

held to apply only to public streets open to the sun and air, and traffic; in confined places and under some conditions, wood might be objectionable. I have seen it decaying in confined places without traffic."

The one statement by the Medical Health Officer of Detroit refers directly to the cedar-block pavement as we understand it in this country. The other opinion, that of Col. Heywood of London, is expressed regarding the wooden pavement as laid in European countries. Between these two pavements there is a vast difference. Under European practice, many of the pavements are of the Karri and Jarrah woods of Australia which are thoroughly saturated with resins, are very hard and are not subject to decay. They are sawn into brick like blocks and laid on concrete. Where soft woods are used, they are also cut into regular oblong blocks and laid on concrete; and are saturated with creosote or treated with some other preservative process. Wooden pavements of America, however, represented by cedar-block, are of a very different order. The round blocks, of irregular diameter, are merely the untreated wood, still carrying the bark. These, placed on a bed of sand, are under the most favorable conditions possible for decay, being constantly exposed to moisture, air and warmth. With no preservative treatment they are enabled to absorb to the fullest extent all forms of liquid street filth which, in the process of putrefaction, feeds on the organic matter of the wood. The surface, which quickly becomes uneven, retains a large quantity of loose matter subject to decay, the whole giving rise at times to noxious odors. The effect, were sufficient of such paving used, would subject us to the conditions favorable to marsh fever. From a sanitary standpoint the cedar-block pavement of this country would indicate a serious menace to health. At the same time, while we are justified as a matter of theory in arriving at this result, there do not appear to be any statistics to prove the conclusion to be a correct one. The death-rate of cities most largely paved with cedar-block does not bear any ratio to the extent of such pavement; nor does a change from cedar-block to another less absorbent pavement produce a noticeable effect on the death-rate.

In European practice, wood more suited to a business street than macadam, affording a better foot-hold for horses than asphalt, less noisy than granite setts, is exceedingly popular in spite of its less sanitary character. In this country, however, there is an unwillingness to renew a wooden pavement when decay has rendered it unfit for further use, and this, coupled with the less careful method of laying, is the cause of the complete disrepute into which it has fallen. Experiments have been made recently by a Polish scientist with regard to cedar-block. The bacteriological examinations showed that, in specimens taken from blocks which had been in use for four years, and from a depth of one centimeter and two centimeters below the surface, there were at the end of five days 650,000, 220,000, and 12,100 bacteria per gramme of wood. A later examination showed 1,200,000 colonies per gramme in the surface of the wood, and 8,600 colonies per gramme at two centimeters below the surface. An estimate, in terms of its nitrogen, was made of the organic matter absorbed by the wood, and indicated that the surface layer of wood contains more nitrogen than the most polluted soil. A comparative estimate of the pollution of the atmosphere was made by placing a definite quantity of sulphuric acid under a glass bell, on the surface of wooden and asphalt pavements, the result, as indicated by the quantity of ammonia absorbed by the acid, being much in favor of asphalt. The observations show that while a wooden

pavement gives absolute protection to the soil and to the subsoil water, there was considerable atmosphere contamination. The experiments were made on blocks of pine, preserved by impregnation with copper sulphate. Such being the case with a wooden pavement laid under European practice, there can be little doubt of the unwholesome effect of cedar-block upon the atmosphere. Further experiments of this description, conducted by members of your association, would doubtless prove instructive and profitable.

Broken stone or macadam would next arouse suspicion with regard to its absorptive qualities. There is this great difference between the two, however, that whereas a wooden pavement itself decays and affords food for the decay of other organic matter falling on it, the macadam does not in itself decay. With under-drainage such as well-built macadam roads possess, it should be little more than a good sewage disposal bed for the comparatively small amount of sewage which falls upon it. A macadam pavement can be scraped and swept, it is not noisy, dust can be subdued by sprinkling, and on sanitary grounds appears to be an excellent pavement for residential streets where traffic is not excessive. For business streets, or for heavily traveled thoroughfares of cities, a harder surface is advisable.

With regard to absorption, there can be no objection to asphalt, vitrified bricks nor stone blocks. Asphalt is impervious to water; while the joints of brick or stone pavements are practically perfect so far as absorption is concerned. To be sanitary a pavement should not be dusty. The dust of a pavement is not only an irritant, but carries with it the bacteria of disease which, from various sources, are a part of street filth. To prevent dust the pavement must be so perfectly cleaned that a practically harmless amount is taken up by the wind; or if perfect cleanliness is not possible, dust must be subdued by sprinkling. Unless perfectly cleaned, much more perfectly cleaned than is commonly the case in this country, an asphalt pavement is very apt to be a disagreeably dusty pavement on a windy day in summer. This, indeed, is one of its greatest faults from a sanitary standpoint. Toronto has the reputation of being a clean city, with a well-organized street department, yet even under these favorable conditions, a walk or drive down Yonge street on a warm, windy day is a very trying experience. The smooth, hot surface quickly dries any matter falling upon it, a wheel passing over this dry substance grinds it to powder, and the result is that clouds of dust find their way into the eyes, nose, mouth, throat and lungs of pedestrians. Business men in their offices are not safe from its attack, as it drifts in through the open windows. The dust imbeds itself in clothing, fastens itself on articles of food exposed in the shops, to be eaten finally by the purchaser. One case came to my notice in which a consumptive patient was ordered by his physician to leave Jarvis street, one of the best residence streets of Toronto, because of the dust which came from the asphalted roadway. These streets are swept by machines, and are hand-swept by a corps of city employees, but are not to my knowledge flushed as are similar pavements in London and Paris. Flushing is the only method whereby asphalt can be freed from this unsanitary dustiness, but in addition to being expensive and hurtful to the asphalt, such a proposal will doubtless meet the disapprobation of the engineer in charge of sewers. The dust, however, is not a defect of the pavement so much as it is a fault in the method of cleaning. Asphalt has, nevertheless, the disadvantage of being a very hot pavement. Its smooth surface, reflecting back