

Municipal Chemistry

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While most of the larger cities own well-equipped municipal laboratories, the smaller cities and the towns and villages feel that it would be out of the question for them to endeavor to maintain such institutions. Just what numerical limit of population might be set as the dividing line between the need for such protection and the absence of need is rather an indefinite proposition. If one hundred thousand people find a municipal laboratory a necessity, are ninety thousand people exempt from the dangers and unnecessary ex-

penditure that one hundred thousand are exposed to? Will unscrupulous contractors, epidemics, frauds and adulterators have mercy on corporations below a certain population, or having only a certain tax revenue? It will be admitted of course, that if a large city needs a municipal laboratory, a small city or even a village will need one in proportion. In the large city the staff of the municipal laboratory will use some initiative in instituting investigations and making tests. They will be appointed by, and do work for, the various departments of the municipal service. Experience in these various departments would put the heads in the position to make use of the chemist. In the smaller municipalities, only a few departments are in continual operation under salaried officers. In some cases, especially those of smaller towns a good deal of very important work is carried on by committees of the council, whose members have no qualification other than membership in the said council. Some of these members would be interested to know what materials, problems, or investigations become fit subjects for the consideration of the chemist. What are the qualifications of the municipal chemist of to-day? At once we dismiss the idea of a mere manipulator of evil smelling mixtures whose chief business in the opinion of some is to find out whether your neighbor is feeding arsenic to your prize cattle or adding water to the milk he sells. To give some idea of the various lines of work in which a chemist can assist a community, we will divide his work up into its several important departments, citing a few cases in each:—

(1)—CONSTRUCTIONAL.—Road-making, sewer and water-pipe laying, purchase of bricks, stone, cement, sand, lime, etc. In every one of these classes of material or operation, municipalities have met with more or less serious loss or received service below the standard paid for. In one case a contract was for a dustless road to be constructed of a certain kind of rock. The contractor assumed that any rock would do, a long expensive highway was built and proved to be very dusty indeed. A good municipal chemist could have prevented that almost at a glance. A shipment of cement was rejected as being very inferior. Inquiry later elicited the information that it was sold. Of course, it went into some work in which the material was not subjected to tests. Cement is not very often found defective now, but the occasional failure may be worth many tests. We have come across several cases where important and expensive operations were imperilled or much delayed by the use of inferior sand in concrete, a five-dollar test would have prevented such a trouble. Many of the smaller pieces of municipal work contain small amounts of cement and are not considered expensive enough to warrant getting close inspection or a consultation with a municipal engineering chemist. These works are left entirely in the hands of foremen, yet frequently fulfil functions, the failure of which for any reason would mean disastrous expense and, perhaps, loss of life.

When a town is large enough or ambitious enough to take up the question of permanent paving, a set of specifications

is drawn up or borrowed from another town or city with a few alterations. Many of the specifications so drawn up are vague or ambiguous, some indeed it might be found have been so written that they serve certain interests. A more or less real "engineer" is mentioned in them, and everything is required to be subject to his "approval" or to be "satisfactory" to him. In some cases the specifications are general, merely requiring goods to be "of uniform quality and satisfactory to the engineer." Others are specific about some parts of the work, and very vague about others. Contractors are always on the alert for the "joker" in such specifications and if one is found, it usually works against the interests of the town. There are many points in connection with the laying of bituminous pavements which are best foreseen by an experienced asphalt chemist.

The payment for such work is usually spread over twenty, thirty or forty years, whereas the contractor may be let off with a five-year guarantee. If, as has happened, a pavement gives out in five or six years, from bad workmanship or materials, the community might find itself obliged to replace the paving in many parts, while the original bonds are still to be paid. This is not always the fault of the contractor. The town committee may have interfered with the work or cut down some of the items in the tenders which appeared unnecessary to them.

(2) MAINTENANCE.—The purchase of supplies for maintenance is another source of expense. Fuels, oils, and even stationery supplies may be the subjects of economies under proper inspection. In the case of stationery, not only should consideration be given to the question of expense, but also due attention should be given to the purposes for which it is to be used. Many municipal documents are not only of great historical value, but of legal importance involving the status of a community and its citizens.

As to oils, the various companies competing for this business have developed a very sharp selling fraternity deeply versed in dealing with the "elect." The result is often the purchase of unnecessarily large quantities of some oils and improper grades of others. Even if a town only has one engineer or one dynamo and a pump, it is essential that these be kept in the best running order, and that lubrication should be subject to as little fluctuation as possible. Very few municipalities there are which do not have to buy more or less coal. Coal is not a substance of uniform composition. It may be soft, steam coal having a large proportion of volatile combustible matter, or hard anthracite yield very little volatile matter, but carrying up to 20 per cent of its weight of ash. This latter figure has been found in coal, said to contain not more than 15 per cent, a difference of five tons in every hundred is worth attending to. Paint is another case where much depends on quality.

(3) HEALTH AND SANITATION.—The administration of a municipality has a responsibility in these matters that is not sufficiently recognized. Disinfectants are often bought by municipalities in quite large quantities. These fluids vary greatly in germ destroying power. Some are effective in destroying bacteria in dilutions of one part in 500 or 1,000 of water, while others are only effective in dilutions of one part to 100 or 200 parts of water. The former class are worth three to five times the price of the latter, but can frequently be bought at the same price. If diluted too much, the money spent for them is practically thrown away. Disinfectants should always be tested. It is dangerous to depend on unknown protectors.

(4) FINANCING.—Of course it would be difficult to persuade the ratepayers of a town of 3,000 to 5,000 people that it would pay them to support a chemist, but groups of towns not far from each other could easily support a good man and laboratory jointly at a cost of ten to fifteen cents per head per year. The consulting services of a good municipal chemical engineer could be retained at a moderate fee, and all specifications and purchasing questions could be referred to him for consideration, as well as proposed regulations for milk, water and food inspection. In any case, all materials used in construction of public works should be inspected for quality, uniformity and fitness for the work to be done and the actual cost of the work or works should not be made the basis of their need for tests and inspection. The economic value of insuring as far as is scientifically possible, the safety and permanence of public works, and the proper performance of their functions, should in all cases be considered first. It costs less to be sure than sorry.