lons in the dome, add $\times 325{\cdot}22088 = 364{\cdot}37880$ gallons of space in the boiler above the water line.

Water 489·38388 gallons.
Steam 364·37880 " } in the boiler.

(To be continued in our next.)

PLUMBING REGULATIONS IN MONTREAL.

(See Illustration on page 225)

MONTREAL, May 25th, 1880.

To the Editor of the Metal Worker.—It has lately been ordered, and is, I believe, about to become a law, that a trap is to be fitted in all private sewers (house drains), at or near the curb stone, and a ventilator provided just outside the front wall of all buildings. As soil pipes are carried above the roof, I claim that by this arrangement a circulation of cold air is going to be established in the drains that will freeze up the surrounding earth, heave up the drains, freeze water in taps, heave up walls of buildings, and do an incalculable amount of mischief. My experience with traps in drains is that they are a nuisance; but leaving the question of their advantage or disadvantage out of account, is not the damage by frost to which I allude certain to occur in a climate like ours, where we sometimes have for days and weeks a temperature varying from 0 to 20 below zero? In milder climates it might be very well, but is it, in your opinion, suited for the climate of Montreal? We have no trouble from frost when soil pipes and ventilators were carried up and traps omitted, as the warm air from the sewers keeps them open.

J. W. HUGHES.

Comments by the Editor.—We consider the plans shown in Mr. Hughes' sketch and described in his letter objectionable for many reasons, all of which have been fully set forth in these columns. The trap shown in the house drain is wholly superfluous, and will probably give rise to all the trouble which our correspondent predicts. In winter the air current following down the front ventilating pipe will be very cold, and will probably move with considerable velocity, as the temperature of the soil pipe must necessarily be from fifteen to twenty degrees at least above that of the outside air pipe. Under these circumstances there is no reason why the traps in branch wastes should not freeze, and why, under ordinary conditions, the worst results which our correspondent fears should not be experienced. The circulation will be shown by the arrows in the drawing. It might answer under peculiar circumstances, but in a Canadian climate it would be a tremendously dangerous experiment.

Trapping a house drain is almost always bad practice, and is only justifiable when we can do nothing better. It may be necessary at times to cut a boot to ease a corn, but it is much better to cure the corn or have a sound boot made that will not pinch it. Even the wayfaring man, though a politician, should be able to see that there can be no such thing as a pressure, nor even a stationary column of bad air, in a tube open at both ends; and that if one end of a house drainage system opens into the sewer and the other into the open air above the roof, there is no need of cutting it in two in the middle with a trap. A trap cannot resist the pressure of air in the sewer when it seeks an outlet. Its only function is to close a pipe against drafts or air currents, and this is exactly what should not be done at any point along the line of a house drain or soil pipe.

We agree with Mr. Hughes and the Editor of the *Metal Worker*, for the reasons given in condemning the method shown on the illustration, for the ventilation of the soil pipe of a house, and we object to the trapping of a house drain in this climate outside the walls of a house, where it would be very difficult to get at in case of obstruction, but, do not agree with the *Metal Worker* that "*the trapping of a house drain is always bad practice*" The fact is that when we live in a city where no faith can be put in the workmanship of the plumber—any botcher will be employed if his estimate is low enough—then there is no more dangerous system than that of ventilating city sewers through the house. We have placed a plan before the Health Committee which will, at a later period, appear in these columns, and which, if adopted by the Corporation, will, remedy many of the evils, in respect to sanitation, now so much complained of. By the plan now before the Health Committee all danger from sewer gas entering into the house is entirely avoided and its ventilation is perfect—we only use the water conductor in summer as a scourer—it can be disconnected at any time without trouble. Our arrangement places every source of danger within sight and is easily remedied by a tenant without the necessity of always calling in a plumber.

BENEFITS OF GOOD TOOLS.

There is an old saying to the effect that "it takes a good workman to make a good job with poor tools." So it does, and there have been many triumphs, recorded and unrecorded, of brain and skill over seemingly insurmountable obstacles. It is a satisfaction to compass a result with apparently inadequate means, and the mechanic who does it is justly proud of his success. But working with poor tools is never certain to produce good results, however great the skill and inventive the brain. Misses are made as well as hits, and even the most self-assured workman feels safer with good and applicable tools. No workman can afford to risk his reputation and success with poor tools; there is so much risk of a failure and such anxiety for the result, that even if success is attained it has been at the expense of time, thought, muscle and trouble that robs it of half its gratification.

The time has gone by when the workman was expected to "make something out of nothing;" when one implement or appliance was made to do duty for another, and "make-shifts," their origination, use and application to the job in hand were part of the kit of the workman. The constant and growing improvement in tools and labor-saving machinery has not only increased the profits of the manufacturer, but lightened the labors of the workman. The machinist who learned his trade 30 years go would now be ashamed to resort to the wretched substitutes' of tools with which he was then compelled to do his work. The carpenter knows the advantages of the mortising machine, the moulding machine, the band-saw and other improvements. The blacksmith sees the advantages of the drop-hammer, the shears, the steam-hammer and the portable forge; and even the farmer, who keeps up with the times, appreciates the mowing machine and the many improved hand-tools which facilitate his operations and reduce his labor. There may have been brain energy and labor wasted in the production of improved tools and appliances; for there are some which have never met the expectations of their contrivers or filled the wants of the users. But in truth, there has been no portion or department of mechanical endeavor that has accomplished better results or reached higher success. The number of special tools now used is wonderfully great as compared with 30 years ago. There is no manufacture of consequence that has not its special appliances, machinery and tools, and in tools for general work the improvement has been fully as marked. Even in hand-tools the improvement is obvious to the slightest observation. In every department of industry these improvements have made their mark. They save time and labor, and produce more satisfactory results. It is a wise economy to reject imperfect tools, and, as the patent-medicine men advertise, "use the best." Whenever an improved implement is put into the market—one that will do the work better or quicker—it is economy to buy it, even if the old one is intact and serviceable.—*Boston Journal of Commerce.*

AVOIDANCE OF VIBRATION WITH MACHINERY.—Mr. W. H. Delano, in a paper read before the British Institution of Civil Engineers suggests the use of asphalt for the foundation of machinery, notably for those running at high speeds, the asphalt having the valuable quality of absorbing vibration. This was instanced in the case of a Carr disintegrator, which, being mounted in a pit lined with bituminous concrete was worked at 500 revolutions per minute with sensible tremor, whereas with the former wooden mountings on an ordinary concrete base, the vibration was excessive and extended over a radius of 25 yards. In the Paris exhibition of 1878 there was shown a block of bituminous concrete weighing 46 tons, forming the foundation of a Carr disintegrator used as a flour mill, and making 1,400 revolutions a minute a speed which would have been impracticable on an ordinary foundation. Extensive applications of the material for this purpose are made in France, especially in connection with steam engines and steam hammers.