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HOUSE-DRAINS.

By GEORGE DERBY, M.D. Harv.

Prof. of Hygiene, Harvard University.

By the use of water-closets and their attendant conveniences of fixed wash-bowls, and bathing-tubs and kitchen sinks, our city houses are brought into close communication with the sewers, and their occupants are thereby exposed to special dangers.

Whatever gases are contained in these underground passages seek not only to diffuse themselves under the law of nature with regard to gaseous bodies, but are also frequently subjected to severe pressure. These gases are dangerous to health. What the specially noxious element in them is no one can define. It is evidently neither carbonic acid nor sulphuretted hydrogen, nor any other of the gases with which chemists are familiar in the laboratory. There is something beyond all this, coming from the decay of organized substances in a closed, pent-up position, without the free access of light and of air, which at times gives rise to the most virulent poison, and to the most destructive forms of disease.

The sensible properties of sewer-air are quite remarkable. It is by no means foetid, as many people suppose, neither is it pungent or ammoniacal. It is rather negative in character, faint in odor; mawkish, smelling perhaps more like soap than any other familiar substance.

Sewer-air may escape very freely in our dwellings before its presence will be suspected, and that this happens very often there can be no sort of doubt. There are many reasons for this belief. One cause for such escape, and a very active one, is found in the difference of temperature between the interior of our houses and the interior of the underground sewers. A rarefaction of air and an upward current are thus induced. The joinings of the soil-pipes are imperfect from alternate expansion and contraction by exposure to hot and cold water, and, unless a free and safe vent is provided above, there must be leakage at these points.

The air of the sewers is also subject to pressure from the sudden influx of water in rain-storms, and in seaboard towns from the action

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of the tide. In Boston, all or nearly all the outlets of the sewers are below the level of the sea at high water. As the tide rises, it displaces sewer-air, which is pressed inwards, and must inevitably escape at some of the sewer inlets. There can be no doubt that the rain-water conductors often serve the purpose of conveying safely away the imprisoned air thus seeking a vent*—an office not generally thought of in their construction. But their usefulness in this way depends upon their being left untrapped, which is not always the case. Frequently, instead of passing directly to the principal house drain without obstruction, they enter a water-sealed cesspool. But the rain-conductors, while sometimes acting as drain-ventilators, are inoperative when the house-gutters and pipes are filled with water in a heavy rain-storm. Neither do they relieve the pressure on the soil-pipes within the house caused by expansion of the enclosed air by heat. We have then remaining only the water traps of sinks, bath-tubs, wash-basins and water-closets as defences against the air of the sewers. There is, however, another risk to which the health of the family is exposed through these contrivances, in addition to those which come from upward pressure, or from defective construction of the traps, or from unsoldering of their connections of iron and lead, or from their corrosion and decay by time and use. Whenever a large amount of fluid is thrown down the soil-pipe, whether from the bath-tub or any other opening, the tendency is to the formation of a vacuum behind it, and atmospheric pressure causes a suction upon every trap which is at a higher level. This may be shown at any time by pouring down a bucket-full of water and observing the commotion which ensues in all the traps above it. It not unfrequently happens that the water of the trap is in this way sucked or "syphoned" out, and the pipe consequently remains open to the sewer, and the trap empty until filled again by the next use of the water.

There is also an obvious escape of the air of the soil-pipe corresponding with its constant daily use. Whenever fluids are introduced, a certain amount of air is displaced, and must go somewhere. Unless other vent is provided, it flows directly upwards.

For all these reasons we would advise giving the whole drainage plan of a dwelling the freest possible communication with the outer air at a point so elevated that the sewer gases cannot fail to be diffused and got rid of. This can readily be done, while building, by carrying the soil-pipe, made of iron, at full size through the roof, and leaving it open like a chimney. By this arrangement, all stagnation is prevented; the contents of the house-drains are constantly exposed to the oxidising and purifying influence of currents of air; when rain-conductors are filled with water there is still free escape for the sewer gases; and the water traps throughout the house are

* This fact was noticed by Dr. Francis Minot in the Boston Medical and Surgical Journal Jan. 28, 1854.

relieved from pressure both of the pent-up sewer air on the one side, and of suction, or atmospheric pressure, on the other.

In houses already built, a lead pipe may be readily carried from the highest point of the soil pipe directly through the roof—but the larger the pipe and the straighter its course the better. In one instance, at least, where this latter plan has been adopted, a constant current is found to flow outwards through the pipe.

102 *Charles Street*, Jan. 1873.

CYST OF THE POPLITEAL SPACE, COMMUNICATING WITH THE
KNEE-JOINT, AND DESCENDING BY GRADUAL DISTENTION
TO THE CALF OF THE LEG.

By W. C. B. FIFIELD, M.D. Harv.

J. B., machinist, aged 60, has had, for the last twelve years, chronic synovitis of both knee-joints. He was for a very considerable time at the Massachusetts General Hospital without receiving any benefit, and was discharged as incurable. He then came under my care as a private patient.

Both knees, being greatly distended with fluid, were punctured in October, 1868, with a common trocar, and the liquid, amounting to some ounces, drawn off. They were then injected with equal parts of tincture of iodine and water. This proceeding was repeated three times, the last time tincture of iodine of full strength being injected. Some pain and inflammation followed, but not enough to cause a radical cure.

In the summer of 1870, after a slip made on the stairs, he noticed, for the first time, a small, rounded tumor in the left popliteal space, and soon afterwards another in the right. That of the left increased very rapidly in size, so that in the autumn of 1870 it extended between seven and eight inches below the joint, entirely across the upper back part of the leg, and was more than twice as large as the fist, smooth on the surface and distinctly fluctuating.

I punctured the tumor, obtaining a good deal of oily liquid, and some masses resembling bits of hard, yellow fat came through the canula. Violent pain followed, the patient became typhoid, and three days later I laid the whole cyst open from one end to the other. The same oily liquid escaped, together with handfuls of hard, yellow masses, having the odor and appearance of commencing gangrene. On the following morning the typhoid condition had passed away. The extensive wound healed by granulation in a sufficiently short time.

At the expiration of three or four days from this operation, the knee-joint became exquisitely tender and painful, the patient again becoming typhoid and prostrated. A free incision was therefore made in the joint, evacuating thereby a quantity of pus. Again the