

(1) That the prevalence of typhoid fever in Boston is not due to the water-supply.

(2) That situation near tide level is not conducive to the frequency of the disease.

(3) That imperfect drainage is not an important factor.

(4) That, as the germs of typhoid fever can be easily and readily conveyed by milk, it seems reasonable to assume that the comparative prevalence of the disease in this city is due, in a great measure, to infected milk.

THE SANITARY CONDITION OF BOSTON.¹

BY S. M. DURGIN, M.D.

THE sanitary condition of the city may be estimated in a variety of ways and with a greater or less degree of satisfaction. A superficial view of surfaces and surroundings may give sufficient evidence to one; the lack of prevailing bad odors, the want of a high death-rate, the absence of epidemic diseases or the existence of a well-ordered and equipped health organization may be satisfactory evidence to another, that the sanitary conditions are good.

All of these conditions might temporarily exist and furnish presumptive evidence of a good sanitary condition, while a careful investigation beneath surfaces and within doors, would alone furnish data upon which a positive statement could be made. A clean dry surface, a clean well-drained soil, good public and private sewerage, immediate destruction or removal of all decomposable wastes, good food and water-supplies, and a good surveillance over all, would constitute favorable conditions for a healthful city.

For the purposes of this brief paper, I shall confine myself to a statement of a few of the principal outdoor and in-door conditions as they appear to me. We cannot do better, perhaps, than to inquire as to how many of these favorable conditions we can lay claim to.

The area of the city now measures about 37 square miles, or 23,707 acres. Of this area, 1,812 acres are included in parks and public grounds. There are 558 miles of streets, of which 51 miles are paved, 204 miles are macadamized, and 282 miles are formed of gravel.

There are 56,809 dwelling-houses, and of this number there are 10,763 tenement-houses of three or more families each. A portion of the remainder of the city is occupied by various out-buildings for business purposes, leaving large tracts of unoccupied land, especially in the outlying districts.

The parks and public grounds for the most part may be said to represent good sanitary conditions. Some of the parks are not wholly completed but are rapidly approaching that desired end. The condition of some of the ponds will be improved by time; the pond on the public garden needs grading and paving for sanitary purposes. The paved streets have been greatly improved in the last two years, and, for the most part, are kept in a cleanly condition. Some of them, for the want of better paving, are very difficult to keep clean. Most streets in all cities present an unclean and offensive surface. This condition may be due to a faulty pavement, want of pavement, or a lack of care supported by a popular notion that an unclean and

muddy condition of the streets has no appreciable effect upon the public health.

The macadamized streets, where much used, are unclean and offensive at least six days in the week. It would be in the interest of the public health, a cleaner atmosphere, greater public convenience and economy if all the macadamized streets, within the built-up portions of the city, were paved with asphalt or hard brick with close joints.

There are large tracts of vacant land in the outlying districts and some lying nearer the centre of the city. Some of this land is at a low grade, and in portions of it are found creeks and ponds of more or less stagnant water. This water becomes offensive and troublesome when found within the neighborhood of dwellings by becoming mixed with drainage or other foul matters.

Difficulty has been found in various ways in securing a total abatement of many of these nuisances. A resort to the courts and the use of the city's money has resulted in the abatement of the larger and more serious specimens of this class of nuisances; but there are still many delinquent owners under orders, or whose cases are in court at the present time. An improved law for use in securing the filling of such lands to a proper grade is now under consideration at the State House. It would be difficult to say to what extent this class of external or distant nuisances affect the public health, but they are unsightly, noisome, sometimes extremely offensive to smell and, doubtless, to some extent, prejudicial to the health of those within their immediate vicinity.

A very large part of the occupied area of Boston, exclusive of Dorchester, Roxbury and Brighton, has been made by raising the grade of marshes and by filling on tide-water flats. This made land is found particularly in South Boston, Charlestown, East Boston, and at the so-called North, South and West Ends of the city.

This made land is occupied principally for dwelling purposes with a dense population, and partly for business purposes. The grade of the streets in these sections is from twelve to eighteen feet above mean high water, while the cellars are below average high water, are frequently wet, and many of those in the business sections are so low as to require boxing to keep out the tide and surface-water.

It does not necessarily follow that a territory will be unhealthy because the land is made by filling and reclaiming it from tide water. A healthful residence upon such soil depends rather upon the height of the surface of the soil above the ground water-level, the character of the soil between those levels and the exclusion of the soil air from the cellar. The cellar, situated near the ground water-level and in the unclean soil, must continually receive unclean and damp air from such a soil, unless provided by special means to prevent it. Portions of this land have been made with the refuse and dirt of the city, while other portions have been filled by clean gravel from suburban hills. The cellar in one case gets the foul and damp air from the soil, and in the other it is a question of shutting out the dampness from below. For the most part, the soil of the higher elevations of the city is damp and wholly without artificial drainage, while the filled portions are at too low a grade to exclude dampness without extraordinary means.

The alley-ways of the city are numerous, occupying

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no insignificant portion of the city's area, and are an important part of the city's conveniences. Until recently, there has been no definite understanding as to who should take care of them. This care has been exercised in part by the city and in part by the abutters, and the condition has been most unsatisfactory. For the most part they have been unpaved, uncleaned, and a source of much complaint. It has recently been decided, however, that the city will do no more cleaning in these private ways, and the Board of Health has undertaken to secure the proper care of them by the abutters who, alone, hold the fee in them and are responsible for their condition. These places should first be well paved, and then their cleanly condition may be secured at a trifling cost.

The cleaning of private yards and spaces about dwellings is a matter requiring the utmost vigilance of the health inspectors. There is no law or power known to the Board of Health by which certain people can be made to keep their premises clean for more than a few days at a time.

The old privy vaults and cesspools, with their accumulations of filth which were once so common, are now rapidly disappearing from the city. Nearly 7,000 of the privy vaults have been demolished in the last few years, and the few remaining, where a public sewer abuts the premises, are under orders to go. The yard cesspools, which are also common nuisances, are being changed from receptacles for sink and other house drainage, to those for surface drainage only.

The public sewerage is mainly good, including the improved intercepting system. More sewers are needed in many parts of the city where accumulations of filth are now being stored in vaults and cesspools, and are causing considerable annoyance. Many of the old sewers at the North and West Ends of the city are in a dilapidated condition, are very foul, and should be rebuilt without delay. The whole sewage of Cambridge, Somerville, Charlestown, Chelsea and East Boston still discharges into the Charles River and upon the flats in those sections, creating a most serious nuisance.

We see no remedy for this state of things except in the completion and use of the metropolitan intercepting sewer, which is still under construction and which ought to be completed at the earliest practical moment.

Private drainage in our city, like that in most cities, is unsatisfactory, the cause of an immense amount of inspection, complaint and annoyance, and, undoubtedly, the cause of much ill health.

To relate all that need be said concerning house drainage or plumbing in our city would make a very long story, which need not be told to-night. We have statute laws and city ordinances which specify the method, material and workmanship necessary in constructing house drainage. Plans for construction and repairs are submitted to, and the work approved by, the Inspector of Buildings. The Board of Health is called upon to find defects and to order repairs. Such repairs number each year about 4,500.

For the purpose of ascertaining to what extent defective conditions of plumbing exist, and to what extent traps are supplied and water-closets substituted for vaults, we have taken a large number of blocks of dwellings, both new and old, each season for thirteen years, and made house-to-house inspections with the following results:

Want of traps first five years, averaged 50 per cent. ;

during thirteen years 32 per cent. ; and during the last year 22 per cent. ; defective conditions of plumbing, first five years, averaged 49 per cent. ; whole thirteen years 39 per cent. ; and last year 34 per cent. Use of privy vaults, first five years 28 per cent. ; for thirteen years 14 per cent. ; last year three per cent. This means not only a very poor state of plumbing, but a want of commendable progress in the substitution of a better condition, in other words, it indicates poor construction and inefficient repairs.

The removal and disposal of refuse material has become a very serious question to the city as a corporation, and to the individual citizens. At present, it is stored for a time about the dwellings, then removed by the city carts through the streets at a cost of about \$470,000 per annum, and afterwards sold to the farmers to create nuisances elsewhere.

The street sweepings, house dirt, ashes, and a great variety of rubbish and refuse material, including some of the garbage, to the amount of 2,500 loads, or 100,000 cubic feet per week, are dumped in the harbor. It has always seemed to me that the kitchen waste should, by some special provision in the stove, be disposed of as soon as it is made. By this means all subsequent nuisance and expense would be avoided. In regard to the other wastes of the city which are now dumped in the harbor or upon vacant lots for filling, we are of the opinion that such material should first be burned and then used for filling.

Tenement and lodging-houses are objects for constant attention. Poor people and our newly-made citizens from abroad are much inclined to crowd into small spaces where they soon create a most unhealthy condition of things if left to themselves. We have vacated many of the worst of these buildings, have cut down and limited the number of occupants in others, burned much of the bedding, disinfected the remainder, and are enforcing a better degree of cleanliness, light and ventilation in both tenement and lodging-houses. This work can only be regarded as a most incessant and aggressive one in certain quarters of the city.

MASTOID MEASUREMENTS.

BY W. P. COUES, HARVARD MEDICAL SCHOOL.

I RECENTLY examined 400 crania at the Peabody Museum in Cambridge, with the view of determining (1) the relative frequency of the asymmetric mastoid processes, and (2) whether the mastoid process being small or the digastric fossa deep made any difference in the depth and direction of the lateral sinus.

I found that out of the 400 crania examined 13 (or 3.25%) had asymmetric mastoid processes; only marked differences such as could be plainly seen were taken.

This examination shows that in 96.75% the mastoids were symmetric; of the 400 crania examined 164 had either a small mastoid or a deep digastric fossa. Out of these 164, 136 (or about 83.3%) had a very deep lateral sinus coming up towards the mastoid antrum.

This percentage shows that where the digastric fossa is deep, or there is a small mastoid process, the lateral sinus is almost invariably deep, coming up towards the mastoid antrum and encroaching on the mastoid cells, so that in operating on the mastoid, if we find it small, or the digastric fossa deep, great care must be taken lest the lateral sinus be wounded.