There are but three varieties of penetration necessary for sheet asphalt: one for streets with heavy traffic, one for moderate traffic and one for light traffic. The same may be said of asphalt required for asphaltic concrete pavement. For asphaltic macadam there should be one range of penetration, and that a fairly wide one. For example, a specification giving a penetration requirement of from 100 to 125 would cover the matter properly and effectively.

This matter should be given serious thought, and we hope for concordant action which will result in a practice that will make for increased efficiency and economy and at the same time secure a much-needed standardization in the consistency of asphaltic material for paving purposes.

THE PRIVATE SEWERAGE QUESTION*

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FOR many months my time has been almost exclusively given over to the subject of private sewerage. It appeared to me at the outset that the weak spot in our mastery of the sewerage question lay somewhere between the public sewer, in which the municipal engineer is a specialist, and the house installation, which plumbing progress has carried to a high degree of perfection. But the sewage and wastes entering through the plumbing system must find their way to the sewer and the zone between the foot of the plumber's sanitary stack and the street sewer has been in many cases a sort of no man's land, sometimes coming under the supervision of the building contractor, sometimes the plumber and also, to a certain extent, the subject of public regulation.

It has been customary to divide the horizontal part of a private sanitary installation under two designations, although they are essentially one installation. But, yielding to custom in my choice of terms, I will refer to the portion of the sewer from the base of the stack to the foundation wall as the "building drain" and the part extending outside the foundation to the public sewer as the "building sewer." "House drain" and "house sewer" are equivalent terms in a sense to those which I will use, but restricted in their application to residences.

Faulty From Structural Standpoint

From a structural standpoint, private sewer installations are faulty in a large number of cases and these faults are a serious menace to sanitation. Few plights are so tragic, either in the case of a residence or a business building, as the stopping of sewage, with its accompaniment of flooded fixtures and foul odors. As the trouble is underground, the mere discovery of its location may mean tearing up a whole concrete cellar bottom or many yards of lawn or paving and the correction of the trouble is a laborious and nauseating task. I wish to make the point in this connection that less tolerance of mediocre installation is permissible in work which is buried in the ground than in structures which are in plain sight and easily repaired. In practice, on the contrary, it is quite customary for faulty underground jobs to be rushed through and covered up. The mere fact that it is out of sight salves the professional conscience of contractors who otherwise would not permit anything but the best workmanship.

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Leaky building drains and building sewers produce certain typical results which may be enumerated.

Typical Results

1. Escape of sewage. This is perhaps the least serious result, but it does produce foul cellar bottoms and sometimes moist areas in streets. It stimulates neighboring root-growth and invites:—

2. Intrusion of roots. This is one of the most serious and the commonest menace to the proper working of a private sewer. Roots have been known to extend sixty feet from the tree, to enter the pipe as mere tendrils and to swell until they fill the whole pipe. The crisis that they create can be imagined, if you have not had actual experience with it.

3. Intrusion of ground water. This tends to flood the system and interfere with the proper functioning of disposal plants. Where the carrying system is overburdened, it means the flooding or stoppage of the plumbing appliances and suspension of their usefulness.

4. Intrusion of gases. Where gas pipes parallel the public or private sewer, the system often becomes surcharged with gas. It may force the seal of building traps and contaminate the air of a building. Explosions in sewers not infrequently blow up manholes and wreck the walls of sewers. Garage wastes often introduce gas into sewers. Leaky house drains allow the gas thus introduced to permeate the buildings.

When any of these things have gone wrong, the immediate S.O.S. of the building owner is addressed to the plumber. Hence the plumber has taken upon himself the solution of the question both as a matter of cure and prevention. His preventive measures have been the most natural in the world. He is primarily a metal worker and understands the joining of iron pipes. Where he has been consulted, he has usually recommended a building drain of cast iron, as the remedy in which he has confidence. At his advice, there has been a widespread legal propaganda, first for cast-iron building drains, prescribed in many building codes; second for cast-iron building sewers, prevailing only in a few localities; and finally for public sewers of cast iron, a step which is still in the conversational stage.

Cast Iron Sewerage

Anyone must be struck, at the start, with the enormously increased expense of substituting cast iron for the sewerage materials in more general use. Yet if cast iron is the only material capable of being tightly joined, the logic of this movement cannot stop short of complete cast-iron sewer systems, for leaky sewerage is intolerable whether in the private sewer or the public sewer.

My researches have convinced me that there is no sound argument for the use of cast-iron sewerage and many reasons against it.

Take a temporarily pressing reason; the need for metal to win the war is so pressing as to make it questionable patriotism for anyone to use a pound of iron or steel underground. Cast iron used for pipe diverts pig iron from the manufacture of steel. The government's need for steel in the current six months amounts to 200,000,000 tons, where the greatest production record for any preceding six months in the history of the industry has been 160,000,000 tons, both for public and private use. Every five feet of 18-inch iron pipe buried in the ground deprives the government of sufficient metal to build a 430-h.p. Liberty motor or enough to build any standard truck engine in the 30 to 40-h.p. class. Every 2-foot length of cast iron pipe represents enough material