

REPORT

OF THE

MASSACHUSETTS DEPARTMENT OF PUBLIC
HEALTH ON INVESTIGATION AS TO
WHAT MEASURES, IF ANY, ARE
NECESSARY FOR THE PRE-
VENTION AND CONTROL
OF BUBONIC PLAGUE

UNDER CHAPTER 91, RESOLVES OF 1920

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The Commonwealth of Massachusetts.

DEPARTMENT OF PUBLIC HEALTH,
BOSTON, Feb. 21, 1921.

To the General Court of Massachusetts.

In accordance with chapter 91 of the Resolves of 1920, a resolve authorizing the Department of Public Health to report to the next General Court any measures necessary for the prevention and control of bubonic plague, I have the honor to present herewith the following report.

Respectfully,

EUGENE R. KELLEY,
Commissioner of Public Health.

REPORT OF THE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH ON INVESTIGATION AS TO WHAT MEASURES, IF ANY, ARE NECESSARY FOR THE PREVENTION AND CONTROL OF BUBONIC PLAGUE.

Plague is one of the oldest known diseases which, in times past, has swept the world in devastating epidemics, and apparently persists for long periods of time wherever it has once gained entrance. Plague is primarily a disease of rats.

The infection is spread in a very definite manner, passing from rat to rat, or, when the rat population has become depleted, from rat to man through the bite of the infected flea. The rat flea by preference chooses the animal rather than the human family for its host, and this peculiarity gives us a real weapon by which we are able to combat the introduction of plague into the human family, for because of this preference the rat population becomes infected with plague some months prior to its appearance in human cases.

To one who has studied the sequence of plague foci it becomes clearly evident that the paths of infection have closely followed the main routes of travel and commerce. Commencing from the "endemic" centers found on both slopes of the Himalaya Mountains the present "pandemic" made its first appearance in epidemic form in Hong Kong in 1894. During the next six years it followed the main shipping routes up the coast of China, down the coast to Indo-China, into Japan, into Honolulu and the South Sea Islands, and had almost completely ringed the coast of Australia, attacking all of her principal seaports. In like manner the principal seaports of India became infected, and in that country it spread through large areas inland. In the next ten years plague made its appearance at numerous points on the Mediterranean, Black Sea and Red Sea ports, east and west coasts of Africa, Portu-

gal, the east and west coasts of South America, Central America and the West Indies.

In 1900 a small localized outbreak occurred in San Francisco, and in 1907 another outbreak, or perhaps more correctly a recrudescence, of rodent plague occurred which was widespread in its area, with the rat population found to be badly infected. San Francisco has served since this time as a disseminating point for the disease among rats, and has infected the ground squirrels so that to-day this infection is found in eight or ten coastal counties of California. San Francisco is now an endemic center for the disease.

In 1914 New Orleans was infected and has been infected continuously ever since. In 1920 this port showed a sharp recrudescence of the infection, and during that year it was found that infection had spread to Galveston, Port Arthur, Beaumont and Pensacola in this country, and to the Gulf ports of Mexico.

A glance at the accompanying map shows that the Atlantic, Scandinavian and Baltic coasts are probably the only coasts that have not had recognized cases of either rat or human plague during the present world-wide extension of the disease.

That there is a possibility of plague existing in our rat population is worthy of consideration, for during a six months' period of the past year 118 vessels passed through the Boston quarantine station after they had visited a plague-infected port. It is a matter of conjecture as to the number of vessels which may have called at ports where plague exists unrecognized in the rat population, and whether or not any of these rats had gained access to the vessels and were thus transported to our own ports.

It is fair to assume that if plague has been transferred from the coast of China to Honolulu, South America, and even to the Pacific and Gulf ports of this country, there is a likelihood of its having been further carried to the ports of our own State.

The defence against the importation of plague from foreign ports into Massachusetts may be divided into three main parts: —

1. That which is done under the jurisdiction of the United States Public Health Service, which consists of the inspection

of passengers and crews of vessels coming from infected places to detect possible illness of an infectious nature; the fumigation of the holds of vessels to destroy rats; and the regulations requiring the fending off of vessels from docks with the use of rat-guards on all hawsers, with the gangplanks raised or lighted at night to prevent rats from leaving the vessel.

2. A constant systematic campaign directed towards the eradication of the rat by trapping, destroying harborage where it may nest and breed, and by making it difficult for it to obtain food.

3. A survey of the rat population in order that rat plague may be detected at the earliest possible moment, and to know of the existence of conditions which make rat harborage possible.

While all of these procedures are of interest to the citizens of the Commonwealth, both for economic and public health reasons, the Department of Public Health feels that special effort should be made to conduct a survey of the rat population in order that we may obtain some knowledge as to whether or not the rat is infected with plague.

There are several advantages of undertaking a survey in the manner proposed, and the preliminary work now accomplished points strongly to its necessity.

In the first place, it must be evident that if human plague appeared in any of our seaport communities a marked disturbance of business and commerce would immediately result, and, pressed by public opinion to "have something done and that done quickly," the Department would be driven to choose not the most economical but the quickest method to control the situation.

If, however, it should be that rat plague were found in the work of our survey, our efforts could be concentrated upon the spot in which the rat was found, and by intensively trapping we could eradicate the rat from this particular section, and take such other steps as might be necessary, confining our efforts in the main to this one spot.

It may be said that there is to-day no evidence of bubonic plague in Massachusetts. To this the Department thankfully agrees, but it must be further admitted that we do not know,

nor have we any way of knowing save the proposed survey, whether or not the rat population has already become infected.

Until this Department has taken steps to ascertain this fact it is not in any position to pass upon the probability or possibility of infection with any more accuracy than any other group of citizens.

In order that the Department might be prepared to undertake this work, certain members of the staff were detailed to study in the southern ports of this country where plague had been reported. Some weeks were spent in rat-trapping, making laboratory examinations of the rats, observing fumigation of vessels, and rat-proofing of buildings with members of the United States Public Health Service. The result is that we have a competent force at hand consisting of rat-trappers, a bacteriologist and an assistant who are assisting the Boston department of health in trapping and examining rats from the wharves of the port of Boston.

During the past few months a preliminary survey of the 16 municipalities of Massachusetts which possess water fronts used in part for the purposes of shipping was made. This does not include those municipalities on the coast whose harbors are not sufficiently deep for other than very small craft, nor extinct ports, such as Barnstable, Falmouth and Yarmouth, where the harbors have been allowed to fill up.

This survey makes no attempt at the estimation of the rodent population. Those places where it seemed probable that the heaviest infestation with rodents would be found were examined, and an estimate made as to the extent and location of those sections that should be trapped in the making of a rat survey, and the time that would probably be consumed in the making of such a survey. In calculating a time for trapping each community, the estimate was based on a force consisting of one foreman and five trappers, each trapper using 150 to 200 traps.

In all cases it seemed probable that the heaviest rat infestation was along the water front, and, considering that here is where plague infection would be introduced, that rat catching if confined almost entirely to the various water fronts would yield the best information as to present conditions in each community.

Therefore, for the purposes of this report, only a bird's-eye view of the water front of each community considered will be given, with the time necessary to trap and the approximate number of rats advisable to examine; the prevailing type of dock, dock superstructure, and adjacent buildings (with special reference to rat harborage and food supply); and tentative ordinances that should be enforced in each community.

Boston (Population, 748,060). — Boston is the main seaport of New England. Its water front comprises five areas of Boston proper (Roxbury, Boston proper, South Boston, Charlestown and East Boston), with the adjacent communities of Cambridge, Chelsea, Everett, Malden and Somerville.

In Cambridge, Everett, Malden and Somerville the docks are almost entirely coal and lumber docks.

In Boston proper the shipping area with its type of construction is as follows: From Warren bridge and Commercial Street east to Atlantic Avenue, about one-half mile, mostly construction docks and light wharves for coastwise shipping. Atlantic Avenue from Commercial Street to South Station, about one and one-half miles, very congested shipping, comprising coastwise shipping, coal docks, excursion, passenger and freight wharves.

These docks are practically all of old wooden construction with wooden superstructures, offering excellent harborage for rats. Along the water front and in close proximity to the docks are a great many food warehouses, cold-storage and packing plants, and many grocery stores and restaurants. These offer abundant food of easy access to the rats, of which there are many signs of an extremely heavy infestation. Very few of the buildings in this section are rat-proof.

It is estimated that an index of the rat situation along this water front should include the examination of between 20,000 and 30,000 rats. These could easily be secured along the docks and in those large buildings and warehouses within two or three blocks of the docks themselves. This would require between six and eight months.

Roxbury. — The water front of this section is found along Fort Point Channel and South Bay up to Batchelder Brothers' coal wharf at Southampton Street, about one and one-half

miles. The dockage is sparse except in the South Bay section, where there are many docks for lumber and coal. These docks are all of wood with wooden superstructures. The near-by buildings are mostly wooden structures, many of them food depots and lumber yards. All offer excellent rat harborage close to abundant food supply. The New York, New Haven & Hartford Railroad has a large railroad freight yard near by.

Trapping this area would require about one and one-half months, yielding for examination between 4,000 and 5,000 rats.

South Boston. — The water front of South Boston is found on the eastern side of Fort Point Channel and South Bay, as well as Boston Harbor on the north. There are no docks on South Bay. Along Fort Point Channel is a large coal dock and a pier for a large sugar refining company. Large boats dock here from Cuba, Porto Rico and Gulf ports. Both harborage and abundant food supply for rats are found at this place. On the Boston Harbor side is a large government dock (army supply base), Boston Fish Pier and Commonwealth Pier. These are all of concrete construction and are practically ratproof throughout. There are no non-rat-proof buildings close to these piers other than the freight warehouse of the New York, New Haven & Hartford Railroad, about two hundred yards distant. To some of these piers come large boats from all portions of the world. In addition to the above-mentioned docks, and closer to Boston proper, are found coal and general freight piers, docks for coast-wise shipping, and small wharves. Most of the construction of these last mentioned is very old, mostly wooden, and offers abundant harborage to rats.

Trapping of this area would require about two months and yield between 5,000 and 6,000 rats.

From South Boston on the eastern water front, comprising Pleasure Bay, Old Harbor, Dorchester Bay and Neponset River, no shipping other than very small craft is found until Neponset is reached. Here are a few lumber and coal wharves. These are of old construction, of wood, and are excellent rat harbors, with a fairly abundant food supply near by in the shape of many groceries and restaurants.

Trapping of Neponset would require about two weeks, with a yield of about 1,200 to 1,500 rats.

Charlestown. — The eastern water front of Charlestown is largely taken up by the Navy Yard. South of the Navy Yard are found a few docks comprising the Savannah Line and part of the Boston & Maine Railroad system. North of the Navy Yard are many coal docks and a few large grain elevators. These docks and their superstructures are of wood, offering both excellent harborage and abundant food for a large rodent population. The northern or Mystic River water front is taken up by the Boston & Maine Railroad freight yard and docks. These docks are mostly for coal and grain. Excellent harborage and food supply for rats.

Trapping here would require about three months and yield between 8,000 and 10,000 rats.

East Boston. — The docks and water front of East Boston are very congested. They are mostly very old and are entirely of wood with old wooden superstructures. There are a large number of warehouses and storage sheds in close proximity to the docks. Nesting, harborage and food supply for rats are easy of access and in great abundance. Along Marginal Street on the south front are found the Clyde, Cunard and Boston & Albany Railroad docks, with shipping from all parts of the world. Along Meridian Street (eastern water front) are found closely packed small docks and many machine shops, with a few grain elevators interspersed. Along Condor Street (northern, or Chelsea, side) are old dilapidated docks, many wooden barges and dredges, and a large oil tank pier and reservation.

Trapping this area would require about six months and would yield between 15,000 and 20,000 rodents. This is one of the most important areas of Boston requiring examination.

Chelsea (Population, 43,184). — Area approximately three square miles. Water front about three miles long.

Chelsea may be described as a city with two water fronts, one on the southeast, the other along the west side. Inspection of these areas shows that on the southeast the water front is practically a continuous collection of warehouses, docks, dry docks and machine shops. These are of old construction, many of them wood throughout; all are of defective construction, and apparently extremely good rat harbors. No investi-

gation was made at this time as to the presence of rats. Opportunity for their ingress from the boats is excellent, harborage is of the best, and non-protected food depots are abundant and close.

The other water front is not so congested, but of a fairly similar type, with a preponderance of machine shops.

Trapping of Chelsea would require about two months, and should yield for examination between 5,000 and 6,000 rats.

Lynn and East Lynn (Population, 99,143). — Lynn is situated about ten miles north of Boston. The water front is small and very congested. There are numerous coal, lumber and utility docks. In close proximity to the water front is a large grain elevator. The docks are old and wooden, many encased in sheet piling, with many old wooden superstructures thereon. Food stores are found in abundance close to the docks, thickly interspersed among old and often dilapidated houses, sheds and shops. Rat-proofing is conspicuously absent. Rat harborage is extremely abundant and in close proximity to easy food supply.

Trapping this community would require about one month and should yield between 2,500 and 3,000 rats. The rat survey here should not only comprise the water front, but should extend back into the city for at least five blocks from the water front in the congested part of the community.

Salem (Population, 42,529). — Salem is situated north from Boston about fifteen miles. The water front of this city is about two miles long, of which only about one-half mile is used for dock purposes. These docks are mainly used for coal, lumber and hides. The type of construction is old, of wood throughout, with many dilapidated wooden superstructures. Housing along the water front is very congested and of old construction, much of it wooden. On the water front are found many large meat-storage plants; hide and leather factories abut on the water front, and are also scattered throughout most sections of the town. Freight yard and freight houses are close by the water front. A very large number of the structures throughout the water front are old and dilapidated. Rat harborage and goodly food supply are present.

The trapping time of this place should not require over six weeks, and the catch should be concentrated on the rather limited dockage front and the adjacent houses and near-by factories. The yield should be about 4,000 rats.

Beverly (Population, 22,561). — Beverly is situated close to Salem, separated only by a narrow inlet. Its water front stretches out, for the most part, on the north shore of Salem Harbor. This town is connected with Salem by a large bridge, and as a community really forms part of Salem. The water front of Beverly is about one and one-half miles long along Beverly Harbor (a small bay off Salem Harbor) and North River. On the harbor side is found a large oil tank reservation and dock, and many coal and leather docks and warehouses, machine and junk shops. Across the narrow street which parallels the water front are numerous wooden houses (of old construction, many dilapidated), junk shops, hay barns and fish markets. This is an ideal rat location. Up North River as far as Danvers are found numerous isolated coal and lumber docks. Near by are many grain elevators, hide warehouses and shoe factories.

Trapping in Beverly would be, for the most part, concentrated on the harbor water front, with a few trapping expeditions to various grain elevators and shoe factories. Time spent here should be about five weeks, and the yield would be about 3,500 rats.

Danvers (Population, 11,108). — Danvers is situated from Salem northwest about four miles. This is a scattered town of shoe factories more or less spread out along North River, continuing the conditions found up North River from Beverly. Trapping time in this place should consume not over three weeks for a total of about 1,500 rats.

Peabody (Population, 19,552). — Peabody is a small city, almost continuous with Salem, about two miles west of the city proper. There is no true water front found in this place, but a small canal reaches in nearly to the town. This town is similar in activities to Salem, with rather similar conditions excepting the water front. It would be necessary to trap this town in conjunction with Salem, giving about three weeks for a total of about 1,500 rats.

Newburyport (Population, 15,618). — Newburyport is situated north from Boston about thirty-five miles. It lies on the south shore of the Merrimac River about six miles from its mouth. The water front is about one mile long, showing a number of very old coal docks with dilapidated wooden superstructures. Along the water front are many coal yards, some lumber yards, a few provision warehouses (not much used) and one meat-storage depot.

Shipping is very sparse, most of it being coal barges. The water front of Newburyport is not very congested, and, considering the lack of shipping, the trapping time should not be much over two weeks for a total of 1,000 to 1,500 rats.

Gloucester (Population, 22,947). — Situated northeast from Boston about thirty miles. The water front of Gloucester is semi-circular, arranged along the inner side of a landlocked harbor. The dockage front is about two miles long. The docks and adjacent buildings are extremely congested. The docks are of old wooden construction with many wooden superstructures. They are mostly used as fish docks, with some coal docks, machine shops and dry docks. There are many feed houses close to the water front. Rodent harborage is abundant, and food supply is very abundant and easy of access. Practically all of the shipping from this port is that of local fishing boats, with some coal and lumber.

The trapping time in Gloucester should extend for about two months for a yield of between 5,000 and 6,000 rats.

New Bedford (Population, 121,217). — New Bedford is situated south from Boston about fifty miles, fronting on the west shore of the Acushnet River, a little above its entrance into Buzzards Bay. The water front is very long, as is the city (built on a long, narrow peninsula), with navigable water on the river side only. The dockage front is very short and congested, being found from the Fairhaven bridge south for only about one-half mile. Along this stretch are found many lumber and coal yards, cotton docks and general merchandise and oil docks. Almost all are of old wooden construction, with food and fish houses very near. Among these old wooden docks is found one excellent ratproof structure, a State pier of concrete construction. With the exception of this dock all offer excellent

harborage for rats, as do the houses neighboring on the water front, they being for the most part very old, mostly of wood, and frequently with wooden foundations. In this city are found many cotton mills. A large number of these are on the water front. These mills, however, are of masonry construction. No detailed inspection or search for rats was made, but they appear to be practically rat-proof throughout, and it is doubtful if many rats are to be found herein.

Fairhaven. — This is a small town across the river from New Bedford, being connected thereto by one large bridge. On the Fairhaven side are a few coal docks across the way from the dockage area of New Bedford. It would be well to trap Fairhaven in conjunction with New Bedford.

The trapping time for New Bedford should require about six weeks, that for Fairhaven from one to two weeks, or about two months in all, yielding a catch of about 6,000 rodents.

Fall River (Population, 120,485). — Fall River is situated from Boston south about forty-five miles. The city is set on the shores of Mount Hope Bay, an inlet off Narragansett Bay. The water front is long, but only a small portion is used for dockage. This is found extending from the railroad bridge south for about one mile. In this section are found many docks, compact and congested. From this point south for about three-quarters of a mile there is found but one large coal and oil dock. North of the railroad bridge there is a small agglutination consisting of three small old piers and one large modern oil pier connected with a large oil tank reservation. In the city, and especially on the water front, are found many cotton mills. These are, for the most part, of very old construction, but are masonry throughout. They do not appear to be particularly good rat harbors. The dockage proper is about in the center of the water front. The docks are old and wooden, with wooden superstructures upon many. The surrounding area is extremely congested, abounding in warehouses and food establishments. This section seems to offer extremely good rat harborage with abundant food supply.

The trapping time would require about nine weeks and should yield between 6,500 and 7,500 rats.

Buzzards Bay (section of Bourne) (Population, about 500). —

Buzzards Bay is situated about fifteen miles east of New Bedford. This is a very small section, mostly filled with summer homes. The only shipping found here is that of coal barges. However, many ships at this point pass into Cape Cod Canal, not using Buzzards Bay as a stopping point. At the north end of Cape Cod Canal is found Sandwich. This town is even smaller than Buzzards Bay, but somewhat similar in type as to shipping, the only dockage being coal barges. Considering the dissemination of rodents from port to port by means of barges, it would be well to trap both Buzzards Bay and Sandwich, allowing about one week for each place, or two weeks in all, for a yield of approximately 1,500 rats.

Quincy (Population, 47,276). — Quincy is situated from Boston southeast about ten miles on Boston Bay. The waterfront is in the form of a peninsula, between Town River Bay and Fore River. At the point of the peninsula extends the bridge to Weymouth. From this bridge south are found the Fore River shipyards. This is a very large ship-building corporation, which also does extensive ship repairs on boats from many different points. Near these shipyards are found a few coal docks and one oil dock. The housing and warehousing surrounding the shipyards and the above-mentioned docks are not congested, and this area, although offering average harborage and perhaps adequate food, probably does not support as large a rodent population as most of the other ports. From the Weymouth bridge northwest up Town River Bay is found only one coal dock and a yacht basin. This last is sometimes used as a small naval station.

The trapping time for the Quincy water front should not be over three to four weeks for a yield of about 1,500 rats.

Plymouth (Population, 13,045). — Plymouth fronting on Cape Cod Bay is situated southeast from Boston about thirty-five miles. This is a small rambling town stretching thinly along its water front. The dockage area is very small, and is near the center of the town. Of all its former docks there are now but eight in use, and these are for coal, lumber and fish. On the southern end of the water front are found a few coal wharves. A few warehouses and many buildings of the town are very close to the water front. These are of very old

construction, mostly wooden. There are many food depots along the water front. This area offers abundant food and excellent harborage for rats.

Trapping time for Plymouth would require about four weeks for a catch of between 5,000 and 6,000 rats.

Judging from the survey made to date it would seem that the waterfronts of the various Massachusetts ports offer unusually good rat harborage and abundant food. It is estimated that a good index of the presence or absence of infection among the rodent population could be determined after the examination of about 150,000 rats. Rat surveys carried on as suggested above would yield approximately this number.

It is recommended that each health department of the various seaports carry on in perpetuity a continuous but moderate rat catch. This should yield a catch of about 50,000 rats a year, which would, in all probability, reveal the presence of infection at an early date after its introduction.

That the local communities might have for their guidance in the preparation of ordinances, which will help to limit the number of rats in their communities, the Department has prepared samples which may be adopted in part or *in toto*, as the community desires. These ordinances have been copied in the main from ordinances enforced in other communities and found to be efficacious, and are submitted in the Appendix to this report.

CONCLUSIONS.

1. To completely survey all of the seaports of Massachusetts, including those in which there is only a remote possibility of finding plague infection because of the type of the shipping coming into these ports, it will be noted that it would take nearly three years.

2. The Department feels that, while such a complete examination might be desirable, practically all that will be necessary will be the examination of the larger ports, which may be properly and thoroughly done within a year with the assistance of the local authorities.

3. It should be clearly borne in mind that the Department of Public Health is not proposing to enter into a campaign of rat

extermination wholesale, but rather to trap and examine a sufficient number of rats to be reasonably certain that the rodents of a given community do not show evidence of plague infection.

4. Through this survey it is hoped that each seaport community will see the wisdom of taking up as a part of their regular public health activity the trapping of rats, with their subsequent examination in the State laboratories.

5. It is also hoped that the need of preventing great wastage through rat depredations will receive more consideration, and that local communities will adopt ordinances or regulations tending to this end.

In order that this preventive work may be performed in an economic and thorough manner, I would respectfully request that a sum of not more than \$20,000 be appropriated for this work.

Respectfully submitted,

EUGENE R. KELLEY,
Commissioner of Public Health.

APPENDIX.

AN ORDINANCE DEFINING RAT-PROOFING OF ALL BUILDINGS.

SECTION 1. *Be it ordained by* _____ *of the city of* _____, That from and after the promulgation of this ordinance it shall be unlawful for any person, firm or corporation hereafter to construct any building, outhouse, or other superstructure, stable, lot, open area or other premise, sidewalk, street or alley, or to repair or remodel the same, to an extent of _____ per cent of cost of construction within the city of _____, unless the same shall be rat-proofed in the manner hereinafter provided for.

SECTION 2. *Be it further ordained, etc.,* That, for the purpose of rat-proofing, all buildings, outhouses and other superstructures in the city of _____, except stables, shall be divided into two classes, to wit, Class A and Class B; and the same shall be rat-proofed in the manner following, to wit: —

Class A. — All buildings, outhouses and other superstructures of Class A shall have floors made of rat-proof material or of concrete, which concrete shall be not less than 3 inches thick, and overlaid with a top dressing of cement, mosaic tiling, or other impermeable material laid in cement mortar, and such floor shall rest, without any intervening space between, upon the ground, or upon filling of clean earth, sand, cinders, broken stone or brick, gravel or similar material, which filling shall be free from animal or vegetable substances; said floor shall extend, and be hermetically sealed, to walls surrounding said floor, which walls shall be made of rat-proof material or of concrete, stone or brick, laid in cement or mortar, and each wall shall be not less than 6 inches thick, and shall extend into and below the surface of the surrounding ground at least 2 feet, and shall extend not less than 1 foot above the surface of said floor: *provided*, that wooden removable gratings may be laid on such concrete floors in such parts of such buildings, superstructures and outhouses as are used exclusively as sales departments; *provided*, that wooden flooring may be laid over the concrete wherever the intervening space between such flooring and the concrete shall not exceed one-half

inch; and provided, further, that any sleepers that are sunk into the concrete shall be creosoted.

Class B. — All accidental and unnecessary spaces and holes, ventilators and other openings other than doors and windows, in every building, outhouse or other superstructure in the city of _____, shall be closed with cement, mortar or other material impervious to rats, or screened with wire having not more than one-half inch mesh, as the case may require, and all wall spaces shall be closed with cement, mortar or other material impervious to rats, which closure shall extend the full thickness of the wall and shall extend upward at least 12 inches above the floor level, and the whole in such manner as to prevent the ingress or egress of rats; or the ingress or egress of rats from such double wall or space may be prevented by protecting the junction of said wall with the floor or other wall with metal flashing of galvanized iron of 28 or 30 gauge, provided that where such double wall is open beneath, or is in communication with foundations of the house, said opening shall be effectively closed or said junction with foundations flashed with metal, as provided above: provided, that in all buildings, outhouses and other superstructures of Class A, and in all stables, where there are any spaces in walls between the wall proper and the covering on same, or in ceilings between the ceiling and floor, or other ceiling covering above, said spaces shall be eliminated by the removal of said covering, or so closed with cement, mortar or other material impervious to rats as to prevent the ingress or egress of rats, provided that all such wall spaces shall be closed with cement, mortar or other material impervious to rats, which closure shall extend the full thickness of the wall, and shall extend upward at least 12 inches above the floor level.

The cellar of every building hereafter erected within the building limits shall be made rat-proof by the use of masonry or metal. All openings in foundations, cellars and basements in such buildings, except for doors and hatchways, and except also for such windows wholly above ground as may be exempted by the

_____ in his discretion, shall be completely covered with screens of metal having meshes of not more than one-half inch in least dimension, and constructed of rods or wire of not less than 12 gauge.

All buildings, outhouses and other superstructures of Class B separated from any other building on three sides by at least 10 feet, and lacking any basement or cellar, may be rat-proofed in the following manner, to wit: Said building, outhouse or other

superstructure shall be set upon pillars or underpinning of concrete, stone or brick laid in cement mortar; or may be set upon underpinning of substantial timber, such pillars or underpinning to be not less than 18 inches high, the height to be measured from the ground level to the top of said pillars or underpinning, and the intervening space between said building and the ground level to be open on three sides and to be free from all rubbish and other rat-harboring material; or may be made rat-proof by constructing at the margin of the ground area of said building a wall of concrete or brick or stone laid in cement, such wall to extend into and below the surface of the ground at least 2 feet and meet the floor of the building above closely and without any intervening space, to be at least 4 inches thick, and extend entirely around said building: provided, that said walls may be built with openings therein for ventilation only, and provided, further, that such openings for ventilation may be all of such size as the owner may elect, and shall be securely screened with metallic gratings having openings between the bars of said gratings of not more than one-half inch, or with wire mesh of not less than 12 gauge having openings between the wires of said mesh of not more than one-half inch, and the whole so constructed and closed as to prevent the entrance of rats beneath such building.

SECTION 3. *Be it further ordained, etc.,* That every restaurant kitchen, hotel kitchen, cabaret kitchen, dairy, dairy depot, dock, wharf, pier, elevator, store, manufactory, and every other building, outhouse or superstructure wherein or whereon foodstuffs are stored, kept, handled, sold, held or offered for sale, manufactured, prepared for market or for sale, except stables, shall be rat-proofed in the manner provided for herein above as Class A; provided, that such part of any structure herein above defined as of Class A, that shall be entirely over a body of water, may be rat-proofed as of Class B, as hereinafter provided for.

“Foodstuffs,” as used in this ordinance, is hereby defined to be flour and flour products, animals and animal products, produce, groceries, cereals, grain and the products of cereals and grain, poultry and its products, game, birds, fish, vegetables, fruit, milk, cream and products from milk or cream, ice cream, hides and tallow, or any combination of any one or more of the foregoing.

All other buildings, outhouses and superstructures, except stables, not hereinbefore specified as Class A, and all buildings used exclusively for residential purposes, shall be rat-proofed in the manner provided for herein above as Class B: provided,

that the owner of any building, residence, outhouse or other superstructure in Class B may, if he so elects, rat-proof same in the manner provided for in Class A.

Provided, that in any case where, under the foregoing provisions, any building, outhouse or superstructure is required to be rat-proofed as of Class A, and the said building or outhouse or superstructure is used in part for residential purposes, and the part used as a residence is effectively separated from the part falling within Class A by permanently and effectively closing all openings above and below the ground floor, or by constructing a new wall, and in either case the whole in such manner as to make such wall whole and continuous in its entirety, without doorways, windows or other openings, between the part used as a residence and that used for such purpose as makes it fall within Class A, then in such case, and for rat-proofing purposes only, the said building will after such separation and closure of the openings, or by the construction of such new wall, be deemed to be two buildings, and that part used exclusively for residential purposes may be rat-proofed in the manner provided for as a Class B building, and the remaining part of said building shall be rat-proofed in the manner provided for a Class A building.

Stables and all buildings hereafter to be constructed and used for stabling horses, mules, cows and other animals shall be constructed as follows: —

Walls. — The walls of such building shall be constructed of concrete, brick or stone, laid in cement mortar, and shall be not less than 4 inches thick, and shall extend into and below the surface of the surrounding ground not less than 2 feet, and shall extend above the ground a sufficient height as to be not less than 1 foot above the floor level. All openings in such foundation walls shall be covered with metal grating having openings not greater than one-half inch between the gratings.

Floors. — The floors of stables and stalls shall be of concrete not less than 3 inches thick, upon which shall be laid a dressing not less than one-half inch thick of cement or stone, laid in cement mortar, or shall be constructed of floated concrete not less than 4 inches thick in such way as to prevent ingress or egress of rats, such floors to have a slope of one-eighth inch per foot to the gutter drain hereinafter provided for.

Stalls. — The floors of stalls may be of planking fitting either tightly to the concrete floor or elevated not more than one-half inch from the stall floor, and so constructed as to be easily removable. Such removable planking shall be raised at least once

a week, and the said planking and the concrete floor beneath thoroughly cleansed.

Gutters. — Semi-circular or V-shaped gutters shall be constructed in such manner that a gutter shall be placed so as to receive all liquid matter from each stall, each of these gutters to connect with the public sewer or with a main gutter of the same construction, which, in turn, shall be connected with the public sewer or public drain. All openings from drains into sewers shall be protected by a metal grating having openings not more than one-half inch between the gratings.

Mangers. — Each manger shall be constructed so as to have a slope of 2 inches towards the bottom, shall be covered with tin or zinc, and shall be at least 18 inches deep to avoid spilling of food.

Feed Bins. — All feed bins shall be constructed of cement, stone, metal or wood, and with close-fitting doors. If constructed of wood the bins shall be lined or covered with metal, and the whole so constructed as to prevent the ingress or egress of rats. All grain, malt and other animal food, except hay, stored or kept in any stable, must be kept in such feed bins. Said feed bins must be kept closed at all times except when momentarily opened to take food therefrom, or when same are being filled. No feed shall be scattered about such bin or stable, and all such feed found on the floor or in the stalls of said stable shall be removed daily and placed in the manure pits. No foodstuffs intended for or susceptible of human consumption shall be kept or stored in any stable or any other place where animals are kept.

SECTION 4. *Be it further ordained, etc.,* That the construction and materials used in rat-proofing shall conform to the building ordinances of the city of _____, except and only in so far as the same may be modified herein.

SECTION 5. *Be it further ordained, etc.,* That all premises, improved and unimproved, and all open lots, areas, streets, sidewalks and alleys, in the city of _____, shall be kept clean and free from all rubbish and similar loose material that might serve as a harborage for rats, and all lumber, boxes, barrels, loose iron and similar material that may be permitted to remain thereon, and that may be used as a harborage by rats, shall be placed on supports and elevated not less than 2 feet from the ground, with a clear intervening space beneath to prevent the harboring of rats.

SECTION 6. *Be it further ordained, etc.,* That all planking and

plank walks on and in yards, alleys, alleyways, streets, sidewalks or other open areas shall be removed and replaced with concrete, brick or stone, laid in cement, gravel or cinders, or the ground left bare.

SECTION 7. *Be it further ordained, etc.,* That it shall be the duty of every owner, agent and occupant of each building, out-house and other superstructure, stable, lot, open area and other premise, sidewalk, street and alley, in the city of _____, to comply with all provisions of this ordinance.

SECTION 8. *Be it further ordained, etc.,* That it is hereby made the duty of _____, and particularly through its health department, to enforce the provisions of this ordinance.

SECTION 9. *Be it further ordained, etc.,* That any law or ordinance in conflict with the provisions of this ordinance be and the same is hereby repealed.

AN ORDINANCE REGULATING THE REMOVAL OF GARBAGE.

SECTION 1. *Be it ordained by _____ of the city of _____,* That from and after the promulgation of this ordinance, the owner, agent and occupant of every premise, improved or unimproved, in the city of _____, whereon or wherein garbage shall be created, shall provide a metal, water-tight container or containers, each with a tight-fitting cover, such container or containers to be of such size as to be easily man-handled, and of such number as to receive the garbage accumulation of five days from each such premise, and shall place or cause to be placed in such container or containers, for the purpose of having their contents removed, on the sidewalks or open alleys in front or rear of said premises, at the times hereinafter set forth.

SECTION 2. *Be it further ordained, etc.,* That for the purposes of this ordinance the city of _____ is hereby divided into _____ garbage districts.

SECTION 3. *Be it further ordained, etc.,* That for the purpose of this ordinance, the word "garbage" as used in this ordinance shall be construed to mean house and kitchen offal, and all refuse matter not excrementitious liquid, and composed of animal or vegetable substances, including dead animals (except cows, horses, mules and goats), coming from public and private premises of the city, and not destined for consumption as food.

SECTION 4. *Be it further ordained, etc.,* That it shall be unlawful for such owner, agent or occupant of any such premise

to have, maintain or keep any garbage on any premise, except in such garbage containers as are provided for in section 1 of this ordinance.

SECTION 5. *Be it further ordained, etc.,* That such garbage containers shall be kept tightly covered at all times, except when momentarily open to receive the garbage or to have the contents therefrom removed, as provided for hereinafter.

SECTION 6. *Be it further ordained, etc.,* That when such garbage container is placed on the outside of any premise it shall be unlawful for any person engaged in the removal of garbage, or for any person, to remove the cover from such garbage container, except for the purpose of emptying its contents into a duly authorized garbage wagon, or to throw such garbage container on the street or sidewalk, or to injure it in any way so as to make it leak, or to bend it or its cover so as to prevent said garbage container from being tightly covered; and all persons engaged in the removal of garbage shall, after emptying said container, replace the cover tightly on said container.

SECTION 7. *Be it further ordained, etc.,* That the owner, agent or occupant of every premise in the city of _____ shall keep separate from their garbage and ashes, tin cans, broken crockery, hardware, old planks, wooden matter, paper, sweepings and other trash, and place same in a sound, substantial vessel or container kept for that purpose, which vessel or container shall be placed on the sidewalk or alley in front or rear of each premise of the city of _____, as provided in section 1 of this ordinance for garbage containers, for removal on _____ provided that such rubbish, other than garbage, may be so placed _____ on _____

SECTION 8. *Be it further ordained, etc.,* That the provisions of this ordinance shall apply to all public and private markets, as well as all places of business, hotels, restaurants and all other premises, whether used for business, boarding or residential purposes.

SECTION 9. *Be it further ordained, etc.,* That for the purpose of enforcing this ordinance any person living on any premise shall be deemed an occupant, and any person receiving the rent, in whole or in part, of any premise shall be deemed an agent; that on any premise where construction of any kind is in progress, and where employees or workmen eat their dinners or lunches in or about said premises, or scatter lunch or food in or about such premises, the contractor or foreman or other person in charge of such workmen shall be deemed an occupant;

and that the person in charge of any market, or stall in any market, shall be deemed an occupant.

SECTION 10. *Be it further ordained, etc.*, That it shall be unlawful for any person to pick from or disturb the contents of any garbage containers or vessels, or other containers, provided for in this ordinance.

SECTION 11. *Be it further ordained, etc.*, That each day's violation of any of the provisions of this ordinance shall constitute a separate and distinct offence.

SECTION 12. *Be it further ordained, etc.*, That any person violating any provision of this ordinance shall, on conviction, be punished by a fine of not less than \$10 nor more than \$25, or, in default of the payment of said fine, by imprisonment for not less than ten days nor more than thirty days, or both, at the discretion of _____ having jurisdiction of the same.

SECTION 13. *Be it further ordained, etc.*, That any law or ordinance in conflict with the provisions of this ordinance, in whole or in part, be and the same is hereby repealed.

AN ORDINANCE COMPELLING THE PLACING OF RAT-GUARDS.

SECTION 1. *Be it ordained by _____ of the city of _____*

, That from and after the promulgation of this ordinance it shall be unlawful for any vessel, steamboat or other water craft, except harbor boats, to lie alongside of any wharf or dock in the city of _____, and such vessels, steamboats or other water craft shall be fended off from said wharf or dock in such manner that no part of such vessel, steamboat or other water craft shall be nearer than 4 feet from the nearest point of said wharf or dock by a floating fender or spars of sufficient strength to maintain said distance of 4 feet, and each such spar, and each such chain, hawser, rope or line of any kind, extending from any such vessel, steamboat or water craft, to said dock or wharf, shall be equipped with and have properly and securely attached thereto, a rat shield or guard of such design, and in such manner, as shall be approved by _____, of the city of _____, except such harbor boats

SECTION 2. *Be it further ordained, etc.*, That no gangplank, staging, ladder, skids or other device whatsoever whereby rats and rodents may find egress from a vessel to such wharf, dock or landing shall be ever allowed to extend from any vessel in communication with such wharf, landing or dock except only during such times as such vessel is actually engaged in discharg-

ing or receiving cargo, and at the time of loading or discharging cargo only when the master, owner or agent of said vessel shall have stationed at every gangplank, and within 5 feet of the same, a person whose duty it shall be to prevent rats and rodents from reaching such wharf, dock or landing from said vessel. While not actually in use all such staging, gangplanks and other devices and means of egress for rats and rodents from vessels to shore shall be so removed as to positively cut off all communication from such vessels to the dock, landing or wharf.

SECTION 3. *Be it further ordained, etc.,* That after the hour of sunset all such gangplanks, staging or other structure, provided for in section 2 of this ordinance, shall be removed from such wharf or dock: provided, that when loading or unloading is required to be done after sunset, the same shall be done in the manner provided by section 2 of this ordinance; and provided, further, that such light or lights shall be furnished by the owner, master or other officer in charge of such vessel, steamboat or other water craft, and so placed at, or sufficiently near to, each such gangplank, staging or other structure that the presence of rats may be easily and readily seen, and such additional competent men as may be necessary shall be detailed in the manner and for the purpose provided for in section 2 of this ordinance, provided that at the end of each such gangplank, staging or other structure shall be kept whitened at all times when in use for a length of 10 feet.

SECTION 4. *Be it further ordained, etc.,* That no crated cargo or empty barrels, boxes or other containers, especially those from or intended for the storeroom, shall be permitted to leave, or be received aboard of any such vessel, steamboat or other water craft, until the same shall have been so inspected as to insure that they contain no rats.

SECTION 5. *Be it further ordained, etc.,* That the following definitions of words used in this ordinance are hereby adopted: "vessel" is meant any boat engaged in traffic or the carrying of freight; "wharf, dock and landing" are meant and shall embrace any place where a vessel may land, discharge or take on cargo or freight, or receive or disembark passengers, whether the same be the natural shore or a structure or device of any kind that may be used for such purpose.

SECTION 6. *Be it further ordained, etc.,* That the owner, master or agent of any vessel, or their servants or employees, or any person who shall violate any provision of this ordinance shall

upon conviction be punished by a fine not exceeding \$100, or by imprisonment not exceeding thirty days, or by both such fine and imprisonment in the discretion of the

SECTION 7. *Be it further ordained, etc.,* That each day's violation of any provision of this ordinance shall constitute a separate and distinct offence.

