

tributaries, that is, nine inches leading into nine inches, or six inches into six inches, but a lesser pipe should be joined on to the greater, as six inches to nine inches, twelve inches to fifteen inches, nine inches to twelve inches.

14. House drains should not pass direct from sewers to the inside of houses, but all drains should end at an outside wall. House drains, sink pipes and soil pipes should have means of external ventilation. The largest block of buildings may have every sewer outside of the main walls. No foul water drains or cesspit should be formed beneath any house basement. All fluid refuse should pass at once from the drains to the sewers and from the sewers to the outlet.

15. Sinks and water closets should be against external walls so that the refuse water or soil may be discharged into a drain outside the main wall. Down spouts may be used for ventilation, care being taken that the head of such spout is not near a window. Water closets, if fixed within houses and having no means of direct daylight and external air ventilation, are liable to become nuisances and may be injurious to health.

16. Inlets to all pipe drains should be properly protected.

17. Sewers having steep gradients should have full means of ventilation at the highest points.

18. Tall chimneys may be used with advantage for sewers and drain ventilation.

Road-making in rural districts has, of late, been receiving a good deal of attention both in Canada and the United States. The attack upon the statute labor system is being renewed in Ontario, and its utter failure will be clearly demonstrated. In many parts of the province the country roads are practically impassable during the spring season. This entails upon the farmers a heavy task in trying to reach the markets with their products. A few loose sods thrown upon the worst parts of the road is the rough and ready repair that statute labor affords. It is argued, with a good deal of force, that the better way would be to employ skilled road builders and have the work systematically done. It is time Ontario got beyond the back-woods way of building roads.

The county council of Leeds and Grenville has by a vote of seventeen to ten declared in favor of the establishment of a county poor house, or house of industry; and has appointed a committee to meet committees from the towns of Brockville and Prescott to make arrangements regarding it. It is expected that the buildings and land—100 acres—will cost about \$16,000.

Ventilation.

Ventilation is a gradual, continuous and complete changing of the air contained in any structure, a substitution, in fact, of fresh air for foul, but so gradual a substitution that the motion of the air should be imperceptible.

Of course in factories, imperceptibility need not be so much regarded, and in the case of sewers and underground railways it is obvious that any method may be followed which promises the most perfect results.

Dr. James Johnson says that all deaths resulting from fevers are but as a drop in the ocean when compared with the number who perish from bad air.

It is to the efforts of science that we must look for an alteration in so disastrous state of things, and men of science may be assured that society will ere long demand, not as an eminent philosopher is reported to have said, a new faith—we neither look for nor expect that—but a longer life, increased freedom from disease and greater means of enjoying sound health while life lasts.

I believe we cannot doubt that much of the apathy manifested towards our subject by people, generally results from the abortive experiments and useless methods so often tried and resorted to for the purpose of supplying the want of ventilation.

Before I leave this part of my subject, I will mention one other difficulty in the way of ventilation, and this by no means a small one—I mean the cost.

Although efficient ventilation will not cost a very large sum per room, it cannot be denied that somewhat will be added to the expense of the house and this "somewhat" the speculative builder never will add until he finds intending tenants and purchasers who refuse to take houses which are not properly ventilated.

As with houses, so with all other buildings and works: if we make up our minds to ventilate them we must also resolve to pay for it.

I fear that people who build houses for their own occupation are but little in advance of the speculative builder, as far as any recognition of the absolute necessity of efficient ventilation is concerned. Many hold to such crude devices as open doors and windows; others think that a hole of any size, or in any part of the wall, quite sufficient, while I believe the majority pooh-pooh the whole question.

It then becomes the duty of scientific men and bodies to educate the public up to the recognition of the fact that ventilation is every whit as important as drainage to individual houses and that man can no more live in a foul atmosphere than he can while constantly imbibing poisonous water.

Scientific men acknowledge the necessity of ventilating dwelling houses

and buildings, such as are herein mentioned, but with the general public it is unfortunately far otherwise, and one of the greatest difficulties to be encountered in the progress towards a complete and perfect sanitary condition is this inertia of those most interested. Difficulties, however, are only made to be overcome, and it is in the hope of doing something, however little, towards overcoming this particular difficulty that I venture to trespass on the patience of the reader.

It is usually only in times of panic caused by the approach or presence of some fearful epidemic, that people seriously turn their attention to sanitary matters; and at times like these they accept the wildest schemes and act upon the crudest notions, until finding that they are no better and perhaps worse off than before, and the fright beginning to wear off, they begin to lapse into carelessness and vote sanitary science all nonsense. I think detective education is responsible for a great deal of this. I do not intend to assert that the generality of people, at any rate in the upper and middle classes, are what is commonly called ignorant; probably most of those who would be willing to turn their attention to sanitary matters, not being professionally engaged in them, have had at least the usual amount of education, as the term is commonly understood, but what is called the science of life-living, *i.e.* how life is sustained and the reasons why sanitary matters should be so carefully attended to in order that health and strength may be assured, are things of which comparatively few know anything at all.

All persons readily admit as a truism that they cannot live without air, but unfortunately they seldom get much beyond the bare admission. Air is as much a substance requiring space as solids or liquids are, and means of passage into, or out of rooms, churches, etc., just as much as water requires pipes or channels to allow it to flow into, or out of, reservoirs. With most persons air seems to be an abstract idea, rather than a substance of vital consequence to the whole living creation.

Air which has once passed through the lungs is unfit to be respired again, just as unfit as any other substance which has once passed through the system is to be used, as it were, over again. So that were there no other source of contamination to the air of a building, ventilation would be rendered necessary by the very presence of living beings.

As it is, however, there are so many other evil influences at work in most houses, and other buildings, that the necessity is made far more absolute.

In this paper I wish to impress upon the reader the very great importance of pure air, as pure as the district affords, being insured in our houses.

Ventilation is a want arising chiefly from modern ways and customs, and it is therefore a comparatively new branch of