY.

During the year 1890 the following books, journals, and pamphlets were added to the library of the Board by exchange and purchase.

BOOKS.

- Index Catalogue of the Library of the Surgeon-General's Office.
Vol. XI, 1890.
- Richardson. The Health of Nations. Vols. I, II.
- Pistor. Deutes Gesundheitswesen. Berlin. 1890.
- First Report of the Royal Vaccination Commission. London. 1889.
- Second Report of the Royal Vaccination Commission. London. 1890.
- Gerhard. The Disposal of Household Wastes.
- Leffmann and Beam. Examination of Water. Philadelphia. 1889.
- Abel. Practical Sanitary and Economic Cooking. 1890.
- Transactions of the Epidemiological Society. London. Vols. 1 to VIII.
- Eitner. Die Jugendspiele. Liepzig. 1890.
- Preyer. Die Seele des Kindes. Leipzig. 1884.
- Baumgarten. Jahresbericht ueber die Fortschritte in der Lehre von den Pathogenen Mikroorganismen. Braunschweig. 1888.
- Orvananos. Ensayo de Geografia Medica Y Climatologia de la Republica Mexicana. Mexico. 1889.
- Do. Atlas.
- Uffelmann's Supplement for the year 1888.
- Perier. Hygiene de l'Adolescence. Paris. 1891.
- Coriveaud. Hygiene des Familles. Paris. 1890.
- Guyot-Daubes. Physiologie et Hygiene du Cerveau. Paris. 1890.
- Physical Training Conference. Boston. 1889.
- Schulz. Impfung, Impfgeschäft und Impftechnik. Berlin.

REPORTS.

- Eleventh Biennial Report of the State Board of Health of California. 1888-90.
- Twelfth Annual Report of the State Board of Connecticut. 1889.
- First Annual Report of the State Board of Health of Florida. 1890.

- Fifth Annual Report of the State Board of Health of Kansas. 1889.
 Ninth Annual Report of the State Board of Health of Illinois. 1886.
 Tenth Annual Report of the State Board of Health of Illinois. 1887.
 Biennial Report of the State Board of Health of Louisiana. 1888-89.
 Twenty-first Annual Report of the Board of Health of Massachusetts. 1889.
 Seventh Biennial Report of the State Board of Health of Maryland. 1886-87.
 Eighth Biennial Report of the State Board of Health, Maryland. 1888-89.
 Annual Report of the Board of Health of Missouri. 1888.
 Eighth Annual Report of the State Board of Health, New Hampshire. 1889.
 Thirteenth Annual Report of the State Board of Health, New Jersey. 1889.
 Ninth Annual Report of the State Board of Health of New York. 1889.
 Fourth Annual Report of the State Board of Health of Ohio. 1889.
 Eighth Annual Report of the Provincial Board of Health, Ontario. 1889.
 Third Annual Report, State Board of Health of Pennsylvania. 1887.
 Fourth Annual Report of the State Board of Health, Pennsylvania. 1888.
 Twelfth Annual Report of the State Board of Health of Rhode Island. 1889.
 Forty-eighth Registration Report of Massachusetts. 1889.
 Thirty-first Annual Registration Report of Vermont. 1887.
 Eighth Annual Registration Report of New Hampshire. 1887.
 Transactions of the Medical Association of Alabama. 1889.
 Transactions of the State Medical Society of Tennessee. 1889.
 Twenty-second Annual Report of the Board of Education of Jersey City. 1889.
 Cameron. Report upon the State of Public Health in the city of Dublin. 1889.
 Annual Report of the Maine State College, Agricultural Experiment Station. 1889.
 Seventeenth Annual Report Lowell Water Board. 1889.
 Twenty-seventh Annual Report Massachusetts Agricultural College.
 Eighteenth Annual Report of Board of Health of Boston. 1889.

- Annual Report of the Board of Health of Everett, Mass. 1889.
Annual Report of the Board of Health of Taunton. 1889.
Annual Report of the Commissioner of Health, St. Paul. 1889.
Fourteenth Annual Report of the Board of Health of Utica, N. Y.
1889.
Fifteenth Annual Report of the Board of Health of Newport, R. I.
1889.
Fifth Annual Report of the Board of Health of Portland. 1890.
Report of the Local Board of Health of Westbrook, Maine. 1889.
Second Annual Report of the Health Department of Mansfield,
Ohio.
Seventh Annual Report of the Superintendent of Health of Provi-
dence, R. I. 1889.
Seventeenth Annual Report of the Board of Health of New Haven,
Ct. 1889.
Report of the Board of Health of Hawaii on Leprosy, with appen-
dix and supplement. 1886.
Annual Report of the School Committee of Lynn, Mass. 1889.
Biennial Report of the Board of Health of Hawaii. 1886.
Biennial Report of the Board of Health of Hawaii. 1888.
Biennial Report of the Board of Health of Hawaii. 1890.
Annual Report of the Board of Health, Columbus, Ohio. 1889.
Fourth Annual Report of the Board of Health of Hartford, Ct.
1889.
Fourth Annual of the Board of Health of Newark, N. J. 1888.
Biennial Report of the State Board of Health of Louisiana. 1888-9.
Sixteenth Annual Report of the State Board of Health of Minne-
sota. 1888.
Thirty-Fifth Annual Registration Report of Providence, R. I. 1889.
Tenth Annual Report of the Board of Health of Lynn, Mass. 1889.
Annual Report of the Board of Health of Manchester, N. H.
Sixth Annual Report of the Superintendent of Public Health,
Providence, R. I. 1888.
Report of the Fourth Annual Meeting of the Executive Health
Officers of Ontario.
Report on the Sanitary State of the City of Montreal. Montreal.
1889.
Annual Report of Public Schools of Toledo, Ohio. 1885.
Toledo Public Schools. 1889.

- Report of the Microscopists of the United States Department of Agriculture. 1889.
 Report of the Surgeon-General of the Army. 1890.
 Report of the Commissioner of Internal Revenue. 1888.
 Fifth Biennial Report of the Kansas State Historical Society. Topeka. 1887.
 Annual Report of the Maine State College. 1888.
 Report on an Endemic of Typhoid Fever, Springwater, N. Y.

SANITARY AND OTHER JOURNALS FOR 1890.

- Index Medicus. Detroit and Boston.
 The Sanitarian. Brooklyn, N. Y.
 The Sanitary News. Chicago.
 The Annals of Hygiene. Philadelphia.
 The Engineering and Building Record. New York.
 The Sanitary Record. London.
 Public Health. London.
 Building. New York.
 Brooklyn Medical Journal. Brooklyn, N. Y.
 Medical News. Philadelphia.
 The Lancet. London.
 The Microscope. Trenton, N. J.
 The American Monthly Microscopical Journal. Washington.
 Archives of Pediatrics. Philadelphia.
 Science. New York.
 Medical Times. New York.
 Journal of Comparative Medicine and Surgery. Philadelphia.
 Canada Health Journal. Ottawa.
 Occidental Medical Times. Sacramento.
 Medical Standard. Chicago.
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EXPENSES OF THE BOARD.

The amount and character of the expenditures of the board for the year 1890 were as follows :

Engraving and drawing.....	\$103 31
Books and sanitary journals.....	168 79
Instruments.....	142 80
Paper and stationery.....	168 95
Postage.....	200 00
Printing and binding.....	606 55
Secretary's salary.....	2,000 00
Expenses of members.....	457 28
Express and telegraph....	216 67
Clerical help....	741 00
Chemical and microscopical supplies... ..	13 88
Hired or expert help.....	168 75
Miscellaneous.....	3 00
	<hr/>
Total.....	\$4,990 98

LOCAL BOARDS OF HEALTH
AND
EXTRACTS FROM THEIR REPORTS.

ABBOT.

Members of the board: W. W. Delano, Secretary; Chas. Foss, Chairman; James Greenleaf.

Two nuisances have come to the attention of the board, both of which were removed. We have had two cases of diphtheria and four of scarlet fever.

ACTON.

Members of the board: O. C. Titcomb, Secretary; C. N. Brackett, Chairman; B. J. Grant.

ADDISON.

Members of the board: F. A. Chandler, Secretary; H. N. Ingersoll, Chairman; N. W. Curtis.

ALBANY.

Members of the board: Daniel Clark, Secretary; Otis Hayford, Chairman; W. R. York.

A dirty condition of the privies exists in connection with the school-houses, all owing to the "cussed" district system.

ALBION.

Members of the board: Otis Meader, Secretary; R. L. Baker, Chairman; Dr. C. W. Abbott.

Two cases of typhoid fever have occurred, both of which were contracted out of town. Pneumonia was unusually prevalent in the

first quarter of the year as a result of la grippe. The sanitary condition of the town is good; the condition of the water supplies, cellars, and sink spouts should receive attention.

ALEXANDER.

Members of the board: George B. Berry, Secretary; C. M. Huff, Chairman; Jonas A. Bohanon.

We have had no cases of infectious diseases. Influenza did not prevail to any extent in this town.

ALFRED.

Members of the board: Dr. C. E. Lander, Secretary; S. M. Came, Chairman; Dr. J. F. Day, Health Officer.

We have had two cases of typhoid fever, with one death.

ALNA.

Members of the board: Dr. A. M. Card, Secretary and Health Officer; B. W. Donnell, Chairman; A. B. Erskine.

Four nuisances reported to our board were removed. We had one outbreak of scarlet fever, limited to one house and one case.

ALTON.

Members of the board: H. L. McKechnie, Secretary; Chas. Clayton, Chairman; A. J. Hatch.

We have had two cases of typhoid fever; one in each of two houses.

AMHERST.

Members of the board: F. B. Foster, Secretary; N. P. Sumner, Chairman; Fred Silsby.

We have had one outbreak of scarlet fever with two cases and one house infected.

ANDOVER.

Members of the board: Geo. O. Huse, Secretary; Stephen Cabot, Chairman; Dr. W. Z. Twitchell, Health Officer.

We have had two outbreaks of diphtheria confined to a single case in each of two houses.

ANSON.

Members of the board: R. Fairbrother, Secretary; Byron Hutchins, Chairman; Dr. E. C. Andrews, Health Officer.

About a dozen nuisances were reported, all of which have been removed. There is a stagnant frog pond in the village at the east end of the iron bridge, which stands covered with green slime. It ought to be filled up or drained. In the nearest house to this stagnant pond there has been some one sick nearly all the time for the past eight years.

We have had two outbreaks of scarlet fever, both of which were confined to the first house. There were only three cases in all, and no deaths. One of the cases of scarlet fever was a curious one on account of its being a second attack of the same disease. It occurred in a boy thirteen years old who had the first attack of the disease when he was ten months old. In the first attack the boy was attended by a physician, and in this second attack the case was seen by the physician who is on the local board as well as by the attending physician, both of whom pronounced it scarlet fever.

APPLETON.

Members of the board: Dr. F. A. Gushee, Secretary; A. A. Linnekin, Chairman; Samuel Ripley.

We have had no cases of the infectious diseases during the year. Many of the wells for family use are so located as to be exposed to drainage from barns, barnyards, barn cellars, privies, and sink drains. In some cases of dysentery which prevailed the well water was suspected of being the cause.

ARGYLE.

Members of the board: J. N. Tracy, Secretary; S. L. Freese, Chairman; J. M. Freese.

One nuisance reported to the board was removed. We have had no cases of the infectious diseases.

ARROWSIC.

Members of the board: Jason McFadden, Secretary; T. J. Rairden, Chairman; C. T. Willis.

We have had no cases of the infectious diseases.

ASHLAND.

Members of the board: Charles L. Dunn, Secretary; L. C. Coffin, Chairman; Dr. E. A. Duren, Health Officer.

We have had two cases of typhoid fever. Whooping cough was quite prevalent.

ATHENS

Members of the board: Dr. H. C. Taggart, Secretary; Dr. J. S. Tobey, Chairman; L. N. Ellingwood.

We have had no cases of infectious diseases except a few cases of whooping cough. There were about the usual number of cases of the diarrhoeal diseases.

ATKINSON.

Members of the board: G. W. Harvey, Secretary; E. W. Trask, Chairman; J. H. Ramsdell; Dr. E. P. Snow, Health Officer.

We have had no cases of infectious diseases. The general health of the town would be improved by personal attention to the laws of health.

AUBURN.

Members of the board: Dr. J. W. Beede, Secretary; Henry Lowell, Chairman; Daniel Lara.

Twenty-five nuisances have been reported to the board, seventeen of which were abated. Two localities containing tenement houses with no public sewers near are under slack management, always promising but never fulfilling.

We have had thirty cases of diphtheria with five deaths; eleven cases of scarlet fever, none of which resulted fatally; and twenty-four cases of typhoid fever with four deaths. In connection with outbreaks of infectious diseases the instructions given by the health tracts have been ordered carried out. In some of the outbreaks of diphtheria the secretary has ridden ten miles through some almost impassable roads to visit suburban districts. Whooping cough has been prevalent.

At the Webster grammar school-house, sewer gas escapes at somewhat rare intervals in a most disgusting manner. The schools have suffered but very little from contagious diseases. Children from infected houses have been kept at home.

AUGUSTA.

Members of the board: E. R. Bean, Secretary; Dr. J. O. Webster, Chairman; Dr. R. J. Martin, Health Officer; E. R. Bean, Sanitary Inspector.

The sanitary inspection provided for by the city government has proved of great value. The Sanitary Inspector last season visited nearly a thousand houses in the thickly settled portion of the city, and with his aid we were enabled to rectify 180 nuisances, remove forty-nine swine, move six families, and have four houses vacated because of their extremely unsanitary condition.

We have had ten cases of diphtheria, and about seventy-five cases of typhoid fever were reported to the board. Most of the cases of typhoid fever occurred during the winter. Besides typhoid fever, so-called winter cholera was quite prevalent.

As methods of improving the healthfulness of this city, the extension and improvement of the sewerage may be recommended.

AVON.

Members of the board: J. A. Badger, Secretary; Joel Wilbur, Chairman; Benj. Butler.

We have had one case of typhoid fever.

BAILEYVILLE.

Members of the board: J. D. Lawler, Secretary; Jas. G. Smith, Chairman; Geo. W. Libby; Dr. J. M. N. Smith, Health Officer.

We have had no cases of infectious diseases. There were three or four cases of pneumonia in horses.

BALDWIN.

Members of the board: Chas. C. Rounds, Secretary; Lorenzo D. Norton, Chairman; Irving A. Chase.

Six nuisances have been reported to the board, all of which have been removed. One of the worst nuisances we have had to contend with has been the removal of dead carcasses, deposited where they ought not to have been.

We have had one outbreak of typhoid fever consisting only of a single case. For the improvement of the sanitary condition of the town, the condition of the wells and the sink drains should be improved.

BANGOR.

Members of the board: John Goldthwait, Secretary; Dr. D. A. Robinson, Chairman; Dr. G. M. Woodcock.

During the year about six thousand feet of sewers were constructed. One hundred and twenty-five formal complaints of nuisances have been made to the board, all of which have been removed or remedied as far as could be done.

We have had twenty-seven cases of diphtheria in sixteen different houses with eleven deaths; and fourteen cases of scarlet fever in eleven houses. There were fifty-five cases of typhoid fever with eighteen deaths. Diseases of this kind are looked after very promptly. In cases of diphtheria and scarlet fever we placard the house, furnish the family with circulars, report the case to the school agent, see that infected children do not go to school, and, in case of death, a strictly private funeral. and after the case is out of the way see that the house is fumigated and properly cleansed, remove the card and let the children go to school when the doctor says that it will do.

For improving the sanitary condition of the city I can only recommend to build sewers. and faithfully to continue hard work. We find the people more and more willing and ready each year to co-operate with us in trying to keep the city in a cleanly condition, and this is very encouraging to the board.

BARING.

Members of the board: S. P. Polleys, Secretary; Joseph Stevens, Chairman; J. F. Tyler.

We have had no cases of infectious diseases.

BATH.

Members of the board: Dr. Edwin M. Fuller, Secretary; Dr. R. D. Bibber, Chairman; James Bailey.

The year 1890-91 has been, on the whole, quite free from any severe form of epidemic disease. Whooping cough prevailed through the months of November and December, 1890, January and February, 1891, in a mild form. There were a few cases of scarlatina during September, October and November. The cases were quarantined and no epidemic resulted.

Nuisances. Many nuisances have been abated in various parts of the city. In most instances they have been abated without trouble; in a few instances matters have been pressed to a satisfactory adjustment. The dock at the foot of Linden street which

has been receiving large accessions of decaying vegetables, rubbish and garbage for a long time, in warm months is in a very unsanitary condition. We recommend that the accumulations in the vicinity of the fountain, at the foot of Linden street, be hauled away across the ice at once while it can be done at small expense.

Milk. The milk supply of the town is believed to be usually of a healthy quality. There are some practices prevailing among milkmen which, sooner or later, will endanger the health and lives of individuals who use their milk, viz: There are several who carry in their milk carts daily, either a "swill pail" or a "swill tub" often made of a "half barrel," in which swill is collected from house to house or at hotels. There are others who carry fresh meats for sale day after day in their carts, both of which are likely to impart their poisonous microorganisms to the milk and be introduced into the systems of those who consume the milk. Many epidemics in large cities have been traced to these practices before ordinances were framed to meet the cases.

This board is powerless to check the practice without some city ordinance concerning licenses of milk men, or the matter of carrying "swill" and "fresh meat" about town in a cart used to carry milk for public consumption. It is a nuisance that should be immediately abated. There is another very unsanitary practice carried on during the summer months among fish peddlers who go from house to house selling and cleaning fish upon the streets. The cleanings from the fish are thrown into the street, there to decay and furnish unwholesome odors to those who live in the vicinity. We recommend that some ordinances be framed to cover such cases.

Water Supply. The water supply has been ample, pure and clean most of the year. During the month of September it was very yellow in its physical appearance, and beginning about January 15, it became so again, believed to be due to faulty filtering at the pumping station, or the accumulation of a large amount of vegetable matter in the stand-pipe. It is recommended that the stand-pipe be thoroughly flushed at least once a year, under proper restrictions and notice to the public.

The ice supply has been pure and healthy. The following is the analysis of pieces of ice furnished to the State Board of Health.

From Nequasset Lake. (Parts in 100,000.) Date of collection, August 28; date of examination, September 3, A. M.; odor, none; color, none; total solids, 1.0; loss on ignition, .6; phenomena of

ignition, none ; total hardness, .00 : chlorine, .1 ; free ammonia, .000 ; organic ammonia, .002 ; nitrites, none ; nitrates, none.

From Goddard's Pond. (Parts in 100,000.) Date of collection, August 28 ; date of examination, September 3, A. M. ; odor, none ; color, none ; total solids, 1.6 ; loss on ignition, .8 ; phenomena of ignition, none ; total hardness, .00 ; chlorine, .2 ; free ammonia, .000 ; organic ammonia, .000 ; nitrites, none ; nitrates, none.

The drainage in various parts of the town is bad, and the attention of the city government cannot be too strongly called to the matter of beginning some systematic, intelligent effort toward the proper drainage of the city.

There are several hundred school children who have never been vaccinated. It is recommended that the teachers of the various schools be instructed to inform all scholars at the close of the summer term that, unless they present a certificate of vaccination at the beginning of the fall term, they cannot be admitted to school until such certificate is furnished.

Death Rate. Whole number of deaths from March 1, 1890, to February 28, 1891, was 216. Males, 102 ; females, 112 ; sex unknown, 2 ; strangers, 34 ; citizens, 182.

Death rate for the year, from March 1, 1890, to February 28, 1891, was 20 per 1,000.

BEDDINGTON.

Members of the board : A. F. Libby, Secretary ; W. A. Coffin, Chairman ; Eli Oakes.

We have had no cases of the infectious diseases.

BELFAST.

Members of the board : M. C. Hill, Secretary ; F. A. Rhoades, Chairman ; John R. Hurd.

One nuisance reported to the board was removed. We have had one outbreak of diphtheria, which did not spread beyond the first case. There has been very little for us to do this year, but we shall act promptly whenever occasion requires.

BELMONT.

Members of the board : Miles Pease, Secretary ; N. B. Allenwood, Chairman ; D. A. Greer.

We have had two outbreaks of diphtheria, consisting of two cases. In both outbreaks the disease did not spread from the house where it first appeared.

BENEDICTA.

Members of the board: John Rush, Secretary; John Doyle, Chairman; Michael Duffy.

We have had no cases of infectious diseases.

BERWICK.

Members of the board: Dr. P. B. Young, Secretary; C. M. Guffill, Chairman; Dr. H. V. Noyes.

Eleven nuisances have been reported to the board, all but one of which were abated. The nuisance not removed consists of a soap-house, built many years ago when there were but a few dwelling houses in the village, and where then it stood alone, and, it might be said, out in the country. On account of the gradual increase in the size of the village, it is now located in the central part of the place, and he has, surrounding it, three or four open hogyards. Taken as a whole, during hot weather, it is sometimes exceedingly offensive to the surrounding neighbors. The owner seems to think that he has gained his right of location by quiet possession, and I believe most of his neighbors think likewise.

We have had one case of typhoid fever and nine cases of diphtheria with three deaths.

The water supply of the village is very poor and a water company was formed to put in a new supply, but owing to the expense it proved a failure. It will undoubtedly be taken in hand again in the near future.

[One of the outbreaks of diphtheria occurred in a family that had recently moved from across the river in Great Falls, N. H., and the report states that the first case was not reported to the board by the attending physician. It appears, furthermore, that while the attending physician assured the board that "all necessary measures of isolation and disinfection were being taken" the father had the care of the sick child, carrying it about in his arms until it was asleep and then laying it on the bed and going down stairs to take the baby and the other child in his arms without change of clothing. As the result, the disease was communicated to the other two children, both of whom died.—SEC. STATE BOARD]

BETHEL.

Members of the board: Dr. C. D. Hill, Secretary and Health Officer; A. B. Godwin, Chairman; E. B. Goddard.

During the past year a fine system of water works has been introduced in our village, bringing the water from a distance of four miles. The source of the supply is a mountain brook, the waters of which are very pure.

Four nuisances were reported to the board, all of which were removed. We had three cases of typhoid fever in one house, causing one death. We had quite a number of cases of whooping cough. We need now a good sewerage system, and since the water works have been put in, we hope this may soon be accomplished.

BIDDEFORD.

Members of the board: Daniel Cote, Secretary; Arthur Simpson; James Beaumont.

BINGHAM.

Members of the board: T. F. Houghton, Secretary; J. D. Merrill, Chairman; Dr. A. A. Piper, Health Officer.

One nuisance was removed. We have had one outbreak of scarlet fever, consisting of three cases, and there has been one case of typhoid fever.

BLAINE.

Members of the board: John M. Ramsey, Secretary; F. L. Lowell, Chairman; Jonathan Herson.

One nuisance was removed. We have had three cases of typhoid fever. With the exception of the prevalence of la grippe in the early part of the year there has been but little sickness. One of the cases of typhoid fever resulted, in our opinion, from water taken from a well near a barnyard. This case occurred in a large family, but no other member of the family took the disease. Privies and sink holes have been looked after carefully.

BLANCHARD.

Members of the board: E. P. Blanchard, Secretary; Chas. B. Packard, Chairman; Willis H. Knapp.

We have had no cases of the infectious diseases.

BLUEHILL.

Members of the board: Dr. R. P. Grindle, Secretary and Health Officer; A. C. Osgood, Chairman; R. G. Lord.

We have had one outbreak of scarlet fever confined to a single case, and five outbreaks of typhoid fever in five different houses, with six cases and one death. The diarrhoeal diseases of children have been unusually prevalent. For the improvement of the sanitary condition of the town I would recommend better ventilation in dwelling houses, school-rooms, and churches, and better drainage.

BOOTHBAY.

Members of the board: Dr. Alden Blossom, Secretary and Health Officer; J. R. McDougal, Chairman; Byron Giles.

We have had two outbreaks of scarlet fever in two houses with eight cases, and six outbreaks of typhoid fever with six cases and one death. Whooping cough was prevalent.

BOOTHBAY HARBOR.

Members of the board: Dr. F. H. Crocker, Secretary; Dr. J. A. Carter, Chairman; Wm. H. Reid.

BOWDOIN.

Members of the board: A. P. Small, Secretary; Abner Coombs.

Three nuisances were removed. Three outbreaks of typhoid fever occurred with three cases in all. Those having charge of the sick were cautioned to exercise care in the disposal of the excreta, and to prevent contagion if possible.

BOWDOINHAM.

Members of the board: Dr. I. C. Irish, Secretary; Dr. Chas. Lancaster, Chairman; L. D. Small.

Three nuisances were removed. We had five outbreaks of typhoid fever, consisting of six cases. Two deaths resulted from this disease. All cases of this kind are attended to promptly. Pneumonia has been unusually prevalent. Clean cellars, good drainage and a better management of the privies would conduce to the healthfulness of the place.

BRADFORD.

Members of the board: H. T. Williams, Secretary; D. S. Humphrey, Chairman; Dr. H. D. Worth, Health Officer.

We have had no cases of infectious diseases during the year. Our town is very healthy, and there have been but few deaths except from old age.

BRADLEY.

Members of the board: A. E. Perkins, Secretary; H. F. Brown, Chairman; J. N. Knapp.

BREMEN.

Members of the board: Wm. B. Hilton, Secretary; Warren Weston, Chairman; Lauriston Little.

We have had three outbreaks of typhoid fever, consisting of only a single case in each instance. One of the patients died. Measles has been prevalent and there have been some cases of pneumonia. The removal of hog-pens and privies from the vicinity of wells, I would suggest, as a means of improving the sanitary condition of the town.

BREWER.

Members of the board: W. H. Gardner, Secretary; Dr. I. Getchell, Chairman; E. A. Stanley.

During the year we have built about three thousand feet of sewers and in most cases the owners of buildings on the extension have entered them. Six or eight nuisances were reported to the board and all were removed as far as possible. We have had five cases of diphtheria, all of which recovered, and eight cases of typhoid fever with one death resulting. No disease has been unusually prevalent. The few cases of diphtheria were sporadic and of very mild form. For the improvement of the sanitary condition of the town a still further extension of the sewers and the disposal of the wastes from sinks and privies by entering them is to be recommended. Two deaths resulted from accidents, one by the falling of a staging, and the other from the premature discharge of a gun.

BRIDGEWATER.

Members of the board: R. H. Perkins, Secretary; Chas. Kidder, Chairman; Thos. G. Durgin.

Three nuisances have been removed and we have had two cases of typhoid fever, one in each of two houses. One of the cases ended fatally.

BRIDGTON.

Members of the board: S. S. Fuller, Secretary; P. P. Burnham, Dr. H. A. Lombard.

Two nuisances reported to the board were removed. We have had typhoid fever in two houses, one case in each. One of the cases ended fatally. We have lately had a case of glanders in a horse. The case was investigated by the cattle commissioners, and the horse was killed.

BRIGHTON.

Members of the board: L. D. Mathews, Secretary; Asa Strickland, Chairman; G. C. Davenport.

BRISTOL.

Members of the board: S. N. Smith, Secretary; George Johnston, Chairman; Dr. S. W. Johnson.

We have had two houses infected with scarlet fever, one case only in each house. Whooping cough has been quite prevalent, but it was in a very light form.

BROOKLIN.

Members of the board: E. P. Cole, Secretary; George R. Allen, Chairman; Dr. F. S. Herrick, Health Officer.

We have had no cases of infectious diseases, excepting a few of whooping cough, all confined to school district number one. One small child died. The board has had no occasion to act during the year, but is always ready.

BROOKS.

Members of the board: M. J. Dow, Secretary; I. G. Reynolds, Chairman; Dr. A. W. Rich, Health Officer.

No cases of infectious disease have been reported to the board.

BROOKSVILLE.

Members of the board: Dr. F. E. Nye, Secretary and Health Officer; Capt. J. Jones, Chairman; S. D. Gray.

We have had one case of typhoid fever, but the disease did not spread even in the same family. It has been exceptionally healthy during the past year.

BROOKTON.

Members of the board: N. A. Clark, Secretary; A. O. Fish, Chairman; G. A. McCluskey.

We have had one outbreak of scarlet fever in which nine houses were infected, and thirty-one cases occurred. Four deaths resulted. Otherwise than this outbreak we have had no cases of the infectious diseases.

The fact of our having so many cases of scarlet fever was due to taking the body of a child that died with this disease to a meeting-house and opening the casket there.

You will see by this report there have been more cases of scarlet fever in this town than you find on my weekly reports. I have gone to each house known to have been infected before we were appointed a board and had the number of cases from the heads of the families, and put them in the report.

[It should here be stated that this outbreak caught the town with no local board of health, that the Secretary of the State Board was notified about the same time by three physicians in three neighboring towns of the outbreak of scarlet fever in a malignant form, and that a telegram was sent to Dr. M. L. Young, Health Officer, of Vanceboro, to visit the place. He did so, and had a local board of health appointed. The board went to work earnestly and faithfully, and stamped out the outbreak in a remarkably short space of time, considering the disadvantages under which the board began its work.—
SEC. STATE BOARD.]

BROWNFIELD.

Members of the board: S. G. Boynton, Secretary; Albert Blake, Chairman; Dr. H. F. Fitch.

We have had one case of typhoid fever. The diarrhœal diseases of children were quite prevalent. Several low marshy places in the town have a tendency to render their localities unhealthful.

BROWNVILLE.

Members of the board: T. S. Pratt, Secretary; G. G. Brown, Chairman; M. S. Berry.

We have had one case of diphtheria and three mild cases of scarlet fever.

BRUNSWICK.

Members of the board: Dr. M. V. Adams, Secretary; F. H. Wilson, Chairman; W. O. Peterson.

About the usual number of nuisances were removed. Cases of infectious diseases not having been reported, I cannot give the number. A system of sewerage is much needed.

BUCKFIELD.

Members of the board: Dr. J. F. DeCoster, Secretary; Dr. J. C. Caldwell, Chairman and Health Officer; H. D. Irish.

Measles and whooping cough have been prevalent, but we have had no cases of the specified contagious diseases. One death from a severe burn occurred. A child four years of age had its clothes catch fire from the cooking stove.

BUCKSPORT.

Members of the board: Dr. G. H. Emerson, Secretary and Health Officer; G. W. McAllister, Chairman; E. A. Crocker.

Two nuisances reported to the board were removed. We have had diphtheria in two houses with five cases; one case of typhoid fever in each of two houses. There was very little sickness during the year. We need a system of sewerage. One death resulted from a railway accident.

BURLINGTON.

Members of the board: J. W. Bradbury, Secretary; Thos. Shorey, Chairman; Mellen Strickland.

Three cases of typhoid fever have occurred.

BURNHAM.

Members of the board: Dr. W. H. Merrill, Secretary and Health Officer; Walter Edmunds, Chairman; N. E. Murray.

No cases of infectious diseases have been reported to the board.

BUXTON.

Members of the board: Dr. C. A. Dennett, Secretary and Health Officer; Chas. Hobson, Chairman; J. H. Waterman.

Six nuisances reported to the board were removed. We have had no cases of infectious diseases, except one of scarlet fever. I have no particularly unhealthy localities to report, excepting a "bog hole" at West Buxton. The selectmen have been notified in regard to it and promise to remedy the trouble by drainage, in the spring.

BYRON.

Members of the board: H. H. Richards, Secretary; G. F. Thomas, Chairman; A. S. Young.

Whooping cough was prevalent, but otherwise we have had no cases of infectious diseases.

CALAIS.

Members of the board: Dr. D. E. Seymour, Secretary; C. Ellis, Chairman; Dr. E. H. Vose.

Eighteen nuisances were reported to the board, but the number coming under the observation of the board and removed has been forty-nine.

We have had one case of scarlet fever and one of typhoid fever, both non-fatal; three outbreaks of diphtheria, sixty-six cases, thirteen deaths, and thirty-three houses infected.

Two deaths resulted from drowning. We have had two or three cases of glanders in horses, all of which were killed as soon as the nature of the disease was determined.

CAMBRIDGE.

Members of the board: J. B. Labree, Secretary; J. W. Cole, Chairman; G. E. Bailey.

One nuisance reported to the board was removed. We have had one case of typhoid fever.

CAMDEN.

Members of the board: J. P. Wellman, Secretary; Abel Merri- man, Chairman.

Four nuisances were reported to the board, but only two of these were found to be such in fact. These two were abated. We have had one case of diphtheria; typhoid fever, three outbreaks, three cases, three houses infected.

CANAAN.

Members of the board: Dr. Ivory Lowe, Secretary; Dr. L. W. Shean, Chairman and Health Officer; David Nason.

We have had one case of diphtheria. Whooping cough has been prevalent. We have no unhealthy localities to report.

CANTON.

Members of the board: H. T. Tirrell, Secretary; R. A. Barrows, Chairman; Dr. L. H. McCollister.

Three nuisances have been removed. We have had six cases of typhoid fever. Whooping cough was prevalent and the diarrhoeal diseases of children in their season.

CAPE ELIZABETH.

Members of the board: T. B. Haskell, Secretary; Dr. J. W. Lowell, Chairman; Dr. S. B. Thombs.

One nuisance was abated by the board. We have had three cases of diphtheria, one of scarlet fever, and one of typhoid fever. One school-room became infected and we thoroughly disinfected it and burned the books that had become infected.

CARIBOU.

Members of the board: Dr. J. Cary, Secretary; Rev. C. E. Young, Chairman; C. B. Roberts.

Eight nuisances reported to the board were abated. A spring in the village that had for some years been a source of typhoid fever, has finally been covered.

Diphtheria, three outbreaks, seven cases, and four houses infected; typhoid fever, seven outbreaks, nine cases, and seven houses infected.

I know of no particularly unhealthy localities except, perhaps, a part of Water street that is but little above the surface of Caribou stream, where croup has been prevalent in years past. The death of a little boy occurred as the result of accidental shooting.

CARMEL.

Members of the board: F. A. Simpson, Secretary; Henry Kimball, Chairman; W. A. Swan.

Two nuisances have been abated by the board. Scarlet fever, two outbreaks, four cases, two houses infected. Whooping cough has been prevalent. Improved drainage would add to the health of the town. A child one year old was killed by the upsetting of a

child's carriage; and one death occurred from suicide, a boy fourteen years of age. There were during the year 20 deaths in all; nine of old age (over 80 years old), six of consumption, (ages from 30 to 74), two of paralysis, one of disease of the heart, one suicide and one accident.

CARROLL.

Members of the board: Albion Gates, Secretary; W. A. Farrar, Chairman; D. W. Danforth.

Diphtheria, one outbreak, five cases, two houses infected; scarlet fever, one outbreak, seven cases, three houses infected; typhoid fever, one outbreak, consisting of a single fatal case.

CARTHAGE.

Members of the board: S. C. Morse, Secretary; W. W. Goodwin, Chairman; J. S. Swett.

We had one case only of diphtheria. We had all persons kept away from the house, except those who took care of the patient. The house was thoroughly disinfected after the recovery. A cough resembling whooping cough was prevalent, but it was not so called by physicians.

CASCO.

Members of the board: L. W. Holden, Secretary; H. B. Harmon, Chairman; Samuel Winslow.

We have had two cases of diphtheria and two of scarlet fever, no deaths resulting. These cases have been attended to in accordance with the requirements of the law.

CASTINE.

Members of the board: Dr. G. A. Wheeler, Secretary and Health Officer; Curtis Stevens, Chairman; Dr. Edward Philbrook.

Four nuisances were removed by the board. We have had one case only of diphtheria, and none of scarlet fever or typhoid fever. The diarrhœal diseases of children were quite prevalent. With the exception of influenza there has been less general sickness in town than in any other year within the past twenty years. While *la grippe* prevailed in my own house, my horses and dog had the disease.

CENTERVILLE.

Members of the board: J. H. Floyd, Secretary; B. L. Drisco, Chairman; H. W. Foster.

We have had no cases of infectious diseases.

CHARLESTON.

Members of the board: Dr. G. D. Cook, Secretary and Health Officer; W. E. Dunning, Chairman; O. L. Smith.

We have had no cases of infectious diseases, excepting two outbreaks of typhoid fever, consisting of a single case in each instance. One woman was burned to death by her clothes taking fire from the cooking stove.

CHARLOTTE.

Members of the board: F. J. Sprague, Secretary; H. W. Stuart, Chairman; D. J. Fisher.

Our board stands ready to attend to whatever needs our attention, but during the past year we have had nothing to do. There have been no cases of infectious diseases.

CHELSEA.

Members of the board: A. N. Douglass, Secretary; A. A. Sampson, Chairman; W. T. Searls.

Four nuisances were reported to the board, all of which were abated. Whooping cough has been prevalent, but otherwise there have been no cases of the infectious diseases.

CHERRYFIELD.

Members of the board: Dr. C. J. Milliken, Secretary; Samuel Ray, Chairman; S. M. Inman.

We have had one case only of diphtheria, and one of typhoid fever. Whooping cough has been prevalent.

CHESTER.

Members of the board: J. D. Kyle, Secretary; A. Libby, Chairman; E. L. Keen.

We have had no cases of infectious diseases. There were two deaths from pneumonia. One of the persons was aged and the other middle aged.

CHESTERTVILLE.

Members of the board: Dr. B. F. Makepeace, Secretary; T. J. Clough, Chairman; L. J. Keith.

CHINA.

Members of the board: Dr. J. J. Nelson, Secretary; E. M. Dowe, Chairman; C. E. Dutton.

We have had one case of scarlet fever, and four cases of typhoid fever. During the latter part of the influenza epidemic, jaundice was prevalent, confined to children chiefly. I think *la grippe* is mildly contagious, with a period of incubation of seven or eight days.

A better arrangement of privies and the location of wells farther from barnyards would be a sanitary improvement. By-laws have been adopted by the board, and copies of them have been forwarded to the office of the State Board.

CLIFTON.

Members of the board: W. D. Campbell, Secretary; F. W. Bowden, Chairman; H. G. Doble.

We have had one case of typhoid fever.

CLINTON.

Members of the board: Dr. G. F. Webber, Secretary and Health Officer; J. M. Winn, Chairman; R. B. Wells.

We have had no cases of infectious disease, except one of typhoid fever.

COLUMBIA.

Members of the board: J. E. Stewart, Secretary; A. Leighton, Chairman; A. J. Tabbutt.

We have had no cases of infectious diseases, as we are glad to report.

CONCORD.

Members of the board: E. O. Vittum, Secretary; Amon Savage, Chairman; C. R. Ellis.

No cases of infectious diseases have come to the knowledge of the board.

COOPER.

Members of the board: Eugene Leland, Secretary; David Howe, Chairman; Wm. W. Sadler.

We have had no cases of contagious diseases.

CORINNA.

Members of the board: J. P. Curtis, Secretary; E. Folsom, Chairman; A. K. Currier; Dr. O. H. Merrill, Health Officer.

We had some cases of pneumonia but no cases of infectious diseases occurred. For the village better sewerage and a better water supply are needed.

CORNISH.

Members of the board: F. C. Small, Secretary; Dr. Wm. B. Swasey, Chairman and Health Officer; Benj. F. Haley.

Three nuisances were removed. We have had two cases of typhoid fever.

CORNVILLE.

Members of the board: S. S. Woodman, Secretary; C. E. Smith, Chairman; C. C. Kinsman.

We removed one nuisance, and have had one case of diphtheria.

CORINTH.

Members of the board: Dr. E. H. Stanhope, Secretary and Health Officer; I. W. Davis, Chairman; C. H. Philbrook.

CRANBERRY ISLES.

Members of the board: Wm. P. Preble, Secretary; T. H. Stanley, Chairman; John Gilley.

We have had one case of typhoid fever.

CRAWFORD.

Members of the board: J. P. Jeffery, Secretary; N. S. Fenlason, Chairman; Robt. Wallace.

Two deaths occurred from scarlet fever, but the cases were not reported to the local board of health.

CUMBERLAND.

Members of the board: Dr. C. T. Moulton, Secretary and Health Officer; A. H. Grannell, Chairman; L. H. Merrill.

We have had no cases of the infectious diseases, excepting one of diphtheria which ended in recovery. Pneumonia was somewhat prevalent, and a few cases of this disease have appeared in animals.

CUSHING.

Members of the board: A. R. Rivers, Secretary; F. C. Hathorn, Chairman; W. A. Rivers.

No cases of infectious disease have appeared in town.

CUTLER.

Members of the board: C. G. Aldrich, Secretary; M. W. Ackley, Chairman; O. A. Davis.

No cases of infectious diseases have come to the knowledge of the board. Whooping cough, or a disease resembling it, has been prevalent.

DAMARISCOTTA.

Members of the board: A. H. Snow, Secretary; Dr. E. F. Stetson, Chairman.

Three nuisances were reported to the board, one of which was abated. We had an outbreak of scarlet fever in which thirty cases occurred with no deaths, and twelve houses were infected. The mildness of the scarlet fever made it quite puzzling at first. The schools were closed on account of the outbreak. Better drainage is needed.

DANFORTH.

Members of the board: Dr. M. L. Porter, Secretary; C. H. Merrill, Chairman; James Carson.

Twelve nuisances were removed by the board. We have had no cases of the infectious diseases, except an outbreak of scarlet fever, in which thirty-four cases occurred. This outbreak necessitated the closure of the schools. Better sewerage is needed.

DAYTON.

Members of the board: Dr. Geo. Sylvester, Secretary and Health Officer; Albert Dow, Chairman; Cyrus Ricker.

We have had one case of diphtheria and one of scarlet fever. Strict precautions were taken in these cases against the spread of the infection. We have also had a few cases of German measles, and whooping cough has prevailed.

DEDHAM.

Members of the board: P. P. Gilmore, Secretary; W. W. Burrell, Chairman; G. W. Gehan.

One nuisance was abated by the board. We have had no cases of infectious diseases. With the exception of influenza, the past year has been unusually healthy.

DEERING.

Members of the board: Andrew Hawes, Secretary; Dr. A. P. Topliff, Chairman; L. B. Chapman.

The beginning of a system of sewerage has been made, and 2,500 feet of pipe have been laid. Complaints were made of nineteen nuisances, of which all but three were removed.

Diphtheria, two outbreaks, two cases, two houses infected; scarlet fever, two outbreaks, two cases, two houses infected; typhoid fever, three outbreaks, eight cases with one death, five houses infected. In connection with cases of the infectious diseases the infected houses have been placarded and families have been kept isolated as far as possible.

DEER ISLE.

Members of the board: A. J. Beck, Secretary; W. B. Thurlow, Chairman; Seth Hatch; Dr. F. B. Ferguson, Health Officer.

Two nuisances were removed by the board. Scarlet fever, four cases, three houses; typhoid fever, eleven cases, three deaths, seven houses. As methods of improving the sanitary condition of the town, better drainage and a water supply are needed at Green's Landing. Three deaths resulted from drowning, and one from powder explosion.

DENMARK.

Members of the board: I. H. Berry, Secretary; Dr. S. T. Brown, Chairman and Health Officer; Joseph Colby.

The local board has known of no cases of infectious diseases. It has been very healthy here in the past year, most of the deaths resulting from old age and infirmity.

DENNYVILLE.

Members of the board: H. H. Kilby, Secretary; Benj. Lincoln, Chairman; Will R. Allen.

Diphtheria, six cases, one death, two houses; typhoid fever, one case. Houses where cases of infectious diseases have occurred have been visited and notices have been posted.

DETROIT.

Members of the board: David F. Libby, Secretary; Parker Sawyer, Chairman; Isaac Spaulding.

One nuisance was abated by the board. No cases of the infectious diseases were reported.

DEXTER.

Members of the board: E. A. Russ, Secretary; C. H. Hayden, Chairman; Dr. C. M. Foss, Health Officer.

One nuisance was abated. Scarlet fever, four cases; three houses; typhoid fever, three outbreaks, three cases, one death. In all cases of infectious diseases a personal investigation is made and isolation is provided for. Pneumonia and the diarrhoeal diseases of children were prevalent. Sewerage is needed for our principal street. Two of the cases of typhoid fever appeared to result from polluted water.

DIXFIELD.

Members of the board: Dr. W. H. Harris, Secretary and Health Officer; Dr. G. G. Richardson, Chairman; W. H. Winslow.

We have had no cases of diphtheria, scarlet fever, or typhoid fever, but there have been some cases of German measles and pneumonia, and whooping cough has been quite prevalent. The drainage of house cellars and stable cellars and of a muck bog on the outskirts of the village would be a sanitary improvement.

DIXMONT.

Members of the board: W. H. Toothaker, Secretary; Dr. H. F. Benson, Chairman and Health Officer; L. F. Simpson.

One nuisance was removed. We have had no cases of infectious diseases. Objection was made by the board to the location of a slaughter house in the immediate vicinity of a school. Dixmont is regarded as a very healthy locality, being elevated, with a rocky soil and an abundance of pure water.

DRESDEN.

Members of the board: Dr. L. H. Dorr, Secretary and Health Officer; M. F. Leeman, Chairman; C. J. Cheney.

We have had one case of typhoid fever, but otherwise than this and whooping cough no infectious diseases have been reported. Pneumonia and the diarrhœal diseases of children were prevalent.

DURHAM.

Members of the board: Dr. J. L. Wright, Secretary; John E. Hasty, Chairman; C. A. Goddard.

One nuisance only was reported to the board and this mysteriously disappeared when it became known that the board would take action against it. Whooping cough was quite prevalent, as well as the diarrhœal diseases of children in their season, but we have had no cases of diphtheria, scarlet fever or typhoid fever.

EASTBROOK.

Members of the board: A. P. Bunker, Secretary; A. W. Googins, Chairman; L. W. Bunker.

We have had no cases of infectious diseases, and I am pleased to make so favorable a report.

EAST LIVERMORE.

Members of the board: C. H. Gibbs, Secretary; A. D. Cole, Chairman.

EAST MACHIAS.

Members of the board: Dr. J. E. Tuell, Secretary; A. J. Hanscom, Chairman; F. H. Wiswell.

One nuisance was removed. Whooping cough has been prevalent, and one school was closed on account of it. We have had no cases of diphtheria, scarlet fever or typhoid fever. Several horses were attacked with a disease similar to influenza.

EASTON.

Members of the board: Dr. D. G. Luce, Secretary; D. Stanchfield, Chairman; Wm. H. Rackliffe.

No case of infectious disease has occurred.

EASTPORT.

Members of the board: A. W. Clark, Secretary; Robinson Flagg, Chairman; A. M. Bibber.

Five nuisances reported to the board were removed. The local board of health was not appointed until an epidemic of diphtheria was well under way and the infection was widely distributed. It has resulted in ninety-three cases, nineteen deaths, and sixty houses infected. Typhoid fever, seven cases, five houses. We need sewerage for the sanitary improvement of the town.

EDDINGTON.

Members of the board: D. S. Stevens, Secretary; W. W. Eddy, J. J. Temple.

We have had no cases of infectious diseases, except one of diphtheria. One death occurred from drowning.

EDEN.

Members of the board: C. R. Clark, Secretary; O. B. Knowles, Chairman; J. S. Bracy.

Three nuisances reported to the board were abated. Diphtheria, twelve cases, three deaths, seven houses; scarlet fever, one case; typhoid fever, three cases, three houses.

EDGEComb.

Members of the board: Eben Chase, Jr., Secretary; Jos. A. Merry, Chairman; D. B. Clifford.

One nuisance was removed by the board. Pneumonia and typhoid pneumonia were quite prevalent through the year, but we had no case of infectious disease, except one of typhoid fever. One bad accident resulted from a fall.

EDINBURG.

Members of the board: C. W. Eldredge, Secretary; C. G. Casey, Chairman; G. H. Eldredge.

We have had no cases of infectious diseases.

EDMUNDS.

Members of the board: Dr. J. P. Sheahan, Secretary and Health Officer; C. W. Hobart, Chairman; I. H. Allen.

Diphtheria, one outbreak, two cases, one house; typhoid fever, one outbreak, three cases, two houses.

ELIOT.

Members of the board ; Albert Lord, Secretary ; Dr. J. L. M. Willis, Chairman ; Dr. H. I. Durgin.

Diphtheria, two outbreaks, three cases, two houses ; typhoid fever one case, ending in recovery. The diarrhœal diseases of children were prevalent in the summer. One man was killed by falling and becoming impaled on an iron bar.

EMBDEN.

Members of the board : J. W. Morin, Secretary ; R. F. Durrell, Chairman ; S. A. Walker.

Chicken-pox appeared in one school, but otherwise than that there have been no cases of infectious diseases.

ENFIELD.

Members of the board : A. J. Darling, Secretary ; J. R. M. Gilman, Chairman ; T. S. Laing.

A few improvements have been made. Water has been brought to the pulp mill boarding house, and in a few cases drains have been made to carry off the surface water. One nuisance was reported and three were removed. We have had typhoid fever in three houses ; four cases in all. One case of pneumonia occurred. At Montague there are some unhealthy conditions owing to the rapidity with which the place has been built up. Some families here have been using water from holes dug in the low lands, not fit for a dog to drink. They are, however, changing rapidly to the use of better water supplies and some have put in drains and others will as soon as they can get at it.

ETNA.

Members of the board : S. J. Locke, Secretary ; E. E. Sylvester ; J. Goodell.

We have had one case of typhoid fever.

EUSTIS.

Members of the board : O. A. Hutchins, Secretary ; C. D. Stevens, Chairman ; F. L. Porter.

We have no cases of diphtheria, typhoid or scarlet fever, but German measles, mumps and pneumonia have been quite prevalent,

with no serious results, except from the last disease. Two deaths have resulted from pneumonia. Two deaths occurred from accidents while handling logs.

EXETER.

Members of the board: Dr. W. F. Hart, Secretary; E. A. Chandler, Chairman; Dr. S. W. L. Chase.

One nuisance was removed, and one case of typhoid fever occurred. Two deaths occurred from accident, one by drowning, and one by the discharge of a gun.

FAIRFIELD.

Members of the board: Geo. C. Eaton, Secretary; Dr. F. J. Robinson, Chairman; F. J. Savage.

Some slight improvements have been made in the sanitary condition of the town, but nothing in comparison with what should be made. Better sewerage is needed very much. Twelve nuisances were reported to the board. All have been removed as far as possible. We have had two cases of diphtheria in a mild form and one of typhoid fever.

FALMOUTH.

Members of the board: H. J. Merrill, Secretary; W. K. Swett, Chairman; W. E. Winslow; Dr. E. A. Fessenden, Health Officer.

One nuisance was abated. Diphtheria, three cases, two deaths, one house; typhoid fever, one case. One of the schools was closed on account of the outbreak of diphtheria. Two deaths have occurred from drowning. Tuberculosis appeared in one herd of cattle.

FARMINGDALE.

Members of the board: Dr. F. M. Putnam, Secretary and Health Officer; A. C. Stilphen, Chairman; Arthur McCausland.

The city water supply has been put into some houses where the water supply has been poor. One nuisance has been abated. We have had one case of typhoid fever. Whooping cough and catarrhal diseases have been prevalent.

FARMINGTON.

Members of the board: Dr. F. O. Lyford, Secretary; E. O. Greenlief, Chairman; H. W. Lowell.

Eight nuisances have been reported to the board and all but two have been removed. We have had one case of scarlet fever, one of diphtheria, and one of typhoid fever. Whooping cough has been prevalent. A good system of sewerage is needed in the village.

FAYETTE.

Members of the board: H. T. Wing, Secretary; A. A. Campbell, Chairman; J. F. Stevens.

We have had four cases of scarlet fever in one house. In connection with these cases we required the patients to be put into a room by themselves and that all clothing used about them be put into water before it was carried from the room, and then thoroughly boiled. The house was placarded. There have been a few cases of whooping cough. A scholar in district number three, having had scarlet fever in a light form, began to go to school again in about ten days from the time she came down with the disease. The school was closed for a fortnight and the rooms were disinfected. One case of tuberculosis occurred in a Jersey cow. The case was taken in hand by the State Cattle Commissioners and the animal was killed.

FOREST CITY.

Members of the board: Samuel Hatch, Secretary; A. A. Cox, Chairman; J. E. Haley; Dr. P. W. Cody, Health Officer.

We have had thirty cases of scarlet fever, eleven houses; typhoid fever, four cases, three houses. Pneumonia has been prevalent.

During the past year our board has had considerable work to do. In the early fall scarlet fever appeared in the village across the river on the Province side. As the majority of the inhabitants of that district did not make any energetic attempt to confine it, our board placed a guard on the bridge, and caused those who were likely to be infectious to remain on their own side of the river. This had the effect of producing a turmoil. Parties on both sides of the line being ignorant of the danger of scarlet fever, as well as of the laws governing the local board of health, worked with an energy worthy of a better cause to thwart the efforts of the board to prevent the spread of the contagion. After a time they quarantined the houses containing patients suffering from scarlet fever, and then the guard was removed, but in the meantime the disease had reached our town on the American side.

In one family a case of scarlet fever occurred in a child. During the sickness of this child, and for two months afterwards, a sister with her mother was away from home seventy miles distant. In the place where they were staying there were no cases of scarlet fever, and no communication was held from home, by letter or otherwise. The little girl and her mother returned home Saturday evening and in excellent health and spirits, but the child was stricken with the fatal malady three hours after her arrival. When first seen, soon after she was taken sick, she was in an unconscious state, thermometer placed in the axilla showed 107 degrees. The pulse could not be counted and the stomach was irritable. Medicine had no effect and she died within four days. The house had been thoroughly attended to so far as disinfection is concerned, after the recovery of the first case two months previously.

• Another case which appeared peculiar to me occurred in a boy eleven years old. When I first saw him he had well marked symptoms of typhoid fever, they being as follows: anorexia, headache, epistaxis, a dark purple flush of face, delirium, fever remittant in character, evening temperature being one and a half degrees higher than that of the morning. Tympany and gurgling were present in the right iliac fossa on the fifth day. On the seventh day I found that the mucous membrane of the throat and mouth were inflamed and that the eruption of scarlatina covered the whole body. The eruption remained ten days, and the patient recovered after a severe illness of five weeks.

A troublesome nuisance has been caused by some of the farmers by spreading the fleshings from the tanneries upon the surface of fields near highways and in other places where this kind of fertilizer is offensive. If it were ploughed under, it would be excusable, but to allow this putrid flesh to remain scattered over the surface is an outrage to the community.

FORT FAIRFIELD.

Members of the board: A. C. Cary, Secretary; E. E. Scates, Chairman; G. E. Bartlett; Dr. A. D. Sawyer, Health Officer.

A number of cases of scarlet fever occurred during the winter of 1889-90. Three nuisances were removed.

FOXCROFT.

Members of the board: R. M. Ingalls, Secretary; O. P. Martin, Chairman; N. F. Batchelder; Dr. Wm. Buck, Health Officer.

Three nuisances have been removed. One case of diphtheria.

FRANKFORT.

Members of the board: F. L. Tyler, Secretary; J. T. Rowe; F. L. Trundy; Dr. E. W. Temple, Health Officer.

Four nuisances have been removed. We have had one fatal case of diphtheria. Measles and mumps have been prevalent.

FRANKLIN.

Members of the board: G. H. Rutter, Secretary; O. C. Donnell, Chairman; Henry Whittaker.

We have had eight cases of diphtheria with two deaths; three houses were infected.

FRANKLIN PLANTATION.

Members of the board: L. C. Putnam, Secretary.

We have had one case of diphtheria and six of scarlet fever. One nuisance was removed.

FREEMAN.

Members of the board: A. W. Mayo, Secretary; N. H. Peterson, Chairman; J. M. Burbank.

One nuisance was removed. We have had no cases of diphtheria, scarlet fever or typhoid fever.

FREEPORT.

Members of the board: W. C. Fogg, Secretary; J. P. Merrill, Chairman; B. P. Soule; Dr. H. F. Twitchell, Health Officer.

Six nuisances were reported to the board, all but one of which were removed. We have had two cases of typhoid fever. The diarrhoeal diseases of children were prevalent in the summer. The cellar under the high school building is very wet and it should be looked after in the spring.

FRIENDSHIP.

Members of the board: Dr. G. C. Chamberlain, Secretary and Health Officer; R. R. Morton; F. G. Jameson.

We have had one case of typhoid fever. Pneumonia and the diarrhoeal diseases of children were prevalent.

FRYEBURG.

Members of the board: Eckley Ballard, Secretary; Dr. Irving Mabry, Chairman, E. S. Chase.

We have had three cases of typhoid fever with one death. There has been no prevailing disease among the children the past year.

GARLAND.

Members of the board: Dr. F. A. C. Emerson, Secretary and Health Officer; E. L. Oak, Chairman; D. A. Robinson.

There has been no town action as regards sanitary improvement, but there has been a noticeable improvement in privies and in the disposal of excreta among the people. We have had three cases of typhoid fever, with one death.

GEORGETOWN.

Members of the board: J. L. Berry, Secretary; S. P. Oliver, Chairman; John Hunt.

GILEAD.

Members of the board: P. Harriman, Secretary; Edgar Harriman, Chairman; Seth Bemis.

We have had no cases of infectious disease.

GLENBURN.

Members of the board: J. F. Tolman, Secretary; Elisha Hill, Chairman; H. N. Parker.

The last year has been one of exceptional good health for the town. We have had no case of infectious diseases.

GLENWOOD PLANTATION.

Members of the board: Alonzo Springer, Secretary; Aaron Austin; I. P. Pierce.

GORHAM.

Members of the board: G. W. Heath, Secretary; C. G. Carver, Chairman; A. W. Lincoln, Health Officer.

Six nuisances were reported to the board, all of which were removed. We have had six cases of scarlet fever, and four cases of typhoid fever. There is need of better drainage and sewerage in the village. Two accidents resulted from becoming caught in a belt.

GOULDSBORO.

Members of the board: T. R. Hammond, Secretary; R. R. Joy, Chairman; Dr. C. C. Larrabee.

No cases of contagious diseases were reported. One case of drowning occurred from the capsizing of a boat.

GRAY.

Members of the board: Dr. J. F. Rowell, Secretary; Dr. E. T. Andrews, Chairman; Dr. E. A. McCollister.

Three nuisances reported to the board were all removed. Diphtheria, five cases, three houses; scarlet fever, two cases, two houses; typhoid fever, three cases, three houses. Houses have been placarded and disinfectants have been used. On recovery, the buildings have been fumigated. Measles have been prevalent. One child three years old was drowned.

GREENBUSH.

Members of the board: H. F. Harris, Secretary; M. J. Harris, Chairman; W. W. Harris.

We have had one case of typhoid fever.

GREENE.

Members of the board: Dr. F. E. Sleeper, Chairman; Dr. Albion Pierce, Health Officer; Alden Sawyer.

No cases of infectious diseases were reported to this board.

GREENFIELD.

Members of the board: E. C. Edgerly, Secretary and Health Officer; M. C. White, Chairman; Jere Avery.

GREENVILLE.

Members of the board: H. A. Sanders, Secretary; L. A. Young, Chairman; Dr. H. Hunt, Jr., Health Officer.

A water supply has been brought from a hill and has been quite generally introduced. Three nuisances reported to the board were removed. We have had seven cases of scarlet fever; five houses were infected. Whooping cough has prevailed. An improvement in our sewerage is needed.

GREENWOOD.

Members of the board: A. C. Libby, Secretary; W. B. Rand, Chairman; Wm. Richardson.

We have had one case of diphtheria and three cases of scarlet fever in one house. Scarlet fever entered one school. The house was closed until it was thoroughly cleansed.

GUILFORD.

Members of the board: Henry Straw, Secretary; L. N. Whittier, Chairman; John Scales.

Two nuisances reported to the board were removed. We have had twenty-five cases of scarlet fever with two deaths. The outbreak was traced to infected clothing.

HALLOWELL.

Members of the board: Dr. J. M. Eveleth, Secretary; E. W. Maddox, Chairman; I. M. True.

A few complaints in writing, and many verbal ones, have been made, and all of the nuisances have been removed. We have had two cases of diphtheria with one death, and two cases of typhoid fever. We have reason to believe that some cases are not reported. More sewers are needed and a more plentiful water supply. One death occurred from drowning, and one of our residents was killed out of town by the cars.

HAMPDEN.

Members of the board: Dr. W. H. Nason, Secretary and Health Officer; H. W. Mayo, Chairman; C. F. Cowan.

Two nuisances were reported. We have had two cases of diphtheria in one house.

HANCOCK.

Members of the board: A. B. Crabtree, Secretary; R. H. Young.

No cases of infectious diseases have been reported to the board.

HANOVER.

Members of the board: J. B. Roberts, Secretary; J. R. Howard, Chairman; C. E. Chapman.

I am happy to say that we have had no nuisances and no cases of infectious diseases as far as I know.

HARMONY.

Members of the board: L. S. Reed, Secretary; S. Leighton, Chairman; F. K. Hurd.

Four nuisances have been removed. No cases of contagious diseases have appeared, except whooping cough.

In a family of five persons, all were taken sick with bowel complaint and one died. The doctors were puzzled as to the cause. The board of health was notified and made an examination, but discovered nothing to account for the disease. The family continued to become worse. In a few days we were called again, for the doctor said there must be some cause undiscovered. At this second visit, in traveling around the house, it was suspected that slops might have been thrown out of the windows, and, as the ground sloped toward the house, that the soakage might have run into the cellar. We therefore had a man haul away several loads of earth from the back side of the house and replace it with fresh earth. In doing this he found, a little below the surface, several inches of human excreta nearly the whole length of the house, and especially near the sleeping room windows. After it was all removed and the cellar ventilated the remaining four members of the family recovered after a lingering sickness. We have no question that the trouble was caused by this condition of things, and the doctor thinks so too.

HARPSWELL.

Members of the board: J. S. Farr, Secretary; G. H. Dearbon, Chairman; J. N. Stinson.

Three nuisances were reported, two of which were removed. Diphtheria fourteen cases, three deaths, eleven houses; typhoid fever. one case. One death occurred from drowning.

HARRINGTON.

Members of the board: E. R. McKenzie, Secretary; Dr. G. H. Walling, Chairman; C. W. Wass

Diphtheria, one case; typhoid fever, two cases, two houses. Whooping cough has been prevalent. A small coaster on which two men from this town were sailing, while in Boston took water which smelled and tasted bad, and soon after arriving home, four of the five making the crew were taken sick. One of the men belonging to our town had typhoid fever and the other one was

threatened with the disease. The other men of the crew belonged to some other town.

HARRISON.

Members of the board: A. Moulton, Secretary; S. L. Weston, Chairman; Dr. H. H. Cole.

We have had one case of typhoid fever. A few places are needlessly unhealthy on account of bad drainage and bad water resulting from the nearness of privies and sink spouts to the well.

HARTLAND.

Members of the board: A. W. Miller, Secretary; Dr. J. F. Brown, Chairman and Health Officer; A. N. Buck.

We have had two cases of typhoid fever.

HAYNESVILLE

Members of the board: S. C. Cummings, Secretary; A. G. Chambers; J. H. Bryson.

HEBRON.

Members of the board: Dr. J. C. Donham, Secretary and Health Officer; Cyrus Ramsdell; D. F. Cummings.

Four nuisances have been reported, three of which have been removed. A school-house privy was condemned as a nuisance in October, but the agent has not yet removed it. We have had one case of typhoid fever in each of two houses. Pneumonia has been quite prevalent.

[The following is the printed report of the local board —A. G. Y.]

“We have held the regular meetings of the board directed by law. We have given personal attention and inspection to every instance to which our attention has been called, either in the form of complaint or report. We have abated three nuisances of decaying carcasses of animals. We have made personal inspection of our school-houses and their privy conveniences, and do recommend that every district give immediate attention to providing for their children such conveniences at their school-houses as to conform to their moral instruction at home.

“We report with pleasure the marked care shown by most of our citizens in providing proper sink spout drainage from their dwellings, also the care given to the cleanliness of the out-buildings

during the hot months. Most of our citizens have learned to guard well the source of their drinking water.

“We desire to thank the people of Hebron for the sensible manner in which they have supported the health board in the discharge of its delicate and unpleasant duties.”

HERMON.

Members of the board: Dr. F. P. Whitaker, Secretary; F. A. Bishop, Chairman; J. Tuesley.

One nuisance was removed. Scarlet fever, seven cases, two houses; typhoid fever, two cases, two houses.

HERSEY.

Members of the board: E. E. Morse, Secretary; L. M. Davis, Chairman; J. P. Crommett; Dr. B. C. Woodbury, Health Officer.

HIRAM.

Members of the board: John Pierce, Secretary; A. K. P. Gogins, Chairman; S. D. Wadsworth; Dr. C. E. Wilson, Health Officer.

One nuisance was removed. I am happy to say that we have had no cases of diphtheria, scarlet fever or typhoid fever. Whenever these cases do occur we have taken all precautions.

HODGDON.

Members of the board: Moses Benn, Secretary; Dr. J. V. Tabor, Chairman; Wm. A. Atherton.

Diphtheria, two cases, two houses; typhoid fever, three cases. Houses where cases of the infectious diseases have occurred have been visited and all necessary instructions have been given.

HOLDEN.

Members of the board: P. L. Pond, Secretary; Alex. Tirrell, Chairman; J. E. Rowe.

We have had one case of diphtheria and two of typhoid fever. The board has seen that all necessary means has been used to prevent the spread of the disease.

HOLLIS.

Members of the board : T. J. Carle, Secretary ; C. E. Randall, Chairman ; Collins Haley.

Several nuisances have been removed at the request of the board. We have had no cases of infectious diseases, except mumps. Pneumonia has been prevalent

The clear, steady cold weather of December has had a tendency to improve the health of the inhabitants and general good health has prevailed.

HOPE.

Members of the board : D. H. Mansfield, Secretary ; M. Metcalf, Chairman ; Levere Howard ; Dr. Isaac Bartlett, Health Officer.

We have had two cases of scarlet fever. The outbreak was at South Hope. It would improve the sanitary condition of the town if some of the sources of the drinking water were changed.

HOULTON.

Members of the board ; Dr. C. E. Williams, Secretary ; L. B. Johnson, Chairman ; Dr. Geo. Cary.

The sewerage system has been extended. About fifty nuisances were reported. Nearly all were removed so far as was practicable.

Diphtheria, one case ; scarlet fever, seven cases, five houses ; typhoid fever, one case. The methods pursued in connection with these cases have been personal visitation in nearly all the cases, distribution of circulars, and the giving of information and instruction as to the prevention of contagion. Two fatal cases of cerebrospinal meningitis occurred. There had been no cases of this disease here previously for several years.

HOWLAND.

Members of the board : J. O. Davis, Secretary ; O. C. Sweat, Chairman ; L. T. Mason.

We have had one case of typhoid fever, but have known of no other cases of infectious diseases. Pneumonia was prevalent.

HUDSON.

Members of the board : W. B. Hastings, Secretary ; L. H. Strout, Chairman ; P. Barker.

We have had no cases of diphtheria, scarlet fever, or typhoid fever.

HURRICANE ISLE.

Members of the board: M. H. McIntyre, Secretary; J. J. McCabe, Chairman; Eugene Thomb.

No cases of the infectious diseases were reported. Two deaths occurred from drowning.

INDUSTRY.

Members of the board: Wm. C. Hatch, Secretary; H. B. Luce, Chairman; C. W. Gilmore

We have had one fatal case of typhoid fever. The family was furnished with disinfectants and was given such sanitary instructions as were deemed necessary. Whooping cough and chicken pox have been unusually prevalent.

ISLAND FALLS.

Members of the board: G. H. Donham, Secretary; A. Craig, Chairman; W. D. Warren

We have had no cases of infectious diseases. It has been remarkably healthy.

ISLE AU HAUT.

Members of the board: J. H. Simpson, Secretary; James Robinson, Chairman; J. T. Barter.

Our town has good drainage and good water. We have had no cases of diphtheria, typhoid or scarlet fever. Seven cases of measles occurred in one family. At first there was a suspicion of varioloid, but the disease proved to be measles. Precautions being taken in season, it did not spread outside of the family.

ISLESBORO.

Members of the board: J. A. Sprague, Secretary; Alonzo Coombs, Chairman; L. W. Hammons

Two nuisances were removed. We have had nine cases of diphtheria. Five houses were infected.

JACKSON.

Members of the board: D. D. Gould, Secretary; J. H. Cook, Chairman; J. B. Jacobs, Health Officer.

We have had no cases of infectious disease.

JAY.

Members of the board: H. H. Allen, Secretary; S. B. Farnum, Chairman; E. W. Gould.

One nuisance was removed. Two cases of typhoid fever, two houses. Whooping cough and pneumonia have prevailed. Better drainage is needed.

JEFFERSON.

Members of the board: J. J. Bond, Secretary; H. W. Clary, Chairman; Dr. A. A. Jackson.

We have had one case of diphtheria.

JONESBORO.

Members of the board: E. M. Watts, Secretary; G. F. Whitney, Chairman; G. E. Noyes, Dr. H. H. Smith, Health Officer.

About ten complaints of nuisances were received. All of them were willingly removed by their owners as soon as they were spoken to. Typhoid fever four cases, two houses. In the months of August, September and October, the diarrhœal diseases were quite prevalent, and there was a considerable number of pneumonia cases, apparently the result of *la grippe*.

JONESPORT.

Members of the board: J. W. Kelley, Secretary; G. E. Watts, Chairman; E. L. Kelley.

Diphtheria, five cases, three houses; typhoid fever, one case. The houses were placarded in the cases of diphtheria and every precaution was taken to keep the disease from spreading. Three deaths occurred from consumption, one in a child six years of age, one a young lady or sixteen, and one a young married lady. A foreigner, aged sixty-five years, a resident of this town for fifteen years, took Paris green which resulted in death. A very sad case of drowning occurred. Two young men sixteen and eighteen years of age filled their boat, loaded with lobster traps, and were both drowned in sight of their father's house.

KENDUSKEAG.

Members of the board: G. W. Worster, Secretary; M. L. Fisher, Chairman; A. A. Cook.

KENNEBUNK.

Members of the board: Dr. F. M. Ross, Secretary and Health Officer; John Cousens, Chairman; E. G. Littlefield.

Diphtheria two cases, two houses; typhoid fever one case. There have been several cases of pneumonia and measles, and an unusual number of cases of rheumatic fever. A child was drowned by falling into the river.

KENNEBUNKPORT.

Members of the board: W. H. Cluff, Secretary; E. T. Colman, Chairman; Ivory Bickford.

One sewer was built for the accommodation of summer cottages. Four nuisances were removed. Diphtheria, one case; scarlet fever, two fatal cases, two houses; typhoid fever, one fatal case. Measles and the diarrhoeal diseases of children have been prevalent. One case of contagion occurred where preceding cases were not reported to this board. One case of accidental drowning.

KINGFIELD.

Members of the board: W. E. Cummings, Secretary; C. W. Clark, Chairman; James Lord.

We have had no cases of diphtheria, typhoid or scarlet fever.

KINGSBURY.

Members of the board: W. S. Hilton, Secretary; H. R. Sinclair, Chairman; J. H. Smith; Samuel Whitman, Health Officer.

We have had no cases of diphtheria, scarlet fever, or typhoid fever.

KITTERY.

Members of the board: Dr. L. O. Buzzell, Secretary; Dr. M. F. Wentworth, Chairman; Dr. A. W. Johnson.

Four nuisances have been removed. We have had five cases of diphtheria in one house. There are some unhealthy conditions in the upper village. We need a water supply and a system of sewerage.

KNOX.

Members of the board: J. R. Sparrow, Secretary; J. H. Brown, Chairman; J. H. Linekin.

No cases of infectious diseases are reported.

LAGRANGE.

Members of the board: H. W. Blake, Secretary; Fred H. Savage, Chairman; Dr. A. H. Stanhope, Health Officer.

We have had no cases of infectious diseases the past year.

LAMOINE.

Members of the board: W. S. Hodgkins, Secretary; E. H. King, Chairman; I. N. Salisbury.

One nuisance was removed. Two cases of scarlet fever in the same house Whooping cough was somewhat prevalent.

LEBANON.

Members of the board: S. D. Lord, Secretary; Dr. J. S. Parker, Chairman and Health Officer; Horace Williams.

LEE.

Members of the board: O. I. Getchell, Secretary; J. G. Ricker, Chairman; A. K. Lewis.

No cases of diphtheria, scarlet fever, or typhoid fever, but whooping cough prevailed to a slight extent.

LEEDS.

Members of the board: H. M. Brewster, Secretary; Albert Barker, Chairman; Dr. R. S. Loring.

Diphtheria, eleven cases, six deaths, four houses infected. June 17th, Ethel Drake, aged seven years, was taken sick with diphtheria, and died on the 24th. On the day of her death, her mother, and the next day, her father, were taken down with the disease, but they both recovered after a sickness of two weeks. Eleven days before Ethel was taken sick she visited the house where a young woman had died of consumption, and where, in the preceding January, five had died of diphtheria. While at this house a trunk was opened for clothing, which had not been opened since it was brought from Lawrence, Mass., whence it will be remembered the infection was brought in furniture and clothing that started the epidemic resulting in five deaths in this house in January, 1890.

LEWISTON.

Members of the board: C. V. Emerson, Secretary; Dr. O. A. Horr, Chairman; Dr. J. A. Donovan.

Thirty-eight nuisances were reported, thirty-one of which were removed. Diphtheria, ten cases, in seven houses; scarlet fever, eight cases, five houses; typhoid fever, twelve cases. An extension of the sewerage system is needed.

LIBERTY.

Members of the board: Dr. E. A. Porter, Secretary; Wm. H. Moody, Chairman; J. O. Johnson.

We have had four cases of typhoid fever with one death. Whooping cough has been prevalent. This outbreak of typhoid fever was imported, and was prolonged by impure water in a well in the stable.

LIMERICK.

Members of the board: Dr. J. D. Haley, Secretary; Chas. Libby, Chairman; J. Holland, Jr.

LIMESTONE.

Members of the board: A. D. Hatfield, Secretary; E. G. Weymouth, Chairman; Mark Trafton.

One nuisance was removed. Typhoid fever, seven cases, one death, five houses.

LIMINGTON.

Members of the board: W. S. Small, Secretary; Dr. J. F. Moulton, Chairman; Dr. G. W. Weeks.

We have had one case of scarlet fever, six of typhoid fever, five of mumps, and fifteen of pneumonia, with six deaths.

LINCOLN.

Members of the board: Dr. C. Fuller, Secretary and Health Officer; C. A. Sargent, Chairman; L. W. White.

Two nuisances were removed. We have had three cases of typhoid fever with one death. Pneumonia has been prevalent. There is need of a sewer through Main street. One case of voluntary poisoning with Paris green.

LINCOLNVILLE.

Members of the board : Dr. E. F. Benson, Secretary and Health Officer ; Benson Sherman.

Our water supply is good throughout the town, and drainage, sewerage and excreta are carefully looked after. Four nuisances were removed.

Diphtheria, three cases, two houses ; scarlet fever, two cases, one house ; measles and pneumonia have been prevalent.

LINNEUS.

Members of the board : Dr. Robert Boyd, Secretary and Health Officer ; R. B. Young, Chairman ; G. W. Getchell.

We have had no cases of diphtheria, typhoid, or scarlet fever. In no summer and autumn since I have been in practice, have I seen so few cases of bowel troubles as in the last season. One fatal accident resulted from the falling of a pitch fork grapple.

LISBON.

Members of the board : C. H. Miles, Secretary ; Henry Hackett, Chairman ; W. S. Merrill ; Dr. A. W. Potter, Health Officer.

Twenty-five nuisances were removed. Diphtheria, five cases, two deaths, two houses infected ; scarlet fever, one case ; typhoid fever, six cases, three deaths, six houses. Whooping cough and pneumonia have been prevalent, and we have had a few cases of German measles.

A good sewerage system is needed in Lisbon Falls. Two deaths resulted from drowning. On account of an outbreak of rabies, twenty-five dogs were killed by order of the board, and more than as many more by their owners. All the other dogs were confined or securely muzzled.

LITCHFIELD.

Members of the board : G. Roberts, Jr., Secretary ; Dr. Enoch Adams, Chairman ; Thos. Holmes.

Two nuisances reported to the board were removed. We have had no cases of diphtheria, scarlet fever, or typhoid fever. One family had a disease resembling diphtheria and it resisted treatment until the water which they used for drinking purposes was boiled, when all speedily recovered. The spring is so situated that

it catches the drainage from the sink spout and privy. The school children who have been accustomed to use water from this spring have been troubled much with sore throats. This has been noticed for several years.

LITTLETON.

Members of the board: L. F. Hall, Secretary; G. C. Hayward, Chairman; H. A. Hall.

Two nuisances were removed. We have had no cases of infectious diseases, except German measles. Pneumonia has been prevalent.

LIVERMORE.

Members of the board: W. F. Fuller, Secretary; R. B. Bradford, Chairman; Dr. G. F. Adams, Health Officer.

LOVELL.

Members of the board: Dr. C. P. Hubbard, Secretary; W. W. Durgin, Chairman; J. K. P. Vance.

We have had no cases of diphtheria, typhoid, or scarlet fever. We had rather more cases of pneumonia than usual, which I think were complications of, or caused by, influenza.

LOWELL.

Members of the board: J. F. Dam, Jr., Secretary; J. Varney, Chairman; M. O'Halloian.

No cases of contagious diseases are reported.

LYMAN.

Members of the board: A. J. Blanchard, Secretary; Dr. E. Hurd, Chairman; A. F. Roberts.

Diphtheria, one case; scarlet fever, eight cases, two houses. Whooping cough prevailed to quite an extent. Scarlet fever entered one of the schools. The school was closed at once and the school-room was disinfected.

MACHIAS.

Members of the board: Dr. H. H. Smith, Secretary and Health Officer; C. B. Donworth, Chairman; Dr. S. B. Hunter.

Two nuisances were removed. Diphtheria, two cases, one house ; typhoid fever, three cases, three houses. Whooping cough and the diarrhœal diseases were quite prevalent. One man, a few miles from here, was killed last summer in the haying field by lightning. Two cases of poisoning occurred from eating canned corn beef.

MACHIASPORT.

Members of the board : C. W. Gates, Secretary ; Edward Small, Jr., Chairman ; Robert Stuart.

We have had thirty-one cases of diphtheria, with six deaths ; eleven houses were infected. One death occurred from drowning.

MADAWASKA.

Members of the board : Arthur Daigle, Secretary ; Michael Martin, Chairman ; Lament Fouriner.

We have had no cases of diphtheria, typhoid, or scarlet fever. Measles has been quite prevalent.

MADISON.

Members of the board ; C. W. Dyer, Secretary ; C. D. Morrill, Chairman ; John Chadbourne.

MADRID.

Members of the board : L. P. Rowe, Secretary ; Reuben Sargent, Chairman ; David Wilbur.

One nuisance was reported. We have had no cases of contagious disease.

MANCHESTER.

Members of the board : G. M. Knowles, Secretary ; W. R. Merrill, Chairman ; F. J. Hewins.

Not a case of contagious disease has come to the knowledge of the board of health the past year. A boy was drowned by accidently falling from a bridge

MAPLETON.

Members of the board : J. C. Chandler, Secretary ; J. A. Stewart, Chairman ; James McAlpine.

Two nuisances were removed. Contagious diseases prevailed in adjoining towns, but prompt action was taken to prevent them from extending into this town.

MARIAVILLE.

Members of the board: Benj. Young, Secretary; G. W. Black, Chairman.

We have had two cases of typhoid fever. Three deaths have occurred in the town, all from old age.

MARION.

Members of the board: B. L. Smith, Secretary; Jos. Thompson, Chairman; F. N. Gardner.

MARSHFIELD.

Members of the board: J. W. Foss, Secretary; Wm. Hilton, Chairman; Thomas Berry.

No cases of contagious diseases are reported.

MARS HILL.

Members of the board: F. L. Keay, Secretary; H. W. Safford, Chairman; Dr. J. H. Syphers, Member and Health Officer.

Two nuisances reported to the board were removed. We have had no cases of diphtheria, typhoid, or scarlet fever. Two cases of glanders in horses.

MASARDIS.

Members of the board: F. W. E. Goss, Secretary; H. D. Smith, Chairman; S. W. Clark.

We have had no cases of diphtheria, typhoid or scarlet fever.

MASON.

Members of the board: F. I. Bean, Secretary; H. G. Mason, Chairman; Arthur Morrill.

We have had no cases of contagious diseases.

MATTAMISCONTIS.

Members of the board: W. G. Sawyer, Secretary; E. E. Roberts, Chairman; W. P. Roberts.

MATTAWANKEAG.

Members of the board: F. J. Fiske, Secretary; Alex. McClain, Chairman; G. F. Stratton.

One nuisance was removed. We have had no cases of contagious diseases.

MEDDYBEMPS.

Members of the board: J. S. Bridges, Secretary; A. J. Allen, Chairman; C. L. Hatton.

We have had no cases of contagious diseases. Only two deaths occurred last year; one was an infant only a few days old, the other an old man.

MEDFORD.

Members of the board: S. O. Dinsmore, Secretary; W. S. Lovejoy, Chairman; D. A. Hathorn.

We have had no cases of contagious diseases.

MEDWAY.

Members of the board: S. Pomroy, Secretary; N. A. Powers, Chairman; C. F. Moore.

Two nuisances were removed. Last spring the board made a sanitary examination of the whole town. We have had no cases of infectious diseases.

MERCER.

Members of the board: Dr. V. R. Perkins, Secretary and Health Officer; I. S. Ford, Chairman; A. M. Pattee.

One nuisance was removed. We had one case of scarlet fever. Prompt action was taken to secure isolation and disinfection. The diarrhoeal diseases of children were quite prevalent.

MEXICO.

Members of the board: H. W. Parke, Secretary; H. G. Virgin; L. H. Harlow.

We have had no cases of contagious diseases, except a few of whooping cough.

MILBRIDGE.

Members of the board: Dr. Geo. Googins, Secretary and Health Officer; L. G. Means, Chairman; Dr. G. A. Sawyer.

Improvements have been made in drains, sewerage, etc. Two nuisances reported to the board were removed. Diphtheria, three cases, two houses; typhoid fever, one case. Whooping cough and

the diarrhœal diseases of children were prevalent. Better drainage of houses and premises and more care in the selection of water supplies is needed.

MILFORD.

Members of the board: M. W. Sawyer, Secretary; M. A. Austin, Chairman; A. Hammond.

We have had no cases of diphtheria, typhoid or scarlet fever. In one locality the land is low and needs proper drainage.

MILLO.

Members of the board: A. W. Murray, Secretary, M. L. Durgin, Jr., Chairman; Dr. H. Hamlin.

MINOT.

Members of the board: Dr. C. M. Cobb, Secretary; Dr. C. A. Tobie, Chairman; C. F. True.

Three nuisances were removed. We have had two cases of typhoid fever. Whooping cough has prevailed. Sewers and water supply are needed.

MONMOUTH.

Members of the board: J. H. Norris, Secretary; Dr. D. E. Marston, Chairman and Health Officer; H. O. Pierce.

We have had one case of diphtheria. House was placarded, inmates isolated, etc. Catarrhal and bronchial troubles were quite prevalent.

Two children were taken sick after eating colored candy. The symptoms were suspicious and the health officer thought it probable that poison was present. Both children recovered in a short time.

MONROE.

Members of the board: Dr. J. J. Sewall, Secretary and Health Officer; Freeman Atwood, Chairman; E. H. Nealley.

The village sewer has been improved. Two nuisances were removed. Scarlet fever, one case; typhoid fever, three cases, one death, three houses. More attention to the condition of privies and to procuring pure water for household use is desirable. Frequent suggestions have been made by the board relative to better drainage, ventilation and water supply.

MONSON.

Members of the board: D. J. Jackson, Secretary; L. P. Bray, Chairman; J. Davison; Dr. A. H. Hardy, Health Officer.

Diphtheria, five cases, one death, five houses infected; scarlet fever, two cases. German measles was prevalent. Better drainage is needed, particularly for a pool from a hotel.

MONTICELLO.

Members of the board: G. W. Lowell, Secretary; M. J. Hogan, Chairman; O. A. Stanley.

We have had two cases of typhoid fever. Two houses were infected. "What methods can you suggest for improving the sanitary condition of your town?" "Drink less rum and more water."

MONTVILLE.

Members of the board: Dr. A. D. Ramsey, Secretary; B. F. Foster, Chairman; J. W. Collins.

We have had no cases of infectious diseases.

MORRILL

Members of the board: D. O. Bowen, Secretary; Dr. J. W. Pearson, Chairman; B. A. Hatch.

We have had no cases of contagious diseases, except measles, confined to one family, and a few cases of whooping cough. For the improvement of the sanitary condition of the town, I would suggest education in physiology and hygiene.

MOSCOW.

Members of the board: A. Burke, Secretary; C. M. Hill, Chairman; Thomas Emerton.

We have had nine cases of scarlet fever; four houses were infected. Much improvement might be made by many families if they would take more pains to secure a pure water supply.

MT. CHASE.

Members of the board: E. A. Cooper, Secretary; Willis Myrick, Chairman; John Sargent.

Our town has been unusually healthy since the organization of the local board. In the early part of June we inspected the dwelling

houses in the town and found them all in a healthful condition. We have had no contagious diseases. One child was burned to death by her clothing catching fire while she was playing around a stove.

MT. DESERT.

Members of the board: S. M. Nash, Secretary; B. T. Atherton, Chairman; W. S. Smallidge.

MT. VERNON.

Members of the board: H. F. Fletcher, Secretary; R. F. Fletcher, Chairman; J. A. Robinson.

We have had one case of scarlet fever and one of typhoid fever. I have visited the infected houses and have prescribed the proper sanitary measures.

NAPLES.

Members of the board: P. O. Cannell, Secretary; G. W. Hall, Chairman; Dr. C. Y. Lord.

No changes have been made in the water supply, the drainage, or the disposal of excreta, except better applications of former methods. Two nuisances have been removed. We have had no contagious diseases. One death occurred from drowning.

NEWBURGH.

Members of the board: C. H. Whitcomb, Secretary; B. D. Newburgh, Chairman; Dr. F. O. J. S. Hill.

We have had three cases of scarlet fever and one of typhoid fever. Prompt action has been taken to keep the disease from spreading.

NEWCASTLE.

Members of the board: D. S. Glidden, Secretary; R. C. Chapman, Chairman; S. D. Wyman.

Two nuisances were removed. We have had two cases of typhoid fever; two houses were infected. Whooping cough has prevailed. One case of accidental drowning occurred and one probably not accidental.

NEWFIELD.

Members of the board: I. M. Trafton, Secretary; T. E. Mitchell, Chairman; C. L. Wentworth.

No cases of infectious diseases have been reported in the town.

NEW GLOUCESTER.

Members of the board: Dr. J. I. Sturgis, Secretary; Wm. True, Chairman; M. C. Clark.

Whooping cough has been prevalent; otherwise there have been no cases of contagious disease, except one of typhoid fever. In this case the typhoid fever circulars were distributed, disinfectants were freely used and excreta was buried.

NEW LIMERICK.

Members of the board: J. A. Grant, Secretary; F. J. Dyer, Chairman; C. A. Sheldon.

NEWPORT.

Members of the board: F. M. Shaw, Secretary; R. H. Libby, Chairman; Dr. A. I. Harvey

Two nuisances reported to the board were removed. We had two cases of diphtheria in one house. Pneumonia, mumps and the diarrhœal diseases were quite prevalent.

NEW PORTLAND.

Members of the board: Dr. W. H. Stevens, Secretary; Dr S. A. Bennett, Chairman; Abel Thompson.

Three nuisances reported to the board were all removed. Two cases of typhoid fever. Whooping cough and mumps had a wide distribution. Some of the schools were suspended on account of the last mentioned disease. I would suggest for the improvement of the sanitary condition of the town, a proper disposal of excreta and sink slops, and a better ventilation of sleeping rooms.

NEWRY.

Members of the board: W. B. Wright, Secretary; A. W. Powers, Chairman; L. W. Kilgore.

We have had no cases of diphtheria, typhoid or scarlet fever. There were a few cases of mumps. One accident resulted from the breaking of a kerosene lamp on a hot stove.

NEW SHARON.

Members of the board: D. R. Hargraves, Secretary; J. R. Jewell, Chairman; D. J. Jordan.

We have had three cases of typhoid fever. Three deaths occurred from cancer. In the house where the two cases of typhoid fever occurred, we found a well under the ell. A pump which brought the water from it had an iron sink by the side of it, the bottom of which had been cracked by freezing. The sink was therefore leaky, and the contents ran upon the floor above the well. The floor was completely rotten.

NEW VINEYARD

Members of the board: G. H. Pratt, Secretary; A. D. Turner, Chairman; E. J. Voter.

Three nuisances were reported to the board, all of which were removed. Whooping cough has been present, but we have had no other cases of infectious disease. Some kind of a disease, as yet undetermined, has existed in a herd of cattle, seven out of eight dying.

NOBLEBORO.

Members of the board: J. M. Winslow, Secretary; W. H. Moody, Chairman; A. Cunningham.

We have not had a case of contagious disease in town for the past year, nor has there been a nuisance complained of or existing to my knowledge.

NORRIDGEWOCK.

Members of the board: P. S. Lindsey, Secretary; A. O. Fred-eric, Chairman; Henry Murphy.

A drain has been built in the lower part of the village. Three nuisances have been removed. Whooping cough has prevailed, but we have had no other contagious disease. More work should be done in putting in drainage.

NORTH BERWICK.

Members of the board: Geo. H. Wentworth, Secretary; L. E. Brackett, Chairman; Dr. F. B. Morrill, Member and Health Officer.

Twenty complaints have been received of nuisances, and thirty or more have been removed. Privies and sink drains have been the bane of this town, but we have made great improvements and instituted new methods that work finely. Cases of pharyngitis have been prevalent, but we have not known of any cases of diphtheria, scarlet fever, or typhoid fever.

The system of ventilation in our school-houses is ridiculous and must have attention. A sewerage system is needed. One case of accidental drowning, a boy.

NORTHFIELD.

Members of the board: E. M. Smith, Secretary; Jas. McReavy, Chairman; Frank Smith; Dr. H. H. Smith, Health Officer.

Pneumonia and the diarrhoeal diseases of children have been somewhat prevalent.

NORTH HAVEN.

Members of the board: B. C. Calderwood, Secretary; O. B. Kent, Chairman; Jewett Turner.

We have had three cases of typhoid fever. One death occurred from drowning. As regards kerosene accidents, a fearful one occurred here in December, in which a man, his wife and child were burned nearly to death. For a time the lives of all three were in the most extreme danger. The room was badly burned and an adjoining store barely escaped. The accident was occasioned by boiling kerosene on the stove to cleanse a tin vessel.

NORTH YARMOUTH.

Members of the board: S. H. Sweetsir, Secretary; A. Mitchell, Chairman; Wm. Osgood, Member and Health Officer.

NORWAY.

Members of the board: E. F. Smith, Secretary; Dr. B. F. Bradbury, Chairman; E. H. Brown.

We have had twelve cases of scarlet fever and six of typhoid fever, with two deaths from the latter disease. Erysipelas, measles and whooping cough have been unusually prevalent. Two cases of typhoid fever, both in the same family, were traced to the drinking of impure water. A sewerage system is badly needed. The work of investigating by the board has been done more thoroughly than ever before and excellent results have followed.

For some time, as your board are well aware, and as is set forth on page thirty-seven of the second annual report of the State Board of Health, Norway has been troubled with the exceedingly bad condition of the meadow lands close to the village. This same condition still continues.

OAKLAND.

Members of the board: H. W. Wells, Secretary; G. W. Hubbard, Chairman; Dr. M. S. Holmes, Member and Health Officer.

We have had one case of typhoid fever. No cases of scarlet fever or diphtheria. One drain relaid and enlarged by the town.

OLD ORCHARD.

Members of the board: F. G. Staples, Secretary; Gilbert Wylie, Chairman; J. H. Ricker.

About half a mile of sewer pipe was laid. The town has been free from contagious diseases. One death occurred from drowning, and one person was killed by a runaway horse.

OLD TOWN.

Members of the board: Dr. G. G. Weld, Secretary and Health Officer; A. Rigby, Chairman; E. R. Humphrey.

The following is taken from the printed annual report of the board:

‘During the year about eight miles of water main and pipe have been laid, by means of which and the pumping station located at Old Town Falls, the several sections of the town, including the villages of Upper Stillwater, Great Works and Old Town, are supplied with Penobscot river water. No river in the State of Maine has a better surface-bed or is less affected by heavy rain storms, extreme droughts, viz: sudden and severe rain falls cause no muddy or colored appearance of the water; neither during prolonged drought, is there a lacking in volume of water, and sufficient rapidity of current, for the oxidation of organic impurities. The year 1890 was noted for two short low-water periods. The first period commencing the latter part of the month of May and ending about June 20, and the second period commencing about September 15, and ending the latter part of October. The first period was short and for that season of the year, an unusual and severe low-water period. Three cases of typhoid fever were reported, all of which were fatal. The second period was not extreme in length, or severity of drought, and the three reported fever cases recovered. The presumable places where our six fever cases originated, were Montague, town of Enfield, 1; Pea Cove, Boom House, 2; city of Bangor, 1; Greatworks village, 1; Old Town village, 1. Thus it

may be considered, that only two of our fever cases originated within the limits of the town.

“July 17th, I was notified of the existence of a few diphtheria cases, at the lower part of Old Town village. On visiting the afflicted family, found that a child several months old had died but a few hours previous, and a boy several years old very ill, and who shortly afterwards died from the severity of the disease. The disease in both cases seemed to be unusually virulent. Ordered isolation and thorough fumigation. No new cases were afterwards reported, but learned that several older persons in the immediate neighborhood had had several sore throats, presumably of diphtheritic nature, and the probable source of contagion which proved so fatal to the two children.

“During the past year more interest has been taken in the providing of better accommodations and more healthy surroundings for the several schools of our town, than had been manifested by our citizens for a number of previous years. While about thirteen thousand dollars has been expended upon our school buildings as a whole; the principal part of this amount or about eleven thousand six hundred dollars has been utilized in the construction of a fine and much needed building for the north primary, intermediate and grammar schools. The new building will accommodate from three to four hundred scholars. The Smead system is used to provide heating, ventilating and disposal of sewer matter. Being the first school building in the State to which the system as a whole had been introduced, Feb. 3d, 1891, Dr. J. O. Webster of the State Board of Health, made a thorough test of this system and in points of ventilation, heating and purity of atmosphere, all tests proved very satisfactory.”

ORIENT.

Members of the board: Wm. McAllister, Secretary; W. H. Decker, Chairman; H. H. Bowen.

One nuisance was removed. Pneumonia has been quite prevalent. No cases of contagious diseases are reported, excepting one case of death from “fever,” the case not reported to the board.

ORLAND.

Members of the board: R. P. Harriman, Secretary; Henry Partridge, Chairman; Dr. G. W. W. Whiting, Member and Health Officer.

We have had no cases of infectious disease.

ORNEVILLE.

Members of the board: M. W. Morgan, Secretary; Chas. Hoxie, Chairman; R. G. Herrick.

We have had no cases of contagious diseases excepting one of typhoid fever. One case of drowning.

ORONO.

Members of the board: C. P. Crowell, Secretary; Dr. J. H. Knox, Chairman and Health Officer; U. R. Penney.

Six or seven nuisances were reported to the board, all of which were removed. We have had two cases of diphtheria, three of scarlet fever and several mild cases of typhoid fever. I have no facts to report regarding diseases caused by poisoning or ventilation, unless it is in the high school building where the ventilation is defective and the privy is in the basement. Many persons object to its being there.

ORRINGTON.

Members of the board: Dr. G. B. Tibbetts, Secretary; A. N. Luffin, Chairman; J. D. Hinds.

Diphtheria one case; scarlet fever, five cases, five houses; typhoid fever, three cases, three houses. The board has had the patients isolated, houses placarded, disinfectants used freely, etc. Scarlet fever was introduced into one of the schools; the school was closed at once, the room fumigated and washed with bichloride solution 1:1000, and the ceiling whitewashed with lime. The books infected by the sick ones were burned. Whooping cough has been prevalent.

OTIS.

Members of the board: J. R. Grant, Secretary; Luther Garland, Chairman; W. W. Tibbetts.

We have had no cases of infectious diseases, and but one death in town, that of a very aged lady.

OTISFIELD.

Members of the board: F. J. Sawyer, Secretary; D. L. Brett, Chairman; Sumner Spurr.

We have had two cases of diphtheria one of which was fatal; two houses were infected. Whooping cough has been prevalent.

OXFORD.

Members of the board: Dr. Orrin Stevens, Secretary; G. A. Poor, Chairman; S. D. Edwards.

Three nuisances have been reported. Two were removed and the other one was improved. Diphtheria, three cases, one death, two houses; typhoid fever, six cases, one death, six houses. Whooping cough was prevalent and severe. One case of drowning.

PALMYRA.

Members of the board: C. M. Jewett, Secretary; G. W. Hanson, Chairman; J. B. Chase.

Two nuisances were removed. No cases of contagious diseases have been known to the board, excepting a few of whooping cough in mild form.

PARIS.

Members of the board: Dr. F. H. Packard, Secretary and Health Officer; J. S. Wright, Chairman; Dr. I. Rounds.

Four nuisances reported to the board were removed, at least for the time being. We have had one case of diphtheria and one fatal case of typhoid fever. Whooping cough has been prevalent. An instance came under my observation in which the family used water from a brook which receives the washings from back buildings, and I have no doubt that it was the cause of the death of two persons from typhoid fever. One case of glanders in a horse. The horse was killed.

PARKMAN.

Members of the board: H. O. Ayer, Secretary; Ireson Briggs, Chairman; Dr. J. F. Butterfield, Health Officer.

We have had five cases of scarlet fever; two houses were infected. These cases were thoroughly attended to. They occurred after the outbreak in Guilford and were well marked cases of scarlet fever. Not a symptom was lacking. Undoubtedly the disease was brought here from Guilford, and brought to that town in the clothing of a family that moved from the Provinces.

One serious accident occurred to a man while working in a saw mill.

PATTEN.

Members of the board: Dr. F. F. Bigelow, Secretary; Leroy Miles, Chairman; Dr. B. C. Woodbury.

We have had no cases of infectious disease, except measles and a few cases of German measles. Drainage is needed for improving our sanitary condition. A child was burned to death by its clothes catching fire.

PEMBROKE.

Members of the board: Dr. J. C. Rogers, Secretary; C. W. Hersey, Chairman; E. K. Smart.

Three nuisances were removed. Diphtheria, seven cases, one death, two houses; typhoid fever, four cases, two deaths, three houses. Scarlet fever went through the town in a very mild form. Only one death resulted from it.

PENOBSCOT.

Members of the board: E. A. Sprague, Secretary and Health Officer; John Littlefield, Chairman; J. B. Snowman.

Three nuisances were removed. We have had eight cases of scarlet fever; five houses were infected. A number of the scarlet fever cases had no medical attendance and were not reported. Two drowning accidents and one accident in the woods resulted fatally.

PERKINS.

Members of the board: W. A. Lewis, Secretary; B. F. Curtis, Chairman; T. A. Hinckley.

We have had no cases of infectious diseases.

PERRY.

Members of the board: G. P. Ricker, Secretary; F. L. Gore, Chairman; J. B. Nutt.

We had one fatal case of diphtheria in the person of a young lady who had been visiting at Eastport where diphtheria prevailed. Others were exposed to this case before its nature was known, but fortunately no one else took the disease.

PERU.

Members of the board: A. B. Walker, Secretary; Otis Wyman, Chairman; E. A. Eastman.

We have had nineteen cases of scarlet fever. Seven houses were infected. These cases were very mild.

PHILLIPS.

Members of the board: B. E. Pratt, Secretary; Dr. C. L. Toothaker, Chairman; E. M. Robinson.

Two nuisances were removed. We have had one case of typhoid fever in each of two houses. Pneumonia and German measles prevailed.

PHIPPSBURG.

Members of the board: C. V. Minot, Jr., Secretary; Geo. Duley, Chairman; F. S. Bowker; Dr. W. H. Ferguson, Health Officer.

We have had one case of diphtheria. Whooping cough prevailed, and on account of it, it was deemed advisable to close the schools. The well at a boarding house was subjected to pollution, and, in accordance with the advice of the board, the use of the water from it was discontinued.

On the 22d of January, 1890, a house was burned. It was an old-fashioned brick structure. It seems that the attic was used as a sleeping apartment, and, on the night of the fire, the bed of one of the occupants was found to be afire. All immediately left the attic but, in the hope of saving some of their property, some of them returned, among whom was a boy aged about fifteen. He went off by himself, the others thinking to save the house seized upon the bed and got it stuck in the stairway thus blocking all egress in this direction. There were windows in each of the gable ends, but it seems that these had been boarded up and thus unwittingly the boy was imprisoned. When they got him out he was badly burned about the back, and the flesh was hanging in shreds to his hands. He lived about two weeks after the accident.

PITTSFIELD.

Members of the board: Dr. T. M. Griffin, Secretary and Health Officer; H. C. Pooler, Chairman; David M. Parks.

Six nuisances were removed. We have had two fatal cases of typhoid fever, one in each of two houses. Better sewerage is needed.

PITTSSTON.

Members of the board: John Scott, Secretary.

PLYMOUTH.

Members of the board: Dr. W. H. Merrill, Secretary; S. P. Gifford; J. F. Longley.

We have had no cases of infectious diseases. An epidemic of diarrhœal diseases of children occurred in the latter part of September, immediately after the heavy rainfall.

POLAND.

Members of the board: Dr. E. F. Bradford, Secretary and Health Officer; S. L. Littlefield, Chairman; B. M. Fernald.

Four nuisances were removed. We have had one questionable case of diphtheria and ten cases of typhoid fever. More sewerage is needed.

PORTER.

Members of the board: Dr. E. R. Chellis, Secretary and Health Officer; Daniel Wentworth, Chairman; Amos Blazo.

Three nuisances have been removed. No cases of diphtheria, scarlet fever or typhoid fever. Pneumonia and the diarrhœal diseases of children were prevalent. Bad drainage and the drinking of surface water prevails in some places. As a village, we should improve our supply of drinking water.

PORTLAND.

Members of the board: Geo. C. Burgess, Secretary; Dr. C. D. Smith, Chairman; Dr. A. K. P. Meserve; J. H. Sayward, Inspector.

The new reservoir of 20,000,000 gallons capacity has done good service during the year. There have been built 2,829 feet of new sewers. We have had no unusual trouble or difficulty in securing abatement of nuisances, but a disposition has been shown on all hands to comply with the requests of the board

Diphtheria, thirty-one cases, six deaths; scarlet fever, fifteen cases, one death; typhoid fever, fifty-five cases, three deaths. In connection with cases of contagious diseases infected houses are placarded, the premises are examined by the inspector, the schools and the public library are notified, and circulars of instruction are furnished. Upon the termination of the case and disinfection of the premises, the placard is removed from the house.

From the middle of October to the end of the year there prevailed here a fever resembling typhoid, but lacking some of its

characteristic symptoms. It was a "continued fever" and might perhaps be called atypical typhoid fever. There were many more cases of pneumonia and diarrhœal diseases of children in 1890 than in the preceding year. *La grippe* was very prevalent and largely affected the rate of mortality. In the four weeks ending February 1st, the number of deaths was 101; from pneumonia alone, 24.

Nineteen serious accidents occurred during the year. They were as follows: Burned at a stove, 1; crushed by an iron bar, 1; falls, 6; run over by a carriage, 1; shot, 1; fracture of skull by a blow, 2; drowned, 3; railroad accidents, 2; smothered in bed, 1.

House to house inspections have been continued with good results. The following is a summary of the Health Inspector's report for the year:

No. of formal complaints to Secretary or inspector	230
“ “ vaults found in bad condition	617
“ “ overflowing vaults...	9
“ “ overflowing cess-pools...	4
“ “ cellars in bad condition.. . . .	353
“ “ water closets inspected	906
“ found in good condition	721
“ “ in bad condition	185
“ of swine ordered removed.. . . .	8
“ “ vaults built: no sewer in street...	1
“ “ water closets ordered built...	116
“ “ bad sink-drains, rubbish heaps, filth, etc., ordered fixed or removed...	445
“ “ sinks found without traps	214
“ “ visits made on account of contagious diseases...	100
“ “ vaults found in good condition	109
“ “ cellars found in good condition...	390
“ “ sink-drains found in good condition	658
“ “ yards found in good condition	132
“ “ visits made, unclassified, chiefly to see that orders are carried out or to find parties of whose premises complaint is made...	1,086

POWNAL.

Members of the board; S. A. Vosmus, Secretary; I. S. Brown, Chairman. H. B. True.

We have had one case of diphtheria and one of typhoid fever. We have tried to carry out the advice given by the State Board in dealing with cases of this kind. Whooping cough and pneumonia have been prevalent.

PRENTISS.

Members of the board: J. F. Belden, Secretary; E. E. Butters, Chairman; T. N. Butterfield.

We have had one case of diphtheria and seven of scarlet fever. Measles has been present.

PRESQUE ISLE.

Members of the board: Dr. Frank Kilburn, Secretary; Dr. G. H. Freeman, Chairman; C. P. Allen.

Three nuisances were removed. Scarlet fever, thirty-seven cases, four deaths, ten houses infected; typhoid fever, three cases, two houses. Dysentery was quite prevalent during the month of October, but only one death was reported. Several of the cases appeared to be due to polluted water.

The largest number of cases of scarlet fever occurred in the southern part of the town and were due to importations from Fort Fairfield. One young man who had not fully recovered from the disease visited his parents and a number of other houses in the vicinity, and this caused quite an extensive spread before we were notified.

PRINCETON.

Members of the board: S. G. Spooner, Secretary and Health Officer; James Spencer, Chairman; Henry Heald.

We have had six cases of scarlet fever to the end of the year, and there have been a few cases of pneumonia, two of which among children were fatal.

PROSPECT.

Members of the board: O. B. Gray, Secretary; Geo. Avery, Chairman; G. W. Crockett.

We have had no cases of contagious diseases the past year.

RANDOLPH.

Members of the board: B. A. Cox, Secretary; G. L. Smith, Chairman; Benj. Clark.

Two nuisances were removed. Diphtheria, five cases, one death, three houses. Scarlet fever, two cases, two houses; typhoid fever, one case. Infected houses have been placarded and all proper care has been taken against the spread of these diseases. Whooping cough was quite largely present and there were a few cases of measles. Our cases of contagious diseases have been in some of our best families and in cleanly neighborhoods. One death occurred from an accident in a mill. For the improvement of the village, sewers, sewers, sewers, is the need.

We had one puerperal case of diphtheria which ended fatally. Two other cases of ordinary diphtheria followed in the same house; both of these recovered.

RANGELEY.

Members of the board: Dr. S. A. Ross, Secretary and Health Officer; J. F. Herrick, Chairman; Daniel Hoar.

Two nuisances were removed. We have had no cases of contagious disease.

RAYMOND.

Members of the board: H. M. Cash, Secretary; L. W. Welch, Chairman; Albert Wilson.

One nuisance was removed. Diphtheria, five cases, five houses; typhoid fever one case. In many cases the healthfulness of dwelling houses in this town would be improved by better drainage from the kitchen sink, and by the removal of the privy farther from the dwelling. A young married woman died as the result of swallowing Paris green.

READFIELD.

Members of the board: Dr. E. S. Hannaford, Secretary and Health Officer; Prof. W. F. Morse, Chairman; A. W. Brainerd.

RIPLEY.

Members of the board: A. G. Farrar, Secretary; A. R. Dunlap, Chairman; W. H. Lombard.

We have had no cases of contagious diseases, excepting two or three of whooping cough. Pneumonia has been prevalent. Several animals in the herd of John Nutter were pronounced by the veterinary surgeon to have pneumonia. He has lost two or three head of cattle.

ROBBINSON.

Members of the board: F. R. Leach, Secretary; Alonzo Smith, Chairman; N. E. Campbell.

We have had two cases of diphtheria, one in each of two houses, and one case of typhoid fever. The local board has attended to its duties promptly as soon as notified of each case.

ROCKLAND.

Members of the board: Dr. E. E. Hitchcock, Secretary and Health Officer; Hon. C. E. Littlefield, Chairman; O. H. Tripp.

Several new sewers have been built in accordance with the survey made in 1888. Fifty-six nuisances have been reported, all of which were attended to. We have had no cases of diphtheria or typhoid fever, but a death occurred from scarlet fever. I would suggest for the improvement of the sanitary condition of the city the continuance of work on the sewerage system.

ROME.

Members of the board: L. G. Martin, Secretary; J. E. Farnham, Chairman; G. S. Tibbetts.

We have had one case of typhoid fever, in which we secured the co-operation of the attending physician in advising as to disinfection and the disposal of excreta.

ROXBURY.

Members of the board: A. W. Robbins, Secretary; S. M. Locke, Chairman; John Reed.

No contagious diseases are reported.

RUMFORD.

Members of the board: H. F. Abbott, Secretary; H. M. Colby, Chairman; Wilson Thomas.

SACO.

Members of the board: Dr. L. D. Dennett, Secretary; Dr. J. D. Cochrane, Chairman; Dr. W. T. Goodale.

Our so-called Woodbury brook sewer has been completed. Sixteen nuisances were reported to the board, all of which were

removed. Diphtheria, one case ; scarlet fever, one case ; typhoid fever, three cases ; but no deaths resulted from these diseases.

We have, since June 26, 1890, had forty-seven deaths from the following causes : consumption, 15 ; heart disease, 7 ; pneumonia, 3 ; cancer, 3 ; chronic bronchitis, 1 ; meningitis, 2 ; membranous croup, 1 ; apoplexy, 2 ; paralysis, 3 ; chronic diarrhœa, 1 ; cholera infantum, 3 ; old age, 2 ; infantile weakness, 1 ; unknown, 1 ; total, 47.

SALEM.

Members of the board : Geo. W. Harris, Secretary ; Albert H. Perry, Chairman ; Geo. E. Willis.

One nuisance was removed. We have had one case of typhoid fever.

SANFORD.

Members of the board : Geo. E. Allen, Secretary ; A. B. Sanborn, Chairman ; H. T. Bennett, Dr. J. H. Neal, Health Officer.

The Springvale Water Company has improved and extended their system of water supply. Five nuisances reported to the board were all removed. Scarlet fever, twenty cases, fourteen houses ; typhoid fever, thirty-one cases, four deaths, twenty-one houses. One case of cerebro-spinal meningitis occurred. The typhoid fever has not been confined to any one locality but has prevailed over the entire town. The cause appears to be referable to the unusually wet season of 1890. The cases of scarlet fever were in the village of Springvale. It was of a very mild type and no deaths occurred from the disease. No cause was known, as the utmost caution was exercised in every case by the board.

SANGERVILLE.

Members of the board : H. C. Ford, Secretary ; C. F. Dearth, Chairman ; Dr. C. W. Ray, Member and Health Officer.

Two nuisances were reported to the board, one of which was abated. Diphtheria, two cases, one death, one house ; typhoid fever, one fatal case. More thorough drainage is needed in the village.

SCARBORO.

Members of the board : Dr. J. B. Thornton, Secretary ; B. F. Carter, Chairman ; M. I. Milliken.

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Four nuisances were removed. We had one fatal case of typhoid fever.

SEARSMONT.

Members of the board: J. W. Farrar, Secretary; P. S. Wing, Chairman; Dr. A. Millett.

No cases of contagious diseases.

SEARSPORT.

Members of the board: Dr. E. W. Gould, Secretary; J. G. Pendleton, Chairman; Jos A. Clement.

One nuisance was removed. We have had four cases of small-pox, with one death, and two fatal cases of diphtheria. Prompt isolation and disinfection have been carried out in connection with these cases. The small-pox patients were removed to the pest-house, and all infected houses were disinfected. Two short sewers in the village would improve the condition of things. The two cases of diphtheria occurred in a house with no cellar, and situated in a hollow where there was no drainage and where the surroundings were bad from a sanitary point of view.

SEBAGO.

Members of the board: B. F. Cole, Secretary; Loren Bachellor, Chairman; W. W. Haley.

No cases of diphtheria, scarlet fever or typhoid fever are reported.

SEDGWICK.

Members of the board: M. L. Elwell, Secretary; Dr. R. E. Hagerthy, Chairman; J. W. Penny.

Some improvements have been made in drainage and in disposing of excreta. There have been two cases of diphtheria.

SHAPLEIGH.

Members of the board: Dr. F. A. Bragdon, Secretary and Health Officer; John Pugsley, Chairman; Dr. L. W. Leighton.

Diphtheria, three cases, one house; scarlet fever, ten cases, three houses; typhoid fever, one case. No deaths resulted from these diseases.

SHERMAN.

Members of the board: L. C. Caldwell, Secretary; G. W. Durgin, Chairman; Dr. D. H. Owen.

We have had no cases of contagious diseases. More thorough drainage is needed around many premises and better ventilation of private and public buildings. I think, however, that more interest is now taken in these matters and in regard to the method of disposal of excreta than was formerly the case.

SHIRLEY

Members of the board: Henry Blackstone, Secretary; A. T. Mitchell, Chairman; J. Dennen.

We have had no cases of contagious disease except two of measles. We have also had two cases of pneumonia. I should like to see our little village supplied with water from some of the large springs on the hills, three-fourths of a mile away.

SIDNEY.

Members of the board: Dr. Daniel Driscoll, Secretary and Health Officer; Charles Goodhue, Chairman; Ambrose Sawtelle.

One nuisance has been removed. We had one case of typhoid fever imported into the town. Thorough cleanliness and disinfection were enforced. Whooping cough has been prevalent. With the exception of influenza the year has been a remarkably healthy one. The summer months were free in great measure from the usual bowel difficulties of children.

SKOWHEGAN.

Members of the board: Geo. Cushing, Secretary; Dr. S. A. Patten, Chairman and Health Officer; S. A. Bickford.

We have a perfect water supply and the sewerage was extended the whole length of Court street, besides being built at other points in the town. Eight nuisances have been reported, six of which have been removed. We had an outbreak of diphtheria in which ten cases occurred and four houses were infected. Whooping cough has prevailed.

On account of the outbreak of diphtheria, one school was closed and the building was properly disinfected. Two localities especially are lacking in drainage. One case of drowning and two accidents by burning, one of which resulted fatally.

SMITHFIELD.

Members of the board: W. J. Haynes, Secretary; I. W. Varney, Chairman; C. N. Simonds.

We have had two cases of typhoid fever, one of which ended fatally. Otherwise than these, no cases of contagious diseases have come to our knowledge.

SMYRNA.

Members of the board: A. J. Berry, Secretary; A. P. Daggett, Chairman; H. C. Douley.

SOLON.

Members of the board: S. F. Greene, Secretary; Stephen Merrill, Chairman; Jotham Whipple.

We have had no cases of diphtheria, typhoid, or scarlet fever. No disease has been unusually prevalent except *la grippe*.

SOMERVILLE.

Members of the board: Morrill Glidden, Secretary; A. L. Soule, Chairman; J. E. Bartlett.

We have had no cases of diphtheria, typhoid, or scarlet fever, but whooping cough has been present.

SOUTH BERWICK.

Members of the board: Dr. E. D. Jaques, Secretary and Health Officer; Dr. C. P. Gerrish, Chairman; Dr. G. D. Emerson.

SOUTHPORT.

Members of the board: W. T. Maddocks, Secretary; Albert McKeown, Chairman; Sumner Orne.

SOUTH THOMASTON.

Members of the board: Dr. Geo. C. Horn, Secretary; Capt. E. Tolman, Chairman; John Alexander.

Scarlet fever, five cases in one house; typhoid fever, one fatal case. Two deaths occurred from accidents at sea or on board vessels.

SPRINGFIELD

Members of the board: Dr. P. H. Jones, Secretary; E. C. Ryder, Chairman; C. R. Brown.

ST. ALBANS.

Members of the board: Dr C. A. Moulton, Secretary; N. H. Vining, Chairman; N. B. Turner.

Two nuisances were removed. One case of typhoid fever and one of cerebro-spinal meningitis.

STANDISH.

Members of the board: D. L. Warren, Secretary; M. S. Spear, Chairman; C. D. W. Shaw.

Scarlet fever, eight cases, one death, six houses infected. The infected houses were placarded, infectious children were excluded from the school, and the houses were disinfected.

STARK.

Members of the board: Thos. Buswell, Secretary; B. F. Yeaton, Chairman; J. F. Frederic.

One nuisance was removed. Typhoid fever, four cases, one death, three houses. As soon as I have been notified, I have visited the infected premises immediately and arranged to prevent the spread of the infection.

STETSON.

Members of the board: Dr. J. W. Tibbetts, Secretary and Health Officer; C. W. Wentworth, Chairman; G. M. Bond.

Two nuisances were removed. We have no cases of diphtheria, typhoid or scarlet fever, but there was an epidemic of mumps. Better sewerage is needed in the village.

STEBEN.

Members of the board: B. W. Stevens, Secretary; G. W. Moore, Chairman; M. S. Smith; Dr. S. B. Overlock, Health Officer.

The drainage in Steuben is excellent and the water, except in a few cases, is nearly as pure as can be found in wells.

We have had seven cases of diphtheria and three of typhoid fever, none of which proved fatal. In one case of diphtheria, we excluded from the school all the scholars in the immediate vicinity. One boy seven years old fell between the wheels of a wagon and had his legs so badly broken that he died during amputation.

ST. GEORGE.

Members of the board: Dr. A. Woodside, Secretary; H. F. Kalloch, Chairman; W. H. Mathews.

One nuisance was removed. Scarlet fever, two cases, one house; typhoid fever, two cases, two houses. Whooping cough and pneumonia have prevailed. One death by drowning.

STOCKTON SPRINGS.

Members of the board: Dr. G. A. Stevens, Secretary and Health Officer; J. W. Thompson, Chairman; J. F. Hichborn.

We have had two cases of typhoid fever in one house.

STONEHAM.

Members of the board: W. L. Goodwin, Secretary; N. H. Palmer, Chairman; H. McAllister.

No cases of diphtheria, typhoid, or scarlet fever are reported, but whooping cough was prevalent. Infectious scholars were kept away from the schools.

STOW.

Members of the board: F. E. Guptill, Secretary; O. P. Charles, Chairman; O. R. Barrows.

One nuisance was removed. No cases of diphtheria, typhoid, or scarlet fever. Three cases of measles. Whooping cough was quite prevalent, and we had one case of pneumonia.

STRONG.

Members of the board: J. W. Porter, Secretary; Dr. G. Z. Higgins, Chairman; M. B. Will.

We had one mild case of diphtheria and prompt action was taken to prevent the spread of the infection.

SULLIVAN.

Members of the board: Dr. W. W. Bridgham, Secretary and Health Officer; M. H. Hawkins, Chairman; M. E. Rideout.

Three nuisances were reported. Diphtheria, one case; scarlet fever, three cases, two houses. Whooping cough and the diarrhoeal diseases have been prevalent. I think if the cases of diphtheria and scarlet fever had not been under the care of the local boards

of health of Franklin and Sullivan, we would have seen a repetition of those scourges which formerly visited them. By prompt action they were checked at once and restricted to narrow limits.

SUMNER.

Members of the board: Sharon Robinson, Secretary; L. H. Bisbee, Chairman; Dr. C. M. Bisbee, Health Officer.

Scarlet fever, four cases, one house; typhoid fever, one case. Whooping cough was prevalent.

SURRY.

Members of the board: Dr. W. E. Emery, Secretary and Health Officer; Aug. Milliken, Chairman; D. G. Means.

One nuisance was removed. Diphtheria, three cases, one house; scarlet fever, five cases, two houses; typhoid fever, seven cases. No deaths resulted from these diseases. The places where diphtheria and scarlet fever occurred were visited, the houses placarded, isolation provided for, and persons, clothing, and rooms disinfected. Whooping cough has prevailed.

SWANVILLE.

Members of the board: H. E. Greeley, Secretary; C. M. Marden, Chairman; Z. L. Downs.

No cases of contagious diseases reported.

SWEDEN.

Members of the board: W. H. Gordon, Secretary; O. R. Maxwell, Chairman; Elden Brown.

We have had no cases of diphtheria, typhoid or scarlet fever and no disease has been unusually prevalent.

TALMAGE

Members of the board: F. R. Neal, Secretary and Chairman; H. F. Dunsmore; G. W. Witham.

TEMPLE.

Members of the board: S. R. Norton, Secretary; L. H. Farmer, Chairman; G. W. Staples.

No contagious diseases have been reported.

THOMASTON.

Members of the board: Dr. H. C. Levensaler, Secretary and Health Officer; J. H. H. Hewitt, Chairman; Dr. J. E. Walker.

Five nuisances were reported to the board, the most of which were removed. The worst of the nuisances has been the spreading of offal from slaughter houses on land to the annoyance of near residents, and the carrying of dead animals on fields and leaving them unburied. Scarlet fever, four cases; typhoid fever, two cases. The diarrhœal diseases of children were quite prevalent. A thorough system of sewerage is required. Efforts were made at the annual meeting to establish such a system, but the town voted it down. One case of lead poisoning contracted at sea produced really locomotor ataxia in all its symptoms. Recovered.

THORNDIKE.

Members of the board: V. N. Higgins, Secretary; J. C. Whitney, Chairman; R. S. Ward.

We are happy to say that Thorndike has been a very healthy town. No cases of contagious diseases.

TOPSFIELD.

Members of the board: C. T. Day, Secretary; W. H. Littlefield, Chairman; L. Tupper.

TOPSHAM.

Members of the board: J. C. Purington, Secretary; R. P. Whitney, Chairman; D. S. Colby.

Five nuisances were removed. Typhoid fever, three cases, one death. Pneumonia was quite prevalent. On account of the prevalence of rabies, we posted a notice in the latter part of June, that all dogs without a muzzle would be shot by the police. The requirement of muzzling was very fully complied with, and we only had one mad dog, which was promptly shot. Muzzles were ordered off September 1st.

TREMONT.

Members of the board: Dr. W. A. Spear, Secretary; James T. Clark, Chairman; J. H. Gilley.

Five nuisances were removed. We have had no cases of diphtheria or typhoid fever, and only one of scarlet fever. Pneumonia has been prevalent.

TRENTON.

Members of the board: K. K. Thompson, Secretary; W. G. Bunker, Chairman; D. B. Alley.

We have had no cases of contagious diseases excepting whooping cough in a mild form.

TRESCOTT.

Members of the board: John Sanders, Secretary; W. H. Leighton, Chairman; S. A. Wilcox.

We have had no cases of diphtheria, typhoid or scarlet fever. Pneumonia was more prevalent than usual

TROY.

Members of the board: Dr. M. T. Dodge, Secretary; O. B. Rhoades, Chairman; John Woods.

We have had no cases of contagious diseases. Pneumonia was unusually prevalent, fifteen cases occurring with one death. One death resulted from a gun shot, and one from a falling tree. A case of lead poisoning occurred in a young man learning the carriage painter's trade. Recovery.

TURNER.

Members of the board: Dr. Roscoe Smith, Secretary; J. H. Conant, Chairman; H. C. Haskell.

One nuisance was abated. Diphtheria, thirty-one cases, fifteen houses infected; typhoid fever, one case. Whooping cough has been prevalent.

On the 5th of October the board of health was notified that there were four cases of diphtheria in two families in the north part of the town. The members of the board immediately went to the place and found two patients in each family suffering with diphtheria. The houses were placarded, circulars treating of diphtheria were left with the family, the necessary instructions were given them, and the importance of carrying out to the letter the requirements of the quarantine, and, lastly, thorough fumigation of the premises and clothing, and washing the whole cutaneous surface were made particularly prominent.

Our attention was now directed to the origin of the disease. We found, in the families of the near neighbors, a little girl, who, while

on a visit in the state of Massachusetts was sick with sore throat and who, on her recovery returned home. Soon after her arrival, a brother had sore throat which lasted a few days. Not suspecting the nature of the disease a physician was not called. The children in these two families now suffering with diphtheria, had, a few days before they were taken sick, visited this family and played with these children who had just recovered from an attack of sore throat. The children now sick were attending school in a small building some two and a half miles from their home, and were at school when their throats commenced to be sore. The school was immediately closed. Three days after the attack of these children, the teacher and six of his pupils were attacked, representing as many different families. The same disposition was made of them as of the first families. They were isolated; no one but the nurse was allowed to go into the room where they were sick. The quarantine was so scrupulously enforced that, from these last cases, there were but two other families in the village and the vicinity that took the disease.

From the families that first had the disease, it spread into other families; but its communication can be easily traced, and the main reason of this spread was a lack of strict isolation which was due to a lack of hearty co-operation of the attending physician. But by a persistent effort on the part of the board of health, the disease had been so thoroughly surrounded by safeguards that its further spread was impossible, and its career was ended. There have been twenty-nine cases without a single death. The type was mild. These cases were not treated by one physician, but there were four. I have no doubt that the cases were diphtheria.

UNION.

Members of the board: B. Buxton, Secretary; E. R. Daniels, Chairman; A. J. Young.

Diphtheria, one fatal case; scarlet fever, two cases; typhoid fever, five cases, two deaths.

UNITY.

Members of the board: Dr. Jas. Craig, Secretary; John Perley, Chairman; B. F. Kelley.

We have had no cases of contagious diseases. Pneumonia was very prevalent. A better water supply is needed in many places,

and the drainage of one place where stagnant water stands would effect an improvement.

UPTON.

Members of the board: F. B. Brooks, Secretary; H. T. Chase, Chairman; H. M. Lambard.

We have had no cases of contagious disease.

VANCEBORO.

Members of the board: C. A. Sterling, Secretary; Capt. Chas. Cobb, Chairman; Geo. H. Peva; Dr. M. L. Young, Health Officer.

Ten nuisances were reported all of which were removed. We have had eighteen cases of scarlet fever, distributed in six houses. No deaths resulted from them. If possible the isolation of these cases was secured; if not, the house was quarantined, placarded, and disinfection carried out. Rheumatic fever was more prevalent than usual, as also were pulmonary diseases following influenza.

The outbreak of scarlet fever originated obscurely. I learned of two children being sick for a day or two and then returning to school. I went to the school-room and found them in the stage of desquamation. The school was closed, but four houses were infected nearly simultaneously. This occurred in June. In September, a dance was held in a private family, and a visitor to the village attended. This was followed by another epidemic, as the visitor, I have since learned, came direct from an infected house, transporting the contagion about fifty miles.

VASSALBORO.

Members of the board: Dr. G. L. Randall, Secretary; C. S. Stilson, Chairman; Dr. C. Mabry.

Scarlet fever, four cases, two houses; typhoid fever, three cases, three houses. When cases of contagious diseases have been reported, the action of the board has been prompt, decisive, and thorough.

The inhabitants of this town have shown a willingness to help the local board all they can, with one exception. They are cleanly in their habits, intelligent, and seem to have a large degree of sanitary knowledge. The secretary has kept the citizens supplied with useful information received from the State Board of Health which

has been timely and valuable. There is an urgent need of the thorough re-vaccination of this town.

VEAZIE.

Members of the board: L. H. Parke, Secretary; J. B. Skinner, Chairman; A. J. Spencer.

Large improvements have been made in water supply, drainage, and sewerage. Three nuisances were removed without expense to the town. No cases of infectious diseases have been reported. Several cases of pneumonia, but none fatal, and one fatal case of cerebro-spinal meningitis. Two accidents occurred by falling, one from a building, resulting in broken ribs, the other on the ice, fracturing the leg. A boy was accidentally shot and instantly killed.

VERONA.

Members of the board: A. H. Whitmore, Secretary; Jos. Allen, Chairman; Peter Allen.

We have had no cases of diphtheria, typhoid, or scarlet fever

VIENNA

Members of the board: L. C. Davis, Secretary; H. Porter, Chairman; Elbridge Allen.

Four nuisances were reported all of which were removed. Typhoid fever occurred in two houses, with three cases, but no deaths resulted.

VINALHAVEN.

Members of the board: Dr. F. A. Smith, Secretary; J. A. Babbige, Chairman; O. H. Lewis.

One nuisance was removed. We have had sixteen cases of scarlet fever with one death, and two deaths from pneumonia. *La grippe* was very severe and two deaths were caused by it. We need better sewerage, but the soil in many places is not deep enough to lay a sewer below the frost. The people here are quite ready to do anything to improve the sanitary condition of their premises.

WAITE.

Members of the board: J. C. Neale, Secretary; J. B. Phelps, Chairman; Joseph Bagley.

Scarlet fever, three cases, two deaths, one house; typhoid fever, one case. There was one fatal case of pneumonia.

WALDO.

Members of the board: G. C. Harding, Secretary; A. J. Simons, Chairman; J. D. Webster.

One nuisance was removed. Scarlet fever, two cases, one house. No other diseases have been unusually prevalent.

WALDOBORO.

Members of the board: F. M. Eveleth, Secretary; C. P. Hovey, Chairman; E. Farrington.

We have had one case of scarlet fever and one of typhoid. Measles prevailed as an epidemic with a few cases of pneumonia following, but with no deaths.

WALES.

Members of the board: B. Hodsdon, Secretary; A. M. Donnell, Chairman; T. T. Jenkins.

One nuisance was removed. We have had one case of scarlet fever. In this case the family was informed of the danger of spreading the disease, what to do to prevent it, and how to have the house and clothing cleansed. Some of the school-house privies need attending to. We would suggest for the improvement of the sanitary condition of the town, the reading of the *Sanitary Inspector* and the heeding of its instructions.

WALTHAM.

Members of the board: Hannah S. Fox, Secretary; M. Haslam, Chairman; Alden Haslam.

We have had no cases of contagious diseases.

WARREN.

Members of the board: Dr. J. M. Wakefield, Secretary and Health Officer; W. O. Counce, Chairman; B. B. Libby.

Two cases of diphtheria occurred in two houses and typhoid fever in four, two deaths resulting from the latter disease. Pneumonia was unusually prevalent. Pure water and better drainage are

needed. The people are always ready to assist the local board in the discharge of its duties.

WASHBURN.

Members of the board: Dr. P. J. Conroy, Secretary and Health Officer; C. L. Stoddard, Chairman; A. W. Stratton.

Two nuisances were removed. Scarlet fever, fifteen cases, four deaths, ten houses; typhoid fever, six cases. Drainage is needed in some places, and better water than that obtained from the shallow wells. One girl was nearly burned to death by her dress catching fire after it had been saturated with kerosene.

WASHINGTON.

Members of the board: T. S. Bowden, Secretary; J. F. Davis, Chairman; E. A. Sidlinger.

Two nuisances have been removed. Typhoid fever, five cases, two deaths, two houses; pneumonia has been unusually prevalent. Better ventilation is needed, especially of school-houses. One citizen was thrown from a wagon, resulting in a fractured leg, necessitating amputation. Another person fell from a building and broke his leg, but recovered.

WATERBORO.

Members of the board: C. W. Patterson, Secretary; Dr. J. T. G. Emery, Chairman and Health Officer; George P. Chase.

We have had no cases of diphtheria, scarlet fever, or typhoid fever. Several cases of pneumonia occurred and a large number of children have had chicken-pox. A bad accident occurred by the explosion of a gallon can of boiling coffee into a man's face. Several persons were cut by saws in the mills.

WATERFORD.

Members of the board: C. L. Wilson, Secretary; Dr. C. M. Coolidge, Chairman; Melville Monroe.

We have had no cases of diphtheria, scarlet fever, or typhoid fever.

WATERVILLE.

Members of the board: C. R. McFadden, Secretary; Dr. M. H. Holmes, Chairman; G. A. Alden; Dr. F. C. Thayer, Health Officer.

Our system of sewerage has been extended, and is now first-class in nearly all the streets of the city. No nuisances have come under our observation, excepting those caused by sink spouts and privy vaults. Many of these have been removed. Diphtheria, six cases, four deaths, six houses. One death occurred from drowning.

WAYNE.

Members of the board: Dr F. L. Chenery, Secretary; Dr. C. H. Barker, Jr., Chairman; W. Jennings.

We have had no cases of diphtheria or scarlet fever, but have had one fatal case of typhoid fever.

WEBSTER.

Members of the board: J. G. Jordan, Secretary; A. J. Larrabee, Chairman; T. C. Billings.

Some improvements have been made in drainage at the village. One nuisance was removed. We have had no cases of contagious diseases, except whooping cough. Pneumonia was quite prevalent.

WELD.

Members of the board: Dr. C. E. Proctor, Secretary and Health Officer; A. E. Houghton, Chairman; L. L. Jones.

We have had one case of diphtheria. Pneumonia was quite prevalent and German measles and whooping cough early in the year. Better water supplies and drainage would effect sanitary improvements.

WESLEY.

Members of the board: Samuel Hawkins, Secretary; Jeremiah Driscoll, Chairman; J. W. Day.

There was one case of typhoid fever.

WESTBROOK.

Members of the board: H. K. Griggs, Secretary; Dr. A. H. Burroughs, Chairman; H. T. Clark.

Ten nuisances were reported, nine of which were removed. Diphtheria, eight cases; six houses; scarlet fever, seven cases; typhoid fever, thirteen cases. These cases have received immediate attention, isolation is enforced, houses are placarded, circulars

of instruction left, and fumigation and disinfection done at the proper time.

Between the villages of Saccarappa and Cumberland Mills there is a flat piece of ground which has been built over within a few years. I suppose building lots were bought there because they were cheap. The cellars are usually wet; in fact it is a difficult locality to drain. The result is that typhoid fever finds its home there nearly every season. When the expense from loss of time and doctor's bills are taken into account, there is no economy in building on low, wet ground, even if the lot is gratuitous.

Last spring the town voted \$5,000 for sewers and drains to be expended by the selectmen, subject to the recommendation of the board of health.

WEST GARDINER.

Members of the board: S. M. Pinkham, Secretary; D. E. Merrill, Chairman; W. P. Haskell.

There were no cases of diphtheria, scarlet fever, or typhoid fever, but pneumonia and whooping cough were prevalent, and there were a good many cases of *la grippe*. One case of drowning.

WESTON.

Members of the board: Geo. W. Brannen, Secretary; Geo. Moody, Chairman; Greenlief Marble.

There have been no cases of contagious diseases. Our town has been unusually healthy the past year.

WESTPORT.

Members of the board: S. P. Webber, Secretary; Jas. Thomas, Chairman; Wilmot Greenleaf.

We have had one fatal case of typhoid fever.

WHITEFIELD.

Members of the board: Dr. W. Johnson, Secretary and Health Officer; C. J. Skehan, Chairman; E. C. Jewett.

There were no cases of diphtheria, scarlet fever or typhoid fever. Whooping cough and pneumonia have prevailed, and there were cases of influenza in nearly every house in town.

WHITING.

Members of the board: W. I. Crane, Secretary; A. M. Crane, Chairman; Judson Hall.

We have had no cases of contagious diseases.

WHITNEYVILLE.

Members of the board: W. M. Flynn, Secretary; D. W. Rollins, Jr., Chairman; M. E. Bridgham.

Scarlet fever, three cases, two outbreaks, two houses infected. The infected houses were placarded, school teachers notified and suggestions as to proper management offered. Influenza was quite prevalent, but generally in a mild form. To improve the sanitary condition of the town I would suggest the dry earth closet for the old time privy, and better house and stable drainage. The only accident which occurred was the instant death of one man by lightning. A throat and head disease has been somewhat prevalent among horses.

WILLIAMSBURG.

Members of the board: A. Merrill, Secretary; M. W. Kenison, Chairman; L. T. Pitman.

We have had no cases of the contagious diseases, except one case of influenza which proved fatal.

WILLIMANTIC.

Members of the board: F. Hart, Secretary; E. Floyd, Chairman.

One nuisance was removed. We have had no cases of the infectious diseases. Influenza was quite prevalent, but generally in a mild form. A young man, twenty years old, had one hand slightly bruised in taking care of his horse, and got cold in it and died in a few days with what was called blood poisoning.

WILTON.

Members of the board: Dr. A. B. Adams, Secretary and Health Officer; J. T. Wilkins, Jr., Chairman; F. F. Noyes.

We have had two cases of typhoid fever. We had a large number of cases of influenza.

WINDHAM.

Members of the board: Dr. I D Harper, Secretary; Dr. A. N. Witham, Chairman; C. A. Nichols.

Three nuisances were removed. We have had three cases of diphtheria, and three cases of typhoid fever with one death. Whooping cough was prevalent, and *la grippe* affected the majority of the people. One school was closed one week on account of whooping cough. A man was killed in the pulp mill at South Windham. One cow died of tuberculosis.

WINN.

Members of the board: A. L. Hall, Secretary; W. F. Lovejoy, Chairman; Jas. Rice; Dr. F. W. Merrill, Health Officer.

There have been no cases of the infectious diseases. Pneumonia was prevalent.

WINSLOW.

Members of the board: J. W. Bassett, Secretary; B. F. Towne, Chairman; Geo. S. Lernerd.

One nuisance was removed. We have had no cases of contagious diseases.

WINTERPORT.

Members of the board: Dr. C. F. Atwood, Secretary; John R. Carleton, Chairman; Dr. A. R. Fellows.

Diphtheria, three cases, two houses. The houses were placarded, State Board literature was circulated in the neighborhood, communication was prohibited, and scholars from the infected houses kept home from school. The experience of our board has not suggested any changes which ought to be made in the health laws of the State, but we would *insist* that the present law be rigidly, but carefully enforced.

WINTHROP.

Members of the board: Dr. C. A. Cochrane, Secretary and Health Officer; C. A. Wing, Chairman; G. R. Smith.

Three nuisances were removed. We have had no cases of diphtheria, scarlet fever or typhoid fever. Measles and whooping cough have been prevalent. Better drainage is needed in some portions of the village.

WISCASSET.

Members of the board: W. F. Merrill, Secretary; J. G. Somes, Chairman; Dr. B. R. Brown, member and Health Officer.

Two nuisances were removed. Two fatal cases of diphtheria occurred in one house. A system of sewerage and water works are needed.

WOODLAND.

Members of the board: R. W. Withee, Secretary; D. A. Snowman, Chairman; A. J. Johnson.

We have had no cases of diphtheria, scarlet fever or typhoid fever. The year has been noted for its healthfulness.

WOODSTOCK.

Members of the board: Dr. C. B. Rankin, Secretary; Isaac Andrews, Chairman; A. L. Rowe.

One nuisance was removed. Two cases of typhoid fever occurred in one house. Whooping cough has prevailed extensively. There have been more accidents than for many years before, but only one of them resulted fatally, that a gunshot wound at the base of the brain in a boy fifteen years old.

YARMOUTH.

Members of the board: R. Harding, Secretary; Dr. W. W. Thomas, Chairman; Charles T. Grant.

We have laid 1,175 linear feet of fifteen inch vitrified stone drain pipe on Main street. This empties into Mr. George W. Hammond's sewer pipe starting from Main street and running into Royal river. Seven nuisances were abated.

Diphtheria, eight cases, five deaths, two houses; scarlet fever, two cases, no deaths, one house; typhoid fever, four cases, two deaths, three houses. On receipt of a notice from the attending physician I have immediately visited the house, inspected the premises, and carried out the instructions of the State Board of Health as set forth in their blanks and circulars.

YORK.

Members of the board: Dr. W. L. Hawkes, Secretary and Health Officer; G. W. S. Putnam, Chairman; Frank Ellis.

Five artesian wells have been drilled for water supply. Four nuisances were removed. We have had no cases of diphtheria, scarlet fever or typhoid fever, but one case of typhoid pneumonia occurred.

Orders and By-Laws of Local Boards of Health, or Extracts from Them.

PORTLAND.

Orders of the board of health of the city of Portland, Maine. Approved by William Wirt Virgin, one of the justices of the Supreme Judicial Court.

1. On and after the first day of June, 1887, no person shall be allowed to construct any privy vault, cess-pool, or any other receptacle or conductor for drainage, for filth of any kind, within any locality within the city limits, where access can be had for drainage to a public sewer. When, upon proper complaint made in writing to the board of health, any privy vault, cess-pool, receptacle or conductor constructed and maintained prior to the adoption of these orders, shall, after careful and thorough investigation, be adjudged by the board of health to constitute a nuisance or a source of danger to the public health, such privy vault, cess-pool, receptacle or conductor, shall forthwith be discontinued and abolished, when the premises upon which said nuisance exists can be connected with a public sewer.

When such nuisances exist in localities unprovided with proper street sewers, such disposition shall be made of them as the board of health may determine.

2. Whenever any reasonable complaint is made regarding the keeping of any swine within the city limits, the Inspector shall order said swine to be removed.

3. Any accumulation of refuse matter, such as swill, waste of meat, fish or shells, bones, decayed vegetables, dead carcasses, excrement, or any kind of offal which may decompose and generate disease germs or unhealthy gases, and thus affect the purity of the air in the immediate vicinity of any dwelling house or place of business, shall be considered a nuisance, and must be removed or

disposed of either by burial, burning or otherwise, and in such manner that it may not be offensive to the neighborhood wherever located.

4. No diseased animal or its flesh, and no decayed meat, fish, vegetables or fruit, or impure or adulterated milk nor any impure or adulterated articles used as food, shall be sold or offered for sale as food.

Chapter 123, Public Laws of 1887.

SECT. 26. Any person who shall willfully violate any of the provisions of this act or of said regulations and by-laws the penalty for which is not herein specifically provided for—and any person who shall willfully interfere with any person or thing to prevent the execution of the provisions of this act or of said regulations and by-laws, shall be guilty of a misdemeanor; and upon conviction thereof shall be subject to a fine not more than fifty dollars.

Adopted May 20, 1887.

Order of the board of Health of the City of Portland, Me. Adopted Sept. 25th, 1890. Approved by Wm. Wirt Virgin, Justice of the Supreme Court, October 3, 1890.

All shops, stores or buildings used, occupied or let for the purpose of manufacture or trade, shall be furnished with suitable and sufficient water closets and urinals, which in respect to their construction and supply of water shall be satisfactory to the board of health; and any person or persons who shall use, occupy or let any building or tenement in which trade or manufactures are carried on, and shall not furnish the same with suitable and sufficient water closets and urinals satisfactory to the board of health, shall be subject to a penalty of five dollars for each offense, and five dollars additional for each month that the offense shall be allowed to continue.

AUBURN.

Be it ordained by the mayor, aldermen and common council of the city of Auburn, as follows:

That Chapter VIII, of the Revised Ordinances be amended by adding thereto the following section, viz:

SECT. 14. Wherever there is an adequate public sewer or drain built or maintained by the city of Auburn in any of the streets, alleys or lanes thereof, if the Board of Health, or a majority

thereof, shall be of opinion and shall so adjudge that the waste water, slops and human excreta upon, and incident to the use of, any building or buildings or premises, on lots contiguous to any of said streets, alleys or lanes in which is any such sewer or drain, but not connected with such sewer or drain through proper and authorized plumbing, are offensive to sight or smell, or dangerous to life or health, the owner or owners of such house or premises shall forthwith connect said house or premises with said sewer—and shall thereafter drain all wash water, waste water, slops and human excreta from said building or premises into said sewer. And any such owner or owners, who after thirty days notice in writing from the Board of Health, that said waste water, slops and human excreta are offensive to sight or smell, or are dangerous to life or health, and that he or they must forthwith connect said house or premises with said sewer or drain, shall fail or neglect to make such connection in a manner satisfactory to the Board of Health; or if such connection has been made shall thereafter fail or neglect after such notice to cause all wash water, waste water, slops and human excreta to be drained from said building or premises into and through said sewer, shall forfeit and pay for each week's failure or neglect, not exceeding twenty dollars to be recovered in an action of debt for the use of the city.

PLUMBING AND HOUSE DRAINAGE

1. Before proceeding to construct any portion of the drainage system of a building, the owner, builder or person constructing the same shall file with the board of health a plan thereof showing the whole drainage system, from its connection with the common sewer to its terminus in the house, together with the location and sizes of all branches, traps, ventilating pipes and fixtures, and no such work shall be done in any building without the approval of said board of health.

2. All soil pipes shall be carried at their full size, at least two feet above the roof and left open.

3. All drains now built shall be reconstructed, whenever in the opinion of the board of health it may be necessary.

DEERING.

Orders of the Board of Health of the town of Deering, Maine.
Adopted May 26th, 1890.

1. No sink, bath tub, water closet, privy, cess-pool or place of accumulation of offensive liquid matter, shall be allowed to drain into any lane, street or highway.

3. No night soil, sewage, contents of privy vaults or cess-pools, or other noisome substance, shall be deposited in any place, or used as manure or fertilizer in such way or manner, as shall be detrimental to life or health, or offensive to the neighborhood wherever located.

4. Whenever a privy vault shall have been removed by order of the board of health, or otherwise, the premises shall be supplied with suitable water closet which, in respect to its water flush, shall be satisfactory to the board of health.

EDDINGTON.

SECT. 1. A public funeral shall not be held for any person who has died of scarlet fever, diphtheria, small-pox, cholera or typhus fever; and the body of any person who has died of any of these diseases, shall neither be brought within nor carried without the jurisdiction of this board without permission in writing from the board, nor shall there be a disinterment of any such body after it has once been buried, without the written permission of the board.

SECT. 2. No dead animal shall, within the jurisdiction of this board, be put into any river, well, spring, cistern, reservoir, stream or pond; nor shall any live animal be put into any river, well, spring, cistern, reservoir, stream or pond for the purpose of drowning and allowed to remain in said waters; nor shall any dead animal be allowed to decay upon the surface of the earth within the jurisdiction of this board.

MASON.

By-laws of the town of Mason relating to public health. Adopted June 20th, 1887.

RULE 5. No privy shall be located so as to affect the purity of any well or spring of water used for drinking or cooking purposes, and all privies shall be cleaned out at least twice each year, on, or before the first day of June and the first day of November.

RULE 6. All sinks shall be so drained as not to endanger the purity of any well or spring of water, and no sink drain shall leave its deposit sufficiently near any dwelling as to make the air unhealthy.

RULE 7. All cellars must be properly cleaned once each year, on or before the first day of June, of all decaying vegetables or impure collections.

NORTHPORT.

Rules and regulations of the local board of health of Northport. Adopted August 4, 1887.

The frequent throwing out of dirty water or other liquids in any place so as to cause an offensive condition of the premises, or the collection of refuse matter in or around the immediate vicinity of any dwelling house, cottage, tent, or place of business, such as swill, waste of meat, fish or shells, bones, decaying vegetables, dead carcasses, excrement, or any kind of offal that may decompose and generate disease germs or unhealthy gases, and thus affect the purity of the air or contaminate the water of any well, shall be considered nuisances of the worst kind and must be discontinued and the offensive substances removed, or disposed of by burial, burning or otherwise, and in such manner as not to be offensive to the neighborhood wherever located.

Copies of the orders or by-laws adopted by many other local boards of health in this State have been received, but they are based on the model by-laws suggested by the State Board, are duplications of some of the foregoing, or our later State legislation has rendered them needless.

ASBURY PARK, N. J.

Sanitary code of the borough of Asbury Park, N. J. Adopted March 22, 1887.

SECT. 6. Every physician shall report to this board, in writing, the name, age and address of every person having scarlet fever, diphtheria, membranous croup, dysentery, measles, small-pox, varioloid, cholera, typhoid fever, typhus fever, yellow fever or any other contagious or infectious or communicable disease, publicly declared by this Board to be dangerous to the public health, whom such physician shall have professionally attended or prescribed for; said report to be made within twelve hours after such physician has first professionally attended such sick person. Said reports shall

be written on blank forms provided by this Board, and said reports shall be furnished subject to the provisions of section 14 of the rules and regulations of this Board. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of one hundred dollars.

SECT. 7. Every physician shall report in writing the name, age, and address of any person who shall have died of any of the diseases mentioned or referred to in the foregoing section, within three hours after he shall have been informed of said death, and such report shall be independent of the regular certificate of death required by law. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of twenty-five dollars.

SECT. 8. No principal, teacher or superintendent of any school, and no parent or guardian of any child attending any school, shall permit any child sick with any disease mentioned in Section 6, or with any other communicable disease, or any child residing in any house in which such disease shall exist, to attend any school until this Board shall have given its permit therefor. Any person or persons offending against any of the provisions of this section shall forfeit and pay a fine of twenty dollars.

SECT. 9. Whenever it shall be deemed necessary by this board to establish the true character of any disease which they may believe to be communicable, a medical examination of the person or persons affected by such disease may be ordered, and such examination shall be permitted by all attendants and persons. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of fifty dollars.

SECT. 10. In case infectious or contagious or communicable disease occurs in this borough, the person affected thereby shall at the discretion of this Board, be isolated or they may be removed to such locality as this Board may order and direct; and all buildings, clothing, property and premises and vehicles which may become infected by the presence of persons affected by contagious, infectious or communicable disease shall be disinfected at the expense of the tenant, occupant or owner thereof, and said disinfection or fumigation shall be made and performed in such manner and with such materials and within such stated time and under such supervision as this Board may direct. And this Board may establish such separation and isolation or quarantine of the sick from other

persons not necessary as attendants, and also provide and effect such special care, disinfection and cleansing of property and premises as shall, in the judgment of the Board, be needed in order to prevent the spreading of such diseases to other persons. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of fifty dollars.

SECT. 11. Whenever quarantine or isolation and separation of persons or property is ordered by this Board, notice of said order shall be given to the persons affected thereby. Said notice shall be in writing and it may be served personally, or it may be posted upon the building or premises occupied by the infected persons or property. The requirements of said quarantine notices shall be obeyed by all persons, and no such notice nor any other sign indicating the presence of communicable disease upon any premises shall be removed except by consent of this Board. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of one hundred dollars.

SECT. 12. No person or article liable to propagate a communicable disease shall be brought within or removed from the limits of the borough of Asbury Park without the written permit and under the direction of the board of health thereof; and whenever it shall come to the knowledge of any person that such person or article has been brought within such limits, he shall immediately give notice thereof to the said board. No person shall, within the borough of Asbury Park, without a permit from the board of health therefor, carry or remove from one building to any other, any person sick of any communicable disease, nor shall any person by any exposure of any individual sick of any communicable disease, or of the body of such person, or by any negligent act connected therewith, or in respect to the care or custody thereof, or by a needless exposure of himself, cause or contribute to, or promote the spread of any communicable disease. Any owner, lessee or tenant of any dwelling in which there shall occur a case of communicable disease, shall immediately notify the board of health of the same, and until instructions are received from the said board, shall not permit any clothing or other property that may have been exposed to infection to be removed from the house. Nor shall any occupant of such a house change his residence elsewhere without the consent of the said board during the prevalence of any public danger from said disease; and all attendants upon any person sick with small-pox,

typhus, typhoid or scarlet fever, diphtheria, cholera or other disease dangerous to the public health, shall forthwith report the same to the board of health. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of fifty dollars.

SECT. 13. That when death has been caused by communicable disease, no dead body of any human being shall remain unburied for a longer time than twenty-four hours without a permit from this board. When death has been caused by communicable disease the body shall be immediately thereafter disinfected in such manner as may be directed by this board, and inclosed in an air-tight coffin, which shall not thereafter be opened, and the funeral of such persons shall be strictly private, and in the removal thereof for burial or otherwise hearses only shall be employed. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of fifty dollars.

SECT. 14. Every person having authority to solemnize marriages, shall transmit to the board of health of this borough, a certificate of every marriage solemnized before him, within ten days next thereafter, and said certificate shall be made out on the blank forms furnished by this board for that purpose, and shall include all facts required by said forms. Any person or persons violating the provisions of this section shall forfeit and pay a penalty of twenty-five dollars.

SECT. 15. It shall be the duty of the physician or midwife present at the birth of every child born in this borough, and in case there is no physician or midwife present, it shall be the duty of the parent or witness present at such birth, to report in writing to the board of health of this borough, all particulars concerning said birth and called for on the blank forms furnished by this board for that purpose, and said report shall be made within ten days next after the date of said birth. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of twenty-five dollars.

SECT. 16. No undertaker or other person shall bury in, or bring into, or remove from this borough the dead body of any person without first having received from the board of health of this borough a permit to do so; said permit shall be granted only upon presenting to the said board the certificate of death, which shall be in accordance with the requirements of the following section, or

which shall be given by one of the coroners of the county of Monmouth. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of twenty-five dollars.

SECT. 17. That in the case of any person dying within this borough, it shall be the duty of the physician who may have attended during the last illness, to furnish the undertaker or any member of the family a certificate of death, which certificate shall be made out on and shall comprise all the facts stated in the blank forms furnished for that purpose by this board. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of twenty-five dollars.

SECT. 39. No person shall slaughter any swine, sheep or goats, nor any cattle within the limits of this borough until a permit therefor is first obtained from this board. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of ten dollars.

SECT. 40. No animal affected with an infectious or contagious disease shall be brought or kept within the limits of this borough, except by the written permission of the board of health. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of fifty dollars.

SECT. 41. No person shall allow any cattle, swine, goats or fowls to run at large in the borough; and no person shall keep or permit to be kept any swine, cows, goats or fowls without a permit to do so from this board. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of twenty dollars.

SECT. 46. No person shall let or occupy, or suffer to be occupied separately as a tenement, any cellar or underground room whatsoever, unless the same be in every part thereof at least seven feet in height, measured from the floor to the ceiling thereof, nor unless the same be for at least three feet of its height above the surface of the street or ground adjoining or nearest to the same, nor unless there is a clear space of not less than one foot below the level of the floor, except where the same is cemented, nor unless the same have at least one external window opening of not less than nine superficial feet for every one thousand cubic feet of space, in which window opening there shall be fitted a frame filled in with glazed sashes, at least four and a half superficial feet of which shall be made so as

to open for the purpose of ventilation. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of fifty dollars.

SECT. 47. Every tenement house, and every part thereof, shall be kept clean and free from any accumulation of dirt, filth, garbage or other matter in or on the same, or in the yard, passage, area or alley connected with or belonging to the same. The owner or lessee of any tenement house, or part thereof, shall thoroughly cleanse all the rooms, passages, stairs, floors, windows, doors, walls, ceilings, privies, cess-pools, and drains thereof, of the house or part of the house of which he is the owner or lessee, to the satisfaction of this board, as often as shall be required by said board, once at least in every year. Any person or persons offending against any of the provisions of this section shall forfeit and pay a penalty of twenty-five dollars.

HAVERHILL, MASS.

Regulations of the board of health for the construction of house drainage. 1887.

SECT. 1. On every street provided with a common sewer the sewerage from each building shall be conducted into the common sewer, and no privy vault or cess-pool will be permitted upon any premises situated on such street, unless upon permission of the board of health in writing. All buildings located on such streets must be provided with water-closets either in the house or yard.

SECT. 2. Before proceeding to construct or re-construct any portion of the drainage system of any building, the contractor or plumber having charge of the same shall, except in the case of leaks, file with the board of health plans and specifications of the whole drainage system, including branches, ventilating pipes, traps, etc., and in case of a privy vault, a description thereof, giving its position relative to the house and limits of the lot, its size, construction and ventilation; and no person shall commence any portion of such work until the description thereof shall have been approved by the board of health, and after such inspection there shall be no alterations unless likewise approved. Blank specifications will be furnished to architects, plumbers and others on application at the office of the board of health.

SECT. 3. The agent of the board of health shall be promptly notified in writing, and upon blank forms to be provided for that

purpose, when the plumbing work on any house is completed or sufficiently advanced for inspection. He shall proceed at once to pass upon the work, and all inspections shall be made promptly, not later than twenty-four hours after such notification. No part of the plumbing work of any house shall be covered, or in any manner hidden from view, until after such inspection has been made and certificate of approval issued by the board of health. The agent shall promptly condemn and order removal of any defective material, or of any work done other than in accordance with the provisions of these regulations.

SECT. 4. When required by the agent of the board of health, all plumbing shall be tested with the peppermint or water test by the plumber, in the presence of the agent, and all defective joints made tight, and other openings made impermeable to gases. Defective pipe discovered shall be removed and replaced by sound pipe.

SECT. 5. *Materials.* Every soil, drain, waste or ventilating pipe above ground and inside or under the building, shall be of metal. Soil-pipes shall be of iron, sound, free from sandholes, of a uniform thickness, and of not less than four inches in diameter; and waste-pipes shall be of iron or lead. The portion of the main drain within the house-walls, and through and to two feet outside of the cellar-wall, shall be of iron, and shall pass through the walls two inches clear of the masonry on the top and both sides to avoid injury by settlement. Beyond this point it shall be of extra heavy iron pipe or vitrified earthen pipe of suitable size, with a fall of at least one-quarter inch to the foot.

SECT. 6. *Joints.* Joints in iron pipe shall be either screw, oakum-packed and lead-calked, or carefully and properly made rust joints; and joints of lead pipe shall be, where practicable and possible, of wiped solder. Joints in cement or earthen pipe shall be made water tight by means of hydraulic cement-mortar, and care must be taken that no mortar is left at the joint inside the pipe; and joints of lead with iron pipe shall be made with a brass sleeve or ferrule joined with the lead pipe with a wiped solder joint and calked with lead in the iron hub.

SECT. 7. *Connections.* Connections of branch wastes with the main drain, soil or other waste pipes shall be made so as to change the direction of the flow as smoothly as possible, and when cast fittings are used, connections shall be made by means of Y branches and 1.8 bends, except on vertical waste or soil stacks.

SECT. 8. *Water-Closets.* No water-closet shall be set up in any room or apartment that has not a window having an area of at least three square feet opening directly to the external air; they will, however, be permitted in rooms or apartments having no windows communicating directly with the external air, providing that there is a duct to the open air through a heated flue with an opening under, or near the seat of the water-closet for taking air; and such air-ducts shall enter the flue above all openings for stoves. All water-closets shall be furnished with a sufficient supply of water to keep them at all times clean and well flushed, and shall, unless otherwise permitted by the board of health, be supplied from a special tank, which shall not hold less than five gallons of water for each water-closet which it supplies.

SECT. 9. *Traps and Fresh Air Inlet.* Each fixture shall have an effectual trap close to it—the distance not to exceed two feet—and which, if of a kind and in a position liable to be syphoned or affected by back pressure, shall be protected therefrom by a special air pipe, in no case less than two inches in diameter for water-closet traps, and one inch and a quarter for other traps. As exception, the use of a single trap may be permitted for one set of wash trays or two adjoining fixtures, consisting of wash-bowls or bath-tubs. In no case shall the waste pipe from a bath-tub or other fixture be connected with a water-closet trap: nor shall traps be placed on or at the foot of vertical soil-pipes. A running or 1-2 S trap shall be placed on the house-drain at an accessible point, either outside or inside of the foundation wall of the building. This trap must be furnished with a hand hole for convenience in cleaning, the cover of which must be properly fitted and made gas and air tight. There shall be an inlet for fresh air entering the drain just inside this trap, of at least four inches in diameter, leading to the outer air.

SECT. 10. *Safes, Overflows, Refrigerators.* Waste-pipes from safes and refrigerators and overflow tanks or cisterns, shall empty over sink, trapped gully or otherwise, as may be approved, but shall not connect directly with the drainage system.

SECT. 11. *Conductors.* Rain-water leaders shall not be used as soil, waste or vent pipes, nor shall any soil, waste or vent pipe be used as a leader. When within the house, the rain-leader must be of cast-iron, with leaded joints; when outside of the house and connected with the house-drain or common sewer, it must be trapped

beneath the ground, or just inside the wall, the trap being arranged in either case so as to prevent freezing. In every case where a leader opens near a window or a light-shaft, it must be properly trapped at its base.

SECT. 12. *Ventilation.* Soil-pipes shall be continued full bore, up through the roof without return bend, in as direct a line as possible, terminating at least two feet above any window or opening into the building. All branches of ten feet or more in length shall be continued at full size through the roof, or be taken into the soil-pipe above the highest fixture, unless otherwise permitted. Any branch less than four inches in diameter, to be carried through the roof, shall, four feet before passing through, be enlarged to not less than four inches and terminate not less than two feet above the roof, and remote from windows or other openings into the building. Ventilation pipes shall be of not less than two inches in diameter for distances of thirty feet or less, and of not less than three inches for distances of more than thirty feet.

SECT. 13. *Arrangement.* Soil, drain, waste and ventilating pipes shall be concentrated as much as possible, and, on the completion of the work, shall be left readily accessible, and in view as much as possible. Drain, soil, waste and ventilating pipes and the traps, should be exposed to view for ready inspection at all times, and for convenience in repairing. When necessarily placed within partitions or recesses in walls, soil and waste pipes shall be covered with wood work so fastened with screws as to be readily removed. In no case shall they be absolutely inaccessible. Any house-drain put in and covered over without due notice to the board of health, must be uncovered for inspection at the direction of its agent or inspector.

SECT. 14. *Workmanship.* The whole drainage and plumbing work of buildings shall be executed by skilled mechanics in a thorough and workmanlike manner.

SECT. 15. *Privy Vaults.* Privy vaults shall be built of smooth, hard-burned bricks, laid with hydraulic cement-mortar, and with walls of solid masonry eight inches thick. The whole interior surface shall be coated with cement-mortar, and shall be ventilated in such a manner as not to annoy occupants of neighboring buildings.

SECT. 16. *Privies.* No privy shall open directly from any living or food-storage room.

SECT. 17. *Ventilation.* No brick, sheet-metal or earthen ware flue shall be used inside of any building to ventilate any privy

vault, cess-pool, trap, drain, waste, or soil-pipe, and chimney flues shall not be used as such ventilators.

SECT. 18. *Cess-pools.* Cess-pools shall be built in a thorough and substantial manner, and shall be properly ventilated. Should the cess-pool be located within twenty feet from the foundation wall of the cellar, or fifty feet from a well or other source of water-supply which is used for culinary purposes, it shall be made absolutely water tight.

SECT. 19. No opening shall be provided in the sewer-pipe of any building for the purpose of receiving the surface drainage of the cellar, unless special permission is granted by the board of health, and any opening so made shall be immediately and permanently closed when directed by the board of health. Cellar and foundation walls must when possible, be rendered impervious to dampness, and the use of asphaltum or coal tar pitch, in addition to hydraulic cement, is recommended for that purpose.

SECT. 20. Subsoil drains shall be provided whenever dampness of site is known to exist. When used they must be effectually trapped and means provided to maintain a seal.

SECT. 21. All drains now built shall be re-constructed whenever in the opinion of the board of health, it may be necessary.

SECT. 22. The provisions of sections 4 to 13, inclusive, of these regulations shall apply only to buildings erected, and to work performed after their passage.

CLEVELAND, OHIO.

Regulations of the city of Cleveland, Ohio, for the construction of plumbing and house drainage.

SECTION 1. Be it ordained by the city council of the city of Cleveland, that no part of the work in plumbing or house drainage shall be covered or concealed in any way until after it has been examined by the inspector of the board of health, and notice must be sent to the office of the board of health when the work is sufficiently advanced for inspection, and when the plumbing work is finished notice must be given at the office of the board of health, within two days, that the work is ready for inspection. No inspections will be made on legal holidays.

SECT. 2. All plumbing and house drainage must be constructed in accordance with the following rules :

RULE 1. All materials must be of good quality and free from defects; the work must be executed in a thorough and workmanlike manner.

RULE 2. The arrangement of soil and waste pipes must be as direct as possible.

RULE 3. The drain, soil and waste pipes and the traps must if practicable, be exposed to view for ready inspection at all times and for convenience in repairing. When necessarily placed within partitions or in recesses of walls, soil and waste pipes should be covered with wood work so fastened with screws as to be readily removed. In no case shall they be absolutely inaccessible.

RULE 4. It is recommended to place soil and other vertical pipes in a special shaft between or adjacent to the water-closets and bath room and serving as a ventilating shaft for them. This shaft should be at least two and one-half feet square. It should extend from the cellar through the roof and should be covered by a "louvered skylight." It should be accessible to every story and should have a very open but strong grating at each floor to stand upon. Shafts not less than three feet square in area are required in tenement houses to ventilate interior water-closets.

RULE 5. Every house or building must be separately and independently connected with the street sewer.

RULE 6. All house sewers must be of iron or hard salt glazed and cylindrical earthen-ware pipe, laid on a smooth bottom, free from all projections of rock, and with soil well rammed to prevent settling of the pipe. Each section must be wetted before applying the cement, and the space between each hub and the small end of the next section must be completely and uniformly filled with the best hydraulic cement. Care must be taken to prevent any cement being forced into the drain to become an obstruction. No tempered up cement shall be used. A straight edge must be used inside the pipe, and the different sections must be laid in perfect line on the bottom and sides.

RULE 7. When water closets discharge into it, the drain must be at least six inches in diameter.

RULE 8. It must be laid in a straight line if possible, and all changes in direction must be made with curved pipes, and all connections with "Y" branch pipes and one-eighth bends.

RULE 9. Any house drain or house sewer put in and covered without due notice to the health department must be uncovered for inspection at the direction of the inspector.

RULE 10. A running or half-S trap must be placed on the house drain at an accessible point near the front of the house. This trap must be furnished with a hand hole, for convenience in cleaning, the cover of which must be properly fitted and made gas and air-tight with some proper cement.

RULE 11. No brick, sheet-metal, earthen-ware or chimney flue shall be used as a sewer ventilator, nor to ventilate any trap, drain, soil or waste-pipe.

RULE 12. Every soil and waste-pipe must be of cast iron, lap-welded wrought iron, lead, copper or brass, and where it receives the discharge of fixtures on two or more floors, or fixtures upon any floor above the first, except for water-closets, it must be extended at least two feet above the highest part of the roof or coping. All soil-pipes that receive the waste from water-closets must extend at least two feet above the highest part of the roof or coping, of undiminished size. They must not open near a window nor an air-shaft which ventilates living rooms. For small fixtures other than water-closets, located with not more than eight feet vertical fall, and connected separately to the sewer, the special air-pipe may be omitted. When two or more fixtures discharge into the same waste-pipe, the traps must be protected from syphonage as prescribed in Rules 27 and 28 in this section.

RULE 13. Soil, waste and vent-pipes in an extension must be extended above the roofs of the main building, when otherwise they would open within twenty feet of the windows of the main house or the adjoining house.

RULE 14. The minimum diameter of soil-pipe for water-closets permitted is four inches. A vertical waste-pipe, into which a line of kitchen sinks discharge, must be at least two inches in diameter with one inch and a half branches.

RULE 15. Where lead pipe is used to connect fixtures with vertical soil or waste-pipes, or to connect traps with vertical vent-pipes, it must not be lighter than the grade called "extra light."

RULE 16. There shall be no traps on vertical soil-pipes or vertical waste-pipes.

RULE 17. All cast iron pipes must be sound, free from holes and of a uniform thickness of not less than one-eighth of an inch for a diameter of two, three or four inches, or five thirty-seconds of an inch for a diameter of five or six inches; and in case the building is over sixty-five feet in height above the curb, the use of what

is known as "extra heavy" pipe and corresponding fittings is required, which weigh as follows: 2 inches, $5\frac{1}{2}$ lbs. per lineal foot; 3 inches, $9\frac{1}{2}$ lbs. per lineal foot; 4 inches, 13 lbs. per lineal foot; 5 inches, 17 lbs. per lineal foot; 6 inches, 20 lbs. per lineal foot; 7 inches, 27 lbs. per lineal foot; 8 inches, $33\frac{1}{2}$ lbs. per lineal foot; 10 inches, 45 lbs. per lineal foot; 12 inches, 54 lbs. per lineal foot.

All wrought iron pipes must be sound and must be of what is known as standard grade pipe with corresponding fittings. All fittings for soil, waste and vent-pipes must be of cast iron; all soil, waste and vent-pipes must be supported by hooks or pipe rests not more than ten feet apart.

RULE 18. Before they are connected they must be thoroughly coated inside and outside with coal tar pitch applied hot, or some other equivalent substance.

RULE 19. All soil, waste and vent-pipes must be tested by the plumber in charge, with a water test or by an air test applied with pump and gauge, as directed by inspector, in the presence of the inspector, after due notice to the health office of place and time, by a pressure of not less than twenty pounds to the square inch, after all openings have been closed by the plumber or person in charge of the work. Pipe, joints, fittings or fixtures thus shown to be defective or wrongly placed, must be made good or be replaced within five days and again tested if so required by the inspector. None of the said pipe shall be covered from sight till they have been shown to stand the test prescribed, to the satisfaction of the inspector. After the plumbing work of a building has been tested as directed, no alterations will be permitted except upon written application of the owner or plumber in charge of the work.

RULE 20. All joints in the iron drain-pipes, soil-pipes, and waste-pipes must be so calked with oakum and lead, or with cement made of iron filings and sal ammonia, so as to make them impermeable to gas.

RULE 21. All connections of lead with iron pipes must be made with brass sleeve or ferrule, of the same size as the lead of the pipe, put in the hub of the branch of the iron pipe and calked in with lead. The lead pipe must be attached to the ferrule by a wiped joint.

RULE 22. All connections of lead pipe should be by wiped joints.

RULE 23. Every water-closet, urinal, sink, basin, wash-tray, bath, and every tub or set of tubs, must be separately and effec-

tively trapped, except where a sink and wash-tub immediately join each other, in which case the waste-pipe from the tubs may be connected with the inlet side of the sink trap; in such a case the tub waste-pipe is not required to be separately trapped.

RULE 24. Traps must be placed as near the fixtures as practicable and in no case shall a trap be more than two feet from the fixtures

RULE 25. All soil-pipes must be provided with strong metallic strainers.

RULE 26. In no case shall the waste from a bath-tub or other fixtures be connected with a water-closet trap.

RULE 27. Traps must be protected from syphonage, and the waste-pipe leading from them ventilated by a special air-pipe; in no case less than two inches in diameter for water-closet traps and one and a half inch for other traps, and ventilation pipes less than four inches in diameter must not be carried up outside the building. In buildings more than four stories in height, the vertical vent-pipes for water-closets must be at least three inches in diameter with a two inch branch for each trap, and for traps of other fixtures not less than two inches in diameter, with branches one and a half inches in diameter, unless the trap is smaller, in which case the diameter of branch vent-pipe must be at least equal to the diameter of the trap. In all cases vertical vent-pipes must be of cast or wrought iron gas pipe.

RULE 28. These pipes must either extend two feet above the highest part of the roof or coping, the extension to be not less than four inches in diameter, to avoid obstruction from frost, or they may be branched into a soil-pipe not less than six feet above the highest fixture. They may be combined by branching together those which serve several traps. These air-pipes must always have a continuous slope to avoid collecting water by condensation.

RULE 29. No trap vent-pipe shall be used as a waste or soil-pipe.

RULE 30. Overflow pipes from fixtures must in each case be connected on the inlet side of the trap.

RULE 31. Every safe under a wash-basin, bath, urinal, water-closet, or other fixtures, must be drained by a special pipe not directly connected with any soil-pipe, water-pipe, drain or sewer, but discharging into an open sink upon the cellar floor or outside the house.

RULE 32. The waste-pipe from a refrigerator shall not be directly connected with the soil or waste-pipe, or with the drain or sewer, or discharge into the soil; it should discharge into an open sink. Such waste-pipes should be so arranged as to admit of frequent flushing, and should be as short as possible and disconnected from the refrigerator.

RULE 33. The sediment pipe from kitchen boilers must be connected on the inlet side of the sink trap, if connected to waste-pipe.

RULE 34. Rain water leaders must never be used as soil, waste or vent-pipes, nor any soil, waste or vent-pipe used as a rain water leader; all rain water conductors which are carried up within the wall of a building must be of iron, as required for soil-pipes.

RULE 35. In every case where a leader opens near a window or light shaft it must be properly trapped at its base.

RULE 36. No steam exhaust or blow-off-pipe from a steam boiler will be allowed to connect with any soil or waste-pipe, or directly with any house drain. They should discharge into a tank or condenser, the waste from which, if to be discharged into a sewer through the house drain, must be connected on the sewer side of the running trap.

RULE 37. No privy vault, school sink or sewer-pipe closet will be permitted in any cellar or basement, and all sewer-pipe closets must be located at least ten feet from any building occupied as a dwelling house, nor shall the general privy accommodations of a tenement or lodging house be allowed in the cellar or basement, unless properly constructed water-closets are used.

RULE 38. No privy vault or cess-pool for sewerage will be permitted in any part of the city where water-closets or a school sink can be connected with a public sewer in the street.

SECT. 3. Any person or persons violating any of the provisions of this ordinance shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a fine of not less than ten dollars or more than five hundred dollars, or imprisonment not exceeding thirty days or both, in the discretion of the court imposing the same.

PRACTICAL
SANITARY  ECONOMIC COOKING

ADAPTED TO

Persons of Moderate and Small Means,

BY

MRS. MARY HINMAN ABEL.

THE LOMB PRIZE ESSAY.

Inscription: "The Five Food Principles, Illustrated by Practical Recipes."

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SECRETARY AMERICAN PUBLIC HEALTH ASSOCIATION.
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PREFACE.

Perhaps there is no better way of presenting to the public the facts which led to the creation of this valuable work, than by inserting the announcement which resulted in the exceedingly lively and able competition for the prize, as well as the merited honor which was certain to fall upon the successful competitor. It read as follows :

AMERICAN PUBLIC HEALTH ASSOCIATION.

THE LOMB PRIZE ESSAYS.

Two Prizes for 1888.

Mr. Henry Lomb, of Rochester, N. Y., now well known to the American public as the originator of the "Lomb Prize Essays," offers, through the American Public Health Association, two prizes for the current year, on the following subject :

PRACTICAL SANITARY AND ECONOMIC COOKING ADAPTED TO PERSONS OF MODERATE AND SMALL MEANS.

First Prize, \$500, - - - Second Prize, \$200.

JUDGES: Prof. Charles A. Lindsley, New Haven, Conn. ; Prof. George H. Rohé, Baltimore, Md. ; Prof. Victor C. Vaughan, Ann Arbor, Mich. ; Mrs. Ellen H. Richards, Boston, Mass. ; Miss Emma C. G. Polson, New Haven, Conn.

CONDITION: The arrangement of the essay will be left to the discretion of the author. They are, however, expected to cover in the broadest and most specific manner, methods of cooking as well as carefully prepared receipts, for three classes,—(1) those of moderate means ; (2) those of small means ; (3) those who may be

called poor. For each of these classes, receipts for three meals a day for several days in succession should be given, each meal to meet the requirements of the body, and to vary as much as possible from day to day. Formulas for at least twelve dinners, to be carried to the place of work, and mostly eaten cold, to be given. Healthfulness, practical arrangement, low cost, and palatableness should be combined considerations. The object of this work is for the information of the housewife, to whose requirements the average cook-book is ill adapted, as well as to bring to her attention healthful and economic methods and receipts.

All essays written for the above prizes must be in the hands of the Secretary, Dr. Irving A. Watson, Concord, N. H., on or before September 15, 1888. Each essay must bear a motto, and have accompanying it a securely sealed envelope containing the author's name and address, with the same motto upon the outside of the envelope.

After the prize essays have been determined upon, the envelopes bearing the mottoes corresponding to the prize essays will be opened, and the awards made to the persons whose names are found within them. The remaining envelopes, unless the corresponding essays are reclaimed by authors or their representatives within thirty days after publication of the awards, will be destroyed, unopened by the Secretary.

None of the judges will be allowed to compete for a prize.

The judges will announce the awards at the Annual meeting of the American Public Health Association, 1888.

It is intended that the above essays shall be essentially American in their character and application, and this will be considered by the judges as an especial merit.

Competition is open to authors of any nationality, but all the papers must be in the English language.

IRVING A. WATSON,
Secretary.

CONCORD, N. H., February, 1888.

The above circular was extensively circulated and published throughout the United States and the Dominion of Canada, with the result of bringing to the Secretary, within the specified time, *seventy essays* upon the subject announced. The arrival of these essays covered a period of nearly five months, and they were forwarded to the chairman of the Committee of Award nearly as fast

as received, thus giving the committee ample time for their exceedingly laborious work of examination. The decision of the judges was announced at the Sixteenth Annual Meeting of the American Public Health Association, and was as follows :

REPORT OF COMMITTEE ON THE LOMB PRIZES.

Your committee, to whom were referred the essays upon "Practical Sanitary and Economic Cooking Adapted for persons of Moderate and Small Means," respectfully report that they have perused with thoughtful and considerate attention the three score and ten essays which were submitted to them.

A few of them were presented in beautiful specimens of typewriting, but the great majority of them were in manuscript, and some of them not in the most legible characters, a circumstance which, it will be appreciated, became an important matter, when considered in connection with the large number of competitors, and the fact that many of their papers were each of several hundred pages in length.

The result of the labors of the committee is, that by unanimous approval, the first prize of \$500 is awarded to the author of the essay bearing this inscription,—"The Five Food Principles, illustrated by Practical Recipes."

Your committee would further report that although there were among the remaining sixty-nine a number of essays of considerable merit, there was no single one so prominently superior to others as to commend the approval of the majority of your committee, nor was there any which did not contain some errors of statement, which your committee did not feel justified in endorsing with the approval of this Association by the bestowal of a prize, or else which did not fail to meet some of the conditions upon which the prize was offered, or which was not otherwise objectionable because of literary defects.

Your committee would therefore respectfully report that no essay was found among those submitted to them which they judged deserving of the second prize of \$200.

The committee consider it a duty, in awarding the prize, to emphasize the fact that of all the essays submitted the one selected is not only preëminently the best, but that it is also intrinsically an admirable treatise on the subject.

It is simple and lucid in statement, methodical in arrangement, and well adapted to the practical wants of the classes to which it is addressed. Whoever may read it can have confidence in the soundness of its teachings, and cannot fail to be instructed in the art of cooking by its plain precepts, founded as they are upon the correct application of the scientific principles of chemistry and physiology to the proper preparation of food for man.

All of which is respectfully submitted.

C. A. LINDSLEY,
 GEORGE H. ROHE,
 V. C. VAUGHAN,
 ELLEN H. RICHARDS,
 EMMA C. G. POLSON.

The American public is to be congratulated upon this useful and valuable contribution to the needs of its great army of working people, made possible through the humanitarian benevolence of a private citizen. This was the fifth prize offered by the same citizen, through the same channel, for the noble purpose of ameliorating, in some degree, the hardships which befall mankind in the tireless struggle for existence.

That this essay may be placed in the hands of every family in the country, is his earnest desire as well as that of the Association; therefore a price barely covering the cost has been placed upon this volume. It is to be hoped, that Government departments, state and local boards of health, sanitary and benevolent associations, manufacturers, employers, etc., will purchase editions at cost, or otherwise aid in distributing this work among the people.

Although a copyright has been placed upon these essays for legitimate protection, permission to publish under certain conditions, can be obtained by addressing the secretary.

We commend this volume to the public, believing it to be an unequalled work upon "Practical Sanitary and Economic Cooking, adapted to persons of moderate and small means."

IRVING A. WATSON,
Secretary American Public Health Association.

INTRODUCTION.

Few things are of more importance than that we should find ourselves physically and mentally equal to our day's work, but not many of us realize how largely this depends upon the food we eat.

Supposing there to be just money enough in a given family to buy the right kind and quantity of food. Now if this money is not wisely expended, or if after the food has been bought it is spoiled in the cooking, the results will be very serious for the members of that family; they will be under-nourished and they will suffer in clear-headedness, bodily strength, and in the case of children, in bodily development

Surely the right condition of the body is too important to be left to chance; the best scientific knowledge, the best practical heads should be at its service, and this is the case, indeed, to a large extent in Europe, where the food of the soldiers and of the inmates of public institutions is furnished more or less according to certain rules that have been deduced partly from observation, and partly from scientific experiment.

The application of scientific principles on these lines is not of long standing, for the investigations that have clinched them are all of comparatively recent date. At the end of the last century a beginning was made in France and in Germany in connection with philanthropic efforts to improve the food of the poor, and it was at this time that Count Rumford introduced into the soup kitchens of Munich, the soup that has been named after him. From this time on interest in the subject of foods, both for men and domestic animals, steadily increased, although experimenters were constantly coming to wrong conclusions because the sciences of Organic Chemistry and Physiology, as far as they concerned the subject, were not far enough advanced.

It was only in the early forties that the first experimental agricultural stations were established, but so rapidly have they multi-

plied that they now number more than a hundred in Europe alone ; and in these and in the laboratories of the great universities, analyses have been made of most of the foods used by men and animals and also tests of the relative flesh and fat producing power of different foods and combinations of foods.

For years the results of these investigations have been applied with profit to the feeding of cattle, but it was a case of threatened wholesale starvation in England that first turned the attention of properly trained persons to a like study of the nourishment of human beings. During our Civil War the condition of the cotton spinners in Lancashire and Cheshire, England, became so serious as to make government help necessary to keep them from starving, and in 1862 and 1863 Dr. Edward Smith was commissioned to examine into the dietetic needs of the distressed operatives. In his report for 1863 are found tables of the food consumed per week by 634 families, and in spite of the difficulties standing in the way of such an investigation, the foods consumed were classified into tables showing the amounts of the different food principles taken per week by each family.

One of the great practical results following from this investigation was the determination of the minimum amount of each nutritive principle which men, women and children need, to keep them in fair health. The amount of food with which an unemployed man can fight off starvation, and the diseases temporarily incident to it, was found to be represented in 35 ounces of good bread per day, and the necessary amount of wholesome water.

Since the publication of Dr. Smith's report similar inquiries have been instituted by the scientists of other countries, and many analyses have been made of the exact amount and kinds of food eaten by various classes of laborers under the most varied conditions. Professors Voit and Pettenkofer of Munich have even accounted for every particle of food that passed through the body of a man, both while he was at work and while he was idle. They have also noted how much of his own body was consumed when he ate nothing. Finally a great number of averages have been taken and so-called "standard dietaries" constructed, by which is meant the average amount of each of the chief food principles that keep an average muscle-worker in good condition, when doing average work.

Every one will admit that it is of great importance for the farmer to know in what proportion he shall lay in hay and other food for

the winter feeding of his stock; the animals must thrive, but there must be no waste by furnishing food in the wrong quantities or proportions.

For the housewife, the food question in its relation to her family can be stated in the very same words. It is important that she should economize, but her path will be full of pitfalls if she does not understand in what true economy consists. Most people with a real interest in this subject, have had at some period of their lives certain pet theories as to food. Perhaps they have been at one time convinced that most people ate too much, at another, that meat was the all strengthener, or they may have been afflicted with the vegetarian fad, and whatever their special views have been they have thought that they rested them upon facts. But surely they would never have pinned their faith to one-sided diets if they had rightly comprehended the main facts of nutrition. We believe that if these facts as at present interpreted, and the world's experience in applying them, can be put at the command of the housewife, she can use them to great profit.

We have employed the term "food principles"; what do we mean by it? Everyone knows what is meant by a food, as meat or bread, and everyone knows that the food offered us by our butchers and grocers comes from the animal and vegetable kingdoms. The oxygen we breathe and the water we drink nature furnishes for us directly, so to speak, though unfortunately for many of us, and especially for young children, the former is not thought of as a food. Oxygen aside, it has been found by those who have studied the matter, that all foods contain one or more of five classes of constituents, call "nutritive ingredients" or "food principles." These five principles are:

- (1) Water.
- (2) Proteids.
- (3) Fats.
- (4) Carbohydrates.
- (5) Salts or mineral constituents.

WATER.

It is important to note that our bodies when full-grown are two-thirds water, and our food contains from 1 to 94 per cent of it. Considering the scope of this essay, it must be left to take care of itself as a food.

PROTEIDS.

A class of nearly allied bodies is included under this head. The whole class is sometimes called "Albumens."

The housewife is familiar with proteids in such foods as the lean of meat, in eggs and cheese. These contain the principle in various proportions; for example,

Lean of meat has	15-21 per ct.
Eggs in both white and yolk	12 5 "
Fresh cow's milk on an average	3.4 "
Cheese	25-30 "
Dried codfish	30 "

Vegetables are more deficient in proteids though the grains and legumes contain much of it.

Wheat flour has	10 to 12 per ct.
Peas, beans and Lentils have	22.85 to 27.7 " "

In fresh vegetables we find only from $\frac{1}{2}$ to 3 per cent, excepting green peas and beans in which the proteids reach 5 to 6.5 per cent.

FATS.

Fats are obtained from both the animal and vegetable kingdoms. Those used by us in cookery come mostly from animals, and are known to the housewife as butter, lard and tallow. Vegetable food as a rule, is very poor in fats, containing from 0 to 3 per cent. only.

Some of the cereals, like corn and oats contain from 4 to 7 per cent. of fats.

CARBOHYDRATES.

The bodies classed as "carbohydrates" are found mainly in vegetables. The housekeeper knows them as starches and sugars.

Under the starches proper are included such things as the starches of grains and seeds, Iceland moss, gums and dextrin.

Milk is one of the few animal products that has more than a very small quantity of carbohydrates. It contains on the average about 4.8 per cent. of this principle;—slightly more than of either proteids or fats.

SALTS.

The things that give hardness to our bones, like calcium phosphate, and the common salt with which we flavor our food, illustrate this class.

FUNCTIONS OF FOOD PRINCIPLES.

To know in what proportion these food principles should be represented in our diet, we must inquire into the part played by each of them in the body. The first and the last principle may be dismissed briefly. The former, water, is the great medium which floats things through the body; the latter, salts, are combined in various ways with the solids and fluids of our foods, and we shall not easily suffer from lack of them.

The other three food principles (let us call them in the following pages the three great food principles), cannot be so summarily dealt with. We might say, briefly and dogmatically, that the proteids are "flesh foods," the fats are "heat foods," the carbohydrates "work foods." To be sure, experimenters are agreed on the main points, but the different schools are still at war on the final explanations and on many details, and it has become more and more evident that we cannot portion off the work of the body in this simple style. Though each of the three great food principles can be said to have a favorite part which it plays better than any other, yet we find that like an actor of varied talents, it has more than one rôle in its repertoire.

FUNCTION OF PROTEIDS.

That this class is indispensable we have the best of proofs. It must be given us in one or another of its forms, for, even if we are not athletes, nearly one-half of our body is made up of muscle which is one-fifth proteid, and the nitrogen in this proteid can only be furnished by proteid again, since neither fats nor carbohydrates contain any of it; therefore in making up bills of fare, let us remember that growing and working proteid, yes, even idle proteid as Dr. Smith found, needs proteid, and that there is nothing in any of the other food principles that can entirely take its place.

Though we think of proteid mostly as a great body builder and restorer, it can also to some extent furnish fat when it stands in a certain relation to the fats and carbohydrates of our food, and we are assured by experimenters that it also furnishes heat and muscle energy under certain conditions.

In these last two activities, however, it is far excelled by fats and carbohydrates. We shall therefore think of it as the nitrogen-

furnisher of our tissues, and also as the grand stimulant among foods, inciting the body, as it does, to burn up more of other kinds.

Scientists, at one time, held the opinion that our muscle energy comes chiefly from proteids. This view has been abandoned, but many a working man still believes that meat is the only kind of food that is of any account; he thinks of fats and starches as quite unimportant comparatively. Now it has been proved over and over again, that we can combine meat with fats and vegetable food in such a proportion that it shall play only its main rôle, viz, that of building and restoring, while these latter furnish the heat and muscle energy needed. Proteid food is such a costly article that it will not do to put it at work which cheaper material can do even better.

FUNCTIONS OF FATS.

The fats also have more than one office in the body. They can be stored as body fat, or they can be burned and give off heat, and they may also serve as a source of muscular energy, in an indirect manner at least

FUNCTIONS OF CARBOHYDRATES.

The carbohydrate principle furnishes fat to our tissues, and is a source of heat and muscle energy, indeed the chief source of muscle energy in all ordinary diets.

FLAVORINGS.

So far we have had chiefly in mind the real working constituents of food, if we may so speak. But many things cannot be studied or classified in the above way; they must be looked at from another point of view.

Thus a pinch of pepper, a cup of coffee, a fine, juicy strawberry,—what of these? They may contain all five of the food principles, but who cares for the proteid action or carbohydrate effect of his cup of good coffee at breakfast, or what interest for us has the heating effect of the volatile oil to which the strawberry owes a part of its delicious taste?

Surely the economical housekeeper who would throw out of the list of necessaries all the things that tickle the palate, that rouse the sense of smell, that please the eye and stimulate our tired nerves, just because these things contain but little food, would make a grave mistake. She may know just what cuts of meat to buy, what

vegetables are most healthful and economical, but if she does not understand how to "make the mouth water," her labor is largely lost. Especially if she has but little money, should she pay great attention to this subject, for it is the only way to induce the body to take up plain food with relish.

The list of these spices, flavors, harmless drinks and the like, is a long one. Unfortunately, we have no comprehensive word that will include everything of the sort, from a sprig of parsley to a cup of coffee; the German calls them "Genuss-mittel"—"pleasure-giving things."

PROPORTIONS AND AMOUNTS OF FOOD PRINCIPLES.

We have brought our discussion of the three great food principles to the point where we can enquire in what proportions and amounts these should be represented in our diet.

The standard daily dietary that is most frequently cited, and which, perhaps, best represents the food consumption of the average European workman in towns, is that proposed by Prof. Voit. This dietary was made upon the basis of a large number of observed cases. It demands for a man of average size engaged in average manual labor,

Proteids*	Fats.	Carbohydrates.
118 gms.	56 gms.	500 gms.

Now it is the opinion of all competent judges, that at least one-third of this proteid should come from the animal kingdom, and this one-third, if given in the form of fresh beef, would be represented by 230 grams of butcher's meat, calculated to consist of

Bone and tendon	18 gms
Fat	21 "
Lean	191 "

When we take whole populations into account, we find that little, if any, more meat than this falls to each person per day. Thus the average consumption per day for three great cities is given as follows :

Berlin	135 gms. per cap.
New York	226 " " "
London	274 " " "

*28.34 grams.=1 oz.

Of course these averages include children, but they also include great numbers of the well-to-do, who eat much more meat than their bodies need.

We will add a few more examples of dietaries, some of which are used by the writer in making out the bills of fare given in this essay.

Proteids, gms.	Fats, gms.	Carbohydrates, gms.	
145	100	450	Proposed by Prof. Voit for a man at hard work.
120	56	500	Allowed to German soldiers in garrison.
150	150	500	Proposed by Prof. Atwater for American at hard work.
125	125	450	By the same for American at moderate work.
100	60	400	Proposed by Prof. Voit for a woman
80	50	320	By the same for children from 7 to 15 years.

We will give an instance of how much below these figures the amount consumed sometimes falls

Prof. Boehm found that a poor North German family, consisting of a man, wife and a child five years old, had in one week for their food:

Potatoes	41 lbs.
Rye flour	2½ "
Meat	1¾ "
Rice	½ "
Rye bread	12 "

A very little milk.

Calculating the food principles contained in these amounts, we find that the three individuals daily consumed of:

Proteids,	Fats,	Carbohydrates,
175.5 gms.	41 gms.	1251. gms.

It needs no comment to show how insufficient is this dietary in amount, and how incorrect in proportion.

We have selected Prof. Atwater's dietary for a man at moderate manual labor as the basis of our twelve bills of fare and have taken Voit's standard for women and children.

Our climate is more trying and our people work faster, and we shall do well to allow more fat and meat to our working-man than the foreign dietaries provide. If our man is to get daily one-third of his proteid in the form of animal food, this would be represented

by 8 ozs. of butcher's meat (without bone), by from 5 to 5.8 ozs. cheese, or by 8 eggs.

We believe that it is better to go a little high rather than too low with proteid food. As a rule, people who eat enough proteids, and especially enough animal food, are vigorous and have what we call "stamina," and doctors incline to the belief that such people resist disease better because their blood and tissue are less watery than in the case of people who draw their proteids almost entirely from such vegetables as potatoes. But many workingmen in America would be surprised to learn how well health and strength can be maintained on what is, after all, not such a very large amount of meat, provided the rest of the dietary contains enough vegetable proteid and fat.

PRACTICAL APPLICATIONS.

It now remains for us to see whether the economist can get practical help from the foregoing facts about the character of foods and the use that is made of them in the body.

We have seen that we cannot economize in the amount of our food beyond certain limits and yet remain healthy and strong; also that we must not greatly alter the relative proportions in which experience has shown that these foods are best combined. The true field of household economy has, then, certain prescribed limits.

Its scope lies, 1st. In furnishing a certain food principle in its cheap rather than its dear form; for example, the proteid of beef instead of that of chicken, fat of meat instead of butter. 2d. Having bought foods wisely, in cooking them in such a manner as to bring out their full nutritive value; for instance, making a roast juicy and delicious instead of dry and tasteless. 3rd. In learning how to use every scrap of food to advantage, as in soup making, and 4th, if we add to these the art of so flavoring and varying as to make simple materials relish, we have covered the whole field of the household economist, so far as the food question is concerned.

We hope she will find help in the following pages, for it will be part of our task in this essay to examine different articles of food as to their nutritive value, and to recommend such combinations and such methods of cooking as will make the utmost out of a certain sum of money. As to foods, we have in America a large range of choice; staple raw products cost less generally than they do in Europe and the laboring man here has somewhat more money

to buy with. The anxious provider, who must feed many mouths on what seems an insufficient sum, may feel assured that he can, without doubt, learn to do better than he now does. In this line we must not disdain to learn lessons wherever we can.

There is an unfortunate prejudice among us against learning of foreign countries. The American workman says indignantly that he does not want to learn how to live on "starvation wages." But the facts, viewed coolly, are just these: the inhabitants of older countries have learned some lessons that we too must soon learn whether we will or no, and to profit by these lessons before we are really obliged to, will in no way lower wages, it will simply help us to get more comfort and pleasure out of our money.

Students of economy, political and domestic, find no better school than the experience of older countries, and constantly draw lessons from their greater thrift and economy in living. Mrs. Helen Campbell found among the poor sewing women of New York, that none were skillful in cooking their scanty food excepting only the German and Swiss women. All observing travelers unanimously give this testimony,—“If our American workman knew how to make as much of his large wage as the foreigner does of his small one, he could live in luxury.”

But you ask, what are the special lessons to be learned of the foreign housewife? We answer, chiefly self-denial and saving. Do not give up in despair because you have a small income and resign yourself to living meanly, in a hand to mouth fashion. Diligent study of the question and resolute abstention from luxuries will solve the problem, if it can be solved.

We indulge ourselves and our children too much in what tastes good, while all the time we know we have not money enough to buy necessaries. For instance, the consumption of sugar in America was in 1887, 56 lbs. per head, in Germany hardly more than one-third that amount. This means a larger consumption of sweetmeats than we can afford and at the same time be well fed otherwise.

We seem, in general, to spend too much money in our country on food compared with what we use in other directions; one great trouble is that we do not know how to save every scrap of food and use it again in some form. For one thing, we have yet to learn the great art of soup making,—and it seems also, of soup eating.

The American housekeeper would say to me: “This is nothing new, for years we’ve been hearing about soups. We don’t like

soups!" I only ask, "have you tried them for a considerable length of time, so that you have become skilled in making them, and your family used to their taste?" One fact alone ought to insure for them a good trial; that at least three nations, the French, German and Italian, make daily use of them and have for generations. To take part of our food in this form is an absolute necessity if we are to do the best possible with a certain amount of money.

PRACTICAL DIFFICULTIES.

The practical difficulties in the way of improvement in household cookery are not small. As cook, we have the wife and mother, who has too little time for this very important branch of household work; she has had, perhaps, no good training in the art of cookery (for it is an art), and besides, her kitchen and kitchen utensils are not at all what they should be. Indeed, the qualifications for a given task could not well be further from the ideal.

In Europe families of small means have many helps unknown to us. In the first place, bread is never baked at home, the baker's bread being both excellent and cheap. It would seem that among us, baker's bread must shortly improve in quality and decrease in price; either the profits must be too large, or the business not well managed. For instance, in those parts of Germany where white bread is eaten as a staple, it costs a trifle over 3 cents a pound, while flour of average quality costs about the same. In contrast with this, compare the prices of bread and flour in our own country where in no large city is bread quoted at less than 7 cents, while flour costs 3 cents. That is, bread costs in Germany about the same as flour and in America more than twice as much; and yet the German baker is notably a prosperous person!

The foreign housekeeper has still further help from the baker. If she makes a cake or pie, she sends it out to be baked, and pays from one to two cents (the fuel would have cost more); joints of meat and mix dishes are also sent to be baked for the same price; and before any bakeshop in a German city, at noon on Sunday, can be seen a line of servant girls, each in turn receiving a steaming dish as it is taken from the oven. The soup kitchens (*Volks Küchen*) of various grades are also a great help. The writer has repeatedly had brought from one of them an excellent meat broth (1 pt. for 2

cents), and good cooked vegetables are furnished for a price less than they could be cooked for at home, if one took any account of time and fire.

But such helps are not yet to any great extent available to the American woman; she must wrestle with her own problem at home and solve it as best she can.

THE KITCHEN.

The kitchen of a woman of average means is not the ideal kitchen. It is perhaps too small or not light enough, or it may have still more serious defects, as a bad drain. We must take it as it is, however, requiring only that it contain what is necessary to the end we have in view,—plain cooking for a family of six.

Size of kitchen. In the cheaper city dwellings the kitchen is small, too small for good ventilation, and for the heavier kinds of work as washing; but for cooking, a very small kitchen can be so arranged as to answer every purpose.

Any one who has seen a ship's kitchen can understand this. The cook as he stands before his range is within reach of all his stores, for rows of drawers and shelves literally line the walls from floor to ceiling, little tables for pastry or cake making are drawn out of the wall and pushed in again when not wanted, and every inch of floor and wall space is used to the best advantage. This cook would tell you that he did not want a larger kitchen; he would only lose time running about in it.

Arrangement. Begin to utilize the wall space. If you have not yet as many shelves as the walls will accommodate, put up more, and especially about and above the stove, so that as you stand at your cooking you can reach salt, pepper and every other flavor that can be used in a soup or stew; cooking spoons and forks and knives, potlids and holders—all these should be at your hand. Let a carpenter fasten into the mortared wall strips of wood that will hold nails and a few shelves, and if the stove is in a niche with wall on two or even three sides of it, all the better. On these nails should hang nearly every implement used in cooking, and on the

shelves should be found all spices and flavors ; farther back can be placed what is more seldom used. If there are no drawers, never mind, use close tin boxes for as many things as you can ; if no closed cupboard for your dishes, hang a curtain before the open shelves.

The nearer your sink is to the stove the better, that is the path your feet must oftenest travel. There must be a table of some sort very near the stove ; if it is a movable one, all the better, or it may be a broad shelf with a very strong and safe hinged support under it, letting down when not in use.

I take for granted that the main part of your work is to be done on this stove and table, and that a well stocked pantry, fitted out for the making of pastry and cake and elaborate dishes, is not within your reach any more than the time for making such.

The utensils you need are few, but these few you must have. Consider the value of the food materials that you use ; a few burns on an old sauce pan will quite buy a new one. We will speak only of the most important and absolutely necessary utensils.

First, do not use tin ; it is cheap, but coal is not, and you will waste a great deal of coal in trying to cook in tin. Brass and copper cooking vessels are to be avoided by one who must economize, as they are expensive and require too much care to keep them free from the poisonous verdigris.

Of chief importance among your utensils is a flat bottomed iron pot with close fitting *iron* lid. Get the smoothest and best, even if it cost double. In this you will roast meat with little fire, cook vegetables, all but peas and beans, cook anything indeed that is not acid. Have two of these, if you can, of different sizes. Next, an iron frying pan, also of the smoothest wrought iron and light ; this too should have a close fitting cover. Some people consider iron utensils heavy and old fashioned, but where economy is an object, no other ware is so good and satisfactory. The blue or grey enamelled ware is very nice but will not stand great heat and easily chips and cracks, but you should have one kettle of this ware as it is valuable for cooking fruit and anything acid. You must have a wire gridiron for toasting bread and broiling meat ; this you should use for many things which you now cook in the frying pan. The tea-kettle is a matter of course, and a griddle. There is one other utensil not as common, but which deserves to be, viz., a steamer ; a simple pot with perforated bottom which will fit tightly into the top

of the iron pot, and have a very tightly fitting cover. Its use will be discussed later.

You can hardly do without a number of earthen jugs, glazed with lead-free enamel, especially for cooking and holding milk. Get also a number of wooden spoons; they are cheap and clean, and of convenient shape for stirring. The old fashioned pudding stick of the Yankee kitchen is the earliest form among us, and many people know no other.

Stoves. A good stove is of first importance in a kitchen, but fortunately good stoves have become common. A graver question, however, is the cost of fuel to be burned in them. Of course coal must be the stand-by, and when the stove is heated up as on ironing and baking days, care can be taken to use the fire to its fullest capacity; in winter, dishes can be cooked ahead for several days.

Coal Oil. To cook a single dish or for boiling a teakettle a coal oil stove is a saving; it is also invaluable for keeping a pot at a simmering heat—a thing very difficult to accomplish on a stove.

Charcoal. For the same purpose, and for any steady cooking, and above all for broiling meat, every housekeeper ought to have appliances for burning charcoal; it only needs a grating with a rim two or three inches high, to let down into the stove hole (a sort of deep spider with a grated bottom). For such purposes, a bushel of hard wood charcoal costing fifteen or twenty cents would last a long time. Charcoal is almost the only fuel used in Paris for cooking; indeed, throughout France and in Western Germany it is in very common use.

“Cooking Safe.” For “Cooking Safe” as a saver of fuel, see page 194.

PROTEID-CONTAINING FOODS AND THEIR PREPARATION.

We have already in the introduction called attention to the importance of this food principle. It is well for us to bear in mind that there are three great classes of proteids, Albumens proper, Caseins, and Fibrins, and that in both plants and animals are found representatives of these three classes. Thus, in plant juices and in eggs we have things belonging to the Albumen class; in the curd of sour milk and in the legumine of the pod-covered plants we have examples of caseins; and in the gluten of grains and in the clot whipped out of blood we have examples of fibrins.

ANIMAL FOODS.

Our animal foods contain some other things that the housewife ranks with proteids and we have a few words to say about one of them, viz., gelatine, that nitrogenous substance boiled out of bones and cartilage.

Gelatine, Hist.
of. In the history of foods this gelatine, like meat extract, has played a great part. Before the real functions of the food principles were understood it was thought that what could be extracted by water from a piece of meat comprised all in it that was of value to the body; and so it happened that for more than a hundred years after Papin had discovered the method of extracting all the gelatine out of bones (which he did by the aid of that contrivance still known in kitchens as the "Papin Soup Digester") gelatine was considered to be one of the most, if not the most nourishing constituent of meats. In the last decade of the eighteenth century, and in the early part of this the French made great use of gelatine under the impression that it was a proteid because it yielded nitrogen to the chemist. Improved methods of extracting it were invented, and so general did its use become, especially in the public institutions of Paris, that from 1829-38, two and three quarters million portions of bone-gelatine soup were dealt out to the inmates of a single hospital. But in spite of the opinions of

eminent scientists that gelatine soups and gelatine tablets were a perfect substitute for proteids, their consumption decreased; physicians again took hold of the subject, and by the middle of the century opinion had so changed that nearly all, if not all, food value was denied to them. Modern experimentation based on more rational methods has put gelatine in its right place. It is a food, just as much so as is fat, but like fat it cannot play the rôle of proteid although a certain amount taken with fats and carbohydrates will enable the body to get along with a little less proteid. It is even said by Prof. Voit to excel fat in its ability to do half duty for proteid material.

We have thought it well to speak of this because of a sort of superstitious regard in the kitchen for "stock," a survival, one would think, of Papin's time. A good German housewife was wont to discourse to the writer on the economical virtues of a certain "Frau Doctor" who "always boiled her bones three times" and dwellers in many a household have had their nostrils assailed by the smell of glue, during the sixth hour of bone boiling.

But if the importance of gelatine was and is still exaggerated, this is still more true of the other parts of meat that can be extracted by water.

Sol. Albumen
and Extract-
ives.

We have seen that hot water coagulates proteid, and once coagulated, it will not dissolve in water, and for this reason the soup generally contains of this valuable principle only the soluble albumen which rose as scum. If the cook has skimmed this off, the soup which she calls strong is strong with flavors rather than with nutritive principles.

To show how very little real food a good tasting meat soup may contain, we will give an analysis made by Professor König.

Analysis of
soup. He took 1 pound of beef and about 6½ ounces of veal bones, and treated them, he says, as is usually done in the kitchen to get a pint of good strong soup or boullion. This contained

Proteids,	Fat,	Extractives,	Salts,
1.19 per ct.	1.48 per ct.	1.83 per ct.	.32 per ct.

But where are the albumens that were in the meat to begin with? Many of them are still there in that stringy, sodden mass, the "soup meat," which the cook tells us contains no further value. It consists of cooked connective tissue and albumen; now these are foods and they must be rescued from the garbage barrel, for

with the help of the chopping-knife and the herb bag we can make them still do proteid duty in our bodies.

Real import-
ance of soup. If we do not overvalue either the gelatine or the flavoring matters in our meat soups, nor throw away the meat out of which they are made, we shall begin to make soups on the right basis, that is an understanding of the real value of the materials we are working with, and we shall use meat for our soups less often than we now do perhaps, considering its high price and our greater need of it cooked in other ways. Soups should not be regarded as a luxury, neither as the last resort of poverty, but as a necessary part of a dinner, just as they are now used by all classes in Europe; but they need not be made of good cuts of meat, nor indeed, of meat at all.

Proteid as we
buy it. We will now direct our attention to the proteid as we buy it.

We cannot here take up the chemical composition and exact nutritive value of every kind of meat to be bought at the butcher's stall, the fish market and the poultry stand. But we must note a few points of importance.

Butchers' meat. We know that butchers' meat contains from 50 per cent to 78 per cent of water, according to the quality of the piece and the kind of animal. Most people in buying meat think first of the red part; they may know that it is advantageous to buy meat that is streaked with fat, but they hardly realize how wise it is to do so. As a rule fat takes the place of water. Let us consult tables of analyses for the amounts of water, proteids and nitrogenous extractives, fats and salts contained in lean pieces and in pieces streaked with fat. In Prof. König's valuable treatise on Foods we find such analyses, carefully collected and sifted out of a large amount of material; Pr. f. König's analysis of meat. samples of neck, tenderloin, shoulder, hind-quarter and so on, just as bought at the butchers', were analyzed after being freed from adherent *lump* fat, and the average composition of all the different cuts was as follows:

Fat and lean ox compared.	Water Per Ct.	Nitrogenous Substances. Per Ct.	Fat Per Ct.
From a very fat ox	55.42	17.19	26.38
From a medium fat ox	72.25	20.91	5.19
From a lean ox	76.71	20.78	1.50

These tables illustrate how wise it is to buy meat from a very fat animal. They show that a pound of meat from a fat ox may have

more than 20 per cent less water than a corresponding piece from a lean one ; of course such a piece may contain from 3 to 4 per cent less proteid, but to compensate for this, it will have 25 per cent more fat.

Let us give another table which illustrates that pieces like tenderloin are not the richest in proteids and fats, though they do have the finest flavor. It may help to console those whose purses do not allow them to buy these expensive cuts.

Dif. part of ox compared.	Water.	Nitrogenous substances.	Fat.
Neck.....	73.5 per ct.	19.5 per ct.	5.8 per ct.
Shoulder	50.5 “	14.5 “	3.4.
Tenderloin	63.4 “	18.8 “	16.7
Hind-quarter..	55.05 “	20.81 “	23.32

In this case the difference between shoulder and tenderloin as to the amount of water contained in each is striking. In the case of *medium* fat and lean animals, poor and good pieces approach each other more nearly in composition.

We regret that the scope of this essay will not allow us to give drawings and full illustrations of the different parts of an animal, with advice in detail as to what to buy. We are glad to mention in this connection a former prize essay—“Healthy Homes and Foods for the Working Classes”—which gives much information needed by the housekeeper as to the qualities and comparative value of the meat from different animals, of milk and milk products.

Of butchers’ meat, beef must always be considered the most economical, its choice being governed by facts just stated. Fat mutton also ranks high.

Pork. *Pork.* Say what we may against pork, it is a most valuable kind of meat, especially for the poor man, and the laws governing its slaughter and sale should be so stringent as to protect him. The great importance of salt pork and bacon we have considered under ‘Fats.’

It is of little use to give rules about buying this meat ; we must generally take what the butcher furnishes, but at least we can cook it well, never eating it raw even when well dried and smoked.

Fish. *Fish.* From the standpoint of the economist, fish is worthy of especial mention ; nature does the feeding, we have only to pay for the catching. In the season when it is best and cheapest, fresh fish should be used freely. We have only

to remind the housewife that she loses $\frac{1}{3}$ to $\frac{1}{4}$ of the weight of a fish in bones and head.

Salted and smoked fish is of great importance as food, and not alone for people living on the sea-coast. Salted cod contains, according to König's tables, 30 per cent of Proteids, and this fact, together with its low price, fully justifies its popularity with all economical people.

Other salted and preserved fish, as for instance, the herring, give variety in the diet of many a poor family.

LIVER, HEART, ETC.

Internal organs. Of the internal organs of animals generally considered eatable, we really appreciate only the liver. The lungs, brains, kidneys, heart, and the stomach prepared as tripe, are good food and they are often sold very cheap in country towns. The head of most animals, as of the calf, is excellent for soups and other dishes, and in the country it is often given away.

EGGS.

To get an idea of the comparative value of eggs as a food let us compare them with medium fat beef.

Eggs compared with meats as a food.	Water.	Proteids.	Fat.
Medium fat beef has	72.5 per ct.	21. per ct.	5.5 per ct.
Eggs have	74 5	" 12.5 "	12.

We see that while the water is nearly the same in both, the meat has the advantage in proteids and the eggs the advantage in fat, the fat moreover, being of very fine quality.

Take eggs at their cheapest, as in April when they often sell at 15 cents a dozen, that would be $12\frac{1}{2}$ cents a pound, 10 eggs of average size weighing a pound. They could then be considered cheaper than the highest priced cuts of meat, but still much dearer than the cheaper parts, flank, neck and brisket, at 8 cents. So that even at this low price, they are somewhat of a luxury to the man who must get his proteid and fat in their cheapest form.

And when we consider that only for a short time in the year is the price so low,—eggs being on an average quoted at 25 to 30 cents, the showing for them as a proteid rival of meat is poor indeed. Except in the spring the economically inclined must be sparing of their use even in dessert dishes. When housekeepers

say, as I have heard them, that eggs at 25 cents a dozen are cheaper than meat, they must be speaking in comparison with very high priced meats.

CHEESE

Cheese (its food value.) In America, cheese is regarded more as a luxury than as a staple article of food, and yet 1 pound of cheese is equal in food value to more than 2 lbs. of meat, it being very rich in both fat and proteids. Considering this, its price is very low and it ought to be a treasure to the poor man and do good service in replacing sometimes the more expensive meats.

Use of cheese abroad. Its food value is fully recognized abroad. For the Swiss peasant it is a staple second only to bread, while the use of it in Italy and in Germany is extensive. The writer once spent several weeks in the house of a large farmer on the slope of Mt. Pilatus in Switzerland, and observed daily the food given to the harvesters; the luncheon sent twice a day to the fields consisted of a quarter section of the grayish skim cheese, accompanied with bread. I was told that the poor people in the region ate scarcely any meat, using cheese in its stead.

The writer has also observed the use of cheese in Germany. Every locality has its special variety of the soft kind made of sour milk, and great amounts of the Swiss, both skim and full milk, cheese are consumed. It is generally eaten uncooked, but also as an addition to cooked food in a great variety of dishes.

Digestibility of Cheese. There is no doubt of the food value of cheese, but there does seem to be some question as to its digestibility. When we come to inquire into this point, we find that thorough experiments have been made by German scientists; Dr. Rübner, a pupil of Voit, gives the result of experiments on himself. He found that he could not consume much of it alone, but with milk he took easily 200 grams, or nearly $\frac{1}{2}$ pound, and only when he took as high as 517 grams or over a pound daily, was it less completely digested than meat. Professor König says, that in the amounts in which it is generally eaten, 125 to 250 grams daily ($\frac{1}{4}$ to $\frac{1}{2}$ lbs.) it is as well digested as meat or eggs. The extensive use of it abroad would seem to be some guarantee for the digestibility of the foreign varieties at least.

American cheeses have in general a sharper flavor than the foreign, still it is probable that well mixed with other food, enough could

be taken many a time, to give a man his needed daily quantity of animal proteid—between six and seven ounces—and this is a matter of great importance from an economical point of view.

METHODS OF COOKING MEAT.

Why cook. And first—why do we cook it at all? In the animal as well as in the vegetable world some foods are all ready for our digestion, as milk. Raw eggs too, are perfectly digestible and are often given to invalids. We hear of “Raw meat cures.” and it has been found that tender and juicy raw meat, if chopped fine to break the connective tissue, is well digested.

But raw meat does not taste good to most of us, while the delicious flavor and odor of a broiled steak make it very acceptable to the palate, and we must believe to the stomach also. We “bring out the flavor,” as we say, by cooking; what else do we do? Let us examine for a moment a piece of meat with reference to the effect heat has upon it.

Structure of meat.

The red part is made up of, first, very tiny sausage-like bags, or muscle fibres as they are called, and in these is contained the precious proteid matter, flavors and salts all mixed together with water into a sort of jelly; second, these muscle fibres are bound together by strands of connective tissue, as that white stringy mass is called, in which the fat and blood vessels are lodged; this is also of food value, but inferior to the fibres. Third, dissolved in the juices floating between the fibres and strands, there is also a proteid called soluble albumen. The little bags of proteid, when we can get at them, are as digestible in our stomachs as is the white of egg, though, like the egg again, their flavor is improved by slight cooking. But as we have seen, they are imprisoned in the connective tissue, somewhat, we may say, as are the starch grains of the potato in the cellulose.

Softening connective tissue.

This connective tissue we can soften by heat, thereby turning it into a sort of gelatine, but unfortunately, unless the meat is very tender, this requires a longer application of heat than is needed to cook the delicate albumen all full of flavors

too easily lost. To soften the connective tissue without overcooking the albumen, is one of the problems of meat cookery.

The next question is, how do our methods of cooking meet these requirements?

COOKING MEAT IN WATER.

1st method. Put a piece of lean meat into cold water, heat it very slowly and watch the effect. The water becomes slightly red, then cloudy, and as the heat increases, yellowish in color, and finally it clears sending a scum to the surface. If we examine this scum, we find that the water has soaked out much soluble albumen and a large proportion of the salts of the meat as well as other substantives called extractives; and now the odor of the boiling meat begins to fill the kitchen. The longer and slower the warming process, the more of all these things we shall extract, and the meat when taken out will be in just that proportion poor.

Soup making. This is the process known as soup making,—very simple, if we care nothing for the piece of meat but to soak out of it all the food and flavors possible. After some hours of cooking we find it shrunken, gray and tasteless. A dog if fed on that alone could not live many days. However, as we have before said, we are not to conclude, that it contains no more nutriment, but the stomach rejects it now that it is separated from all the flavoring matters.

2nd method. Now put a piece of meat into boiling water and continue the boiling. The surface of the meat suddenly whitens and a little scum rises on the water, though very little compared with what we saw in the former method. We have coagulated the albumen contained in all the little cells in the surface of the meat, and the soluble albumen, flavoring matters and salts cannot get out; the sealing up is not quite perfect, enough escaping into the water to make it a weak soup, but it is a good method of cooking a large piece if properly completed from this point. But if we *go on* boiling our meat, that is, keeping the temperature at 212°, we shall overcook the albumen in the outer layers before that in the centre is coagulated. By overcooking, we mean making it horny and flavorless, as we do the white of an egg if we cook it in the old-fashioned way, by dropping into boiling water and keeping it at that heat. Having seared the outside of the meat to keep the juices in, we must lower the temperature. The albumen coagulates

at between 160° and 170°, but the water in the kettle may be a little above this, as it must constantly transfer heat to the interior of the meat. The general rule is that it should "bubble" or "simmer" only, and if the cook can do no better she must follow these indications. That the true temperature for cooking meat is below the boiling point, many an intelligent housekeeper knows, but how is she to know when the water is at 170°? Here we come upon the weakest point in household cookery; various degrees of heat have different effects on the foods we cook, but of only one temperature is the housekeeper certain—that of boiling water.

For the use of the thermometer and the heat saver see page 194.

But to return; is there no way of cooking that will keep in the meat all these flavors and salts and albumens, just as nature mixed them? Yes, there are three ways—frying in fat, baking in an oven, and broiling over coals.

We will examine the first. If we plunge a thin piece of meat, as a cutlet coated with egg and breadcrumbs, into boiling fat, the albumen in the surface or rather in that of the egg surrounding it is coagulated as in boiling, but this time the outer rind preserves the juices still better because the fat will not mix with them as will water. Everyone knows how an oyster cooked in this way retains its juices.

When we bake a piece of meat in the oven, we start in the same way; we sear the outside in fat, turning the roast about in a small quantity of fat made hot in a kettle; we then transfer it, still in the kettle or pan, to a hot oven where the process of cooking is completed, but at short intervals we moisten the surface with the fat in the pan. If we did not baste the roast, we would find a thick layer of grey, tasteless meat inside the outer brown crust, and indeed the whole piece would dry long before the center of our roast had reached the coagulating point; we baste, in order to keep in the juices which, as we know, will not mix with the fat, and also that only a mild degree of heat, not exceeding the coagulating point of proteids, may be transmitted to the interior. In the intervals of our basting, some water is driven out of the meat and evaporated into steam, and the high heat of the oven expends itself in evaporating this, in heating the basting fat, and perhaps (if it reach so high a temperature) in decomposing part of it, and in changing the chemical character of small quantities of

extractives, thus making the meat "tasty," and so it happens that only a mild degree of heat is passed into the center of the piece. We would hardly believe that the inside of a roast, with its light pink color, registers only 160° by the thermometer, yet this can be proved by any one with a long chemist's thermometer.

Although some of the water of our meat has evaporated, the extractives and salts are retained to a larger extent than in boiling, as we shall see by the table given later.

Broiling. In broiling, the principle applied is exactly the same as in baking, the cooking being done by the medium of heated air. The dry heat of the coals affects the outer layer of the meat, as does the hot air of the oven. In both these methods, just as in boiling, we try to hold the temperature of our cooking medium just high enough to keep the heat traveling toward the interior of the meat.

We have now learned to cook the albumen enough and not too much and to keep the flavors of our meat; what about the connective tissue, and how has that fared with our different modes of cooking?

Tender meat. If our meat is cut from the tenderer parts of an animal of the right age, well fed and fattened, and if it has been kept long enough after killing, the connective tissue will soften into eatable condition in the length of time required to cook the albumen by the methods described. Such meat, so cooked, will always be tender and full of flavor.

Tough meat. But if the meat is cut from the tougher parts, or from an old or ill-fattened animal, or cooked too soon after killing, the connective tissue will not soften in that time; we must continue the application of heat till this tissue softens.

Methods compared: 1st, as to quality of meat. Therefore, what method of cooking we shall use, depends on the quality of the meat we have. Trimmings and tough portions we will make into soup, expecting to chop the tasteless meat next day and add other flavors to make it palatable. Somewhat better pieces, but still requiring long cooking to soften the connective tissue, may be made into a stew or ragout; or if the piece is large and compact, boiled in water; but meat that is tender and juicy (and for improving tough meat see page 195) should be boiled, baked or broiled, choosing oftenest the last two methods, because of the more perfect retention of the juices and the fine flavor given to the outer layer.

2nd, as to economy. We are told that baking or broiling is a very wasteful way of cooking meat; that if we would be truly economical we would always boil or stew, using our meat or its juices to flavor vegetables. From this we must dissent for it would condemn us to such a monotony as would be unendurable even to the poor. Better sometimes a smaller piece of broiled or baked meat with its delicious and stimulating flavor, and make our soup of vegetables and season it with herbs. Besides, according to the scientists, baking and broiling are *not* wasteful methods. I quote from a table of Professor König's, wherein are given the results of analysis of beef raw, after boiling and after "*braten*." Raw, it contained .86 per cent extractives (nitrogenous bodies mostly; very important as giving the stimulating smell and taste) and 1.23 per cent. salts.

	Extractives.	Salts.
Raw. . . . .	.86 per ct.	1 23 per ct.
After boiling. . . . .	.40 "	1.15 "
After " <i>braten</i>" . . . . .	.72 "	1.45 "

The advantage is seen to be in favor of *braten*, both in regard to extractives and salts. The loss of water was nearly the same in both cases. As for the fat lost in broiling a beefsteak, that is indeed a loss, but one to be made up in some measure by the smaller quantity of fuel necessary to cook the meat. The loss of this fat need not be made so much of, until we have learned to do better in many other still more important directions.

The philosophy of cooking meat according to the different methods has been treated, and we will now give a few additional directions as to carrying out these methods.

SOUP MAKING.

Materials for soup making. Lean meat of any sort, beef best; fresh, better than that long kept; bones of next value, especially the spongy rib bones and vertebræ. Saw and chop the bones into little pieces,—cut the meat small. Soft water is better than hard.

Method of making. Keep a kettle, if possible, for this purpose alone, and add to it all bits of meat and bones as they accumulate. Put the meat into cold water, let it stand some hours if possible, heat very gradually and keep *simmering*. Two hours or less brings out all the flavors of the meat, but a much longer time is necessary to get all the nutriment from the bones.

Skimming. Do not remove the scum ; it contains the albumen of the soup, and nothing objectionable if the meat was well cleaned.

An hour before the soup is served add flavors ; onions and carrots are the best, celery, summer savory, and parsley next. Use others, as cloves, nutmeg, bay leaf, etc., only occasionally. Add salt and pepper just before serving.

When done, strain and skim off all fat (better if left to stand till next day, the fat removed and the soup simply rewarmed), and make such additions as you wish.

[We prefer our soups with the fat removed, but the laboring people of Europe with their hardy stomachs find a soup much better if covered with "eyes."]

These rules apply to all meat soups. Mutton makes a strong and nutritious soup, veal a delicate soup. An excellent soup is made from a calf's head.

BOILING.

To boil meat. Put the meat into boiling water, bring quickly again to a boil and keep so for 10 minutes, then lower the temperature (as see page 189), and so keep it till the meat in the center has reached 160°–170°, or has changed in color from bluish to red, our usual test. For use of the "Cooking Safe" for this purpose, see page 194. Braising, "a la mode," kettle roasts, &c., are but modifications of this method.

To make meat stews. This is a combination of soup making and boiling. Use inferior parts, cut in pieces and cook, at 170° if possible, till tender. Half an hour before serving, season in any way you wish. See page 197.

FRYING IN FAT.

How to prepare suet in which to fry meat. Lard if used for this purpose should be tried out at home, but beef fat is cheaper and if nicely prepared no one can object to the taste.

Cut the fresh suet in pieces, and cover with cold water ; let it stand a day, changing the water once in the time. This takes out the peculiar tallowy taste. Now put it in an iron kettle, with a half teacup of milk to each pound of suet, and let it cook very slowly till the fat is clear, and light brown in color, and till the

sound of the cooking has ceased. The pieces may be loosened from the bottom with a spoon, but it is not to be stirred; if it burns the taste is ruined. Now let it stand and partly cool, then pour off into cups to become cold; it smells as sweet as butter and can in many cases be used instead of it. The fat left still in the pieces may be pressed out for less particular uses.

Any clean fat, even mutton, has its uses in cookery, and should be tried out and kept nicely.

Oils for use in frying. There are oils now sold which but for prejudice we would always use. *Pure* cotton seed oil is a fine oil with a delicate flavor; rape seed oil, which is used extensively abroad for this purpose, is also a pure vegetable oil, but somewhat rank in flavor. It is treated thus: a raw potato is cut up and put into the kettle, heating with the oil and cooking till it is brown, it is then taken out and the oil used like lard. The potato has absorbed the rank flavor.

Thin pieces of meat, like cutlets and chops, are coated with beaten egg and bread crumbs, and cooked in boiling fat for 5 to 10 minutes, according to the kind of meat.

To bake meat. Make some beef fat hot in an iron pan or broad kettle. Put the meat into it, and with a fork stuck into the *fat* part, turn it rapidly till it is on all sides a fine brown, then put it into a hot oven (about 340° F.), elevating it above the pan on a meat rack, or a few iron rods. Now comes the process called basting; in five minutes or less you will find that the top of the meat has dried, and you must now dip, with a spoon, the hot fat from the pan over the top. Do this every few minutes adding *no water* to the pan; you will find your meat well cooked in from twelve to fifteen minutes to the pound. It is done when it has lost, in the middle, the blue color, and become a fine red. Only salt and pepper should be used to season such a roast, and must be added when the meat is half done; if earlier, it toughens the fibres.

To broil meat. But when fuel is expensive, or in summer when a hot fire is a nuisance, the perfectly cooked meat can also be obtained by broiling; the management of the fire is the only trouble. We are told that a beefsteak for broiling should be cut three-fourths of an inch thick, and put over a hot fire of coal or charcoal; quite right, but when it has browned quickly, as it should, and been

turned and browned on the other side, it yet remains raw in the middle and if left longer, the surface burns. This is the experience of the novice, who has yet to learn two things; first, that immediately after the first browning, the fire must decrease in heat, or the meat be brought further away, so that the steak may cook ten to twelve minutes without burning—less time will not cook it nicely in the middle; and second, that like baked meat, the surface must be kept moist with hot fat. Before your steak is put over (unless it be very well streaked with fat), cover both sides with melted suet, and afterwards, as it dries, spread on a little butter or beef fat. Have ready in a hot platter a few spoonfuls of water in which the bones cut from the steak have been boiling, also salt and pepper. When the steak is done, lay it in the platter and keep it hot for five minutes, turning it once in the time; thus you will have both good steak and good gravy.

Professional cooks always use charcoal for broiling, and its advantages are great. As described on page 180 it needs only a simple contrivance, easily adjusted to any stove; a handful will broil a pound of steak, and the cooking of the rest of the dinner can go on without interference.

USE OF THE THERMOMETER IN COOKING MEAT.

To cook meat at a temperature of between 150° and 160° F., is no easy matter with the usual kitchen appliances. Even over an easily regulated heater, as a gas or coal oil flame, how are we to know that temperature when it is reached? The writer, knowing of no thermometer arranged for use in a kitchen, constructed a simple one after the model of those used in laboratories. A thermometer tube registering 300° Celsius was simply fastened into a cork, the bulb projecting below and protected by a short cylinder of wood. This floated on the water and made it easy to cook at any given temperature. This thermometer was also hung in a light wire frame and used for testing the heat of an oven.

THE HEAT SAVER.

It is a part of common information that the inhabitants of northern countries make extensive use of non-conducting substances, like wool, for preventing the escape of heat from a vessel in which cooking is going on. It is strange that we do not make more use of such appliances, for they have often been described and illus-

trated ; it is probably because they are not found ready-made, and with a complete list of directions for use. The writer made and used a cooker of this sort, and after considerable modification and experiment it became a very useful thing in the kitchen. If you wish to cook meat at the proper temperature, this contrivance makes it possible to do so, and is also very saving of fuel.

Directions for
making heat
saver.

Take a packing box measuring, say, two feet each way and cover the bottom with a layer of packed wool four to six inches thick ; set into the middle of this another box or a cylinder of sheet iron and fill the space between the two with a layer of wool, four to six inches thick and closely packed. Into the inner compartment put your kettle of meat or vegetables already brought to the boiling point and having a tightly fitting cover, and over this press a thick pillow or woolen blanket. Then fasten down tight over all, the lid of your box. As the heat in the water must finish the cooking already begun, its amount must be rightly proportioned to the amount of food to be cooked, *e. g.*, two quarts of water to one and one-half pounds beef rib, were used. The water was brought to the boiling point, the meat placed in it and allowed to boil for five minutes, the pot was then tightly covered, placed in the box and allowed to remain three hours. At the end of that time the meat was tender.

TO MAKE MEAT TENDER.

To make meat
tender.

It is well known that meat must be kept some time after killing to make it tender. In winter, a large piece of beef or mutton will keep for six weeks if hung in a dry, cool place. Indeed, this is the time allowed in England for the Christmas "shoulder of mutton," and every few days it is rubbed over with salt and vinegar. In summer, unless the butcher will keep the meat for you, you must resort to other means.

A tough piece of meat may be laid in not too strong vinegar for three or four days in summer and twice as long in winter, adding to the vinegar such spices as you may like. To soften a tough steak pour a few spoonfuls of vinegar on and let stand for twelve or twenty-four hours. This method has been long recommended and is to some extent used among us ; the foreign cook employs sour milk for the same purpose and with even greater success, but this must be changed every day and at the end of the time well washed from the meat.

We cannot too strongly urge that the housekeeper, especially if she be straightened in means, should become used to these methods and practice them occasionally. She does not want to confine herself to soups and stews and she cannot buy "porter-house" steak at 20 or 25 cents a pound, but she can buy "round" at half that price, and after a little experiment can make it tender for boiling, roasting or broiling by one of these methods. In winter, she should buy a supply of meat ahead and keep it until it grows tender.

RECIPES FOR COOKING MEATS.

The methods of cooking meat having been treated and mention made of the parts adapted to each, it remains only to give practical hints as to making and varying dishes.

BEEF.

Boiled, roast and broiled beef have been sufficiently dwelt upon. See pages 192-93.

Stews and ragouts. No mode of cooking meat has so many variations; the flavor of the meat being used to season vegetables of every sort, also doughs, as in dumplings, or in the crust of meat pie. For making meat stews see page 192.

With potatoes. One-half hour before the meat is done lay on top of it peeled potatoes, all of the same size, and serve when done with the meat and gravy.

Meat pie. When the meat is cooked tender, thicken the gravy and pour all into a pie or pudding dish. Cover with a common pie crust or one of mashed potatoes, and bake $\frac{1}{2}$ hour.

You may also mix sliced raw potatoes with the stew, in layers.

Potato Crust. 1 cup mashed potatoes, 1 egg, 2 tablespoons butter, 1 cup of milk, salt. Beat together till smooth, and then work in enough flour so that you can roll it out. It should be $\frac{1}{2}$ inch thick, and as soft as you can handle.

With tomatoes. Add to meat when tender, 1 quart tomatoes to 2 pounds meat. Thicken with flour and stew 5 minutes.

Flavors for stews. Stews are variously flavored ; onion, salt and pepper, are always in place. A little lemon juice added as it is served gives a delicious flavor, or even a tablespoonful of vinegar may be used. Any herbs, a piece of carrot, a clove or bit of garlic, may be used for variety. Catsup is also good as a flavor.

Corned beef. Wash it well, put into plenty of cold water and bring slowly to the simmering point. Cook 3 to 4 hours.

Turnips or cabbage are often eaten with corn beef. They should not be boiled with the meat but in a separate pot.

Beef liver. If from a good animal, beef liver is often as tender as calf's liver.

Broiled. This is the best method. Soak an hour in cold water, wipe dry, slice and dip in melted beef fat. Broil *slowly* (see page 193) till thoroughly done ; then salt and butter.

Fried. When prepared as above, the slices of liver may be fried in a pan with a little beef fat. This gives an opportunity for more flavors, as onions may be fried with it, a little vinegar added to the juices that fry out, then thickened and used as gravy.

Baked. If liver is not quite tender it can be made into a stew, or it may be chopped fine, mixed with bread crumbs and egg and baked $\frac{1}{2}$ hour.

Beef's heart. If fire is no object, you may boil a beef's heart, it will take all day. Put into cold water and bring slowly to the simmering point and keep it there. Next day it may be stuffed with well seasoned bread crumbs and baked $\frac{3}{4}$ hour.

Tripe. Cut in strips, soak in salt and vinegar $\frac{1}{2}$ day, wipe dry and fry in hot lard. It may also be stewed.

RECOOKING BEEF.

(A) Boiled, baked or broiled beef which is tender and full of flavor.

To serve roast beef a second time.

Roast beef re-served. Heat the gravy, put the roast in it. After trimming it into shape again, cover closely and put into a hot oven for ten minutes or less according to size of piece.

Or, cut in slices and lay in hot gravy only long enough to heat them through.

Hash. Being full of flavor such meat may be chopped and mixed with from $\frac{1}{3}$ to $\frac{1}{2}$ as much chopped or mashed

potatoes, bread crumbs or boiled rice. These mixtures may be warmed as hash, or made into cakes or balls to be fried on a griddle or in boiling fat.

Mix the chopped meat with the potatoes, bread-crumbs or rice as above, add salt and pepper and make quite moist with water or soup. Put a good piece of butter or of beef fat into a spider, and when it is hot, put in the hash. Cover and let it steam, then remove cover and let it dry out while a brown crust forms on the bottom. *Or*, stir till hot and dish immediately.

Hash balls. Make not quite as moist as for hash, form into little cakes, dust with flour, and fry to a nice brown in a little beef dripping on a griddle. *Or*, egg and bread crumb the balls, and fry in boiling fat.

RECOOKING SOUP MEAT.

(B.) This meat, though made tender by long cooking, has given much of its flavor to the soup. It has not, to the same degree, however, lost its nutritive value; if we can make it *taste* good again, both palate and stomach will approve it.

It will not do to mix this meat with neutral substances like potatoes and bread; it needs addition rather than subtraction.

In any case, first chop the meat very fine.

Pressed soup meat. Season the chopped beef well with salt and pepper, and some other addition, as celery salt or nutmeg, or some of the sweet herbs. Moisten with soup or stock, pack in a square, deep tin and place in the oven for a short time. To be sliced cold, or warmed as a meat hash to be served on toast.

Meat croquettes. When so good a dish as this can be made out of soup meat, it is worth a little trouble.

Ingredients. Two cups of the chopped beef, 1 tablespoon butter, 1 tablespoon flour, 1 egg, $\frac{1}{2}$ a lemon or 1 tablespoon vinegar, a few gratings of nutmeg and $\frac{1}{2}$ cup of stock or milk.

Cook the flour in the butter and add the stock or milk and seasoning, then the beef, and cook, stirring all the time till the mass cleaves from the side of the kettle. Let it get cold, then make into little egg shaped balls, let them dry a little, roll in beaten egg and bread crumbs and fry in boiling fat.

To vary—add one-third as much chopped salt or fresh pork as you have meat.

VEAL.

This meat takes other flavors well and is used by cooks for all manner of fancy dishes. It is lacking in fat and for that reason easily dries in cooking; an addition of pork is always an advantage to the taste. It must be always well cooked, never rare.

Roast veal. This may be a piece cut from loin, breast or shoulder, or a rib piece. Roast like beef (see page 189), allowing twice as long, or $1\frac{1}{2}$ -2 hours, for any piece under four pounds.

Broiled veal chops. Cutlets, chops and steaks are broiled like beef, but slower and twice as long and must be buttered and floured to prevent drying. Should be served with a tomato or onion sauce.

Veal stew. Cook like beef stew, see page 196. It may be varied in the same way and is generally more highly seasoned. Especially good as pot-pie. Salt pork should be added to it.

Liver, sweet breads and heart. Veal liver, sweetbreads and heart are all tender and excellent, but high priced, especially the sweetbreads. Liver and heart are prepared like the same parts in beef (see page 197), but the heart cooks tender in two hours. This latter is an excellent dish, do not soak it—stuff with well seasoned bread crumbs and bake, basting well.

MUTTON AND LAMB.

Mutton and Lamb. The quality of mutton is so varying that when cooked the dish is often a disappointment. The influence of long keeping or "hanging" upon it is even more beneficial than upon beef.

Mutton fat. *Fat of Mutton.* Some cooks trim away every bit of fat from mutton. It is perfectly wholesome, but sometimes gets a taste from coming in contact with the hide or hair of the animal; hence the prejudice. Scrape the outside of the meat well, pulling off the dried skin and cutting away the dark ends.

Pieces to roast. Unlike beef, other pieces besides the rib are good for roasting; the loin and haunch are most economical, the shoulder next, the leg next. Roast like beef, see page 189.

Unless the meat is first class, do not roast, but boil it. The leg is oftenest used for this purpose.

To boil mutton. Simmer about 12 minutes to the pound; that is the rule, but very frequently the meat when it comes on the

table, will be tough, owing entirely to the difference in the quality of the meat. Such meat must be boiled twice as long, or is better cooked in a stew.

Mutton chops. The chop is oftenest broiled and is a famous dish. Cut $\frac{3}{4}$ in thick, and broil rare like beef.

Chops and cutlets are excellent fried in fat. See page 192.

Mutton stew. This is the most economical and perhaps the most satisfactory of all mutton dishes. The inferior parts, as the neck, are as good as any for this purpose. Proceed exactly as with beef stew.

A good stew is made from sheep's kidneys.

Sheep tongues. These may be mentioned because sometimes thrown away or sold very cheap. Clean well, and simmer $1\frac{1}{2}$ hours, with a little pork and onion. Add to the gravy 1 tablespoon of vinegar.

All these recipes for mutton apply to the cooking of lamb; remembering however, that lamb, like veal, must be thoroughly cooked.

PORK.

Pork does not need to be kept in order to be tender, that is one of its great recommendations to the housekeeper. It is also easily cooked and we may lay aside some of the precautions we use regarding beef: the lean of fresh pork however, is apt to dry in cooking.

Roasting pieces. The leg, the loin and the chine are good roasting pieces as well as the rib. Pork is so rich in flavor that it seasons finely a bread crumb dressing, to which add a little sage and vinegar or chopped pickles. Bake separately, and lay around it when served. Or better, though more trouble, make holes in the roast and force the stuffing in.

Put directly into a hot oven in a pan containing some hot fat, and baste very frequently till done. Allow at least 20 minutes to the pound.

Steaks and chops. Steaks and chops are broiled, but the surface must be kept well moistened with butter or beef fat, or they will be dry and tasteless.

Stew of pork. Fresh pork is seldom boiled and it is too fat for a stew, though the lean may be selected and cooked like beef stew. It makes also an excellent potpie, or meat pie. See page 196.

Pig's liver. Pig's liver is good cooked like beef's liver, and is cheaper. See page 197.

Pork sausage. The cooking of this is very simple. Fry brown in a frying pan on the stove, or better, set the pan in a hot oven, you will then avoid the sputtering of the fat.

HAM, SALT PORK AND BACON.

Ham may be cooked in any way in which fresh pork is cooked. It may be cut in one-half inch slices, or thinner, and broiled or fried lightly in a pan. If long cooked it becomes tough and dry. If too salt for this, it may be soaked a half hour in warm water.

A large piece of ham is best boiled. If very salt, soak it in cold water for twenty-four hours, then put into cold water, bring slowly to a boil, and simmer half a day if the ham is of good size. A ham may also be baked.

Dishes from cold ham. So highly flavored a meat can be used in numberless ways, especially combined with vegetables and bread.

Sandwiches. Chop one-half pound fine, season with mustard, pepper and one tablespoon vinegar. Spread between slices of buttered bread.

Ham cakes. Take one cup finely chopped boiled ham, two cups of bread crumbs, two eggs, pepper and salt, and enough milk to make quite moist.

To use. 1st. Fry on a griddle in small spoonfuls, and turn as pancakes.

2d. Use mashed potatoes instead of bread crumbs, and fry as above.

Croquettes. 3d. Take either of the above mixtures, using, however, little or no milk, make into little balls and after rolling in egg and bread crumbs, fry in boiling fat.

With eggs. 4th. With eggs. Put either of these mixtures into a baking dish; smooth the surface and make little hollows in it with the bowl of a spoon. Put in the oven till hot, then break an egg into each depression, and return to the oven till the eggs are set.

Broiled salt pork and bacon. After slicing thin, freshen salt pork by laying in cold water over night or one-half hour in warm water. Broil till transparent and a delicate brown in color. Broil bacon without freshening.

Fried. Less delicate than broiled, but much more economical, because saving the fat. Fry only till transparent. Salt pork must be first freshened. To make milk gravy of the fat, see "meat and vegetable sauces."

Both salt pork and bacon are boiled with vegetables.

Bacon or Pork and Cabbage. This is a favorite mixture, and if the cabbage is only boiled half an hour and not in the same pot with the pork, it is not an indigestible dish. Put the pork into cold water, bring slowly to a boil and simmer from one-half to two hours, according to size of piece.

Pork and peas. Cook 1 qt. dried peas according to directions for pea soup. Boil pork with the peas during the last hour, or after parboiling, bake like pork and beans.

Pork and beans. Cook 1 qt. beans according to soup recipe. Par-boil 1 lb. salt side pork, score the skin in squares, half bury in the beans and bake two hours, or till a nice brown.

Pork and potatoes. Slice a dozen potatoes thin, also $\frac{1}{4}$ lb. fat salt pork, put into a pudding dish in alternate layers, seasoning with salt and pepper (only a little of the former). Bake, covered, $\frac{1}{2}$ hour, uncover and brown.

Pork and apples. Fruits seasoned with meat juices and fats, instead of with sugar, are not enough known among us.

Slice sour apples round in slices $\frac{1}{8}$ in. thick without peeling, and fry with strips of pork or bacon. Serve together.

FRESH FISH.

The varieties of fresh fish are numberless, and to cook and serve them in perfection requires careful study from the cook. The subject must here be treated very briefly.

Fresh fish may be cooked in any of the ways applicable to meat; the length of time being much shorter, and care being required on account of the delicacy of the fibre. This makes broiling somewhat difficult. Small fish are perhaps best egged and bread crumbed and fried in hot fat.

Fish chowder. This dish deserves especial mention because of its cheapness and good flavor. It may be made of any fresh fish.

Fill a pudding dish with the fish cut in pieces, seasoning each layer with salt and pepper, and bits of suet or fat pork; put over it a potato crust as for meat pie (see page 196), or a soda biscuit

crust, and bake. Bread crumbs or sliced potatoes may be mixed with the fish, and more seasoning used.

Fish soups. Fresh fish can also be made into soups, and the cheaper kinds should be more used for this purpose.

Codfish soup. Cook 1 tablespoon of flour in one tablespoon of butter. Add $1\frac{1}{2}$ qts. milk, or milk and water, and when it boils stir in 1 teacup of cold boiled codfish that has been freed from skin and bones and then chopped fine or rubbed through a sieve. Add salt and pepper to taste.

Bullhead or catfish soup. An excellent soup can be made of this cheap fish. Clean and cut up 2 or 3 lbs. and boil an hour in 2 qts. water with an onion and a piece of celery or any herbs (it must be well seasoned). Then add 1 cup of milk and a piece of butter or beef fat, or a piece of salt pork cut in bits may be boiled with the fish.

SALT FISH.

Salt cod. This is one of the cheap foods that seems to be thoroughly appreciated among us, and good ways of cooking it are generally understood.

It must be freshened by laying it in water over night; put into cold water and bring gradually to a boil; set the kettle back where it will keep hot for half an hour, separate the flakes and serve with a milk sauce.

Fish balls. This favorite dish is prepared by adding to codfish, boiled as above and finely shredded, a like quantity of mashed potato. Make into balls and fry on a griddle or in boiling fat. Any other fish can be used in the same way.

FOWLS.

The flesh of fowls cannot rank among cheap foods, but in any economical family the Sunday dinner may often be a fricassee made of a fowl no longer young. Unless very ancient, the flavor of such a fowl will be richer than that of a chicken; we have but to cook it till it is tender.

Old fowl fricasseed. Cut into joints, put into cold water and bring slowly to a simmering heat; on no account let it boil,—keep it as nearly as possible at 170° for 3 or 4 hours, or till it is very tender. At the end of 2 hours, add a sliced onion and salt and thicken the gravy.

Chicken soup. None but the wealthy should use chickens for soup, but from the bones left of baked or fricasseed chicken

a good and economical soup can be made. Boil an hour or two, take out the bones, thicken a little and serve with bread dice fried in butter.

Giblet soup. An excellent soup can be made of the *giblets*, that is, heart, liver and neck of chicken, and other fowls, which in city markets are sold separately and very cheap. Cut in small pieces and boil 2 hours with onion and herbs, then add a little butter and thickening, salt and pepper.

EGGS.

The importance of eggs is to be estimated from various points of view; their food value is great, their digestibility when fresh is almost perfect, and they can be cooked in so many ways and are a necessary ingredient of so many dishes, that the cook could ill spare them. Indeed, in all countries, their consumption seems to be limited only by their price.

Freshness. After the first twenty-four hours an egg steadily deteriorates. Physicians say, "never give to an invalid an egg that is more than two or three days old"

There are methods in use for preserving eggs fresh, on the principle of excluding air by sealing up the pores of the shell, but none of them are without risk and they cannot be recommended to one who must economize closely. It is better to go without eggs as nearly as possible in winter.

Raw eggs. Eggs are as digestible raw as cooked, and one easily comes to like the taste of a fresh raw egg beaten to a foam and mixed with a little milk or water and sugar, flavored with a little nutmeg or jelly.

Soft boiled eggs. To soft boil an egg its temperature should not be raised above 170°. The white will then be a jelly-like, digestible substance, but if exposed to a higher temperature, the white becomes horny while the yolk remains uncooked or becomes pasty. There are two methods of boiling an egg properly, which may be adopted according to convenience.

1st. Allow one quart of boiling water to four eggs. Use a pail or jar (heated before the water is put in) and wrap around with a flannel cloth. The eggs will be done in six minutes, but are not harmed by ten.

2d. Put the eggs into cold water and bring slowly to a boil. They are done when the water begins to boil.

Hard boiled eggs. To boil an egg hard, it is no more necessary to expose it to a high degree of heat than in the case of the soft boiled; the heat must simply be much longer continued, twenty minutes to a half hour. The egg will then be solid but not horny as when cooked in boiling water.

A great many attractive dishes can be made of cold boiled eggs. Scrambled, poached, omelet, and baked eggs. These are but different modes of cooking eggs soft or solid. The taste will be more delicate and they will be more digestible if in these cases also only the low degree of heat above mentioned be applied—more time being given them than is usually allowed.

EGG DISHES.

These dishes under many names and in many forms are of next importance after meats, composed, as they generally are, of eggs and vegetables or some preparation of the grains, while numberless additions and flavors are used to give variety and make the dish tempting to the eye and palate. Eggs so prepared have their full nutritive value; not so in rich puddings and cakes, where they are mixed with more sugar and fat than the system can take up in any quantity.

The following are a few recipes that have not been included under other heads. Many others will be found under the Cooking of the Grains.

Bread omelet. One cup of hard bread partly softened in hot water and milk, or in cold water (in which case press in a cloth and crumble), add one-half of a chopped onion, one tablespoon chopped parsley, one egg, salt and pepper. Heat in the frying pan or square baking pan, some bits of suet or beef fat, and pour in the omelet. Cover and bake five minutes, then uncover and brown. Or it may be cooked slowly on top of the stove. Cut in pieces and serve around the meat or with a gravy.

Egged bread. Bread, fresh or stale, is cut in long strips, or in squares or rounds with a cake cutter. Let them soak till soft but not broken, in one pint of salted milk into which two eggs have been beaten. Bake a nice brown or fry on a griddle in half suet and half butter. (May be made with one egg.)

Potato omelet. Fry a small onion, sliced, in a teaspoonful of butter or fat; fill the pan with two cups of cold sliced potatoes, salt and pepper them, and pour over them two beaten eggs. Bake

slowly till it is just solid and turn out carefully on a platter. *Or*, one cup potatoes and one cup bread crumbs may be used.

Rice omelet. One cup cold boiled rice, two teaspoons milk, one egg, one-half teaspoon salt. Mix and pour into a pan in which a tablespoon of butter has been heated. Fry and double over when done. *Or*, it may be baked like a potato omelet.

Flour omelet. One egg, 1 cup milk, 2 tablespoons flour, pinch of salt, add the beaten white of the egg last.

This is the "Yorkshire pudding" which is cooked in the pan over which beef is roasting; it is cut in squares and served around the meat. It may also be baked in a buttered pan without meat.

Tomato omelet. Three eggs, 1 cup flour, (scant), 1 tablespoon fine herbs, salt and cayenne pepper, 1 tablespoon sugar, juice of 2 large tomatoes and 1 cup warm milk. Bake under roasting meat or alone in a buttered pan.

CHEESE DISHES.

Almost any cheese will give a good result in these dishes. Crumbly cream cheese is richer in taste and has also been shown to be more quickly digested. Skim cheeses are as nutritious except in fat, and in some dishes, as in "Fondamin" give a better result. Grate old cheeses, chop new and soft ones.

Grated cheese. Grate old cheese and serve with bread and butter. It is also a good addition to mashed potato, to flour porridges, to oatmeal and wheat flour porridges, to rice, sago, tapioca and indeed to any starchy foods; it should be stirred in while these are quite hot. Its use with macaroni is given elsewhere.

Cooked cheese with bread. The basis of these dishes is toasted bread (white or graham) arranged on a platter, and enough salted water poured on to soften it.

1. Grate enough old cheese to cover the toast prepared as above. Set in the oven to melt, and put the slices together as sandwiches. This is the simplest form of "Welsh Rarebit."

2. One-half pound cheese, 1 tablespoon butter and 1 cup milk. Stir till smooth over a gentle fire or in a water bath and spread over the toast.

3. One-fourth pound cheese, 1 tablespoon butter, 2 egg yolks, $\frac{1}{2}$ teaspoon mustard, a pinch of cayenne pepper. Stir to smooth paste, spread on the toast and set in a hot oven for 4 minutes.

4. To each person allow 1 egg, 1 tablespoon grated cheese, $\frac{1}{2}$ teaspoon butter or 1 tablespoon milk, a little salt and pepper (cayenne best). Cook like custard in a pail set in a kettle of hot water, stirring till smooth, it may then be used on toast or poured out on a platter. It may also be steamed 5 minutes in little cups, or baked very slowly for 10 minutes.

5. Slices of bread lightly buttered, 3 eggs, $1\frac{1}{2}$ cups milk, 1 teaspoon salt, 1 cup grated cheese. Soak the bread in the milk and egg till soft but not broken. Lay the pieces in a pan, cover with the cheese and bake or steam.

Fondamin or
Fondue. This is a famous foreign dish, and although it may seem to have a good many ingredients, it is really not much trouble to make.

One-fourth pound grated cheese (skim better than cream) add to 1 gill of milk, in which is as much bicarbonate of potash as will lie on a three cent piece, $\frac{1}{4}$ teaspoon mustard, $\frac{1}{2}$ saltspoon white pepper, a few grains of cayenne, 1 ounce butter, a grating of nutmeg and 2 tablespoons baked flour. Heat carefully till the cheese is dissolved. Add 3 beaten eggs and stir till smooth. This mixture should be baked separately for each person in patty pans or paper cases and eaten immediately. All cheese dishes should be served very hot.

MILK.

Milk is sometimes called the one perfect food, containing all the constituents in their right proportions. This is true only for the requirements of a baby, but it remains for any age a valuable food when rightly supplemented.

Milk contains on the average 3.31 per cent proteids, 3.66 per cent fat, 4.9 per cent carbohydrates, 87.41 per cent water, and .70 per cent salts.

The housewife, if she wishes to use milk with economy, will not in cooking use it *as such*, but with due regard to the different values of the cream and the skim parts. In cities skim milk is sold for about one-half the price of full milk, and is well worth it if pure, but it is too often mixed with water.

Boiling milk. As soon as milk comes into the house it should be boiled, as it is a notorious carrier of disease germs which only in this way can be killed. Use an earthenware pitcher and let the milk remain standing in the same after cooking. The

next day remove the cream for the morning's coffee, and use the skim part during the day for cooking, with or without the addition of a little butter.

Keeping milk. To keep milk sweet in warm weather is a serious question to the housekeeper who has no cellar or refrigerator. It is of first importance that the vessels used to contain it should be scrupulously clean. Boiling, as above mentioned, and cooling it rapidly afterwards, will keep it sweet for 24 hours, unless the weather is very warm, and the time may be further extended by keeping the milk pitcher set in a dish of cold water. A quarter of a teaspoonful of baking soda to a quart of milk, added while it is still sweet, may be used in case of necessity but this is not to be commended for common use.

Canning milk. A method that the writer has employed is this: simply canning the milk as one would can fruit. Fill glass jars and screw down the lids, then place them in a steamer over cold water; heat the water gradually and steam the jars for an hour, then tighten the tops. I have never kept milk so treated for more than a week, but see no reason why it should not keep much longer.

Sour milk. However, if you find yourself with sour milk on your hands, do not throw it away, it has many uses. Butter-milk is also very valuable to the housewife; it can be kept a long time in good condition for mixing doughs by covering with water, which must, however, be often changed for fresh.

USES FOR SOUR MILK AND BUTTERMILK.

Bonny clabber. Put skim milk into a glass dish or into tea cups and set away until it becomes solid. Then eat with sugar and powdered cinnamon sprinkled over it.

Cottage cheese. Set thick sour milk where it will heat gradually till the curd separates, then pour into a bag and let it drip till dry. Salt well, and add a little cream or milk and melted butter.

Buttermilk. 1st. As a drink. For this it should be very fresh.

2d. Buttermilk soup. (See another page.)

Uses for both. Both buttermilk and sour milk can be used

1st. In making soda biscuit dough (see another page).

2d. In pancakes of all kinds (see another page).

3d. In corn bread (see another page).

4th. In some kinds of cake, as in gingerbread, cookies and doughnuts, where they are by many cooks preferred to sweet milk; and in almost any kind of cake sour milk may be substituted for sweet, remembering always to use only half the quantity of cream of tartar called for in the recipe.

FATS AND OILS.

The third food principle, fats, stands between the two great nutrients, proteids on the one hand and carbohydrates on the other, and we find that we can indulge in considerable latitude as to its use. When we wish to get our food in a more condensed form, we can use fats freely in connection with proteids and lessen the amount of carbohydrates. In army dietaries the amount of fat is largely increased for marching, and for great exertion the quantity becomes three times that allowed in garrison life. For instance, the daily rations served out to the German soldiers in France during the month of August, 1870, contained

	Proteids.	Fats.	Carbohydrates.
Army dietary.	157 gms.	285 gms.	331 gms.

It was represented by one pound, ten ounces of bread, about one and one-eighth pounds of meat, and over one-half pound of bacon besides an allowance of coffee, tobacco and wine or beer. Prof. Ranke has called this an admirable diet for fighting men. In garrison life these soldiers would have received only fifty-six grams of fat, and 120 grams of proteids while the carbohydrates would have been increased to 500 grams or more.

On the other hand, fat when coupled with enough carbohydrate food can replace some of the proteid, and often does so in the food of hardy and economical people. The Bavarian wood-chopper is enabled by his splendid digestion to arrange his diet in the following way: He takes little proteid from the animal kingdom, but in order to get enough of it from vegetable products, he must, as we know, take in an immense quantity of the

Diet of Bavarian
woodchopper.

starch associated with it, and to this he adds a great quantity of fat. Von Liebig says that such a man takes on the average

Proteids.	Fats.	Carbohydrates.
112 gms.	309 gms.	691 gms.

We see therefore that we can have a sliding scale for fat; that while we should not go below two ounces a day, we may, in case we lower one or both of the other two great constituents, go up to eight or nine ounces.

Importance of fat not realized. People belonging to the well-to-do classes, unless they have given special study to the subject, seldom realize the importance of fat in our economy. Fat means to them fat meat, suet, lard and the like, and the much eating of these is considered proof of a gross appetite; they do not consider how much fat they take in eggs, in milk, in grains like oatmeal and maize, in the seasoning of their varied dishes, and in their well-fattened meats, where, as in an average piece from a very fat mutton, they eat twice as much fat as proteid without knowing it.

Indeed, a well fed man of the upper classes may have more fat in his daily diet than has the freshly arrived Mechlenburg laborer who spreads a quarter inch layer of lard on his bread. The latter cannot take his fat in unsuspected forms; he craves this principle with his plain vegetable diet, and must take it as he can get it.

Now let us understand that where economy is to be considered, this question of fat does not take care of itself as it does for the rich man. The economical housewife should always keep in mind that she must furnish her family enough fat, and furnish it cheaply.

Substitutes for butter. Butter is a dear fat; count out the water in it and see what it costs you. We must economize in butter in as many ways as possible. We must eat more fat meat, first, that which is ingrained with the lean where it takes the place of water, as we have seen under "Proteids," costing us practically nothing; when we eat our vegetables seasoned with such a piece of meat, we find them sufficiently seasoned. We must also eat more of fat meat which we recognize as such, taking pains to cook it so that it will be palatable; the crisp, brown outside of a roast is always welcome, but the fat of boiled beef or mutton will also be relished if served very hot. An excellent selection in low-priced beef, is the fat middle rib; the lean part is very tender and juicy when cooked in water at a low temperature for two or three hours (or in Heat Saver, see page 194, for three or four hours) and the

fat, if served hot, any but a pampered taste will relish. Too much cannot be said in praise of pork as furnishing a good tasting and cheap fat; it can be cooked in many ways and used to flavor vegetables, etc.

Digestibility of fat. It is consoling to the economist to know that little of this food principle will be wasted in the body. Fat is more completely absorbed, according to the testimony of the experimenters, than any other kind of food, even meat.

We want to say a few words as to the character of different animal fats, and then we are done with this subject.

All the fats consumed by us, without exception, are composed of three bodies called neutral fats, mixed together in varying proportions. These three bodies are "olein," "palmatin" (margarin), and "stearin," and the chief difference between them is that they melt at different temperatures; the more olein a fat has, the more easily it melts, and the less it has, the more it is like tallow. In vegetable oils, we find in addition to these, small quantities of what are called "fatty acids," and in butter we have beside the three common fats, a small per cent of four scarcer ones.

Fats compared. Practically therefore, all fats are alike, and when absorbed they do the same work in the body, their varying flavors and their colors having nothing to do with this.

However, their flavor, their appearance and the ease with which they melt in the mouth and in the digestive tract have much to do with our estimation of them as foods. Mutton fat will do our body the same service as butter, but because of the relatively small amount of olein it contains, we have difficulty in swallowing it.

As to the comparative digestibility of these fats, it is generally admitted that those which melt at a low temperature, like butter and vegetable oils, are most readily taken up by the system; it is thought that we could digest beeswax if it would melt in the stomach. Still, although butter stands in common estimation as the most digestible, as it is the most palatable of the fats, the stomach finds no trouble in disposing of reasonable amounts of any fat used in the household.

Artificial butter. The fact that all fats are so similar in composition, and that, if once digested, they will do the same service in the body, first led scientists to try to make out of the cheaper fats a substitute for butter. It was Napoleon III who set the chemist Mège-Mourier at work to discover an artificial butter for

use in the army. This chemist added butter color and flavors made in the laboratory, to olein and margarin extracted from beef suet, and mixed with this a little real butter, and so successful was the result, that the making of artificial butter has become a great industry. Now certainly no one objects to artificial butter on the ground that it is made of animal fats, for he eats these every day on his table; he objects because he has doubts as to the cleanliness or the healthfulness of its method of manufacture.

Therefore since the substitution, to some extent, of animal fats for butter is from an economic standpoint so desirable, if we cannot bring ourselves to use oleomargarine we must do the best we can in these kitchen laboratories of ours to make other fats than butter acceptable to the taste.

USES OF FATS.

Beef suet. Its uses. Beef suet has many uses. It should be bought perfectly fresh, that surrounding the kidneys being chosen as of the best quality. Chopped fine, it is used in suet puddings, and may be employed to enrich other puddings made of skim milk, as a rice pudding; it combines well with bread crumbs in any hot dish, in bread puddings, bread stuffing, bread omelet and soup balls. In all cases it must be chopped fine and cooked sufficiently to fully incorporate it with the other materials. Suet may also be used in many flour dishes instead of butter, if they are only cooked long enough and eaten warm, also in all cake where molasses and spices or any strong flavor is used.

Marrow. Every bit of marrow in bones should be scraped out and carefully used. Its taste is more delicate than that of suet, and it can be substituted for butter even in fine cake.

Butter tried out. Whatever butter you use in cooking should be *cooked* butter which may be prepared when butter is cheap and put away for winter use. So prepared it will keep as long as lard.

A second quality of butter may be used for this, or that which is beginning to be rancid; if already so. add one-fourth teaspoon soda to each pound, but such butter when tried out will not keep as long as that made from sweet butter. In trying out butter great care must be taken not to burn it. Put it in a large iron kettle and cook it down very slowly until you no longer hear the sound of boiling; it will then begin to froth and rise and this is a sure sign that the process is completed. Set the kettle back to cool a few moments,

then skim and pour off the butter from the dregs into jars. Keep in a cool place and closely covered. In any recipe use one-fourth less than of fresh butter.

Tried out suet. This should be done with even more care, to avoid the tallowy flavor. Exact directions are given in "Cooking Methods," page 192. The "scraps" are often relished by children.

This beef fat (which we decline to call tallow) should be put away in cakes in a jar closely covered.

To use. To use it, scrape it fine, sprinkling a little flour in it to keep it light. So prepared it may be used in any of the ways mentioned under "suet," and to this list still others may be added, since it does not need, as does suet, long cooking in order to mix it well with the other ingredients of the dish. It can be used successfully in warm breads of all kinds, and in all but the nicest cakes if mixed with one-half butter.

Lard. Much of the lard now furnished is so poor, that unless one pays a high price to a well known dealer, it is better for each housekeeper to buy the leaf lard and try it out herself.

Cut fine and cook all the water out, taking care not to burn.

The "scraps" are even better than those left from suet and should by no means be thrown away.

SAUCES FOR MEAT AND VEGETABLES.

The economical and busy housewife says she has no time nor money for sauces, but the fact is she cannot afford to do without them.

All vegetables must have some fat to season them and to use butter in every case is extravagant and gives no variety, while a cheaper fat if made into a sauce with flour and water, can be flavored in a dozen ways.

DRAWN BUTTER SAUCES.

Drawn butter, which is the foundation of most of the sauces is thus made.

Plain. A heaping tablespoon of butter or beef fat is put into a saucepan; when it boils, 1 heaping tablespoon flour

is added and stirred as it cooks. To this add gradually 1 pint of water, 1 teaspoon salt and $\frac{1}{4}$ teaspoon of pepper. If you wish to unite economy and good flavor use $\frac{1}{2}$ tablespoon of beef fat in making the sauce, and add $\frac{1}{2}$ tablespoon butter, cut in little pieces, just before serving.

Milk sauce is the same, made with milk instead of water.

In *brown sauce*, the fat and flour are stirred till they brown, then make as above.

Any number of sauces can be made from these three by adding different flavors; chopped pickles and a tablespoon vinegar are added to No. 1 when it is to be used on fish; or mustard for mustard sauce.

The addition of eggs raw or cooked makes another variety.

With the help of milk we can make a gravy as in *Milk gravies*. “milk sauce,” with beef or pork fat, seasoning with salt and pepper and perhaps some powdered herb.

Children like all these gravies, if nicely made and flavored, to eat on bread as well as on vegetables.

MEAT SAUCES.

A few cheap sauces for meats alone deserve special mention.

Mint sauce. Two tablespoons green mint or spearmint chopped, 1 tablespoon sugar, $\frac{1}{2}$ cup vinegar. Mix and let stand an hour or two.

Tomato sauce. Boil 1 pint fresh or canned tomatoes with a little onion, salt, and herb flavoring until quite thick, then strain and add 1 teaspoonful of flour cooked in a teaspoonful of butter.

Fruit sauce. Any sour fruit, as apples or plums, makes an excellent sauce to eat with meat. Apple sauce goes especially well with pork.

Horseradish sauce. Add to drawn butter or any meat gravy $\frac{1}{2}$ cup grated horseradish. Simmer a few minutes.

CARBOHYDRATE-CONTAINING FOODS AND THEIR PREPARATION.

We are now to furnish for the body the third great food principle, the carbohydrates. These we mean when we speak of the starches and sugars, and with unimportant exceptions, they are furnished by the vegetable world only.

Cellulose. As we have seen, that troublesome body, cellulose, plays here a large rôle. It is the skeleton, so to speak, of plants, built by them out of sugar and starch; the chemist finds no difficulty in his laboratory in turning it back into dextrin and sugar, and our stomachs too can digest a large part of the cellulose of very young and tender plants,—from forty-seven per cent to sixty-two per cent it has been found, of young lettuce, celery, cabbage and carrots,—but in older plants, the cellulose proper becomes all intergrown and encrusted with substances of a woody and mineral nature, from which even the chemist separates it with the greatest difficulty, while our digestive juices are entirely unequal to the task. Therefore it is that the whole art of the cook is needed in treating this substance; she must soften it, she must break it up, and in many cases separate it as completely as possible from the sugars, starches and proteids which it hinders us from appropriating to our use.

Its use. In some cases, as in oatmeal and graham flour, we leave the cellulose because of its mechanical action on the bowels. To be sure, this is a wasteful process, for the cellulose carries with it when it leaves the body considerable undigested food, but better this waste than to give the muscles of our intestines so little work to do that they become unable to digest any but fine, condensed foods.

As a rule, however, we must think of cellulose not as a food at all, but as a tough, foreign body which we must reckon with before we can utilize the proteid and starch particles of many important vegetable foods.

Amount of Carbohydrate. The carbohydrates, especially the starches, are the cheapest of the food constituents and therefore most

apt to be in excess, especially in the food of the poor. According to estimates already given, an adult at average hard work gets along nicely with one and one-eighth pounds of carbohydrate material (meaning, of course, the dry amount of this one principle), though fortunately, as mentioned under "Fats," it is found that some of this large amount can be exchanged for fat, if the body, for any reason can better use the latter. Brainworkers and the richer classes the world over take less of carbohydrates, at least in their starch form, and more proteids and fats.

Inasmuch as we get these carbohydrates from the vegetable kingdom, and because the housewife must furnish them combined with other principles as in bread and other things made of flour, and in various dishes in which vegetables are combined with meat, milk, eggs, etc., we will cease speaking of carbohydrates as such, and will give a few hints as to how to prepare vegetable foods so that we can get the most out of them, bearing in mind, however, what has been said about not following out this principle to the extent of weakening the bowels.

To what extent digested This leads us, first, to examine the general digestibility of the whole class of vegetable foods; meaning by this, not the rapidity nor the ease, but the *extent* to which the nutritive principle is yielded up to us. It has been found that, as usually prepared, vegetable foods give up to us from one-fourth to one-half less of their nutrients than do animal foods, and especially is this true of those that are rich in proteids. To illustrate: A workman eats as part of his dinner a dish of boiled beans, but though he rightly considers that he has been eating a nourishing dish, he has really absorbed only sixty per cent of the nitrogenous substances contained in it, the other forty per cent passing from him unused because of its intimate connection with the cellulose; at least this was the case with Prof. Strümpell who records the result of personal experiments on the digestibility of beans cooked whole. Now this workman digested of the meat part of his dinner ninety-seven and one-half per cent, and this comparison shows how the tougher kinds of cellulose interfere with the absorption of the food matters which they enclose.

The starch part of vegetable food we seem to get out much better than the proteid part, even with our ordinary methods of cooking; thus out of cooked rice we get almost ninety-nine per cent of the starch, but only eighty per cent of what proteid it contains; flour

in the form of noodles and macaroni yields up ninety-eight and one-half per cent of its starch and eighty per cent of its albumen—in the form of bread a little less of each. The potato will give us only seventy-five per cent of what little proteid it contains, but as high as ninety-two and one-half per cent of its starch.

Effect of too
much starch
in the diet.

Although the starch-containing foods are cheap and although they yield up a good per cent of this nutritive principle, they must not be used to excess for the following reason. Starch must first be turned into sugar by our digestive juices before it can be taken up into the blood, and if the stomach is given more at a time than it can master, certain fermentations may take place, and digestion be influenced. The best authorities say that without doubt the continued and severe diarrhœas of small children are due to the fermentation of starch foods for which their digestive organs are not yet ready.

These fermentations, the irritating action on the bowels of too much cellulose, and the loss of a good deal of proteid substance connected with it form the shady side of a vegetable diet. Even the ox with his many stomachs gets out of grass and unchopped hay only sixty per cent of the proteid and fifty per cent of the fat contained in it.

VEGETABLE PROTEIDS.

Even in our part of the world two-thirds of the proteid food of most people is taken from the vegetable kingdom, and in order to choose our food profitably, we must know where to look for vegetable proteids, and how to fit them for eating. Here the cereals and the legumes are our friends, the former furnishing from seven to fourteen per cent in their dried state, the latter giving the astonishing figure of twenty to twenty-four per cent; or as much as meat.

GRAINS.

The cereals or grains, though containing much less proteid than the legumes, are more valuable to us because of their excellent taste, their availability to the cook and the readiness with which when ground they yield us their nutrients.

Since the grains are such important foods, a table is appended showing the average richness in food principles of those in common use among us. We find that different analyses of the same grain differ greatly from one other, barley for instance, ranging from 8

to 18 per cent in its proteid, and this may account for a certain grain being popular in one country and not in another.

In our country we are especially fortunate in the cheapness and excellence of at least two of the grains, Wheat and Indian corn.

Wheat and Indian corn. The first has of course much higher food value, but the latter is so cheap and can be so easily cooked that it is a blessing to the poor. The large per cent of both proteids and fat in oats is to be noted, justifying as it does, the high esteem in which they are now held among us. At the other extreme is rice, the poorest of the grains in both these principles, but its almost perfect digestibility renders it very useful.

Analysis of grains.	Proteids.	Fats.	Carbo-hydrates.	Water.	Cellulose.
Fine wheat flour,	10. per ct.	1.0 per ct.	75.2 per ct.	13. per ct.	0.3 per ct.
Rye flour,	11.5 "	2. "	69.5 "	14. "	1.5 "
Barley grits,	11. "	1.5 "	71.5 "	15. "	0.5 "
Oat grits,	14.5 "	6.0 "	65. "	10. "	2.5 "
Buckwheat flour,	9.5 "	2. "	72.5 "	14. "	1. "
Corn or maize flour,	10.15 "	4.80 "	68.45 "	14. "	2.6 "
Rice grains,	8. "	1. "	76.5 "	13. "	0.5 "

SUGARS.

Most people would class sugar among the luxuries, and indeed we are best acquainted with it in those combinations with fruit, eggs, butter, and various flavoring matters, which, as puddings, pies, cakes, custards, etc, make up our dessert list.

Our first concern, however, is with its food value. Food value. It gives us the high figure of ninety-nine per cent of the third food principle,—Carbohydrates. That is, it must be put in the list with bread and it can be used to a certain extent instead of bread and other starch foods. Moreover, it is especially fitted for a food in cases where nourishment is needed immediately, as it is digested or absorbed into the system almost as quickly as water and without taxing the digestive organs, and perhaps on this account is its consumption so great in our country; we live fast and we want our nutriment in a condensed form.

But on account of its cost and because we are able to take only a moderate amount at a time, sugar cannot, to any great extent, take the place of the starches; we are to value it chiefly for the relish it

Its chief value. gives to other foods. As a flavor, it is of the greatest value, but if we prize variety we are certainly accustomed to the taste of sugar in too many dishes, as in rice, custards, and various egg and bread dishes, which the foreigner would sometimes salt instead of sweeten, and eat with his meat instead of at the end of the meal.

We would suggest that when we do use sugar, as in a pudding, for instance, that we use less of it than we are accustomed to do, for in that case we could eat enough of a dish so flavored to make it furnish more of the real substance of a meal.

BEANS, PEAS AND LENTILS.

Per cent of pro- Look again at the remarkable per cent of proteid
teins. given by this class of vegetables. Beans and peas, twenty-three per cent, lentils, twenty-five per cent, while beef gives on the average only from seventeen to twenty-one per cent. By people who from choice or necessity live principally on vegetables, the legumes have always been largely used; their consumption is extensive in India, China, and in all of Europe.

To be sure, the *quality* of the proteid is not the same as in meat, it is less stimulating and palatable, and perhaps in other ways inferior, but the proteid needs of the body can be answered by it, and that is a very important item when the question is one of economy.

Digestibility. The impression that dried beans and peas are "hearty" food, fitted for out-door workers rather than for less vigorous people or those of sedentary habits, seems justified by the fact that these vegetables contain an unusually large per cent of

Cellulose. cellulose of the tougher sort which requires a long continued application of heat to free it from the proteid and starch of the vegetable; indeed, unless it is broken fine or ground into flour, cooking, however long continued, will be insufficient. We have seen that Prof. Strümpell digested only forty per cent of the proteid of beans cooked in the ordinary way, but when they were ground to flour and baked he digested 91.8 per cent.

Bean flour. The fact is, we could cook and eat our wheat whole much more easily than we can our beans, and yet bean flour is not in the market, if we except the "prepared" sort in small, expensive packages. It seems that the best we can do is to cook beans well and seive them; in that way we free them from the skins at least.

Split pea. The dried and split pea, though as valuable as the bean and already freed from the skin, is not as much used among us; it should be more employed in soups and as a vegetable.

Lentils a few years ago were to be found only in large cities; now they are more easily attainable. Their food value, as we have seen, is still greater than that of beans and peas, but the taste is not as agreeable until one becomes accustomed to it. An economist cannot afford to neglect the legume family.

POTATOES.

We in our country need not feel as bitter against the potato as do the scientists of Europe, for we are not obliged to use it to excess, and considering its cheapness and availability it is for us a good vegetable and on these accounts, though it makes a poor enough showing as to food value, we must rank it next to the bean in importance. It has only 2 per cent of proteids, no fat and only 20.7 per cent carbohydrates, and yet since it can be prepared in so many ways and we never tire of its mild flavor, it will doubtless continue to come upon our tables more frequently than any other vegetable. But every day or twice a day, in large amounts, is far too often; indeed those who use it to this extent must be ignorant of its relatively low food value. The quality of the potato is of great importance and none but the best should be used. It should be a mealy variety and perfectly ripe.

GARDEN VEGETABLES.

Green vegetables, excepting the pea and bean, are not to be valued chiefly for what we can reckon up in them of proteids, fats and carbohydrates, for the amount is very small. Except in the height of the season they must be looked on as luxuries, but we will buy them as often as we can afford them. In quantities sufficient to flavor soups and stews they can always be afforded, and in this way should be freely used, carrots, celery, parsnips, and tomatoes, for example.

FRUITS.

Our markets offer us a great variety of fine fruits, and many of them are cheap in their season; apples in the fall are within the reach of the very poorest.

Fresh fruits have a large per cent of water, as high as 89 per cent in the orange, and few fruits have less than 80 per cent. Their food value is mainly in the form of sugar, apples giving us on an average 7.7 per cent, grapes 14.3 per cent; of proteids, the amount does not, with the single exception of the strawberry, reach 1 per cent; but fruits are very useful to us on account of their flavor, due to various aromatic bodies, fruit acids and sugar. The apple is especially valuable on account of its cheapness and fine keeping qualities, and is used in a variety of ways by the cook to give a relish to plain materials. Although our largest use of them is in sweet dishes, they are perhaps quite as valuable used without sugar; they may be fried in slices and eaten with fat meat, as bacon or sausage, or they may be used to stuff a fowl.

Fruit is not for all people easy of digestion if eaten in considerable quantities, and this is partly on account of its relatively large per cent of woody fibre, and also, especially when not quite ripe, because of the acids and pectose contained in them. Huckleberries have twelve per cent woody fibre, apples only 2 per cent including the seeds and skin.

The importance of dried fruits as food is not well enough understood. Fruit loses in drying a large portion of its water, leaving its nutritive parts in more condensed form for our use; dried apples are very near to bread in the per cent of nutrients they offer, and the dried pear may be called the date of Germany, so general is its use. With us this fruit is too expensive, but in parts of Germany the writer has seen dried pears commonly exposed for sale by the barrel like beans; they are eaten in great quantities by the common people, who seem to digest them and dried apples without any trouble, accustomed as their stomachs are to a rye bread and vegetable diet. These dried fruits are made into a variety of dishes with meats, with potatoes and with beans and also with noodles and macaroni.

COOKING OF GRAINS.

The grains may be cooked whole, coarsely ground, as grits, and finely ground, as flour.

All these grains can be cooked whole but it is seldom done, because of the length of time required. Only rice and barley are generally so cooked.

In cooking rice, the aim should be to have the grains distinct from each other, soft, dry and mealy.

Grains cooked whole.

Rice. To cook.

Steamed. This is the best way. Add to the rice three times its bulk of water, salt well, put in a covered dish in a steamer and steam one-half hour. Or, the rice may be soaked over night, and it will then steam soft in twenty minutes.

Boiled. Put the rice into a large quantity of boiling water, add one teaspoon salt to each cupful of rice; boil fast, stirring occasionally. Drain, dry out a little and keep warm by covering with a cloth, as is done with potatoes. Save the water poured off for soup.

Rice. To use. Its best use is as a vegetable with meat. Being of a bland and neutral character, it can, like bread, be made into an endless number of dishes to be eaten with meats, or into dessert dishes, with sugar, fruits, etc. For rice omelette (see page 206), rice pudding (see "Index" for pages).

Grated cheese is a good addition to rice, supplying its lack of proteids and fat.

Pearl barley boiled. Soak all night and boil soft in salted water. It may also be steamed. Use as a thickening for soups, or like rice, as a vegetable, or as a breakfast dish with sugar and milk.

With prunes. It is excellent mixed with its bulk of stewed prunes;—pour over it melted butter, sugar and cinnamon.

GRAINS, COARSELY GROUND, OR GRITS.

These are better adapted to simple cookery than are fine flours, since to make them eatable it is only necessary to cook them soft in water. The grains used in this way among us are cracked wheat, farina or wheat grits, oatmeal, hominy and corn meal, and they are all cooked in nearly the same way.

MUSHES.

Wheat, oat and corn mushes. *Time* 2-3 hours. This time may be shortened by soaking the grits some hours in water. Oatmeal and corn cannot be over-cooked.

Amount of water. They all, except corn, absorb from three to four times their bulk of water; corn, a little over twice.

Salt. One teaspoonful to one cupful of grits.

Method of cooking. Steaming is best, as there is then no danger of burning or of making the mush pasty by stirring. Put the grits and four times their bulk of water into a double boiler or into a dish and set the dish into a steamer, or use a tin pail with tight

cover, and set in a kettle of water;—any way to keep it at boiling heat without burning.

Porridge. Stir any cold cooked mush smooth with half water and half milk to the consistency of porridge. Add a little salt and boil up. Sugar and cinnamon or nutmeg may be added as flavor. Of course porridges can be also made of the uncooked grits, they are simply very thin mushes.

Pancakes. One cup of cold oatmeal, hominy or corn mush, 2 cups flour, $\frac{1}{2}$ pint of milk, $\frac{1}{2}$ teaspoon salt, and 1 egg, 2 teaspoons baking powder or 1 of soda and 2 of cream of tartar. Or, sour milk may be used with 1 teaspoon soda, omitting the cream of tartar. These mushes will differ a little in thickness, and therefore more or less flour may be needed. Bake on griddle.

Muffins. The same mixture as above, with the addition of a little more flour. Bake in muffin rings.

To fry. For this, only corn mush and hominy are commonly used. When cooking, add a handful of wheat flour to the mush to make it stiffer. Pack while warm into a square mould and when cold cut in slices and fry slowly to a nice brown on a griddle with a little fat. Or the slices may be dipped into beaten egg, then into bread crumbs, and fried in boiling fat.

CORN FLOUR.

There is one fine flour that can be treated in the same way as the coarsely ground,—that made from Indian corn. Perhaps on account of its larger per cent of fat and because little of its albumen is in the form of gluten, it does not form into a sticky paste as does wheat flour, but can be mixed with water only and then boiled or baked into digestible and good tasting food, and this is one thing that makes corn so valuable a grain to people like the negroes of the southern states, whose cooking apparatus is of the most primitive sort. Corn meal has one peculiarity,—it quickly sours and should be kept no longer than a week. The kiln-dried meal, however, keeps indefinitely, and is now largely used, but is not as sweet as the freshly ground. The name “meal” seems to be used for both the fine and coarsely ground

Corn mush. This, whether made from fine or coarsely ground corn, is cooked like grits. See page 222.

Hoe cake or corn pone. One quart Indian meal, one teaspoon salt. Moisten to a dough with boiling water or milk; let it stand a

few hours till it shows air bubbles on the surface, then make into thick cakes and bake in the oven, or cut in slices and fry in pork fat on a griddle. Break, not cut, and eat hot.

GRAHAM FLOUR.

This preparation of wheat, though finely ground, may be treated somewhat like grits, and a bread may be made of it with the addition of water only which will be light and palatable. The secret of success is in having the oven very hot.

Mix salted graham flour with cold water to a batter Graham gems. thick enough to drop, then put it into iron forms already heated, and bake in a *very* hot oven for about fifteen minutes.

FINE WHEAT FLOUR.

Flour may be cooked, of course, in boiling water or milk, and in this way is used to thicken gravies or soups, and also to make a sort of mush with milk and eggs. See "Minute Pudding"

The principle of cooking it in this case differs not at all from the cooking of a potato; in both cases the starch granules soak up the hot water till they burst their cellulose walls. But if we were to try to *bake* flour when wet up into a thick paste, we would find it, in the first place, difficult to accomplish, the heat being very slowly communicated from the surface to the interior, and when done, we would have only a tough indigestible mass. There is, however, one way of preparing such a paste for cooking, which we will consider before treating the "raising" of flour for bread. Flour dough is in this case kneaded hard, rolled thin and then dried. So treated we know it in the form of

MACARONI AND NOODLES.

A trade article extensively used abroad where the Macaroni. best kinds cost only ten to twelve cents a pound, and the broken or imperfect sticks not more than seven. It is a valuable article of food, but its use will not become extensive among us while it is so dear.

Like the fine flour of which it is principally composed it is deficient in fat, and must be eaten with the addition of butter, cheese or milk.

How cooked. Put into plenty of salted boiling water, and boil twenty or thirty minutes, till it is perfectly tender (if old it takes

longer to cook). Drain carefully, pouring it into a cullender or lifting out with a skimmer.

To use. 1st. (Best.) Put it in the dish in layers with grated cheese and butter.

2d. Serve with milk and butter sauce.

3d. Add two beaten eggs to the milk and butter sauce.

Other uses. Like bread and rice, macaroni when cooked is made into a great number of dishes; it is added to soups, it is mixed with meat in ragouts, and it is cooked with certain vegetables, as tomatoes.

With tomatoes. Arrange the macaroni in a pudding dish in layers with grated cheese and stewed tomatoes. Brown in the oven.

Noodles. This is also a trade article, but that of home manufacture is much better. It may be called one of the German national dishes, so extensive is its use among that people, with whom it often constitutes the main dish of a meal without meat.

Ingredients. Three eggs, 3 tablespoons milk or water, 1 teaspoon salt, and flour.

To make. Make a hole in the middle of the flour, put in the other ingredients and work to a stiff dough, then cut in four strips, knead each till fine grained, roll out as thin as possible and lay the sheet out to dry. When all are rolled begin with the first, cut it into four equal pieces, lay the pieces together and shave off very fine as you would cabbage, pick the shavings apart with floured hands and let them dry a little.

To use. Boil them a few at a time in salted water taking them out with a skimmer and keeping them warm. Strew over them bread crumbs fried in butter or use like macaroni.

These noodles will keep indefinitely when dried hard, therefore when eggs are cheap they may be made and laid up for the winter. The water in which they are boiled is the basis of noodle soup; it needs only the addition of a little butter, a tablespoonful of chopped parsley and a few of the cooked noodles.

Experimenters have proved that flour in the form of noodles and macaroni is more perfectly digested than even in bread.

BREAD MAKING.

So far we have used in the cooking of flour no other principle than the simple application of water and heat.

We must now consider how fine flour is to be made into what is known as bread. As before said, the particles easily pack together when wet into a pasty dough which, if so baked, would defy mastication and digestion. We must contrive in some way to separate these flour particles by forcing between them air or some other gas, so as to present as large a surface as possible to the action of the digestive juices and this may be done 1st, By surrounding these particles by fat, as in making pie-crust; 2d, By the air contained in beaten egg; 3d, By forcing carbonic acid gas through the mass by the action of (a) yeast, or (b) of bi-carbonate of soda acting on some acid.

FLOUR RAISED WITH FAT.

The familiar example of this method is pie-crust, where a paste of water and flour is repeatedly rolled and spread with some fat, as lard, until the paste is in paper-thick layers with the fat between. When baked, the air expands and separates the flour particles, a true lightness being the result.

So much fat must be employed to produce this result, however, that the use of this method will of course be limited to the construction of dessert dishes, of which not much is eaten at once.

A flour rich in starch is better for this purpose than a gluten flour.

FLOUR RAISED WITH EGG.

The next most simple method of cooking fine flour is to introduce between its particles the air adherent to beaten egg, and by the immediate application of heat to expand the air and stiffen the mass thus aerated. By this method none of the food principle is wasted as when yeast is used, nor is a chemical salt left in the dough as in the action of soda, but the method is expensive and is limited in its use to what may be called fancy breads and cakes.

We have selected the following mixture as the foundation for egg breads; of course others are possible:

Foundation of egg breads.	One quart milk, 3 eggs, 1 tablespoon butter and 1 teaspoon salt.
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This mixture is then thickened with any kind of flour, *or* with part flour and part bread, boiled rice, boiled hominy or corn mush.

To mix. First beat the eggs very light, whites and yolks separately, then the yolks smoothly with the flour and milk, stir the whites in at last very lightly and bake immediately. The eggs must

be beaten *very* light, and the batter just of good pouring consistency, thinner than if no eggs were used

Wheat, graham or corn pancakes. Add to above foundation mixture a scant pint of either of these flours.

Cooked rice, hominy or corn mush pancakes. Add to the foundation mixture one cup of flour and two cups of boiled rice, hominy or corn mush (or the proportions may be reversed). Bake in small, rather thick cakes. If they stick to the griddle add a little more flour.

Bread pancakes. Add to the foundation mixture 1 cup flour and 2 cups bread crumbs that have been soaked soft in milk or water and mashed smooth. The batter should be rather thick. Bake in small cakes adding more flour if they stick.

Muffins and waffles. Muffins and waffles of all sorts are made like pancakes, but a little stiffer with flour.

Other egg doughs. Other egg-raised doughs, mixed in somewhat different proportions and differently cooked, as fritters, sponge cakes and batter puddings, will be found in another section.

FLOUR RAISED WITH CARBONIC ACID GAS.

This is brought about by (*a*) the growth of the yeast plant or by the action (*b*) of bicarbonate of soda on some acid. Both of these methods have their advantages.

Yeast. The action of the yeast plant when brought into contact with flour and water is to develop carbon dioxide gas and alcohol. This it does at the expense of the little sugar already in the flour, but still more at the expense of that which it manufactures out of the starch, or as some say, out of the gluten. The chemist ascertains this loss of nutritive matter to be as high as one per cent, and Liebig, who was strongly opposed to this method of bread raising, estimated that 40,000 people might be fed on the flour that was wasted in this way in Germany alone. But notwithstanding this waste, the method, on account of its convenience and the good taste it gives to bread, still holds its ground.

The time cannot be far distant when the baker will furnish us better and cheaper bread than we can make in our own kitchens. This has long been the case on the continent of Europe, but for some reason we have not yet reached that point in civilization and the housekeeper must still learn this art and practice it, for good bread is a necessity.

Quality of flour. The best flour is, even for the poor, the cheapest, as it makes more and better bread to the pound. There should always be two kinds kept on hand; the yellowish, high-priced gluten flour for bread making, and the whiter, cheaper sort for pastry, cake and thickenings.

No recipe for making yeast will be given, as the compressed yeast is so much better than the housewife can make, and is now obtainable even in small towns.

To make bread. Proportions, 1 quart warm water, $2\frac{1}{2}$ quarts (about) of flour, 1 tablespoon salt, 1 tablespoon or one cake of compressed yeast, or $\frac{1}{2}$ cup liquid yeast. The proportions of flour and water differ according to the quality of the flour, the gluten flours taking up much more water than the starch flours.

Put the flour and salt into your bread pan and make a hole in the middle, then pour in gradually the water in which the yeast has been dissolved, mixing as you pour with your hand or with a spoon. As soon as the mass will hold together, take it out on a moulding board and with floured hands work it gradually into a tender dough, using as little flour as possible, for the dough must remain as soft as can be handled. This first moulding should take from 15 to 20 minutes. Then let the bread rise in a warm place; the yeast plant can live in a temperature ranging from 30° to 170° F. but thrives best at about 72° . Cover with a cloth and in winter keep by a warm stove. If made with compressed yeast, the dough will rise the first time in an hour. Take it at its first lightness, before it begins to sink back (it should be like a honeycomb all through, and double or treble its original bulk), put it on your moulding board, or $\frac{1}{2}$ of it at a time, and mould it well until it is fine and tender again. Add no flour this time but keep the hands moist with warm water or milk or with lard. Divide into loaves—small ones—which should only half fill the greased tins, and set again to rise, keeping it at the same temperature and letting it get very light again. Flour that is rich in gluten requires longer to rise than that containing more starch.

Baking bread. It is difficult to give directions about the heat of the oven. One housekeeper says "hot enough so that you can hold your hand in till you count twelve," another, "until you can count thirty," and the puzzled novice can only inquire "how fast do you count?" The oven must be hot enough to brown the

bread lightly in ten minutes, and to bake a small loaf in from twenty minutes to half an hour.

Additional facts. If more convenient, a bread sponge may be made at first with the water, yeast, and part of the flour, and when light the rest of the flour added. It hastens the process a little.

How many times shall bread rise? Do not let the bread rise more than twice; it loses each time some of its nutritive qualities. Bread raised *once* is coarse of grain but sweet to the taste.

To keep bread long. Mould it harder than you do bread that is to be eaten soon.

Dough that has become chilled. Set the bread pan immediately into a larger one filled with warm water and as the water cools replace with warm until the dough begins to rise again.

Dough raised during the night This method is often convenient, and does very well if slower yeast is used, but bread is better to be raised quickly with compressed yeast. If the latter is used a forenoon is sufficient for the process of making and baking.

To delay the baking of bread dough. For convenience, as to make warm biscuits for supper, rising dough may be kept at a standstill for hours without injury at a temperature of about 50°, as in a cellar, and an hour before baking brought into a warm room to finish the rising process.

BREADS FROM OTHER FLOURS

Graham bread. Graham bread is made like white bread using two parts graham to one of white flour, or any other proportion liked, but it should be mixed very soft. A little sugar and fat should be added, 1 tablespoon lard or beef fat and 2 table-spoons sugar or molasses. Bake slower and longer than white bread.

The usual and most convenient way of making graham bread is to mix the flour and other ingredients with some of the white sponge on baking day.

Rye bread. Rye bread is made exactly as is bread from wheat flour, but in this country four parts rye, one part corn meal, and a handful of wheat flour are generally used. It must bake much longer—two to three hours in a slow oven. It is still better steamed the first two hours and baked the third.

Corn bread. Corn bread is made of 3 parts corn meal to 1 of wheat flour, same quantity of yeast and salt as for white

bread, and an addition of 2 tablespoons lard or beef fat and two tablespoons sugar. It is only to be stirred, not moulded, and need rise but once.

BISCUITS, BUNS, ETC.

Breakfast rolls or biscuits. These are "little breads" of either white or graham flour. Make part of the dough out into little balls which will rise more quickly and bake in a shorter time, a little butter or lard, one tablespoon to a quart of dough being generally moulded with it.

When called "Breakfast Rolls" the dough is made out into flat round cakes, the top buttered and folded over not quite in the middle.

Milk rolls. Milk rolls are made from bread dough mixed with milk instead of water; they are very tender and delicate.

Wheat gems or drop biscuits. One modification in the baking of dough is worthy of mention. Use about a cup more milk in mixing the receipt for bread given above, so that the dough will just drop from a spoon and then bake in forms in the oven, or on a slow griddle.

Rusks. These are made from bread dough mixed with milk and with the addition of four eggs and one cup of butter to a quart of milk. Form, long and high.

Other uses for rusk dough. There are many uses for the above dough. When made out into biscuit shape it may be steamed and eaten as a simple pudding with fruit, or made into tiny balls and cooked, when light, in a meat stew, the dish being then called a pot-pie.

Buns, plain. These are like *Rusks* (above) plus 2 cups of sugar and a little spice, say, $\frac{1}{2}$ teaspoon nutmeg. Roll the dough out $\frac{1}{2}$ inch thick, and cut with a biscuit cutter. Let it rise till very light, which will take some time on account of the sugar.

Fruit buns. To plain buns add 1 cup India currants, washed, dried and floured, or raisins cut in bits.

Raised cake. From the recipe for buns, as above, a plain and good cake may be made by using one pint instead of one quart of milk to the given quantity of eggs, butter and sugar, and adding a little more fruit. Bake in a ribbed pudding dish which has been thickly buttered, and in the butter, blanched almonds arranged in rows.

Doughnuts. Bun dough may also be fried in fat, as doughnuts.

For a fine brown crust To give a fine crust to biscuit or buns: Brush over before baking, with a feather dipped in one of these mixtures: one teaspoon of molasses and milk, two teaspoons of sugar and milk, or three teaspoons sugar and the white of an egg.

To show the true relation of the above doughs to each other, the quantity has been kept the same as for bread dough, but one-half the given quantity of cake, buns or biscuit would be enough for a large family.

To steam bread. Any of the above doughs can be cooked by steaming instead of baking, when more convenient. They will of course lack the brown crust, but may afterward be dried or browned in the oven. A somewhat longer time is required for steaming than for baking.

YEAST BREADS—THIN.

Raised pan cakes. Wheat, graham and corn. The materials for these are, 1 quart milk, or milk and water, a little more than a quart of flour, 1 tablespoon compressed yeast or $\frac{1}{2}$ cup liquid yeast, 1 teaspoon salt, 1 tablespoon butter; the flour may be wheat flour, wheat and graham mixed, or wheat and corn mixed, or part bread crumbs may be mixed with the flour. Make and raise like bread sponge. It is better they should be too thick than too thin, as milk may be added to thin them after they are light. but raw flour added at that time spoils them.

Pancakes with eggs. Add to the above batter just before baking, 1, 2 or 3 eggs, yolks and whites beaten separately. Use in this case somewhat less flour.

Muffins and Waffles. These can be made of either of the above pancake batters, with 1 cup to 1 pint more flour.

BUCKWHEAT FLOUR

Buckwheat flour makes bread that is relished by those accustomed to its somewhat peculiar taste, but in this country it is used only in pancakes.

Buckwheat pan-cakes. One quart buckwheat flour. 1 teaspoon salt. 1 cup or less of corn meal scalded in a little water, 2 teaspoons molasses (to make them brown—a little buttermilk answers the same purpose), 1 tablespoon compressed yeast, 1 quart warm water, or enough to make a thin batter. Let rise over night.

FLOUR RAISED WITH SODA.

Soda.

On the interaction of bicarbonate of soda and different acids, by which carbonic acid gas is liberated is based a common method of raising doughs. It wastes none of the flour, as does yeast, but it has its own disadvantages. The product of these chemicals acting on each other is a salt which is left in the bread; hydrochloric acid acted on by soda gives common salt, to which there could be no objection, but this method is not easily used in the household, and the salts left by other acids, as the lactic acid of milk when acted on by bicarbonate of soda, we get enough of in other dishes. Whether reliable experiments have been made as to the comparative digestibility of breads raised with soda and those raised with yeast the writer does not know, but there is a widespread impression that the former should be eaten only occasionally, and it is certain that we tire of them sooner than of yeast breads. Besides, which is of importance to one who must economize in milk, eggs, &c., better materials must be used with soda than with yeast to produce an equally rich tasting bread or cake.

METHODS.

We have three methods of using bicarbonate of soda to raise flour; by its action on

1. The acid contained in sour milk, from 1 to 2 teaspoons of soda being used to a quart of milk.
2. On cream of tartar, the proportions being 1 teaspoon soda to 2 of cream of tartar to a quart of flour.
3. On tartaric or other acids already mixed with it in a baking powder and to be used according to directions on the package, or, one may say in general, that three teaspoons of the powder go to every quart of flour.

Secret of success.

The secret of success in making soda raised breads consists in (1) the perfect mixing of the soda and cream of tartar or the baking powder, with the flour, cooks who are particular sieving these ingredients five times. In this connection we cannot urge too strongly that each housewife should make and keep on hand this prepared flour; in a leisure time she can measure, sieve and mix it, and she has then in making biscuit or cake, only to chop in the butter, add the milk and eggs and it is done.

2. In light mixing of the shortening with the flour; this is best accomplished with a chopping knife.

3. In a rapid completion of the work after the two raising agencies have become wet and begun to work, and no delay in baking when all is ready.

Ingredients. One quart of flour, 1 teaspoon salt, 1 Soda biscuits. tablespoon butter, or butter and lard, or butter and suet, 1 scant pint *sweet* milk or water with 1 teaspoon soda and two of cream of tartar, or three teaspoons of baking powder; *or*, 1 scant pint *sour* milk with 1 teaspoon soda and one teaspoon cream of tartar; if the milk be very sour omit the cream of tartar.

To make. In a chopping bowl stir all well together except the shortening and milk, then *chop* in the shortening which should be cold and hard, till all is fine and well mixed. Now add the milk a little at a time, still mixing with the chopping knife. Take out on the moulding board and roll out with as little mixing as possible.

This dough is often made richer, even 1 cup of butter to 1 quart of flour being used, but so much as this can only be considered extravagant and unhealthful.

To use this dough. Roll 1 inch thick, cut with biscuit cutter and bake. To be eaten warm with butter.

As graham biscuits. Use three parts graham flour to one of wheat and treat in same manner.

As short cake. Roll $\frac{1}{2}$ inch thick, fit into jelly cake tins and bake. When nicely browned, split and butter and pile up like toast.

For fruit short cake (see page 237.)

SODA BREAD OF CORN MEAL.

Corn bread, or Johnny cake. One cup sweet milk, 1 cup sour or buttermilk, or both of sour milk, 1 teaspoon salt, 1 teaspoon soda, 1

1. Plain. tablespoon butter or suet or lard, 3 cups Indian meal, and 1 of wheat flour, or all of Indian meal. Pour into a tin and bake 40 minutes.

2. Richer. The same with an egg and $\frac{1}{2}$ cup sugar added.

3. Very nice. No. 1, with the addition of 3 eggs, $\frac{1}{2}$ cup sugar and $\frac{1}{3}$ cup butter, 1 cup meal being omitted.

SODA RAISED BREAD—THIN.

Pancakes without Eggs.

Ingredients. One quart flour, 1 teaspoon salt, and 1 scant quart sour milk, with 2 level teaspoons soda and the same of cream of tartar unless the milk is very sour, when omit the cream of tartar. Sweet milk can also be used with 1 teaspoon soda and 2 of cream of tartar, or 3 of baking powder.

To make. Mix the salt and cream of tartar if used, with the flour. Make a hole in the middle and pour in the milk gradually, stirring with a spoon till smooth. Then beat hard for five minutes, or till it is bubbly. Add the soda dissolved in a teaspoon of hot water, and bake immediately on a very hot griddle.

Unless well beaten before the soda is added, these pancakes without eggs are not a success.

If made with sour milk they will be still better, if when mixed (without the soda of course) the batter is left to stand twelve or even twenty-four hours. Just before using add the soda dissolved in a little hot water.

Are made in the same way, 1 part being of white flour and 3 parts graham.

As above, with corn meal instead of graham.

Pancakes with Eggs.

Ingredients. To any of the 3 preceding recipes add 2 or 3 eggs, beating yolks and whites separately.

Muffins and Waffles.

Muffins and waffles of all kinds are the same as pancakes, made a little thicker and with the addition of 1 tablespoon of butter.

Fritters.

For fritters, which should be next in order (see page 240)

USES FOR BREAD.

These are so numerous that the housekeeper need never fear the accumulation of stale bread, if she will only take care of it in time. Every day the bits left from meals and the dry ends of the loaf must be dried hard in the oven and then put away in paper bags. If time allows, pare off the crusts, cut into cubes and dry separately to add to soups.

To dry bread. This dried bread will keep for weeks or months—it must simply be kept clean and dry. In any recipe where bread-crumbs are called for, as bread pudding or bread omelet, use this dried bread, laying it first in *cold* water till it is soft, then pressing it dry in a towel and crumbling it lightly with the hand.

Here are a few of the ways in which bread can be used.

USES FOR BREAD IN SLICES.

Toast. In dry toast, milk toast, and water toast, to be eaten as such and as a foundation for many other dishes.

Fried toast—bread slices soaked in egg and milk, or water, and fried on a griddle with a little fat. (See page 205). Cold milk or water toast may be so used.

Fritters. For bread fritters (see page 240).

Puddings. For bread and butter pudding (see page 239).

Steamed bread. Stale bread may be cut in slices and steamed so as to taste sweet and good. Set the slices up on end in the steamer and steam five or ten minutes, and then dry a little in an oven.

Bread rebaked. Biscuits of all sorts, even when several days old, may be made nearly as good as when fresh, by wetting the tops and setting in a hot oven for about five minutes. A convenient way of having warm biscuits for breakfast.

USES FOR CRUMBS OR DRIED BREAD

Soaked and crumbled as described on page 236 and use in bread dough instead of half the flour.

In bread omelettes (see page 205).

In meat balls for soups and stews (see another page).

In bread dressing. Pour enough hot water on dry bread to soften it and chop it not too fine; season with chopped onion, herbs and suet or tried out fat. The addition of an egg is an improvement. Bake covered, about an hour, then uncover and brown. This mixture may also be used for stuffing a fowl, leg of mutton, &c.; or it may be fried in spoonfuls on a griddle and eaten with a sweet sauce as the simplest form of pancakes.

In bread pancakes (see page 227).

In bread puddings (see pages 237, 238 and 239).

For breading chops, croquettes, &c., that are to be fried in boiling fat.

SIMPLE SWEET DISHES.

This department does not pretend to be complete, it simply aims to classify as many of the cheaper kinds as the ordinary family needs. These will generally be used as desserts but there is no reason why the main dish of the meal should not have some sugar in it. I remember that in a simple *pension* in Thuringia, Germany, I once ate of a dinner consisting of a soup, a salad and one other dish, which we would call a bread pudding. I was helped bountifully to this main dish of the meal, I ate and was satisfied, for the materials were good and it was well made and delicately baked. The recipe will be found on page 237.

MILK PUDDINGS.

Indian pudding. One quart of milk, $\frac{1}{2}$ cup corn meal, 1 teaspoon salt, $\frac{1}{2}$ cup chopped suet, 1 tablespoon ginger, $\frac{1}{2}$ cup molasses. Bake covered for 3 hours in very slow oven and serve with sweet sauce.

Swelled rice pudding. One quart skim milk or 1 pint full milk and 1 pint water, $\frac{1}{2}$ cup rice, 2 tablespoons sugar, $\frac{1}{2}$ teaspoon salt. Bake slowly 2 hours covered, then uncover and brown. It will be a creamy mass and delicious in taste. Serve without sauce. Raisins may be added.

Minute pudding *Ingredients.* One quart milk—skim milk with 1 tea-
of wheat or spoon butter will do—2 eggs, $\frac{3}{4}$ pint flour, 1 teaspoon
graham flour. salt. To prevent burning make in double boiler or pail set in a

kettle of boiling water. Mix the flour and egg smooth with part of the milk, heat the remainder to boiling and stir in the egg and flour. Stir till it thickens, then let it swell and cook slowly for 15 minutes. Serve with fruit, or with sugar and milk.

Ingredients. One pint water, 1 pint milk, 1 teaspoon salt, $\frac{1}{2}$ pint farina, 2 eggs. Make as above.

This is excellent cut in slices when cold and fried brown on a griddle. It may also be made without eggs.

Ingredients. One pint fresh buttermilk, 2 table-spoons cream or butter, 1 teaspoon salt, a pinch of soda, and flour for stiff batter. Steam 2 hours, or till it bursts open, or bake in little cups or patties. May be eaten with any fruit sauce or with milk and sugar

FRUIT PUDDINGS WITH SODA BISCUIT DOUGH.

Strawberry
shortcakes.

For this dough, see page 233.

When baked as short cake, split the cakes and spread between each pair strawberries mashed and sweetened.

Other fruit
shortcakes

In the same way make shortcake of berries of any sort, stewed apples, stewed pieplant, lemon or orange tart filling, in short, any filling for a pie. that is ready to eat without further cooking. These should be eaten warm but not hot, and are as good next day, if put in the oven long enough to become again warm and crisp.

Roly poly pud-
ding and apple
dumpling.

These favorite dishes are but modifications of the fruit shortcake. In the first the dough is made just stiff enough to roll out, covered with apples or berries or other fruit, then rolled up and put to bake in a pan containing a little water.

For apple dumplings, the crust is cut in squares, sliced apples placed in the middle, then the corners gathered up and pinched together. Bake like roly poly pudding, or steam.

Apple pie. If you wish to cook your fruit at the same time with the crust, fill a deep pie plate with fruit, as apples, and cover with the rolled out shortcake. Bake brown, and when done lift the crust, sweeten the fruit, replace the crust, and the "pie" is ready to serve.

Raised biscuit or bun dough (see page 230), can be used in the same way, or still better, yeast pancake mixture (see page 231) in layers with any sort of fruit.

If you will call these fruit shortcakes "pies," and be content therewith, you will save much labor, much expensive material, and set before your family a more healthful dish. No further recipes for pies will be given; a few that are generally classed as such, coming more naturally under the head of puddings.

FRUIT PUDDINGS WITH BREAD.

1. *Brown Betty.* *Ingredients.* One pint bread crumbs or dry bread moistened, 1 quart chopped sour apples, $\frac{1}{2}$ pint sugar, 2 teaspoons cinnamon, 4 tablespoons butter or suet.

Arrange bread and apples in layers in a pudding dish, beginning and ending with the bread crumbs, seasoning each layer with the sugar and spice and spreading the butter over the top. Cover it till the apples are soft, then uncover to brown.

2. *Berry Betty.* The same, made with raspberries or blackberries. If not juicy enough, a little water must be added. A pudding may be made in the same way with cherries or any other well flavored fruit.

CUSTARD PUDDINGS.

1. *Plain.* *Ingredients.* One quart milk, 4 eggs, beaten yolks and whites separately, 4 tablespoons sugar, a grating of nutmeg and a pinch of salt. Bake in a buttered pudding dish till solid, and take from the oven before it curdles.

2. *Rice and cus-*
tard. To above ingredients add $\frac{1}{2}$ cup of rice cooked soft in part of the milk, or in water. Bake $\frac{1}{2}$ to $\frac{3}{4}$ of an hour, till nicely browned.

This is the foundation for the many varieties of rice puddings. Raisins may be added.

3. *Tapioca.* Tapioca and sago puddings are made in the same way, except they must be soaked for two hours in part of the milk or in water.

4. *Sago.* To the ingredients for plain custard pudding add 1 pint of corn meal and an extra cup of milk, 1 teaspoon salt, 1 teaspoon ginger, $\frac{1}{4}$ cup sugar, $\frac{1}{2}$ cup chopped beef suet or 2 tablespoonfuls tried out fat. Scald the meal first in the milk and bake the pudding, covered, two hours in slow oven.

BREAD AND CUSTARD PUDDINGS.

1. Bread pud- One quart boiling milk poured on as much bread—
ding or "Sem- as will absorb it, about 1 pint if hard—4 eggs, $\frac{1}{2}$ tea-
mel Geräusch." spoon salt, $\frac{1}{2}$ cup sugar.

The milk and bread are allowed to get cold and the other ingredients well beaten with it, the eggs being beaten separately, and the whites added last. Bake one hour in a buttered dish. Eat without a sauce.

Of course a bread pudding can be made with fewer eggs, but then it will hardly do for the main dish of a meal.

2. Bread pud- Dried bread soaked soft in cold water and pressed dry
ding (simple). in a cloth, milk to make it into a soft mush. Add 1
beaten egg to a pint of the mixture. Bake from half an hour to
an hour and eat with sweet sauce.

With raisins. Raisins or currants or fresh fruit, as cherries may be
added.

With dried ap- After putting in $\frac{1}{2}$ the pudding mixture, put a thick
ples. layer of stewed dried apples mashed and sweetened,
and flavored with orange peel or cinnamon.

Bread and but- A convenient variation on the ordinary bread pud-
ter pudding. ding.

Plain. Spread thin slices of bread with butter, and pour
over them a simple custard, viz : 4 eggs to 1 quart of
milk, 4 tablespoons sugar, a pinch of salt. Keep pressed down till
the custard is absorbed; Bake slowly till firm and brown. Eat
with or without sauce.

With fruit. The bread slices may be spread with India currants,
or with any kind of fresh or dried cooked fruit, not too
juicy.

Individual bread pud- Cut small round loaves of bread into quarters, or
dings. use biscuits. Soak in a mixture of 4 eggs, whites and
yolks, beaten separately, and added to 1 pint of milk with a little
sugar and nutmeg. When they have absorbed all they will with-
out breaking, drain and bake in a slow oven to a nice brown, spread-
ing a little butter over once or twice at the last. This dish can be
made very pretty by putting currants in the holes around the top
and sticking in pieces of blanched almonds.

SUET PUDDINGS.

Ingredients. One-half pint beef suet, chopped fine, $\frac{1}{2}$ pint molasses, $\frac{1}{2}$ pint milk, $\frac{1}{2}$ pint raisins or currants, or both. (A part of the fruit may be figs and prunes cut in bits.) One teaspoon salt, one teaspoon soda mixed with the molasses, 1 pint bread crumbs (dry), 1 pint graham flour and 2 eggs. Steam 3 hours or bake 2.

Eat with lemon sauce.

Simple. Use the above recipe, omitting the eggs and using instead of graham flour and bread crumbs $1\frac{3}{4}$ pint white flour.

To reheat puddings. All the preceding puddings are good reheated. Cut in slices, and warm in the oven, or fry in a little butter in a pan. Sift sugar over and eat with sauce.

PUDDING SAUCE.

One pint water made into a smooth starch with a heaping tablespoon flour. Cook 10 minutes, strain if necessary, sweeten to taste and pour it on 1 tablespoon butter and juice of a lemon or other flavoring. If lemon is not used add 1 tablespoon vinegar.

This can be made richer by using more butter and sugar; stir them to a cream with the flavoring, then add the starch.

FRITTERS.

These are various doughs and batters fried in boiling fat, and eaten warm with sugar or sweet sauce. The hot fat gives a puffy lightness and a delicious crisp crust.

Lard is most generally used, but cooking oil (see page 193) is better, and even beef fat prepared as (see same page) is good. The fat must be smoking hot to prevent its soaking into the dough. For the same reason batters so cooked must contain more egg than if they were to be baked.

Forms. The fritter may be rolled out and cut in shapes, or dropped in spoonfuls, or run through a funnel, being of course, mixed of different consistency for each method. When nicely browned, take out with a wire spoon and lay on brown paper, which will absorb the fat, then sprinkle with sugar and send to table.

Soda raised fritters. *Ingredients.* One pint flour, ($\frac{1}{2}$ may be graham) $\frac{1}{2}$ teaspoon salt, 1 teaspoon oil, butter, or lard, 1 egg and

$\frac{1}{2}$ pint sour milk with $\frac{1}{2}$ teaspoon soda, or same of sweet milk with $\frac{1}{2}$ teaspoon soda and 1 teaspoon cream of tartar. Beat the egg, white and yolk separately, adding the white last of all.

Drop from a spoon into boiling lard; *or*, omit nearly half the flour and pour through a funnel.

This batter may be also raised with yeast.

Egg raised frit-
ters. These are more crisp and delicate. If liked very light, soda or cream of tartar or baking powder may be added to these also. These batters are thinner than the preceding; they must be well beaten if no soda is used.

1. *Ingredients.* One scant pint of flour, 2 eggs, 1 teaspoon salt, $\frac{1}{2}$ pint milk, 1 teaspoon oil or butter.

Beat the yolks well, then again well with the flour and milk, add the stiffly beaten whites last. Fry in spoonfuls.

2. *Ingredients.* One heaping pint flour, 4 eggs, 1 tablespoon oil or butter, 1 teaspoon salt, about a pint of water, or enough to make the batter a little thicker than for pancakes. Proceed as before.

Additions. One tablespoon of lemon juice may be added to any of the above recipes, or a little nutmeg or cinnamon if liked.

Fruit fritters. Take sour apples, peel, cut out the core neatly and slice round in slices $\frac{1}{4}$ in. thick. Soak these a few hours in sweetened wine, lemon juice or other flavoring. Dip in either of the above batters and fry. (They are also very good without being soaked in the flavoring.)

Peaches, pine apples and bananas may be used in the same way.

Bread fritters. Trim the crust from sliced bread, cut in nice shapes and soak soft, but not till they break, in a cup of milk to which has been added 1 beaten egg and some flavoring, as cinnamon, lemon, etc. Dip in fritter batter and fry.

COOKING OF VEGETABLES.

The legumes. As we have seen, the food value of the dried bean, pea and lentil, is great, but as usually cooked a large per cent. of it is lost to us.

In the process of cooking, the cellulose part must be broken up, softened, and as much as possible entirely removed. These vegetables, if they cannot be obtained ground, must be soaked in cold water some time before cooking, cooked till very soft and then mashed and sieved. No form of cooking that does not include seiving can be recommended except for very hardy stomachs. See pages 202 and 243.

Potato. This vegetable must also be treated with care. The starch grains of which it is so largely composed swell in the process of cooking, and burst the cellulose walls confining them, but when this stage is reached the potato is too often spoiled by being allowed to absorb steam and become sodden. As soon as tender, boiled potatoes should be drained, dried out a few minutes, then sprinkled with salt, and the kettle covered close with a towel, until they are served. They should then be put into a napkin and sent to the table.

Other vegeta-
bles. Other garden vegetables are cooked more or less alike; put into boiling water and kept at a rapid boil until tender, and no longer, the length of time varying for any given vegetable according to the freshness, size and degree of maturity. When done or nearly so, they should be seasoned and served as soon as possible.

Mixed vegeta-
bles. A welcome variety in the serving of vegetables can be found in skillful mixture of two or more kinds. A few of these mixtures are green corn and shelled beans or succotash, green corn and tomatoes, green corn with stewed potatoes, potatoes and turnips mashed together, green peas with a quarter as many carrots cut very small, potatoes with same proportion of carrots and seasoned with fried sliced onions poured over.

Vegetables and
fruits. There are also mixtures of vegetables and fruits that are very successful, as lentils or beans with a border of stewed prunes.

SOUPS WITHOUT MEAT.

In general. These soups should be largely used by the economical housewife; they are cheap and nutritious, and if carefully made and seasoned, excellent in taste. A large number of recipes are given, from which can be selected what is suited to materials on hand, to amount of time and quantity of fire.

These will be arranged under Vegetable Soups, Flour and Bread Soups, and Cold Soups.

VEGETABLE SOUPS.

If any meat bones are on hand or trimmings of meat not otherwise needed, simmer them from one to two hours in water and use the broth thus obtained instead of water in making any of the following soups.

Most important are those made from the dried bean, pea and lentil, the three pod-covered vegetables. For their nutritive qualities see page 219.

Ingredients. One pound beans, 1 onion, 2 table-
 Bean soup. spoons beef fat, salt and pepper.

Additions, to be made according to taste. One-fourth pound pork, or a ham bone, a pinch of red pepper, or, an hour before serving, different vegetables, as carrots and turnips, chopped and fried.

Soak the beans over night in two quarts water. In the morning pour off, put on fresh water and cook with the onion and fat till very soft, then mash or press through a cullender to remove the skins, and add enough water to make two quarts of somewhat thick soup. Season.

This soup may also be made from cold baked beans. Boil one-half hour, or till they fall to pieces, then strain and season.

Split or dried Make like bean soup.
 pea soup.
 Lentil soup. Make like bean soup.

Greer vegetable The water in which vegetables have been cooked
 soups. should never be thrown away, with the exception of that used for cooking beets, and potatoes boiled without peeling; even cabbage water can be made the basis of a good soup.

General method. Boil the vegetables until very tender, mash or press through a cullender, thin sufficiently and season.

Potato soup. Good and cheap.

Ingredients. Six large potatoes peeled, 1 large onion, 1 heaping teaspoon salt, $\frac{1}{4}$ teaspoon pepper. For a richer soup add $\frac{1}{4}$ pound salt pork cut in bits (in this case put in less salt) or add 1 cup of milk or a beaten egg. Chopped celery leaves give a good flavor.

Boil potatoes, onions and salt in a little water, and when very soft mash, then add, a little at a time and stirring to keep it smooth, a quart of hot water and 1 tablespoon beef fat in which 1 tablespoon flour has been cooked; *or* use the fat for frying bread dice, which add at the last minute.

Most cooks fry the sliced onion before putting it in the soup, but the difference in taste is so slight as not to be worth the few minutes extra time, if time is an object.

This is a delicious soup and very nutritious. Large Green pea soup. peas, a little too hard to be used as a vegetable, may be utilized in its manufacture.

Ingredients. One pint shelled peas, 3 pints water, 1 small onion, 1 tablespoon butter or fat, 1 tablespoon flour. Salt and pepper.

Put peas and onion in boiling water and cook $\frac{1}{2}$ an hour to an hour, till very soft. Press through cullender and season.

Pea and tomato soup. Add to above when done, 1 pint stewed tomatoes and a little more seasoning. This is an excellent soup, having the nutrition of the pea and the flavor of the tomato.

Valuable for its fine flavor, and may be made nutritious also by adding broth, milk or eggs. Tomato soup.

Ingredients. One pint tomatoes, 2 pints water, 1 tablespoon fat, 1 tablespoon flour, salt and pepper.

Cook the flour in the fat, add the peeled tomatoes and a very little water. When they have cooked to pieces, mash them against the side of the pot, add the rest of the water and the seasoning.

Proceed as above, using instead of half the water, 1 Tomato soup No. 2. pint of milk, into which $\frac{1}{4}$ teaspoon soda has been stirred.

Ingredients. One pint of parsnips cut in pieces, 3 Parsnip soup. small potatoes, 3 pints water, or water and milk, salt, pepper and butter.

Cook till the vegetables fall to pieces, mash and add seasoning. If milk can be substituted for part of the water the soup will be improved.

Young vegetable or spring soup. *Ingredients.* One pint chopped onion, carrot, turnips and celery root in about equal parts, 1 tablespoon fat, 1 teaspoon sugar, salt and pepper.

Heat the fat, add sugar, salt and pepper, then stir the vegetables in it till they begin to brown, add 3 pints water and set back to simmer 1 to 2 hours. Serve without straining.

Green corn soup. *Ingredients.* One-half dozen ears green corn, 3 pints water, 1 tablespoon fat and 1 tablespoon flour, salt and pepper, an egg and a cup of milk.

Cut the corn from the cob and boil one hour. Add the flour which has been fried in the fat, season and strain

Dried corn soup. Make as above, using dried corn, soaked over night and boiled 2 hours.

Sorrel soup. An excellent flavor, new to most of us.

Ingredients. One pint sheep's sorrel, light measure (bought in city markets, or gathered in country fields), 1 onion, a few leaves of lettuce and parsley all chopped fine, $\frac{1}{8}$ teaspoon nutmeg, 1 tablespoon fat, 2 tablespoons flour, 3 pints water, 1 or two eggs, 1 cup milk, salt and pepper.

Heat the fat, add the chopped vegetables and sweat or steam for 10 minutes, then add flour and last the boiling water; add the milk just before serving. Serve fried bread with it.

"Hit and miss" soup. To illustrate how all bits can be used, here is a soup actually made from "leavings."

One cup of water drained from macaroni, 1 cup water drained from cabbage, with a few shreds of the cabbage, 2 small bones from roast veal, 1 scant tablespoon boiled rice. Simmer these together with a chopped onion while the rest of the dinner is cooking, thicken with a little flour and serve with fried bread.

FLOUR AND BREAD SOUPS.

Flour soup. *Ingredients.* One tablespoon beef fat, 1 heaping tablespoon flour, 2 sliced onions, 2 pints water, 1 pint milk, 1 cupful of mashed potato, salt and pepper.

Fry the onions in the fat until light brown; remove, pressing out the fat. In the same fat now cook the flour till it is yellow, and add, a little at a time, the water. Put back the onions and let it stand awhile, then add milk and potato. Salt well.

The potato may be omitted and a little more flour used.

Browned flour soup. *Ingredients.* One tablespoon butter or fat, $\frac{1}{2}$ cup of flour, 2 pints water, 1 pint milk, 1 teaspoon salt.

Cook the flour brown in the fat over a slow fire or in the oven; add slowly the water and other ingredients. Serve with fried bread.

Browned farina soup. Make like above, but of wheat farina.

Bread soup. *Ingredients.* Dry bread, broken in bits, water, salt and pepper, an onion and a little fat.

Soak the bread in boiling water for a few minutes, add the onion sliced and fried in the fat; salt and pepper well.

Or, use milk instead of water, and toasted or fried bread.

Noodle soup. (See page 225.)

MILK SOUPS OR PORRIDGES.

These are especially good in families where there are children, and would be welcome on almost any supper table. They are almost equally good eaten cold.

In making, use a porcelain kettle or an iron kettle, greasing it first with a little fat, as a scotched taste spoils the dish.

Wheat porridge (salted.) *Ingredients.* Three pints milk, 1 pint of water (or half water and half milk), $\frac{1}{3}$ cup flour, 2 eggs, 2 teaspoons salt.

To the boiling milk and water, add the flour stirred smooth with a little cold milk; let it cook 10 minutes. Beat the eggs in gradually, but do not cook them; serve with fried bread. Grated cheese is an addition to this soup.

Wheat porridge (sweet.) Same as above, but using only a pinch of salt and as flavoring 3 tablespoons sugar and $\frac{1}{4}$ teaspoon cinnamon. The flavor may be varied by using grated lemon peel, nutmeg, vanilla, bitter almonds or 2 fresh peach leaves boiled with the milk.

Of farina. These two porridges are still better made of farina instead of flour.

Barley porridge. Pearl barley is soaked over night in water, and then cooked for 2 hours till soft. During the last hour add milk instead of water, as it dries away. Flavor with salt and butter.

Indian meal porridge. *Ingredients.* One cup meal, 2 quarts water, 1 tablespoon flour, 1 pint milk, salt, and a little ginger (if liked). Boil the meal and water an hour; add flour and salt and boil $\frac{1}{4}$ hour, and add the milk just before serving.

Oatmeal porridge. Make in the same way, using oatmeal instead of flour.

Graham por- One cup graham flour to 3 pints milk and water.
ridge. Cook 15 minutes. This may be varied in flavor like
flour porridge.

These three porridges can be made from cold corn, oatmeal or graham mush.

Chocolate soup. *Ingredients.* $\frac{1}{4}$ pound chocolate, $2\frac{1}{2}$ quarts milk and water, sugar to taste, 1 egg yolk, a little vanilla or cinnamon.

Cook the chocolate soft in a little water and add the rest; when boiling put in the other ingredients and cook the beaten white of an egg in spoonfuls on the top. Serve with fried bread.

Buttermilk soup The foreign kitchen has many recipes for this soup
or "pop." quite unknown among us.

Cooking brings out the acid, but once used to that taste, one finds the soup good and wholesome.

Ingredients. To each pint of buttermilk, 1 tablespoon flour and 1 tablespoon butter, a little salt.

Bring gradually to a boil, stirring constantly to prevent curdling, and pour on fried bread.

Varieties. Sugar and cinnamon are often added to this soup; also the yolk and beaten white of 1 egg. It is considered nutritious for the sick.

Another. The Germans often add to this soup small potatoes, and bits of fried bacon. In which case the butter is omitted.

Or to the buttermilk soup when done, is added half the quantity of cooked pears or prunes.

Brewis. To salted boiling milk, put enough bread crumbs (either white or graham) to make a thick smooth porridge.

Sour cream This soup is earnestly recommended for trial, as
soup. there are few ways in which such a delicious taste may be given to simple materials.

Ingredients. Three pints water, $\frac{1}{2}$ cup sour cream and the following mixture: $\frac{1}{4}$ cup milk, $\frac{1}{2}$ cup flour, 1 teaspoon butter, $\frac{1}{2}$ tablespoon salt, 1 teaspoon sugar, 1 egg, 1 tablespoon fluid yeast or $\frac{1}{4}$ teaspoon compressed yeast. Mix these together into a dough and let it get light, then drop half of it in teaspoonfuls into the boiling water and cream; then thin the rest with water until it will pour, add it to the soup and cook 5 minutes. (Not all the dough may be needed.)

Cider soup. *Ingredients.* One pint cider just beginning to work, 1 pint water, 1 cup milk (boiling), 1 tablespoon flour, a little cinnamon and sugar.

Let cider and water come to a boil, add the flour rubbed smooth, and cook a few minutes; and lastly add the milk. Serve with toast. An egg yolk may be added.

FRUIT SOUPS.

To be eaten Warm or Cold.

These are made of almost any well flavored fruit, cooked soft and mashed, sufficient water added, with a little thickening, sugar and spice. They are especially welcome in summer; may be eaten as a first course, or set aside to be used as a drink during the meal.

Apple soup,
No. 1. *Ingredients.* Four cups peeled and quartered apples, cooked to a mash in a little water, 1½ pints water, 1 teaspoon cornstarch, 3 teaspoons sugar, ¼ teaspoon cinnamon, a pinch of salt.

No. 2. A soup plate full apples, 1 cup of rice. Cook soft and rub through a sieve, adding a little sugar, cinnamon, lemon peel, and an egg yolk. Thin sufficiently with water.

No. 3. Instead of rice, use in the above recipe bread with the addition of a few India currants.

No. 4. Instead of rice, use oatmeal and cook till soft, or use that already cooked.

Plum soup. Make like apple soup, but if the plums are very sour add a little soda—¼ teaspoon to a quart of soup.

Cherry soup. Made in the same manner.

These soups may also be made of dried plums, prunes or dried sour cherries. Soak the fruit over night.

Soups of pears,
etc. If soup is made of a milder fruit, as pears, which are at some seasons so cheap, add a few sour apples or more spice, to give flavor.

ADDITIONS TO SOUPS.

If your soup has not strength enough, milk and eggs may be added if no meat stock is at hand.

How to add eggs. The egg should be beaten, mixed with a little of the soup, then added to the rest, but not boiled. The yolk is better for this purpose than the white.

Meat extract. Liebig's meat extract is very valuable for adding flavor to a soup but it is too expensive for general use.

1. Flour. This may be boiled a few minutes with the soup after being mixed smooth in a little water, or better, cook it in a little butter or melted beef fat before adding to the soup.

2. Bread sponge. On baking day, save a little of the bread sponge, make thin enough to pour, and if you wish, add a beaten egg. Set away half an hour to rise again, and when light pour into the soup.

3. Farina. This preparation of wheat, now sold by the pound at a reasonable price, is most valuable as an addition to soup; it needs only to be sprinkled in and boiled for a few moments.

4. Potato. Mashed potato mixed smooth with a little milk or grated cold potato may be added to soup to give body.

5. Barley. Add to the soup 1 hour before it is done pearl barley that has been soaked over night.

6. Rice. One-half hour before serving, add to soup 1 table-spoon of rice to a quart of soup.

7. Bread. Bits of bread dried hard in the oven, may be added to the soup just before serving, *or* fry them in the spider in a little beef fat, *or* soak in milk and egg before frying. *Or*, toast bread and cut in squares.

8. Vegetables. Any small vegetables may be added, such as asparagus tops, tiny onions that have been first boiled in another pot, cooked peas, beans, etc. A favorite Russian soup is beef soup, with the addition of beets, cabbage and carrots.

Most important of all additions to soup are those which need a little more time to prepare, but are worth the trouble if the soup is to be the principal part of the dinner. Such are the following :

DUMPLINGS FOR SOUPS AND STEWS.

This word has an unpleasant sound, too suggestive of the heavy and unwholesome balls often served under this name, but there seems to be no other name under which these different preparations can be classed. Their basis is bread and eggs, or flour and eggs.

Bread mentioned here is hard dried bread; it must be softened by soaking in *cold* water (hot water makes it pasty), then press it dry in a cloth and crumble it

Any cooked meat or several different kinds when there is too little of each to be otherwise used, is chopped fine and mixed with as much bread, salted and peppered, a little chopped suet or butter, or better still, marrow, and a chopped onion and some herbs, and to each cup of this mixture allow an egg. Mix lightly, make out into little balls and cook in very gently boiling soup. Try one first to see if it holds together. If not, add a little flour.

Fish balls. Substitute for the meat any cooked fish, chopped fine.

Marrow balls. Two eggs to 1 cup of bread and marrow size of an egg, chopped. Make as above.

Bacon balls. Instead of marrow, add cubes of bacon fried brown.

All these mixtures can also be fried in a pan as an omelette, or baked.

Flour and bread balls. Three cups, half bread, half flour, 1 egg, butter size of an egg, 1 cup milk and water, salt. Soak the bread in the milk and water, and make out into little balls with the other ingredients. Cook, covered, 15 minutes (may also be boiled in salted water and eaten with fruit).

Egg sponge. One egg, 1 teaspoon flour, a little salt. Beat white of egg to foam, mix lightly with the rest and pour on top of the soup. Turn over in a few minutes with a skimmer, and before putting into the tureen, cut it in pieces.

No. 2. One heaping tablespoon flour to 1 egg and the yolk of another, and 1 teaspoon butter. Beat hard and drop in with a teaspoon.

Schwaben Spetzel. One egg, 3 tablespoons milk, nearly $\frac{1}{2}$ cup of flour, salt. Pour through a funnel into soup or into salted water, cook 5 minutes and use to garnish beef.

Biscuit dough
balls. An excellent addition to a stew or soup is of biscuit or rusk dough (see page 230) made into balls no larger than a chestnut, and cooked in the stew, or steamed in a cloth above it.

Buttermilk
balls. Also the following of buttermilk: 1 cup buttermilk, $\frac{1}{2}$ teaspoon soda, 1 egg, salt, and flour enough to allow of the batter being dropped in spoonfuls.

Macaroni. Cooked macaroni cut in pieces an inch long, is a pleasant addition to soup.

FLAVORS OR SEASONINGS.

Without doubt "hunger is the best sauce," but it is not true, as many think, that a craving for variety is the sign of a pampered and unnatural appetite; even animals, whom we cannot accuse of having "notions," have been known to starve in the experimenter's hands rather than eat a perfectly nutritious food of whose flavor they had wearied, and prisoners become so tired of a too oft repeated dish that they vomit at the sight and smell of it.

What we call flavors may or may not be associated with a real food. Meats are rich in flavors and each fruit has its peculiar taste; then, there are the spices and aromatic herbs which are not parts of a real food, and it is most important that the cook should understand the art of adding these as seasonings to mild tasting foods, so as to make new dishes which shall be both nutritious and appetizing. The bulk of our nourishment must be made up of the flesh of a few animals, and a half-dozen grains and as many garden vegetables, but the skillful cook can make of them, with the help of other flavors, an endless variety of dishes.

An American traveling on the continent of Europe becomes acquainted with many new dishes and tastes, and although not all of them are to his liking, he must conclude that our cookery, compared for instance, with that of the French is very monotonous. To be sure, we have the advantage of the European in that our markets offer us a greater variety of natural foods, especially fruits, each having a flavor of its own, and this fact makes us somewhat more independent of the art of the cook; but still we have need

for every lesson of this sort, and especially is this the case with the poor, who must keep to the cheapest food materials, which are not in themselves rich in flavor.

Spices and other flavors, when not used to excess, stimulate our digestive organs to appropriate more easily the food to which they are added; their agreeable odor starts the digestive juices, both in the mouth and in the stomach, and their flavor acting on the palate has the same effect.

The more common spices and flavors, as the housewife uses these terms, are salt, pepper, mustard, cinnamon and mace, nutmegs, cloves, ginger, caraway and coriander seeds, vanilla, and many volatile oils, such as those contained in the rind of lemons and oranges; and to this list we must add certain vegetables, as the horseradish and various members of the onion family, the caper and nasturtium seeds, and the aromatic herbs.

All these have their use and their abuse. Salt is hardly thought of in this list, so necessary do we consider it, and its use is well enough governed by our palate, though no doubt we over, rather than under salt our foods. Pepper is also in nearly every household used to excess, being added to too many dishes. The pungent mustard should be still more carefully used; but a little of it adds relish to a salad or a meat sauce, and goes especially well with certain vegetables, as beans. Cinnamon, mace and nutmeg, we use principally with sweet dishes, but nutmeg makes a nice variety in certain meat stews and in croquettes, foreign cooks use it far too much to suit our taste. Almost our only use of the caraway and coriander seeds is in cookies; try the former in a potato soup for variety. Ginger seems to go well with Indian meal in a pudding or porridge, and with molasses, wherever used.

To give the uses for onions and for the aromatic herbs would be too long a task. The latter can all be bought in a dried state very cheaply, and they retain their flavor well; one of the most useful, however, parsley, is much better fresh; by all means keep a little box of it growing in a window. Perhaps, after onion, celery is most useful as a flavor for soups and stews, root, stem, leaves and seeds being all valuable.

In the flavoring of soups and stews, it is well to use a number of flavors, letting no one of them be prominent above the others; on the other hand, it is well to have certain favorite dishes seasoned always in the same way; as fresh pork with sage; summer savory in a bread dressing, etc.

DRINKS AT MEALS.

A warm drink at meals is better than a cold one, especially in winter or at any time when we are tired ; and the drinking of ice water cannot be too strongly condemned, lowering as it does the temperature of the stomach and so delaying digestion. To furnish warm drinks for each meal, acceptable to the palate, cheap and harmless, is no easy question. Soups or broth once adopted as a part of two meals in the day, as is so frequently seen in Europe, and the problem is half solved ; indeed some of the drinks here given are really thin vegetable soups or porridges to which the flavor of salt or of sugar may be given according to taste.

It may be concluded, after comparing authors on the Coffee. subject, that although coffee somewhat retards digestion and acts as a stimulant to the nervous system, still one or even two cups of moderately strong coffee a day will not harm a healthy person. We may say, therefore, that its use to this extent is a question of expense only.

Java and Mocha coffee in equal parts are considered the best mixture. Rio is much cheaper and of strong, pure flavor. The amount to be used for moderately strong coffee is one tablespoon (ground) to a cup.

Chicory is considered here only as an adulterant, whereas in Europe a very little of it, say one-half teaspoon of the prepared chicory to a cup of ground coffee, is used to improve the flavor.

Next to the quality of the coffee, it is of importance that it should be freshly ground and browned. If you buy it browned, reheat it first before grinding. The easiest and most economical way of making is to grind it very fine and put into a bag made of woven stuff, a white stocking top will do ; leave room to swell. Heat this in your coffee pot as hot as you can without burning. Pour on boiling water and keep it hot and close-covered for fifteen or twenty minutes.

Boiling coffee increases its strength, but does not improve its flavor.

All authors agree as to the harmfulness of strong Tea. tea, taken to excess.

Take great pains in making tea. Use an earthen teapot, and have a tea cozy or a large flannel cloth to wrap it in.

The water used should be between hard and soft, extracting the aroma but not the astringency; in China river water is used. If hard water must be used, remember that boiling increases its hardness and that it should be used as soon as it reaches the boiling point.

Take one teaspoonful of tea to a cup, put it in the teapot and heat in an oven till hot, pour on one cup of water that has just come to a boil, and cover with the tea cozy. Let it stand five minutes, then fill up with the requisite quantity of hot water and serve immediately.

Cocoa and chocolate. These both contain a good deal of nourishment, and as drinks are considered rather heavy. As the various kinds differ very much from each other, they are best prepared according to the recipes found on the packages.

"Cambric tea." Milk, except for children, can hardly be looked upon as a drink, but diluted with hot water, and sweetened, it has already been christened for the children as "cambric tea," and it is no bad drink for their elders.

Gruels. A very thin gruel, slightly sweetened, is a good drink.

Oatmeal gruel. Into a quart of boiling water stir 2 tablespoons oatmeal; boil for an hour or longer, strain through a coarse sieve or a cullender, add a pinch of salt, and a little milk and sugar.

Rice gruel. Wet 1 tablespoon rice flour in a little cold milk, put into 1 quart boiling water, salt slightly and boil till transparent. Flavor with a little lemon peel and sugar.

Cornmeal gruel. One quart boiling water, 3 tablespoons corn meal washed in several waters, $\frac{1}{2}$ teaspoon salt, add $\frac{1}{2}$ cup milk and a little sugar; a pinch of ginger is an improvement.

Barley gruel. Soak pearl or ground barley all night or a few hours in cold water, put into boiling water and cook till very soft. Season like the others.

Sago and tapioca gruel. Can be made in the same way.

All these drinks must be thin and not too highly seasoned.

Corn coffee. Brown common field corn as you would coffee, as brown as you can without burning. Grind coarsely and

steep like coffee. Add milk and sugar, and you will find it a delicious drink.

Cold drinks in summer. Lemonade is too strongly acid for a regular drink at meals, but lemon as a flavor is always welcome.

Irish moss lemonade. Wash a handful of Irish moss in 5 waters, pour over it 2 quarts boiling water and let it stand till cold. Strain, adding more water if necessary and add the juice of 2 lemons and sweeten with lump sugar which you have rubbed on the lemons to obtain the oil in the skin.

Soda cream. One pound sugar, 1 ounce tartaric acid dissolved in a pint of hot water. When cold flavor with lemon zest or extract, and add the beaten white of an egg. When used add 2 tablespoons of it to a glass of water in which you have dissolved $\frac{1}{4}$ teaspoon soda.

Apple water. Slice juicy sour apples into boiling water and keep warm an hour. Strain and sweeten. All these drinks taste best cooled (but not *too* cold) with ice.

Cider. Sweet cider can be bottled for use and makes a delicious drink. Boil and skim till it is clear—no longer; pour hot into bottles, and seal.

See also vegetable and fruit soups.

COOKERY FOR THE SICK.

It is comparatively easy for your family to live on a small income while all its members are in good health, but you will find your resources all too slender when you must cater for the appetite of an invalid.

At best, sickness is always a severe drain on the limited income, but here, as in every other department of your work, you will find that good sense and ingenuity will often stand you in stead for money.

During a severe illness the food as much as the medicine is under the care of the physician, but when the danger is over and he has left you with only general directions, you will be more than likely in your bewilderment to take the advice of the first neighbor that

drops in, although you may know that neither her judgment nor experience is as good as your own.

Now consider first, what did the doctor mean by saying that the patient must be "built up," and how is the wasted frame to get back the fat and muscle that were burned away in the sickness? Chiefly, as you know, by the digestion of food, the proteids and fats and carbohydrates that we have been talking about, and still another, a real food although so often forgotten, the oxygen of the air.

We have said that we need not concern ourselves about this food, that it would take care of itself; and so it will when we are in a state of health and living as human beings should, for as we walk or work we are fed by the air without knowing it. But the case is quite different with a poor invalid shut up in a sick room, we must bring the fresh air to him with as much care and regularity as we do his jellies and broths.

When we are considering what we shall feed our invalid, we cannot do better than keep to our old classification of proteids, fats and carbohydrates. He must have all these principles but in the most digestible form, for the stomach is feeble like the rest of the body. For this reason the proteids must be furnished mainly from the animal kingdom, butter and cream must supply the fat, and the carbohydrates must bring with them as little as possible of the tough cellulose, and they must be so cooked as to be easily digested.

First, as to the proteids.

Hot milk, given often in small quantities, is much used in the early stages of recovery and is generally better liked if accompanied by a bit of toasted bread or made into a thin gruel.

In the first rank, also, comes soup made of lean beef scraped fine, covered with cold water and allowed to stand for an hour, then brought slowly to scalding heat and kept there for a short time; it is then strained through a coarse sieve, the small brown flakes being allowed to pass. Season only with salt. Or, broil a thick, tender steak, cut it in pieces, and then with a lemon squeezer press out every particle of juice, it may then be diluted and seasoned.

Mutton broth is made like beef soup but should be cooked a longer time. Chicken broth also requires more cooking.

Any of these soups may have a little rice or tapioca cooked with them.

Eggs are an important item in the diet of an invalid, being very nutritious and, if fresh, easily digested; do not use them at all if uncertain of their age.

Eggs may be given raw (see page 204) or soft-boiled (see page 205) or poached in hot water. An egg may be served in many ways and makes always a pretty and attractive dish. In cooking it should never be submitted to a high temperature, as that makes the white part horny and indigestible.

A custard made from an egg and a cup of milk and a half table spoon of sugar may be given early in a convalescence. Or use beef soup or chicken broth instead of the milk, and flavor with a little salt and pepper. These custards should be made in a pail set in a kettle of boiling water, the custard being stirred till it begins to thicken.

Next in order comes cooked meat. Beef is best of all, but let it be juicy and tender and broil or roast it, serving it rare. Probably a broiled mutton chop ranks next, although chicken, because of its delicate flavor will often receive the first choice. An invalid should not touch pork, and should be given veal or lamb only in the form of soup.

As to fats, the system needs them of course, but fat meat should not be given, only butter or better still, cream. The butter must never be melted and soaked into the food, nor made into a sauce.

As to the vegetable part of the diet, much care must be used. In the form of gruel or porridge, it is generally very welcome and gives the fluid part of the meal in a good form. For Indian meal and oatmeal porridge see page 246. Milk may take the place of the water.

Toast is with good reason considered invalid's food, for the process of toasting turns part of the starch of the bread into dextrine which is digested with great ease. Grains may be also browned or roasted. Roast rice as you would coffee, cook as usual and eat with a little cream. Remember that bread for toast must be cut thin and first dried out a little distance from the fire, then brought nearer and browned. You may then serve it as dry toast lightly buttered, or in addition to the butter and a little salt, pour hot water or milk on it just before serving.

Panada of toasted brown bread, white bread or crackers, is made by piling the pieces in a bowl, having sprinkled either salt or sugar

over, and then pouring over enough boiling water to soak them well. It should be kept hot for an hour or more, the pieces then lifted out carefully on a hot saucer and served with a little cream and perhaps more salt or sugar. Nutmeg may be added.

Rice is also a very valuable food for use in sickness, as it does not tax the most delicate digestion.

Macaroni is easily digested and of high food value. It should be boiled in salted hot water till tender and served with a little butter or cream. Or it may be added to a custard and lightly baked.

Barley, thoroughly cooked, is good food for an invalid. Oatmeal must be used with caution until the digestion becomes stronger.

As to vegetables proper, a mealy baked potato is perhaps the first to be introduced into the bill of fare; remove the inside, mash fine and season with a little salt and cream. Beware of potatoes cooked in any other way.

The juice of fruits may be used early as a flavor in drinks, but the pulp must be discarded. A baked apple is safest to begin with, when the time comes to introduce fruit as such into the diet.

As to the serving, use the best china, silver and linen that you have in the house and let exquisite neatness never fail.

Remember that surprises are delightful to a sick person; never let the bill of fare be known before hand, and if you can disguise a well known dish, so much the better. Beaten white of egg is a good fairy and serves you cheaply. Snowy white or made golden brown in the oven, it may top many a dish, concealing at one time a custard, at another a mold of chicken jelly or even a cup of delicate apple sauce.

The process of cooking, if simple, an invalid loves to watch and the sight is often a whet to the appetite. Bring his gruel to him in the form of mush and thin it before his eyes with milk or cream, coddle his egg in a stone ware bowl while he eats another course, and by all means make his tea at the bedside.

BILLS OF FARE.

The following bills of fare are made out for a family of six persons, consisting of a working man, two women, and three children between the ages of six and fifteen, the size of the family and the ages attained being considered sufficiently near the average.

The amount of food and the proportions in which the great food principles are represented approximate to what is demanded by standard dietaries for such a family. For the man of the family we have taken, as has been said, the one proposed by Professor Atwater for an American at average manual labor, for the women and children those proposed by Professor König.

Dietary adopted The amounts represented by them are :

	Proteids.	Fats.	Carbohy- drates.
Man	125 gms.	125 gms	400 gms.
2 women (each).....	96 “	48 “	400 “
3 children, 6 to 15 yrs. (each).....	76 “	44 “	320 “
Sum total is.....	545 gms.	353 gms.	2210 gms.
Or translated into oz.....	19.19 oz.	12.42 oz.	78.03 oz.

In calculating these amounts we have followed almost entirely the analytical tables compiled by Professor König.

Meat is reckoned without bone and moderately fat, and in nearly all the bills of fare the amount of proteids enough exceeds that required by the dietary adopted so that we can afford this loss. Flour is of medium quality, eggs are reckoned without shell, and milk as weighing 34.4 ounces per quart.

As to prices, they are mainly those of Baltimore markets, corrected in some cases by those of New York. Eggs are reckoned as costing in the spring eighteen cents, in fall and winter twenty-five cents, canned fruit is put down at the price paid for the fruit in summer. The cost of raw material is given in all cases, bread being reckoned at the cost of the flour contained in it.

In three different seasons, four days in succession are selected, these days being the ones considered most trying to the housekeeper—Saturday, Sunday, Monday and Tuesday, and this gives an opportunity to show how the food should be planned and cooked ahead.

It is intended that on Saturday the food for Sunday should be cooked as nearly as possible, as the Sunday dinner should be a good one but requiring a minimum of labor on that day; the dinner on Monday should be such as can be cooked on the back of the stove and in the oven.

The recipes will have to be varied a little according to advice given in appropriate places as to economy, *e. g.*, substituting beef fat for butter, or adding it when skim milk is used instead of whole milk.

It is intended that each day there shall be a small surplus of money for purchasing seasonings and flavors.

INTRODUCTION TO BILLS OF FARE, CLASS I.

(To the Mother of the Family.)

In the general introduction the writer has stated a few principles that should guide us in choosing our food. We have learned that to keep us in good health and working order we ought to have a certain amount of what is best furnished by meat, eggs, milk and other animal products, and that we must also have fats as well as what is given us in grains and vegetables.

But now our work has only just begun for we are to furnish these food principles in the shape of cooked dishes to be put on the family table three times a day, and the dishes must not only be nourishing but they must taste good, and there must be plenty of variety from day to day; and last—and this is the hardest point of all—we are to try to do this for the sum of *thirteen cents per person daily*.

I am going to consider myself as talking to the mother of a family who has six mouths to feed, and no more money than this to do it with. Perhaps this woman has never kept accurate accounts and does not know whether she spends more or less than this sum. She very likely has her “flush” days and her “poor” days according to the varying amounts of the family earnings, and it may be a comfort to her to know that if she could average these days and plan a little better, she can feed her family nicely on this sum.

A few facts as to what the writer knows to have been done in this line will not be amiss. I know a family of six belonging to one of the professional classes, half, grown people, and half, children, that lived for a year on an average of eleven cents per person daily, and no one would have said that they did not live well enough; they had

meat about four days out of the seven, there was always cake on their supper table, and they used plenty of fruit.

Here is an average bill of fare. Breakfast—milk toast, fried potatoes, coffee; dinner—soup made of shank of beef, fried liver, rice and potatoes; supper—bread and butter, fried mush, stewed pears and cake. Next day there was pressed beef made from the soup meat chopped and flavored, and next day there was cheap fish nicely fried. The head of this household was a skillful economist, absolutely no mistakes were made in cooking, and not a scrap was wasted, she had a long list of simple dishes at her command and she especially studied variety. "I abandon even a favorite dish for weeks," she said, "if any one tires of its." I give this as a sample of what I know to have been done by a highly respectable family in a city of small size in one of our eastern states.

It must be mentioned that the price on which this family lived in comfort could not have been as low as it was but for one great help; they had a small garden that furnished green vegetables and a little fruit. But then almost every family has some special advantage that would lower the rate somewhat; one buys butter or fruit advantageously of friends in the country, another can buy at wholesale when certain staples are cheapest, still another may be able to keep a few fowls, and so on. Numerous instances could be brought to prove that the food for a family can be purchased in a raw condition for the sum per head for which we have undertaken to buy it, and that by skill in cooking, flavoring and giving a right variety, a healthful and very acceptable diet can be furnished, though it cannot, of course, contain luxuries.

Another thing, when I speak of a woman who is to buy the food of a family for 13 cents apiece daily, I have in mind the wife of a man who earns this sum himself, the wife having her time to attend to the housework and children. If a woman helps earn, as in a factory, doing most of her housework after she comes home at night, she must certainly have more money than in the first case in order to accomplish the same result, for she must buy her bread already baked and can only cook those dishes that take the least time.

I shall take for granted that you have the kitchen utensils described on page 179; if not, buy them, because you cannot afford to do without them. Food is very expensive compared with pots and pans; you must not spoil food for lack of the right things to cook it in.

I only ask you in advance to try the recipes I shall give and to try to lay aside your prejudices against dishes to which you are not accustomed, as soups and cheese dishes for instance. You cannot afford to reject anything that will vary your diet, for many good tasting things you cannot buy.

I know it is hard for a busy woman to give to her cooking a bit more time than will "just do," but if you make it a rule to determine the night beforehand just what you will cook on the following day, no matter how simple the food may be, you will gain this result; with the materials at your disposal you will put before your family much better food, and they will call you a good cook and think that no family need live better than they; and this impression will be made principally from your having the right variety. Let us understand, to begin with, that it is your business in life just now to conquer this food question as it affects your family. Just as the business man must watch the market and take advantage of a half cent a pound on an article, that he may successfully compete with his neighbor, so you must be on the alert to use every possible advantage. It is a struggle in which energy and calculation will tell for a great deal, and you will have solid enjoyment in every point that you gain.

In buying meat your saving cannot be so much in quantity as in quality. Try to learn the different parts of an animal, and to distinguish between meat from a fat ox and that from a lean one, for, as we have explained, the former has less water in it, and why should you pay good money for that which nature gives you free? In winter, try to buy meat ahead so that you can make it tender by keeping it, and you will notice, too, that the larger the piece you buy the smaller is the per cent of bone you get with it. The per cent of bone in the whole animal, as in the case of an ox, is not more than 10 or 11 per cent, but the buyer of a small piece of meat often gets twice that proportion. As we have said again and again in these pages, the low-priced or tougher parts have as much nutriment for you as the rib roast which is beyond your purse. Choose often the fat middle rib and cook it long and slowly; buy the neck and scrag of mutton, and make a stew with vegetables; buy half a calf's head, and see what a fine soup you can make of it. Have beef's liver now and then, and tripe, rather than put your money into sausage of doubtful quality. By all means buy fish when it is

cheap, catfish, for instance, which are excellent fried. Keep suet always on hand and use instead of butter, as has been directed.

No one need tell you how valuable salt pork and bacon are for you,—the only danger is that you will use too much of them.

In buying eggs, you must be governed by the price; in winter use as few as possible, and even in the spring when they are cheapest, remember that they are not as cheap as the lowest priced cuts of meat from fat animals. But when they cost only 15 cents a dozen you can well disregard any small comparison of nutritive values, in consideration of their high worth in furnishing variety; you can afford to use them now and then in the place of meat and in making the various egg dishes.

Of the value of cheese as a regular dish to take the place of meat, you can read in another part of this essay. Buy it once a week at least, the skim variety, if you cannot afford the others, and grate or cook it according to the recipes given.

Try to find a reliable milkman and buy skim milk at half the price of full, and use it for all cooking purposes, keeping full milk, and, if possible, a little of the cream, for coffee.

Now let us take the vegetable part of your diet. You must keep
Grains. on hand every kind of flour and grain that is not too expensive; be thankful that wheat flour is so good and so cheap, it will be your best friend. If you are not already skillful in using it in bread and other doughs, you will waste your materials and make mistakes at first, but there is nothing for you but to become mistress of this department of cookery. Use bread freely in all the bread dishes, learn how to make every one. You will use buckwheat for cakes, rice for puddings, barley in soups, oatmeal and cornmeal for mushes, and you must learn to use them all in as many ways as possible. The grains are cheaper foods for us than vegetables, although dried peas, beans and lentils follow hard upon them. Even the potato, which may be called our favorite vegetable, is more expensive than wheat flour, if we are talking only of food values.

Except in the height of their season, have nothing to do with green vegetables, at least not under the impression that they are cheap; if you buy them, know that you are paying for flavors and variety, rather than for food. But even in the early spring, buy plenty of such vegetables as onions, carrots, parsley and other green herbs for your soups and stews. When you go for a walk in

the country, be sure to bring home mint and sorrel in your pocket ; the former will make you a nice meat sauce, the latter a delightful flavor in soup. It will be perfectly easy for you to grow in a window box that delicious herb, parsley, and have it always fresh.

For a low purse, there is no help so great as a knowledge of flavorings. When we remember that we can live on bread, beans, peas and a little cheap meat and fat the year round if we can only make it "go down," we shall realize the importance of such additions as rouse the appetite ; there is room here for all your skill and all your invention. Always make a cheap but nutritious dish inviting in appearance ; especially does this influence the appetites of children who are delighted with a very plain cake if only a few raisins or some sugar appear on the top.

The bills of fare on pages 261 to 268, where seventy-eight cents covers the cost of food for a family of six per day, and where the amount of food is carefully weighed and estimated, is meant only to suggest to you how in a few cases your food problem can be solved. You can, no doubt, spend the money in ways that will better suit the tastes of your family, but I beg you to examine anew your favorite dishes to see if they are as nutritious as they should be for their price. Remember that the proteid column is the one that you must look to most carefully because it is furnished at the most expense, and it is very important that it should not fall below the figures I have given. If, for instance, you should economize in meat in order to buy cake and pastry, this column would suffer at the expense of the other two and your family would be undernourished.

BILLS OF FARE, CLASS I.

For family of six, average price seventy-eight cents per day, or thirteen cents per person.

SATURDAY, MAY.

Breakfast—Flour pancakes, (p. 234) with sugar syrup, coffee.

Dinner—Bread soup (p. 179), beef neck stew, noodles (p. 225), swelled rice pudding (p. 236).

Supper—Browned flour soup, with fried bread (p. 245), toast and cheese (p. 206, No. 1).

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1-2 lb. rice . . . . .	.64	.08	6.12	4
1 lb. sugar	-	-	15.42	7
3-4 lb. fat cheese	3.00	3.48	.24	11 1-4
2 qts. skim milk	2.12	.48	3.30	8
2 lb. flour	3.84	.48	22.88	6
1-2 qt. whole milk . . . . .	.58	.62	.83	3 1-2
2 eggs . . . . .	.34	.32	-	3
2 1-2 lbs. beef neck	8.40	2.20	-	20
3-8 lb. suet	-	5.88	-	3
1-8 lb. coffee	-	-	-	3 2-5
3 1-2 lbs. bread	3.36	.28	29.06	8 1 20
Total	22.28	13.82	77.85	77 1-5
Required	19.19	12.42	78.03	78

SUNDAY, MAY.

Breakfast—Milk toast, coffee.

Dinner—Stuffed beef's heart (p. 197), potatoes stewed with milk, dried apple pie (p. 237), bread and cheese, corn coffee (p. 254).

Supper—Noodle soup (from Saturday, p. 225), broiled herring, bread, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
Heart of fat ox weighing 2 lbs.	5.76	2.56	-	10
4 lbs. bread	3.84	.32	33.22	9 1-5
3-4 lb. sugar	-	-	11.88	5
1 qt. skim milk	1.06	.24	1.65	4
1-2 lb. dried apples . . . . .	.10	-	4.50	6
1 1-2 lb. flour	2.88	.36	17.16	4 1-2
12 smoked herring (1 pound)	3.36	1.36	-	10
1-4 lb. suet	-	9.23	-	2
2 lbs potatoes . . . . .	.64	-	6.62	2 1-2
1-4 lb. butter	-	3.33	-	6 1-4
1-2 lb. skim cheese	2.40	1.07	.40	4
Tea	-	-	-	2
1-8 lb. coffee	-	-	-	3 2-5
1 qt. whole milk	1.16	1.23	1.65	7
Total	21.20	14.39	77.08	76
Required	19.19	12.42	78.03	78

MONDAY, MAY.

Breakfast—Oatmeal mush, with milk and sugar, bread, coffee.*Dinner*—Pea soup (p. 243), mutton stew (p. 200), boiled potatoes, bread.*Supper*—Bread pancakes (p. 227), fried bacon, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
2 eggs.....	.34	.32	-	3
3-4 lb. oatmeal.....	1.74	.72	7.80	3 3-4
1-8 lb. coffee.....	-	-	-	3 2-5
1-2 lb. sugar.....	-	-	7.92	3 1-2
1 1-2 qts. skim milk.....	1.59	.36	1.48	6
3-4 lb. bacon.....	.36	9.60	-	9
4 lbs. potatoes.....	1.28	-	13.24	5
4 lbs. bread.....	3.84	.32	33.20	9 1-5
1 qt. whole milk.....	1.16	1.24	1.66	7
3 lbs. shoulder of mutton.....	8.16	2.88	-	21
1 lb. peas, dried.....	3.68	.32	8.32	5
1-2 lb flour.....	.96	.12	5.72	1 1-2
Total.....	23.11	15.88	80.34	77.3
Required.....	19.19	12.42	78.03	78

TUESDAY, MAY.

Breakfast—Oatmeal mush and milk, buttered toast, coffee.*Dinner*—Fried catfish with mint sauce (p. 214), fried potatoes, bread.*Supper*—Fried farina pudding (p. 237), broiled salt pork, bread, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1 lb. oatmeal.....	2.32	.96	10.40	5
1 qt. whole milk.....	1.16	1.23	1.65	7
1 qt. skim milk.....	1.06	.24	1.65	4
3 1 2 lbs. catfish.....	7.00	.20	-	17 1-2
1 1-2 lbs farina.....	2.50	-	18.22	7 1-2
2 eggs.....	.34	.32	-	3
4 1-2 lbs. bread.....	4.32	.36	37.36	10 35-100
Coffee.....	-	-	-	3 2-5
2 lbs potatoes.....	.64	-	6.62	2 1-2
5-8 lb. salt pork.....	.30	8.00	-	7 1-2
1-8 lb. butter.....	-	1.67	-	3 1-8
1-4 lb. sugar.....	-	-	3.96	1 3 4
Tea.....	-	-	-	2
Total.....	19.64	12.98	79.86	74 3-5
Required.....	19.19	12.42	78.03	78

SATURDAY, SEPTEMBER.

Breakfast—Soda biscuit, baked potatoes with drawn butter sauce, cocoa.

Dinner—Pea soup (p. 243), Irish stew, bread.

Supper—Corn mush and molasses, bread and grated cheese, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1 lb. dried peas	3.68	.32	8.32	5
2 lbs. scrag of mutton	5.44	1.92	-	16
3 lbs. potatoes.....	.96	-	9.94	3 3-4
3 lbs. bread.....	2.88	.24	24.90	6 9-10
2 lbs. cornmeal.....	3.14	.90	19.50	6
1-4 lb. sugar	-	-	3.96	1 3-4
1-4 lb. fat cheese	1.00	1.56	.08	3 3-4
1 qt. whole milk.....	1.16	1.23	1.65	7
1-4 lb. butter	-	3.33	-	6 3-20
1 1-2 lbs. flour	2.88	.36	17.16	6 3-4
1-4 lb. suet	-	3.92	-	2
1-4 lb. molasses	-	-	2-48	2 1-2
Cocoa shells	-	-	-	2
Tea	-	-	-	2
Total.....	21.14	13.78	87.99	71 1-2
Required	19.19	12.42	78.03	78

SUNDAY, SEPTEMBER.

Breakfast—Oatmeal and milk, bread and butter, cocoa.

Dinner—Broiled beef's liver, boiled potatoes and carrots with fried onions (p. 242), bread and cheese.

Supper—Lentil soup with fried bread (p. 244), smoked herring, bread, barley porridge (p. 246).

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1 1-2 lbs. beef liver	4.80	.96	-	15
3 lbs potatoes .....	.96	-	9.94	3 3-4
1 lb. carrots.....	-	-	1.44	1 1-2
1 1-2 lbs. oatmeal.....	3.48	1.44	15.60	7 1-2
1-2 lb. lentils	2.04	.16	4.32	5
1 1-2 qt whole milk	1.74	1.85	2.48	10 1-2
1-2 lb. sugar	-	-	7.92	3 1-2
1-4 lb pearl barley .....	.44	.06	2.86	2
1-4 lb. suet.....	-	3.92	-	2
4 lbs. bread	3.84	.32	33.20	9 1-5
6 smoked herring (8 ounces).....	1.68	.68	-	5
1-4 lb. butter	-	3.33	-	6 1-4
1.4 lb. fat cheese	1.00	1.16	-	3 3-4
Cocoa shells.....	-	-	-	2
Total.....	19.98	13.88	77.76	76 9-10
Required	19.19	12.42	78.03	78

MONDAY, SEPTEMBER.

Breakfast—Buckwheat cakes, fried bacon, coffee.

Dinner—Giblet soup (p. 204), baked potatoes with drawn butter sauce, bread.

Supper—Codfish balls (p. 203), cheese, bread, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
2 lbs. buckwheat flour.....	3.04	.64	23.30	10
Giblets.....	2.20	.12	-	8
3 lbs potatoes.....	.96	-	9.94	3 3-4
3-4 lb. bacon.....	.36	9.60	-	9
4 1-2 lbs. bread.....	4.32	.36	37.36	10 35-100
1-2 lb. sugar.....	-	-	7.92	3 1-2
3-4 lb. fat cheese.....	3.00	2.48	.24	11 1-4
1 lb. salt codfish.....	4.80	.16	-	8
Tea.....	-	-	-	2
1 qt. whole milk.....	1.16	1.23	1.65	7
1-8 lb. coffee.....	-	-	-	3 2-5
Total.....	19.84	15.59	80.41	76 1-4
Required.....	19.19	12.42	78.03	78

TUESDAY, SEPTEMBER.

Breakfast—Fried bacon, boiled potatoes, bread, coffee.

Dinner—Boiled corned beef with horseradish sauce, stewed cabbage, bread, barley porridge (p. 246).

Supper—Pea soup, yeast biscuit and butter, stewed fruit.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1 1-2 lbs. corn beef.....	6.96	1.54	-	15
3 lbs. cabbage.....	.80	-	2.00	6
2 lbs. flour.....	3.84	.48	22.88	6
2 lbs. potatoes.....	.64	-	6.62	2 1-2
1 lb dried peas.....	3.68	.32	8.32	5
3 1-2 lbs bread.....	3.36	.28	29.06	8 1-20
1-2 lb. bacon.....	.24	6.40	-	6
1-4 lb. butter.....	-	3.33	-	6 1-4
1-8 lb. suet.....	-	1.96	-	1
1-2 lb. pearl barley.....	.88	.12	5.72	4
1 qt. skim milk.....	1.06	.24	1.65	4
1 pt. whole milk.....	.58	.62	.83	3 1-2
1-8 lb coffee.....	-	-	-	3 4-10
1-2 lb. sugar.....	-	-	7.92	3 1-2
Fruit.....	-	-	-	3
Total.....	22.04	15.29	85.00	77 1-5
Required.....	19.19	12.42	78.03	78

SATURDAY, JANUARY.

Breakfast—Fried bacon, corn bread (p. 229), coffee.

Dinner—Browned flour soup (p. 245), stewed mutton, mashed potatoes, bread.

Supper—Baked beans, bread, apple dumplings (p. 237), with pudding sauce (p. 240), tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
3 lbs. neck of mutton.....	8.16	2.88	-	24
3 lbs. potatoes.....	.98	-	9.94	3 3-4
4 lbs. bread.....	3.84	.32	33.20	9 1-5
1 lb. flour.....	1.92	.24	11.44	3
2 lbs. corn meal.....	3.14	1.20	22.40	6
1 lb. beans.....	3.68	.32	8.56	5
1-2 lb. sugar.....	-	-	7.92	3 1-2
1-2 lb. bacon.....	.24	6.44	-	6
1-8 lb. suet.....	-	1.96	-	1
1-8 lb. coffee.....	-	-	-	3 2-5
1 qt. whole milk.....	1.16	1.23	1.65	7
Apples.....	-	-	-	2
Tea.....	-	-	-	2
Total.....	23.10	14.59	95.11	75 4-5
Required.....	19.19	12.42	78.03	78

SUNDAY, JANUARY.

Breakfast—Fried codfish, bread and butter, coffee.

Dinner—Sheep's head stew with soda biscuit dumplings, baked potatoes, bread and grated cheese, cocoa.

Supper—Potato and onion salad, broiled salt pork, bread, corn mush with pudding sauce (p. 240).

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
2 lbs. corn meal.....	3.14	1.20	22.40	6
1 qt. skim milk.....	1.06	.24	1.65	4
1 pt. whole milk.....	.58	.62	.83	3 1-2
1-2 lb. sugar.....	-	-	7.92	3 1-2
3 lbs. bread.....	2.88	.24	24.90	6 9-10
1 lb. salt codfish.....	4.80	-	-	8
1-2 lb. butter.....	-	6.66	-	12 1-2
1-4 lb. skim cheese.....	1.20	.53	.20	2
4 lbs. potatoes.....	1.28	-	13.25	5
1-4 lb. salt pork.....	.12	3.20	-	3
1-4 lb. suet.....	-	3.92	-	2
3-4 lb. flour.....	1.44	.18	8.58	2 1-4
1 sheep's head, assumed to contain 1 1-2 lbs. meat.....	4.08	1.44	-	12
Onions.....	-	-	-	2
Cocoa shells.....	-	-	-	2
Coffee.....	-	-	-	3 2-5
Total.....	20.58	18.23	79.73	78
Required.....	19.19	12.42	78.03	78

MONDAY, JANUARY.

Breakfast—Fried mush and molasses, bread, coffee.

Dinner—Soup (from boiled beef) with macaroni, boiled beef flank with mustard sauce, bean puree, bread.

Supper—Boiled potatoes with butter gravy, dried apple roly poly pudding (p. 237), bread, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
2 lb. beef flank.....	6.72	1.76	-	16
1 lb. beans.....	3.68	.32	8.56	5
1-2 lb. dried apples.....	.10	-	4.50	6
2 lbs. potatoes.....	.64	-	6.62	2 1-2
2 lbs. corn meal.....	3.14	1.20	22.40	6
1 1-2 lbs flour.....	2.88	.36	17.16	4 1-2
1-4 lb. butter.....	-	3.33	-	6 1-4
1-4 lb. suet.....	-	3.92	-	2
1-4 lb. molasses.....	-	-	2.48	2 1-2
1-2 lb. sugar.....	-	-	7.92	3 1-2
3 lbs. bread.....	2.88	.24	24.90	6 9-10
1 qt whole milk.....	1.16	1.23	1.65	7
1-8 lb. coffee.....	-	-	-	3 2-5
Tea.....	-	-	-	2
1-4 lb. macaroni.....	.36	.02	3.06	3 3-4
Total.....	21.56	12.38	99.25	77 3 10
Required.....	19.19	12.42	78.03	78

TUESDAY, JANUARY.

Breakfast—Fried potatoes, bread, coffee.

Dinner—Browned farina soup with toast (p. 245), stewed mutton with yeast dumpings.

Supper—Bean soup, milk toast, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
2 1-2 lbs. mutton.....	6.80	2.40	-	20
1 qt. skim milk.....	1.06	.24	1.65	4
1 1-2 lbs. beans.....	5.52	.48	12.84	7 1-2
1-4 lb. butter.....	-	3.33	-	6 1-4
1-2 lb. suet.....	-	7.84	-	4
1-2 lb. sugar.....	-	-	7.92	3 1-2
3 lbs. potatoes.....	.96	-	9.94	4 1-4
1 1-2 lbs. flour.....	2.88	.36	17.16	4 1 2
1 qt. whole milk.....	1.16	1.23	1.65	7
3 lbs. bread.....	2.88	.24	24.90	6 9-10
1-4 lb. farina.....	.42	-	3.03	1 3-4
1-8 lb. coffee.....	-	-	-	3 2-5
Tea.....	-	-	-	-
Total.....	21.68	16.12	79.09	75
Required.....	19.19	12.42	78.03	78

BILLS OF FARE, CLASS II.

For family of six. Average price \$1.26 per day, or 18 cts. per person.

The bills of fare in this class will not be given in detail. Taking those given for Class I. as a basis, it is expected that certain luxuries will be added and a better quality of food used; the quantities of proteid, fat and carbohydrate will then not be lowered, which is the point of greatest importance.

BILLS OF FARE, CLASS III.

For family of six, average price, \$1.38 per day, or twenty-three cents per person.

SATURDAY, MAY.

Breakfast—Oranges, egg omelet on toast, boiled rice with milk and sugar, coffee.

Dinner—Beef soup with egg sponge (p. 250), macaroni with cheese (p. 225), dandelion greens, bread.

Supper—Sour cream soup (p. 247), meat croquettes of soup meat (p. 198), graham bread and butter, tea, cake.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1 lb. rice	1.28	.16	12.24	8
1-2 lb. sugar	-	-	7.92	3 1-2
6 oranges	-	-	-	10
3-4 lb. macaroni	1.08	-	9.18	12 3-4
4 lbs. bread	3.84	.32	33.22	9 1-5
2 lbs. flour.....	3.84	.48	22.88	6
1-8 lb. coffee	-	-	-	3 2-5
2 qts. whole milk.....	2.32	2.46	3.30	14
10 eggs.....	1.70	1.60	-	15
2 1-2 lbs. meat.....	8.40	2.20	-	20
3-4 lb. butter.....	-	9.99	-	18 3-4
1-2 lb. fat cheese.....	2.00	2.32	.16	7 1-2
Sour cream and flavors for soup.....	-	-	-	6
Tea	-	-	-	2
Total.....	24.46	19.53	88.90	136 1-10
Required.....	19.19	12.42	78.03	138

SUNDAY, MAY.

Breakfast—Oatmeal mush with sugar and milk, bread and butter, coffee.

Dinner—Ham and eggs, salad of cold beans and lettuce, rhubarb pie, cocoa, bread.

Supper—Rice pancakes (p. 227), with sugar syrup, stewed potatoes, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
3-4 lb. oatmeal	1.74	.72	7.80	3 4-5
1-8 lb. coffee	-	-	-	3 2-5
1 lb. sugar	-	-	15.84	7
2 qts. whole milk	2.32	2.46	3.30	14
3-4 lb. butter	-	9.99	-	18 3-4
1 lb. ham	3.84	5.84	-	25
1-8 lb. suet	-	1.96	-	1
12 eggs	2.04	1.92	-	18
Cocoa	-	-	-	4
3 lbs. potatoes .....	.96	-	9.94	3 3-4
4 lbs. bread	3.84	.32	33.20	9 1-5
1-2 lb. lettuce .....	.10	-	.20	5
1 lb. beans	3.68	.32	8.55	5
Rhubarb	-	-	-	4
1-2 lb rice .....	.64	.08	6.12	4
1 1-2 lbs. flour	2.88	.36	17.16	4 1-2
Tea	-	-	-	2
Salad dressing	-	-	-	5
Total	22.04	23.97	102.11	137
Required	19.19	12.42	78.03	138

MONDAY, MAY.

Breakfast—Oranges, milk toast, coffee

Dinner—Roast mutton and bread dressing (p. 236), mashed potatoes, corn mush with sugar and milk, soda cream (p. 255).

Supper—Parsnip soup (p. 244) with yeast dumplings (p. 250), bread and butter, sponge cake, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
3 1-2 lbs. bread	3.36	.28	29.06	8 1-10
3 lbs. mutton	8.16	2.88	-	48
2 qts. whole milk	2.32	2.46	3.30	14
1 1-2 lbs. sugar	-	-	23.76	10 1-2
1 lb. flour	1.92	.24	11.44	3
1-2 lb. butter	-	6.66	-	12 1-2
1-8 lb. coffee	-	-	-	3 2-5
6 oranges	-	-	-	10
2 lb. cornmeal	3.14	1.20	22.40	6
4 eggs .....	.68	.64	-	6
3 lbs. potatoes .....	.96	-	9.94	3 3-4
Tea	-	-	-	2
Soda cream	-	-	-	3
Parsnips	-	-	-	6
Total	20.54	14.36	99.90	136 1-4
Required	19.19	12.42	78.03	138

TUESDAY, MAY.

Breakfast—Buttered toast, coffee, canned fruit.

Dinner—Sorrel soup (p 245), fried oatfish, noodles (p 225), bread, swelled rice pudding (p. 236).

Supper—Fried mush, stewed rhubarb, fresh rusks and butter (p 230), tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
Canned fruit.....	-	-	-	15
2 lbs. corn meal.....	3.14	1.20	22.40	6
3 lbs. bread.....	2.88	.24	24.90	6 9-10
1 1-2 qts. whole milk.....	1.74	1 86	2.50	10 1-2
2 qts. skim milk.....	2.12	.48	3.30	8
Rhubarb.....	-	-	-	8
2 lbs. flour.....	3.84	.48	22.88	6
1 lb. butter.....	-	13.33	-	25
1-2 lb sugar.....	-	-	7.92	3 1-2
Sorrel, etc., for soup.....	-	-	-	5
1-2 lb. rice.....	.64	.08	6.12	4
1-4 lb. suet.....	-	3.92	-	2
3 lbs. fresh fish.....	8.00	.24	-	18
1-8 lb. coffee.....	-	-	-	3 2-5
4 eggs.....	.68	.64	-	6
Tea.....	-	-	-	2
Total.....	23.04	22.47	90.02	129 3-10
Required.....	19.19	12.42	78.03	138

SATURDAY, SEPTEMBER.

Breakfast—Hominy mush with sugar syrup, stewed pears, toasted crackers, coffee.

Dinner—Plum soup (p. 248), broiled beef steak, boiled green corn, turnips and potatoes (p 242), bread, apple pie (p 237).

Supper—Irish stew (p. 200), biscuit and butter, yeast doughnuts (p. 231), tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1 lb. hominy.....	1.58	.60	11.20	5
Pears and plums.....	-	-	-	5
2 lbs. bread.....	1 92	.16	16.60	4 3-5
1-2 lb crackers.....	.50	-	4.15	5
2 lbs beef steak.....	6.72	1.76	-	36
1 doz. green corn.....	-	-	-	15
2 lbs. potatoes.....	.64	-	6.62	2 1 2
Apples.....	-	-	-	4
1 lb. turnips.....	.15	-	1.12	0 7-10
3 lbs. flour.....	3.76	.64	34.32	9
1-8 lb suet.....	-	1.96	-	1
1 lb. mutton.....	2.72	.96	-	8
3-4 lb butter.....	-	9.99	-	18 3-4
2 eggs.....	.34	.32	-	4 1-6
Tea.....	-	-	-	2
1 lb. sugar.....	-	-	15.84	7
1 qt. whole milk.....	1.16	1.23	1.65	7
1-8 lb coffee.....	-	-	-	3 2-5
Total.....	20.83	17.62	91.50	138 1-10
Required.....	19.19	12.42	78.03	138

SUNDAY, SEPTEMBER.

Breakfast—Sour milk pancakes with sugar syrup (p. 234), sausage, bread, cucumbers, coffee.

Dinner—Green corn soup (p. 245), fricasseed chicken (p. 203), potatoes and carrots (p. 242) with fried onions, bread.

Supper—Fried farina pudding (p. 237), water toast, radishes, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
Radishes	-	-	-	3
1 lb. sausage	2.32	6.00	-	12
3-4 lb. sugar	-	-	9.90	5 1-4
1 1-2 qts. whole milk	1.74	1.85	2.48	10 1-2
3 lbs. bread	2.88	.24	24.90	6 9-10
1-2 doz. green corn	-	-	-	7 1-2
An old chicken (3 pound)	9.00	1.90	-	50
2 lbs potatoes .....	.60	-	6.60	2 1-2
1-2 lb carrots	-	-	.72	1
Cucumbers	-	-	-	2
1 1-2 lbs. flour	2.88	.36	17.16	4 1-2
1-2 lb. farina .....	.84	-	6 00	2 1-2
1-4 lb. butter	-	3.33	-	6 1-4
1 qt. sour milk	1.06	.24	1.65	4
Coffee	-	-	-	3 2-5
Tea	-	-	-	2
2 Eggs .....	.34	.32	-	4 1-6
Total	21.66	14.24	69.41	127 2-5
Required	19.19	12.42	78.03	138

MONDAY, SEPTEMBER.

Breakfast—Codfish balls, bread and butter, coffee, stewed apples.

Dinner—Roast beef, baked potatoes, stewed tomatoes, lemonade, bread.

Supper—Berry roly poly (p. 237), cheese, bread and butter, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
3-4 lb. codfish	3.60	-	-	6
4 lbs. potatoes	1.28	-	13.24	5
3 lbs. bread	2.88	.24	24.90	6 9-10
3-4 lb butter	-	9.99	-	18 3-4
2 qts. whole milk	2.32	2.46	3.30	14
1 lb. sugar	-	-	15.84	7
2 1-2 lbs. beef	8.40	2.20	-	40
3 lbs tomatoes	-	-	4.00	5
Lemons	-	-	-	7
1 1-2 lbs. flour	3.88	.36	17.16	4 1-2
1-2 lb. fat cheese	2.00	2.32	.18	7 1-2
1-8 lb coffee	-	-	-	3 2-5
Tea	-	-	-	2
Fruit	-	-	-	10
Total	24.36	17.57	78.62	137
Required	19.19	12.42	78.03	138

TUESDAY, SEPTEMBER.

Breakfast—Broiled mackerel, stewed potatoes, bread and butter, coffee.

Dinner—Sour cream soup (p. 247), roast mutton with bread stuffing, boiled beets, bread pudding (p. 239, No. 2).

Supper—Apple fritters (p. 241) with sugar syrup, bread and butter, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1 1-2 lbs. flour	2.88	.36	17.16	4 1-2
4 eggs .....	.68	.64	-	8 1-3
2 qts. whole milk	2.32	2.46	3.30	14
1 lb sugar	-	-	15.84	7
1½ lb. suet	-	1.96	-	1
2 1-2 lbs. mutton	6.80	2.40	-	40
2 lbs. beets	-	-	3.00	5
1 1-2 lbs. salt mackerel	4.56	3.00	-	18 3-4
1 1-2 lbs. potatoes .....	.48	-	4.96	1 9-10
4 lbs. bread	3.84	.32	33.20	9 1-5
1-2 lb. butter	-	6.66	-	12 1-2
Sour cream and apples	-	-	-	8
1-8 lb. coffee	-	-	-	3 2-5
Tea	-	-	-	2
Total	21.56	17.80	79.46	135 1-2
Required	19.19	12.42	78.03	138

SATURDAY, JANUARY.

Breakfast—Buckwheat cakes and sugar syrup, bread and butter, coffee.

Dinner—Roast fresh pork with apple sauce, mashed potatoes, Indian pudding (p. 238), bread.

Supper—Herring and potato salad, lentils with prunes (p. 242), bread and butter, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
2 lbs. buckwheat flour	3.04	.64	23.20	10
1 1-2 lbs. corn meal	2.28	.91	16.80	4 1-2
1 lb. butter	-	13.33	-	25
3-4 lb. sugar	-	-	11.88	5 1-4
1 qt. whole milk	1.16	1.23	1.65	7
Apples	-	-	-	4
2 1-2 lbs. fresh pork	8.00	2.80	-	37 1-2
3 lbs. potatoes .....	.96	-	9.94	3 4-5
2 eggs .....	.34	.32	-	4 1-6
1 qt. skim milk	1.16	.24	1.65	4
3 lbs. bread	2.88	.24	24.90	6 9-10
1-2 lb. lentils	2.04	.16	4.32	5
1-2 lb prunes .....	.15	-	3.80	5
1-8 lb. coffee	-	-	-	3 2-5
Tea	-	-	-	2
6 herrings	1.68	.68	-	5
Salad dressing	-	-	-	5
Total	23.69	20.55	98.14	137 1-2
Required	19.19	12.42	78.03	138

SUNDAY, JANUARY.

Breakfast—Milk toast, fried potatoes, coffee.

Dinner—Cold roast pork, noodles (p. 225), stewed cabbage, bread, swelled rice pudding (p. 236), corn coffee (p. 254).

Supper—Potato soup (p. 244), grated cheese, bread and butter, raised cake (p. 230), canned fruit, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
1-4 lb. fat cheese	1.08	.95	.06	3 3-4
4 lbs potatoes.....	1.28	-	13.24	5
2 lbs flour.....	3.84	.48	22.88	6
4 eggs .....	.68	.64	-	8 1-3
2 qts. whole milk.....	2.32	2.46	3.30	14
1 qt. skim milk.....	1.06	.24	1.65	4
3-4 lb. butter.	-	9.99	-	18 3-4
1 lb. sugar	-	-	15.42	7
2 lbs. fresh pork	6.40	2.24	-	30
2 lbs. cabbage.....	.80	-	1.60	8
1-2 lb. rice.....	.64	.08	6.12	4
3 lbs. bread.....	2.88	.24	24.90	6 9-10
Corn (dry grain).....	-	-	-	2
Canned fruit.....	-	-	-	10
1-8 lb. coffee	-	-	-	3 2-5
Tea.....	-	-	-	2
Total	20.98	17.32	89.17	133 1-10
Required.....	19.19	12.42	78.03	138

MONDAY, JANUARY.

Breakfast—Buckwheat cakes, sausage, coffee, apple sauce.

Dinner—Pea soup (p. 243), roast beef, baked potatoes, canned tomatoes, barley gruel (p. 246).

Supper—Potato soup with egg and bread balls (p. 249), brown bread and butter, canned fruit, tea.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
2 lbs. buckwheat flour	3.04	.64	23.20	10
1 lb. sausage.....	2.32	6.00	-	12
2 lbs. beef.....	6.72	1.76	-	32
3 lbs. potatoes.....	.96	-	9.94	3 3-4
2 lbs. tomatoes (canned at home).....	.19	-	3.50	6
3 lbs. bread.....	2.88	.24	24.90	6 9-10
2 eggs .....	.34	.32	-	4 1 6
1-2 lb. barley.....	.88	.12	5.72	4
1 qt. whole milk.....	1.16	1.23	1.65	7
1-2 lb. sugar.....	-	-	7.92	3 1-2
1 lb dried pease.....	3.68	.32	8.32	5
1-2 lb. butter.....	-	6.66	-	12 1-2
Canned fruit.....	-	-	-	10
1-8 lb coffee.....	-	-	-	3 2-5
Tea	-	-	-	2
Apples.....	-	-	-	5
Total	22.17	17.29	85.15	127 1 5
Required.....	19.19	12.42	78.03	138

TUESDAY, JANUARY.

Breakfast—Graham biscuits, fried bacon, apple sauce, coffee.

Dinner—Boiled mutton, baked potatoes, winter squash, dried apple short cake with pudding sauce, corn coffee.

Supper—Mutton and bean broth, bread and butter, cheese, tea, cookies.

	Proteids. oz.	Fats. oz.	Carbo- hydrates. oz.	Cost in cents.
3-4 lb. bacon .....	.36	9.66	-	9
1-2 lb dried apples .....	.10	-	4.44	6
1 lb. beans	3.68	.32	8.56	5
1-4 lb fat cheese	1.00	1.16	-	3 3-4
1 lb sugar	-	-	15.84	7
2 qts. whole milk	2.32	2.46	3.30	14
2 1-2 lbs mutton	6.80	2.40	-	30
3 lbs potatoes .....	.96	-	9.94	3 3-4
2 lbs. winter squash .....	.16	-	3.20	10
Cookies	-	-	-	15
2 lbs bread	1.92	.16	16.60	4 3-5
2 1-2 lbs flour	4.80	.60	27.94	8 1-2
1-4 lb butter	-	3.33	-	6 1-4
1-8 lb. coffee	-	-	-	3 2-5
Tea	-	-	-	2
Apples	-	-	-	5
Total	22.10	20.09	89.82	132 7 10
Required	19.19	12.42	78.03	138

TWELVE COLD DINNERS.

If a man is to eat a cold dinner for months or even for weeks, it is quite worth while to make that dinner as good as it can be, and to pack it nicely for carrying. Every one knows how it can take the edge off even a keen appetite to find his sandwich smeared with apple pie, or his cake soaked with vinegar from the pickles. That a box or basket of given dimensions should hold as much as possible, and keep the different kinds of food separate, it must be divided into compartments.

Simplest—an oblong basket,—divide into two compartments by a piece of pasteboard cut so that it slips in rather tightly, then line the two compartments with nice wrapping paper put in fresh every day. It may be divided into four parts in the same way. A close

fitting tin spice box is nice for holding cheese. A tiny "salve" box should contain salt and pepper mixed. Sew leather straps on the cover of the basket inside, for holding knife, fork and spoon.

Put a strap around the basket that you may hang from it a little pail containing cold soups recommended for drinks in summer.

Cold puddings should be wrapped in strong writing paper, then in wrapping paper and pinned close.

COLD DINNERS FOR SUMMER.

1. Bread and butter, salad of potatoes and cold baked fish, cold boiled beef, molasses cookies, apple soup.
2. Corn bread, ham sandwiches, baked sweet apples, custard pie, plum soup.
3. Bread and butter, cold veal, hard boiled eggs, pickled beets, cherry pie.
4. Chopped beef sandwiches, salad of Lima beans, ginger snaps, cottage cheese, Irish moss lemonade.
5. Graham bread, cold roast mutton, cucumbers and salt, pumpkin pie, soda cream.
6. Bread and butter, dried beef, crackers, cheese, sponge cake, cold coffee.

COLD DINNERS FOR WINTER.

7. Bread, cold boiled pork, cold baked beans with mustard and vinegar, doughnuts, apple pie, cold coffee.
8. Yeast biscuits and butter, cold chicken, pickles, cold rice pudding, apples.
9. Cold soda biscuits, veal and ham sandwiches, Saratoga potatoes, mince pie.
10. Biscuits and butter with honey, cold corn beef and rye bread, dried apple tarts, cheese.
11. Bread and butter, smoked herring, pickled beans, gingerbread, apples.
12. Corn bread and butter, cold roast beef and white bread, bread and apple pudding, bread cake.

The Final Report of Professor S. H. Woodbridge on Steam Heating and Ventilation of the State House.

MY DEAR SIR: The work given to my care by the Board of State House Commissioners has been executed in as close accordance with the plans proposed in my communication to the Board under date of June 8, 1889, as has been found practicable.

The apparatus advised consisted of a fan and engine capable of moving and distributing under slight pressure 25,000 cubic feet of air per minute, a heater capable of heating that air from 20° below to 70° above zero, a system of iron conduits and of wall flues for the distribution of this air throughout the extension and to both the assembly halls of the main building, a system of dampers for the control of the quantities and the direction of flow of the air moved, a system of direct steam heaters under automatic control for the even warming of the rooms; boilers and chimney of sufficient capacity for the required work, and a system of vent flues and channels for the discharge of vitiated air.

The several parts of this combined system were in plan carefully proportioned to their required individual and associated duty and to the ordinary and the special requirements for which they were designed. Departures from that plan have been chiefly due either to modification in the building itself, and in required adaption to such changes, or else to the limited means at the disposal of the commissioners for the execution of the work.

Trials of the system have been personally made under conditions of weather favorable to a test of its ability to meet assumed maximum requirements. The results of the tests are herewith submitted in some detail, together with such notes as appear of possible value to a clearer knowledge of the purposes for which the several parts are designed and the method of their use for obtaining the best results.

THE FAN.—With the conduit dampers arranged for the movement of a maximum volume of air, the amount passed through the fan when making 196 revolutions a minute was found to be 21,000 cubic feet at 4° (F) or nearly 25,000 cubic feet at 70°. A higher fan speed and a proportionately larger volume of air moved are easily obtainable by the use of a higher boiler pressure than the thirty-six pounds carried at the time of the experiment. The specifications called for a maximum of 25,000 cubic feet per minute, with a fan speed of 250 revolutions.

THE HEATER. The heater is made up in three sections of about 340 square feet of steam-pipe surface each. Two of these sections are connected with the boilers and one with the engine for the use of exhaust steam and the utilization of its heat. It is specified that this heater shall be capable of warming 25,000 cubic feet of air per minute from 20° below zero to 70° above. With steam shut off one of the boiler sections, and but five pounds steam pressure on the other, the exhaust steam from the engine filling the third, the temperature of 21,000 cubic feet of air a minute was raised from 4° to 65°. By increasing the steam pressure in the one coil used for boiler steam to forty pounds, the temperature of the air could have been raised to 85°. There can, therefore, be no question as to ability of the heater to perform the stipulated duty.

The absence of the by-pass called for in the specifications is a matter of oversight on the part of the contractors, and it is hoped that the commissioners will not accept the work as complete until that needed means of regulating the temperature of the air flow is provided.

Its purpose is to allow a part of the cold air to pass by rather than through the coil, and to mix it with the heated part of the air before its passage through the fan in such proportions as to furnish the wished for temperature in the mixture. In case such by-pass is not supplied the sectional form of the heater furnishes a means for an approximate regulation of temperature. General directions for their use for such purpose are as follows:

Outside temperature.	Exhaust section.	Boiler section No. 1.	Boiler section No. 2.
Below 10°.....	On full	On (at req. pres.)	On (at req. pres.)
Between 10° & 20°.	On full	Off.....	On (at req. pres.)
Between 20° & 40°.	On (at req. pres.)	Off.....	On (at req. pres.)
Above 40°.....	On (at req. pres.)	Off.....	Off.

AIR DISTRIBUTION. The iron conduits are proportioned for a maximum flow rate of 1200 linear feet per minute, and the area of the flues are scheduled for a flow rate of 600 feet. By means of dampers in the conduits and at the bases of the flues the air movement may be directed and distributed as desired.

It is assumed that the rooms are to be continuously warmed and ventilated only when occupied, and that the air furnished by the fan is primarily for the purposes of ventilation and not for heating. For ventilation alone the air need be heated only to the point of comfort, as 70°, or under. If, as in early morning heating, the fan current is also used for warming, its temperature may be anything desired within the range of the apparatus.

The method of quick heating in the morning by a rotation of the air of the rooms through the fan is to be recommended on the ground of economy. In all but the severest weather the steam may be shut off from the extension at night, and at six o'clock or later next morning the doors may be opened between the rooms and the hallways, and from the basement hallway into the fan room, and from the fan room into the heater's connection with the window. Steam may then be put on the entire system and the fan started. One hour of rapid circulation will generally be found sufficient to bring the rooms to a comfortable temperature. At eight o'clock the fan and heater may be adjusted for their day's work of ventilation only.

The air is to be directed where the occupants are assembled. When the Senate and House are in session, the air is to be cut off from the committee rooms and directed to the assembly halls, and *vice versa*. The only rooms which it is necessary to continuously ventilate are those permanently occupied by the several departments of State.

The schedule of rooms supplied directly from the fan is as follows: Rooms marked (C) were at the time of scheduling assigned to committee uses, and all others to State departments. All work has been done on the basis furnished by this schedule, and the system cannot be held responsible for any results growing out of changes from the schedule arrangement and uses of rooms.

Rooms.	Area of Flues, square feet.		Required Air	
	Supply.	Discharge.	Volume, cubic feet per hour.	Measured Air Volume.
Basement.				
S. E. Room	0 50	1.00	18,000	
S. W. "	0.50	1.00	18,000	
W. M. "	0.50	1.00	18,000	
N. W. "	0.50	1.00	18,000	
			<u>72,000</u>	
First Floor.				
S. E. Room	1.25	2.50	45,000	
S. M. "	0.50	1.00	18,000	
S. W. "	0.50	1.00	18,000	
W. M. "	1.25	2.50	45,000	
N. W. "	1.25	2.50	45,000	
N. M. "	0.30	0.60	11,000	
N. E. "	0.20	0.40	7,000	
			<u>189,000</u>	
Second Floor.				
S. E. Room (C)	1.25	2.50	45,000	26,000
S. M. " (C)	1.25	2.50	45,000	38,000
Library.....	1.50	3.00	54,000	65,000
N. M. Room	0.25	0.50	9,000	13,000
N. E. " (C)	1.25	2.00	45,000	
			<u>198,000</u>	
Third Floor.				
S. E. Room (C)	0.75	1.50	27,000	27,000
S. M. " (C)	1.25	2.50	45,000	35,000
S. W. " (C)	2.00	4.00	72,000	56,000
W. M. " Court...	2.00	4.00	72,000	58,000
N. W. " (C)	2.00	4.00	72,000	76,000
N. M. " (C)	0.75	1.50	27,000	26,000
N. E. " (C)	0.75	1.50	27,000	25,000
			<u>342,000</u>	
Required.				
Main Building.		Minimum.	Maximum.	Measured.
House of Representatives		300,000	750,000	526,000
Senate		90,000	300,000	133,000

The supply for department rooms is based on the largest number of permanent occupants each is likely to accommodate, and that for committee rooms on a maximum rate of air change of six times an hour. The tests were confined chiefly to rooms farthest removed from the fan, as those most likely to be given less than their proportion of supply. All tests made in the basement and first floor

rooms showed their supply to be in excess of requirement. The results above given were obtained by measuring the rate of air flow through the registers and assuming the effective area of the registers as two-thirds that of its face, a method which generally gives minor rather than major values. By partially closing the dampers belonging to the basement and first floor rooms, and, if necessary by speeding up the fan to two hundred and fifty revolutions, the full maximum of air required may be furnished the most remote rooms, should such quantities ever be called for.

THE HALL OF THE HOUSE OF REPRESENTATIVES. The minimum supply to this room is based on an attendance of two hundred, and the maximum supply to a possible attendance of five hundred, on rare occasions. The air conveyed from the fan by two iron conduits, enters the under floor space at the two western corners, and finds entrance into the room through floor registers under the members' fixed chairs and next the eastern wall. The aggregate free area of these inlets is 8,320 square inches, or fifty-two square inches to each member. To supply the minimum volume the velocity of flow must therefore be seventeen inches a second through the register *openings*. The air movement above the registers being diffused over their entire area, the minimum and the maximum velocities will be practically reduced to twelve and thirty inches.

It is a matter of regret that the necessities of floor and desk arrangements were regarded as adverse to the method of inlet proposed in my communication of June 8th, '89, and designed to reduce the danger of troublesome draught to a minimum. The per capita inlet area obtainable by that method was shown to be 180 square inches, and its position, directing the flow of entering air into the aisles, would have been favorable to the least possible disturbance from draught effect. The significance of such details in arrangement cannot be rightly appreciated until the fatality of a sensible draught to any system of ventilation is accepted as a guiding fact of the first importance in the designing or choosing of methods.

When the air moved by the fan making 196 revolutions was diverted from the committee rooms to the House and Senate Chambers, the quantity entering the House was found to be 526,000 cubic feet per hour, sufficient to give 300 occupants 1,750 cubic feet per hour each, or to "change" the air of the hall once every nine or ten minutes. To neutralize the heating effect of the

audience, the air supplied in such quantity must have a temperature lower than that of the room by about 0.009° for each occupant when the outside temperature is at or near 0° , and this difference must be greater as that between in-door and out-door temperature is less.

To roughly test the correctness of theoretical computation 216 candles, evenly distributed over the desks, and eighteen gas jets were burned for one and half hours with the following results :

	Beginning.	End.
West side of hall, five feet from floor,	62.0°	62.5°
East side of hall, five feet from raised floor,	64.0°	68.0°
Air supply,	64.0°	64.5°
Gallery, men's side,	66.0°	68.5°
Attic vent., over women's gallery,	68.0	72.0°
Outside air,	4.0°	5.0°

The computed heat developed by the burning of the gas and the candles equals that produced by about 300 average adults ; but the greater concentration of warm air currents rising from the flames as compared with the more diffused current rising from an occupant in sitting posture caused a somewhat lower floor temperature than would have resulted had 300 men crowded the floor space. The unprotected east side thermometer was, doubtless, effected by radiation from the candle flames, and, therefore, failed to register the air temperature. The increase in atmospheric temperature is best indicated by the two gallery thermometers taken in connection with the air volumes moved through each gallery vent. The proportions of air passing out through the men's gallery was twice that finding exit through the women's gallery. The resulting temperature increase for the total air moved would be 2.8° . The theoretical increase due to the presence of 300 occupants would have been 2.7° .

It may therefore be safely assumed that for 250 occupants, and each supplied with 2,500 cubic feet of air per hour, the temperature of the supply should be kept about 3° below that of the discharge air. The number of occupants being constant, the temperature of the supply must be reduced in proportion to the reduction of the supply volume. If, on the other hand, the supply remains constant in volume and the number of occupants vary, the temperature difference between supply and discharge must vary as the number of occupants.

It is not expected that the very best results obtainable can give satisfaction to every occupant of the hall. The varieties of tem-

perature, humidities and climatic and other conditions to which they are habituated in their domestic, business, or out door life cannot be furnished within the hall at one and the same time. A temperature of 65° cannot be furnished the occupant of one desk, and a temperature of 75° to another, or dry air to one and humid air to another, or "lively" air to this member and motionless air to that. Only the thoughtless can imagine as possible such a provided variety of local conditions within one room, and only the selfish will demand that condition throughout the room which is agreeable to himself. All are to come to atmospheric conditions as nearly equable as it is possible to maintain them. These conditions are chosen with reference to the greatest comfort of the greatest number, and to them all are expected to adapt themselves in clothing or otherwise, as much as though they were going to a fixed climate where the man who is too warm must wear lighter clothing, and the man who is too cold, heavier clothing, and the man with cold ankles must doff low shoes for boots. The utmost to be attempted in artificial warming and ventilation is to provide such conditions as shall make it possible for every occupant to make himself comfortable with proper clothing, and with the least amount of total individual adaptation. Such adaptation there must be, and the attempt to avoid it by adjusting the conditions to special idiosyncrasies will prove disastrous. The idiosyncrasy must adapt itself to the common comfort, and not be allowed to impose discomfort on the many by demanding personal gratification at their expense. For this reason the engineer should receive orders only from the President of the Senate and the Speaker of the House, with reference to their respective rooms, or from such officer as may be duly authorized to direct the proper warming and ventilation of the House.

THE SENATE HALL. The large per capita floor space and the arrangement of seats in this room make a special provision for the distribution and diffusion of the air supply less necessary than in the House. The scheduled minimum supply is 90,000 cubic feet per hour for 45 occupants. The volume delivered with a fan speed of 196 revolutions was found to be 133,000 cubic feet. A fan speed of 250 revolutions would result in a supply of 170,000 cubic feet as against the 300,000 scheduled maximum. On the rare occasions when such maximum quantities are required for the House and Senate they may be had by shutting off the extension and directing the full volume of air moved by the fan to the House

and Senate. It is doubtful, however, whether, with the present arrangement of inlet in the House, such a supply would be tolerable in that room.

THE DIRECT HEATING SYSTEM. The entire apparatus for this work seems to be doing its work admirably in the circulation and distribution of steam, in the return of condensed water, and in noiseless action. The amount of heating surface required for each room, and the form best adapted to the rooms used were carefully determined with reference to the extent, character and exposure of cooling surfaces, and the heater's location. For obtaining the greatest thermal efficiency of the radiators and their best effect in preventing cold floors, as well as for the purpose of locating them with reference to the least possible floor obstruction, they were planned for the window recesses. Architectural necessities prevented the complete carrying out of this plan, and the altered position of some and form of others somewhat impairs their action.

They were designed—with the aid of an open fire—to keep the rooms comfortably warm in the severest weather (-20°) for which the entire system is planned. They have been tested when the outside temperature was 15° above, with no fires in the fireplaces, the fan stopped and a fresh westerly wind blowing, and also when the outside temperature was 15° below, only a light wind blowing, the fan circulating air at 70° for two hours in the early morning and no hearth fires in use.

The results are given below, together with the scheduled and actual heating surfaces for each room, (R) indicating a removal of some or all of the surfaces from window recesses, and (F) a change in form from that scheduled. The temperatures were taken in every case by means of a rapidly whirled thermometer, in order to expedite work as well as to reduce the effect of wall radiation and obtain atmospheric temperatures solely.

Rooms.	Square Feet of Radiator Surface.		Temperature of Rooms with Outside Temperature.	
	Scheduled.	Actual.	+15°	-15°
Basement.				
S. E.	45	45		
S. W.	60	(F) 42	67	
W. M.	78	78	74	
N. W.	108	(F) 144	74	
Hall.	66	(F) 42		
First Floor.				
S. E.	156	(R) 144	75	
S. M.	45	45		
S. W.	84	56	60	64
W. M.	132	(F) 132	66	69
N. W.	180	180	70	70
N. M.	66	66	73	
Hall.	90	90		
N. E.	66	66		
Telegraph Office.	15	27		
Second Floor.				
Stairway	27	27		
S. E.	33	(R) 33	76	
S. M.	33	(R) 33	steam off.	62
Library.				
S. W.	132	132		
W. M.	103	(F) 103	floor. 62	65
N. W.	156	(F) 156	loft. 70	72
N. M.	45	45	72	
N. E.	45	(R) 45	72	
Stairway	33	33		
Third Floor.				
Stairway	27	33		
S. E.	33	(R) 33	74	
S. M.	33	(R) 33	74	
S. W.	90	(R) 90	66	77
W. M.	54	(R) 54	65	
N. W.	132	(R) 132	69	
N. M.	39	(R) 39	72	
N. E.	39	(R) 39	78	
Stairway	33	33		

The temperatures were taken on the second day only in those rooms in which they had been found low on the milder day, it being assumed that they were by that test proved the most difficult to heat. The effect of the low temperature air supply distributed from

the fan on the morning of the second trial was to lower the higher room temperatures and to raise the lower. The steam pressure carried on the direct system during these tests was five pounds. By increasing this pressure the efficiency of the radiators may be so increased that it is doubtful whether open fires will be required in any but the most exposed rooms, or in the most extreme weather.

Double sashing the library windows would greatly aid in securing an equal distribution of the heat between the floor and the high ceiling, and may be found necessary. Such additional protection for the entire western exposure is to be advised on economic as well as hygienic grounds.

Rectifications promised and doubtless made with a view to bringing the heating surfaces in all rooms more nearly in correspondence with the amount and form of that scheduled and shown on plans will have a beneficial effect in equalizing temperatures. The generally high temperatures of the southerly rooms is due to the sun and wind effect. On a cloudy day with a cold southerly wind, they would more nearly equal the northern rooms in temperature.

AUTOMATIC REGULATION OF TEMPERATURE. The steam heating surfaces are designed to meet the requirements of severe weather. They are too large for continuous use in milder weather; the heat yielded would then be too great. Reduced steam pressure in the distributing mains affords only partial relief. Intermittent supply of steam by valve manipulation is neither easy nor likely to be so well regulated as to maintain anything like uniformity in room temperature. The occupant, with sensibilities dulled by slow changes in temperature, shuts off the steam only when the heat becomes intolerable, or lets it on only as forced to do so by the persistent discomfort of chilliness. The effects are first, enervation resulting from habituation to high temperatures, which in turn demands a warmer than normal air for comfort, and, which increase susceptibility to cold; second, the general harmful results of the inevitable fluctuations attending this method of heat regulation; third, a general tendency to wastefulness through overheating and open window cooling in weather admitting of such a method of relief.

Any heating system, however perfect in plan, is in as much need of automatic means for adapting it to its variable duty as is the finest engine in need of a governor to adapt and hold it to its varied work. The larger the engine and the more fluctuating its work, the more imperative for its perfection do such automatic

means become. An engine without a governor would be anywhere condemned. The wastefulness, the affected health, the discomfort and complaint which attend the use of an unregulated heating system only wait a better knowledge of the available appliances for its automatic control to find expression in protest and condemnation when the means for such control are wanting.

An inspection of the above columns of temperatures will furnish sufficiently suggestive evidence of the value of automatism in heat regulation and will make unnecessary any further expression of regret that a lack of funds in the hands of the commissioners has thus far prevented them from authorizing the incorporation of the recommended means.

THE DISCHARGE VENTILATION. Provision for this part of the system has proved more difficult and is correspondingly less complete than that for any other part. This has resulted from the lack of wall space for the introduction of suitable wall flues, the necessity of placing many flues in the outside walls, and the encroachment of the mason or other work on the flue areas as provided in the schedule and plans. The locations of both supply and discharge flues were generally determined more by necessity than by considerations of efficiency, and in this matter the vent flues suffered most.

The value for ventilating work given to the fireplace flue is fifty per cent. in excess of that given to the same areas in cold air flues, because of the assumption that the fire-places would be used for fires and the flues heated.

THE BOILER AND CHIMNEY POWER. These have been proved to have a safe residual capacity for the maximum duty likely to be imposed on them for warming and ventilating work. If it is the practice of the State to insure its property, the insurance of its boilers in such a company as the Hartford Boiler Inspection and Insurance Company is to be recommended as much for the value of their inspection and their oversight in the use of the boilers as for protection against loss.

As a matter of record, as well as for the purpose of a check upon the fireman and an incentive to the best work of which he is capable, a water meter (Worthington's special make for high temperature, $\frac{3}{4}$ inch, and costing \$32) would serve a good purpose. The meter reading would show the weight of steam used, and that quantity compared with the weight of coal burned would indicate the char-

acter of work done in the boiler-room. In any case, and particularly if such a meter is to be used, the feed water from the main should be passed to the boiler through the tank and pump.

TELE THERMOMETER. For the use of the engineer a thermal indicator should be provided him in the engine room which should register the temperature of the Hall of Representatives, so that at any moment he may know the Hall temperature and be spared the necessity of leaving his room, climbing the stairs and entering the Hall for an observation of the thermometers. Such an instrument is made by the Standard Thermometer Company and may be had for \$130 or so.

SPECIFICATIONS AND RECOMMENDATIONS. With the complete carrying out of the specifications and recommendations made in previous communications and with a due regard to the enclosed general directions for use, it is believed that satisfactory results may be had. Departure from either must be attended with effects not chargeable to the system as designed.

COST OF SYSTEM AND OF ITS USE. The estimated cost of the heating and ventilating apparatus proposed in the original plan was about \$4,300, not including the boilers and their settings nor the fittings required by the halls of the Senate and House, nor the extra cost involved in the outside location of the boiler-house, and excluding the Johnson electric service.

The total cost of the combined plant has reach the sum of \$7,500, of which \$2,500 may be assigned to the boiler-rooms.

The cost of use may be included under two items, first, interest at eight percent on the cost of the ventilating apparatus to cover interest on the investment and the cost of repairs; and second, the cost of an average of seventy-five pounds of coal for every 1,000,000 cubic feet of air passed through the fan during the months between the first of October and the last of May. The latter item of cost must depend largely on the intelligence and skill of the engineer in the use of dampers and the fan. Except during the session of the legislature the dampers to the committee rooms and the Senate and Representatives' Hall may be closed, and 320,000 cubic feet an hour will supply the department offices. The committee rooms will require full ventilation only when crowded. The House with an attendance of 200 would be well ventilated by a supply of 400,000 cubic feet of air per hour, and the Senate with a 100,000 cubic feet supply for fifty occupants.

The present engineer has shown an interest, faithfulness and skill which augers well for the State's interest. That he may be better equipped for his work it would be well to provide him with an anemometer for the measurement of air flow and the regulation of air quantities supplied.

A good instrument is not the sole essential to a satisfactory product. Yet more essential is skill in the use of the instrument. A bungler cannot be relied upon to produce good results with a tool, however perfect. The system with which the State House is now furnished is nothing more than a somewhat complicated tool. Everything depends on the manner of its use. Its reputation either as a noteworthy success or a conspicuous failure rests largely in the hands of the user. It cannot be so made as to be incapable of misuse. The State's work is but half done in providing a good system ; it must furnish a competent controller and user. The warming and ventilation of the whole building should be placed under the exclusive charge of a competent authority with power to control all arrangements of valves, dampers, doors, transoms or windows necessary to the best results.

Not until this is done, and the best possible use made of the system, can unsatisfactory results be made chargeable to it.

In closing my report and my work for the State, allow me to express the pleasure afforded me in all my association with the Board of Commissioners and the State Board of Health, and in their cordial co-operation in the work to which they called me, and also in the respectful consideration accorded all my proposals and demands on the part of both the commissioners and the architects.

Respectfully submitted,

S. H. WOODBRIDGE.

To His Excellency the Governor, HON. EDWIN C. BURLEIGH, Chairman of the Board of State House Commissioners, Augusta, Maine.

BOSTON, January 1, 1891.

[See next page.]

The accompanying figures indicate certain of the methods recommended for use in the State House ventilation.

Figure 1 shows the desk arrangement proposed for the admission of air to the representatives' chamber.

Figure 2 shows the method advised for the discharge of air from that chamber into the attic, each gallery having its own vent through its ceiling and close to its rear wall into the same attic.

Figure 3 shows the designed and board vent from the attic, through the cupola stairway and cupola ceiling and dome, vent by open cupola door or window being considered unreliable because of varying wind action.

Figure 4 shows the pattern of roof ventilator proposed for the attic of the extension. It is designed to allow free egress of air and to prevent the entrance of rain and snow

Figure 5 shows the arrangement of check valve recommended for all but fireplace flues for the prevention of down draught through them, and to allow the escape of air when the supply to a room exceeds the discharge capacity of its fireplace. Such valves should be made of the lightest gossamer rubber cloth. They open freely for the egress of air, and close lightly against its movement in the reverse direction. In the absence of such check valves reversal is liable to occur, first, when the supply is shut off from a room and the ingress of air to supply that removed by the fireplace must be by inward leakage; second, when the attic air and that in the flues connected with it becomes so chilled and heavy as to overcome the tendencies, otherwise favorable, to the flow in the desired direction; third, when by the discharge of air into the attic through other channels than the flues is so free and the vent through the roof is so restricted as to produce a partial plenum condition within the attic space.

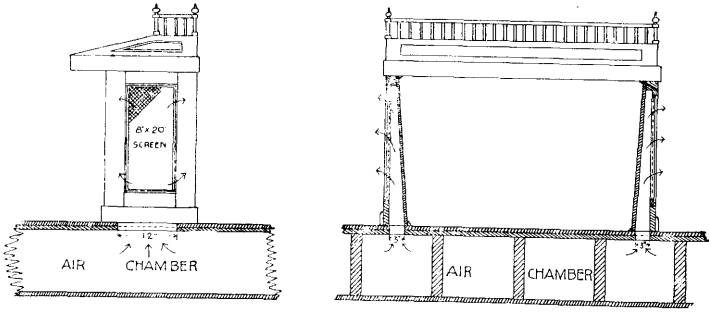


FIG. 1

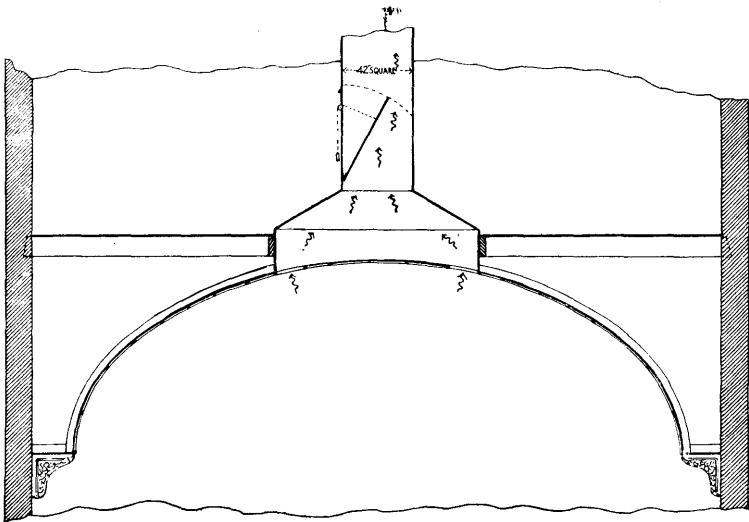


FIG. 2

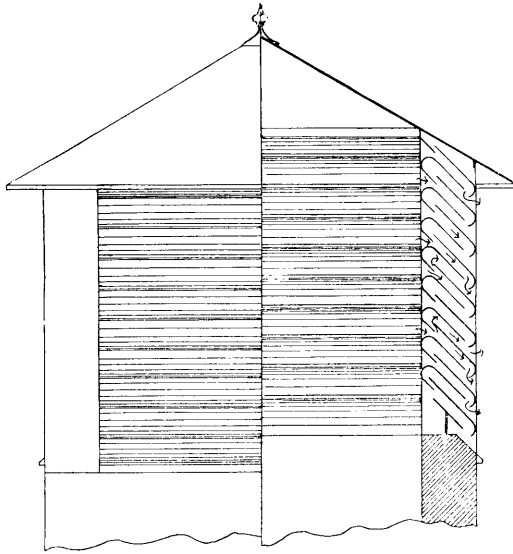


FIG. 4.

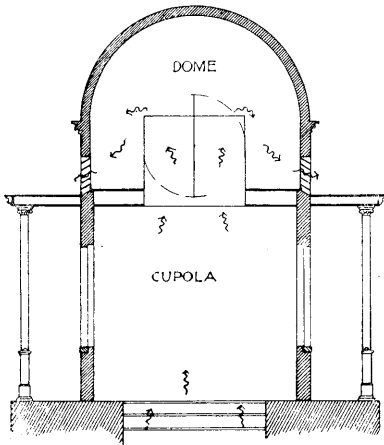


FIG. 3.

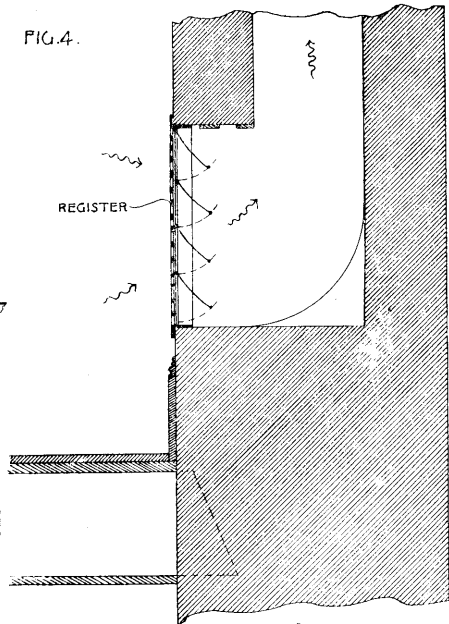


FIG. 5.

THE METRIC SYSTEM.

LENGTH.

1 Myriameter.....	Mm.....	(10,000 m.)..	=6.2137 mi'es.
1 Kilometer.....	Km.....	(1,000 m.) ...	=0.62137 miles.
1 Hectometer.....	Hm.....	(100 m.).....	=328.0833 feet.
1 Decameter.....	Dm.....	(10 m.).....	=393.7 inches.
1 Meter.....	M.....	(1 m.).....	=39.37 inches.
1 Decimeter.....	dm.....	(0.1 m.).....	=3.937 inches.
1 Centimeter.....	cm.....	(0.01 m.).....	=0.3937 inch.
1 Millimeter.....	mm.....	(0.001 m.)....	=0.03937 inch.

SURFACE.

1 Hectare	Ha.....	(10,000 sq.m)	=2.471 acres.
1 Are.....	a.....	(100 sq. m.)..	=119.6 square yards.
1 Centare.....	ca.....	(1 sq. m.)....	=1550 square inches.

CAPACITY.

1 Kiloiter or Stère....	Kl. or st..	(1,000 l.).....	=61027.0515 Cu. inches,	=264.17 gallons.
1 Hectoliter	Hl.....	(100 l.).....	=6102.7052 Cu. inches..	=26.417 gallons.
1 Decaliter	Dl.....	(10 l.).....	=610.2705 Cu. inches...	=2.6417 gallons.
1 Liter.....	l.....	(1 l.).....	=61.0271 Cu. inches....	=1.0567 quarts.
1 Deciliter	dl.....	(0.1 l.).....	=6.1027 Cu. inches.....	=0.845 gill.
1 Centiliter	cl.....	(0.01 l.).....	=0.6103 Cu. inch.....	=0.338 fluid ounce.
1 Milliliter	ml.....	(0.001 l.).....	=0.0610 Cu. inch.....	=0.27 fluid drachm.

WEIGHT.

1 Millier or Tonneau..	M. or T.	(1,000 Kg.)..	=1 Kl. or 1 Cu. m.....	=2204.6 lbs.(avoird)
1 Quintal.....	Q.....	(100 Kg.)....	=1 Hl. or 0.1 Cu. m....	=220.46 pounds.
1 Myriagram.....	Mg.....	(10 Kg.).....	=1 Dl. or 10 Cu. dm. ..	=22.046 pounds.
1 Kilogram	Kg.....	(1,000 g.)....	=1 l. or 1 Cu. dm.....	=2.2046 pounds.
1 Hectogram.....	Hg.....	(100 g.).....	=1 dl. or 0.1 Cu. dm....	=3.5274 ounces.
1 Decagram	Dg.....	(10 g.).....	=1 cl. or 10 Cu. cm.....	=0.3527 ounce.
1 Gram	g.....	(1 g.).....	=1 ml. or 1 Cu. cm.....	=15.432 grains.
1 Decigram.....	dg.....	(0.1 g.).....	=0.1 ml. or 0.1 Cu. cm.,	=1.5432 grains.
1 Centigram	cg.....	(0.01 g.).....	=0.01 ml. or 10 Cu. mm.,	=0.1543 grain.
1 Milligram.....	mg.....	(0.001 g.)....	=0.001 ml. or 1 Cu. mm.,	=0.0154 grain.

One kilogram is equal to a weight represented by one liter of distilled water at 4 degrees C. One inch = 2.5 centimeters nearly; one quart (wine measure) = 0.946 liter; one pound Troy = 0.373 kilogram; one acre = 0.4046 hectare.

To reduce (approximately) grains to grams, divide by 10 and from the quotient subtract one-third of itself; to reduce drachms to grams, multiply by 4; to reduce ounces to grams, multiply by 32.

To convert degrees of one thermometer scale into those of another. Fahr. into Cent.—Divide by 9, multiply by 5 and deduct 32; Cent. into Fahr.—Multiply by 9, divide by 5 and add 32.

GLOSSARY.

This Report has been prepared for the benefit of all classes of persons in the State, and it has been the wish to make its language as clear and intelligible as possible. A few technical terms, however, are so inseparably interwoven into the consideration of the subject of public hygiene that the avoidance of their use is impossible, and as it is desirable that the general public should become acquainted with their meaning, and especially to know in what sense they are used in the present work, this Glossary is introduced.

- Aerobic.** Applied to bacteria that can flourish only in the presence of air.
- Ætiology.** [See Etiology].
- Anaerobic.** Applied to bacteria that can grow in the absence of air.
- Anorexia.** Want of appetite.
- Antiseptics.** Agents which prevent or retard putrefaction; or as now understood, those which prevent the development of pathogenic or fermentative organisms. Some of these which, in weaker solutions, act as antiseptics, in stronger solutions, being destructive of the life of the organisms, are also disinfectants.
- Axilla.** The arm-pit.
- Bacilli.** The plural of bacillus.
- Bacillus.** One genus of bacteria in which the length of the cells distinctly exceeds their thickness. They are sometimes arranged in threads.
- Bacillus anthracis.** The bacillus of anthrax, the essential cause of the disease.
- Bacteria.** Unicellular organisms, microscopic in size, on the border land between the vegetable and the animal kingdom, but now regarded as pertaining to the former. Schizomycetes.
- Bacteriology.** That branch of science relating to the bacteria.
- Bacterium.** The singular of bacteria.
- Caecum.** The uppermost part of the large intestine, next to the ileum, and separated from it by the ileo-caecal valve.
- Cannula.** A small tube.
- Caseation.** A degenerative change into a substance resembling cheese.
- Clinical.** Pertaining to a bed. Clinical observations are observations which are made at the bedside of the patient.

- Contagion.** The specific cause of certain diseases by means of which they may be transmitted. Also applied to the act of transmission of communicable diseases.
- Contagious.** Capable of being transmitted by contagion; communicable; infectious. But little effort has been made in this report to discriminate between the meaning of Contagious and Infectious; although their derivation and original application were different, most of the later medical writers of Europe and America use the two words interchangeably. This, at least in works for popular use, is the less confusing way.
- Coryza.** Cold in the head.
- Cyanosis.** A bluish color of the skin due to lack of oxygen in the blood.
- De novo.** Anew. As applied to the origin of infectious diseases, their appearance independent of the contagion of preceding cases.
- Deodorants.** Substances which destroy offensive smells. Some, but not all deodorants, are also disinfectants. (See Disinfectants.)
- Desquamation.** The shedding of the outer skin, usually in scales, after scarlatina and some other diseases.
- Diagnosis.** The determination of the character of a disease.
- Diagnosticate.** To determine the character of a disease.
- Diastase.** A nitrogenous principle developed in grain during fermentation, and having the property of converting starch into that form of sugar which is called glucose.
- Diplococcus.** Double bacteria, of those which are constricted in the centre in the process of division.
- Disease germs.** Disease-producing bacteria. Micro-organisms whose reception into the system, and multiplication in it, produce the contagious diseases.
- Disinfectants.** Agents or substances by means of which the contagion of diseases may be destroyed. Often improperly applied to substances which, though useful as deodorants or antiseptics, are nearly or quite valueless as germicides.
- Duodenum.** The first and upper portion of the small intestine.
- Dyspnoea.** Difficult or labored breathing.
- Endemic.** Applied to diseases which prevail in particular localities of districts, and which are due to local conditions or causes.
- Enteric fever.** Typhoid fever.
- Enzyme.** A chemical ferment.
- Epidemic.** Common to, or affecting many people at the same time; generally prevailing; the causes of epidemics were formerly very generally regarded as depending upon an "epidemic constitution of the atmosphere," but of this there has never been collected any satisfactory proof. The more we study epidemiology the more we are led to look to contagion and the laws which govern its diffusion for an explanation of the occurrence of epidemics.
- Epithelium.** The outer layer of the skin and mucous membranes.

- Epizootic.** Applied to the diseases of animals in the same sense as epidemic is used with reference to human diseases; affecting many animals at the same time.
- Epistaxis.** Nose-bleed.
- Etiology.** The causation of diseases.
- Fauces.** The throat; the posterior part of the mouth, terminating with the pharynx and larynx.
- Fission.** Division; the common method of multiplication with many of the lowest organisms.
- Fomites.** Substances or articles which are liable to carry the contagion of diseases.
- Germicides.** Destroyers of germs; disinfectants.
- Glandular.** Relating to glands.
- Haemoptysis.** Bleeding from the lungs or air passages.
- Haemorrhage.** Loss of blood.
- Hectic.** Pertaining to consumption or to a wasting.
- Hepatization.** A change through which the structure of the lungs or other organs comes to resemble liver.
- House-drain.** That part of the house-drainage system which carries the wastes from the soil-pipe and waste-pipe to the sewer.
- Hygiene.** The science and art relating to the preservation of health.
- Hyperplasia.** Exaggerated increase in the elements of a part.
- Ileum.** The third or lower portion of the small intestine.
- Incubation.** Hatching; as applied to diseases, that period between the reception of the infection and the appearance of the first symptoms.
- Infection.** Contagion; the specific cause of communicable diseases, now known in many diseases, and supposed in others, to be a microscopic organism.
- Infectious.** Communicable, as a disease; contagious. (See *Contagious*.)
- Immunity.** Freedom from liability to disease.
- Inoculation.** Insertion of a known or suspected virus into the tissues of an animal or into a test-culture.
- Laryngitis.** Inflammation of the larynx.
- Lesion.** A wound, injury, or morbid change of a part.
- Malaise.** Uneasiness, discomfort.
- Meningeal.** Pertaining to the meninges.
- Meninges.** The membranes that envelop the brain and spinal cord.
- Meningitis.** Inflammation of the meninges.
- Mesentric.** Pertaining to the mesentery.
- Mesentery.** The double fold of peritoneum connecting the small intestines with the posterior wall of the abdominal cavity.
- Meteorological.** Pertaining to meteorology, or that science which treats of the air and its phenomena.
- Miasm.** A term vaguely applied to noxious exhalations.
- Miasma.** The same as miasm.
- Microbe.** Bacterium; micro-organism.

- Micrococcus.** A genus of the bacteria, consisting of very small, globular or oval organisms.
- Micro-organism.** A minute organism.
- Non-pyrexial.** Without fever.
- Nosology.** Classification of diseases.
- Œdema.** A swelling from effusion of serous fluid into the cellular tissues.
- Papule.** A pimple, or small elevation of the skin containing no visible fluid.
- Pathogenic.** Generative or productive of disease.
- Pathological.** Pertaining to pathology; diseased.
- Pathology.** The knowledge of diseases.
- Peritoneum.** A serous membrane investing the abdominal walls and viscera.
- Phthisis.** Consumption; pulmonary tuberculosis.
- Physiology.** The science which treats of the functions of living animals or plants.
- Pleura.** The serous membrane lining the cavity of the chest.
- Pleurisy.** Inflammation of the pleura.
- Prognosis.** The prediction, from the present symptoms of a disease, of its future course or termination.
- Proteids.** Non-crystallizable substances including nitrogen in their composition, partly of animal and partly of vegetable origin.
- Pseudo-membrane.** False membrane.
- Ptomaines.** Basic compounds resulting from putrefactive changes in animal tissues. Many are highly poisonous.
- Remittent.** A form of fever in which there is no complete intermission, but only an abatement of symptoms.
- Sanitaria.** Plural of sanitarium.
- Sanitarium.** An establishment for the cure of diseases.
- Scarlatina.** Another name for scarlet fever.
- Schizomycetes.** A class of unicellur organisms multiplying by fission and also in some cases by the formation of spores. Bacteria.
- Septic.** Pertaining, or due to putrefaction.
- Serous.** Relating to serum, or to the membranes which secrete it.
- Serum.** Watery, clear or yellowish, animal fluids, exhaled by serous membranes, or separated from the coagulable parts of other fluids, like blood or milk.
- Sewage.** The liquid or other filth conveyed in sewers.
- Sewer.** A drain for conveying dirty water and filth.
- Sewerage.** A system of sewers.
- Soil-pipe.** The pipe which conveys excreta from water-closets and urinals. (See House-drain.)
- Sporadic.** Applied to diseases, it means occurring in single or scattered cases, as opposed to epidemic or endemic, in which numbers, or many are affected.

- Spores.** Minute particles or bodies which are formed within many of the lower flowerless plants, and which perform the functions of seeds. The microscopic one-celled plants called bacteria, multiply by fission, and in addition to this, some of them multiply by means of spores.
- Sporification.** The formation of spores.
- Staphylococcus.** A genus of round bacteria, or cocci, arranged in groups like clusters of grapes.
- Stenosis.** A narrowing.
- Sterilize.** As used in bacteriology, the freeing of culture fluids or other substances, of bacteria which are capable of development.
- Streptococcus.** Cocci or round bacteria, arranged in rows or chains.
- Therapeutical.** Pertaining to the art of healing.
- Tonsillitis.** Inflammation of the tonsils.
- Trap.** An arrangement on some part of the sewerage system, usually a bend in the pipe in which water stands, by means of which we seek to prevent the return of gases and disease germs into the building.
- Tubercle.** Nodules of greatly varying size constituting the disease tuberculosis.
- Tuberculosis.** A specific disease usually characterized by the formation of tubercles. Pulmonary consumption is a tuberculosis of the lungs.
- Typhoid fever.** Meaning literally a fever resembling typhus. The common fever of this country. Formerly typhus and typhoid were not distinguished the one from the other. Typhoid fever is communicable only in a slight degree, if at all, by direct contagion; but there is great danger of its spread from the sick to the well from defective sanitary arrangements and regulations.
- Typhus fever.** A dangerously contagious disease rarely found in this country, and when appearing in our State, probably always by importation. (See Typhoid fever.)
- Umbilicated.** Marked by central depression.
- Varioloid.** Small-pox modified by vaccination. It is contagious, and cases of small-pox as severe may arise from exposure to its infection as from unmodified small-pox.
- Vesicle.** An elevation of the cuticle usually containing a clear fluid; a blister.
- Virus.** An infective agent.
- Waste-pipe.** That part of the house-drainage system which conveys the waste-water from sinks, baths, etc.

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