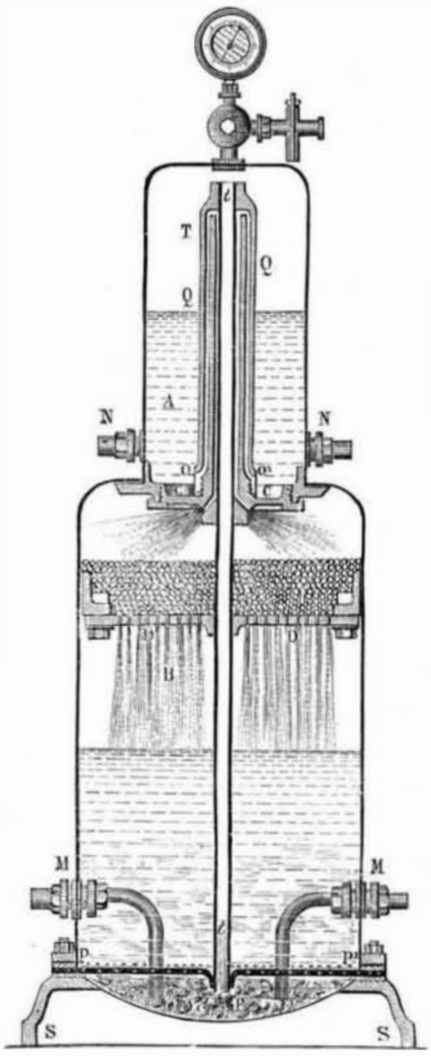
MIXER FOR CARBONIC GAS AND WATER.

The engravings show an apparatus invented by M. Mondollot for intimately mixing carbonic gas and water without a mechanical agitator, to which there are serious objections. The means for charging water with an effervescing gas by this device are very simple and said to be effective. Friction is avoided, leakage is prevented, and the bottling is unattended by violent spurts and ebullition.



THE CASCADE SATURATOR.

The apparatus consists of two vessels, or chambers, A and B, separated by the partition, C. The smaller one, at the top, is the distributer, and the other the accumulator. The gas and water are forced by a pump through the pipes, N, into the distributer, where they separate in consequence of difference in weight. As the pressure increases by the action of the pump the water rises in the tubes, O, and descends to the diverging annular space in the top of the accumulator, where it is forced in spray through the apertures, *i*, on a mass of broken marble, or other carbonate of lime material, through which it passes and descends through the perforated diaphragm, D, in a fine mist.

The water during this process is in contact with the carbonic acid gas at a high pressure, and becomes thoroughly charged. The gas escapes from the distributer by the central tube, *t*, into the bottom of the accumulator, where it passes through the perforated plate in little bubbles. Bottles, or other vessels, are filled at the pipes, M.

It will be seen that as the pressure in the lower cylinder decreases by drawing from it, and increases in the upper cylinder by the action of the pump, there is a constant tendency to equilibrium, the water under pressure falling in a cascade into the gas, and the gas, under pressure, rising through the water, giving the largest amount of contact surface.

Ensilage.

Mr. Atkinson, of Boston, recently sent a cask of maize fodder and a cask of rye to Professor Voelcker, the well-known agricultural chemist of England, with the view of showing the sort of ensilage prepared in America. Having analyzed the samples, the Professor reported the maize fodder to be perfectly sound and the rye very slightly mouldy; but both were wholesome food for cattle. A little cotton-seed meal having been added to the fodder, it was given to cows on an experimental farm. They took to the ensilage at once, and evidently enjoyed it. With careful management, Mr. Atkinson calculates that four cows can be maintained in good condition to one acre of ensilage.

* Translated from *Bulletin du Musee de l'Industrie.*

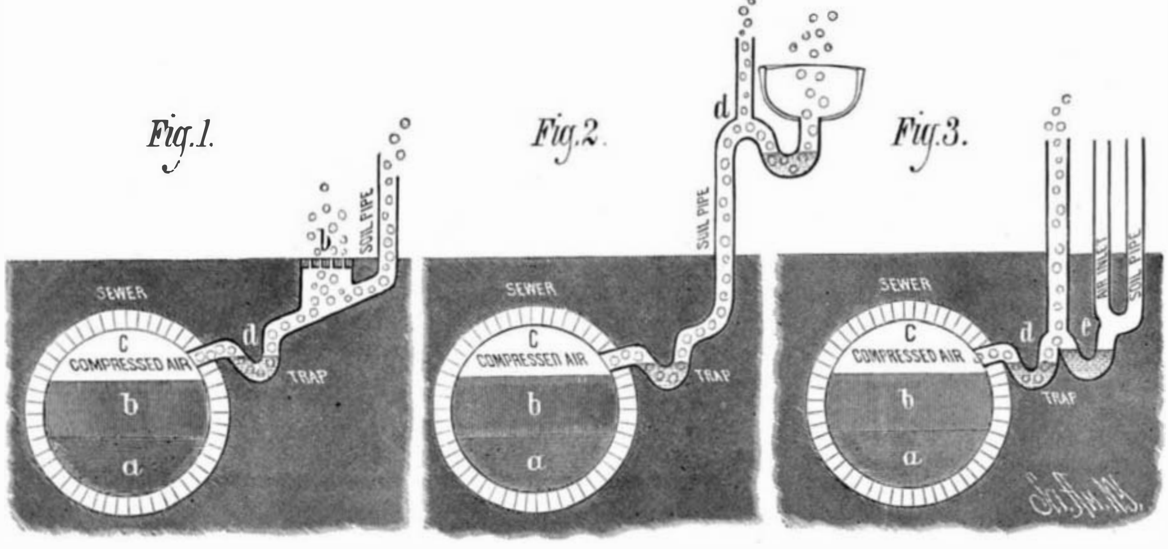
THE INFLUENCE OF STORMS UPON WATER TRAPS.

The last issue of the *Sanitary Record* (London) contains a valuable article on "The Influence of Storms upon Water Traps," by Henry Masters. The points he makes have application in cities in which the sewers are not ventilated. Strangely, there is considerable opposition to sewer ventilation, or, at the least, indifference to it; the result is indicated below.

There are three influences which affect the water seal of a trap, viz., the diffusion of gases, the absorption of gases by the trap water, and pressure by storm water; it is the latter influence which I propose in this paper to describe. I will suppose a common sewer to be cylindrical, and in dry weather the quantity of sewage passing through it is shown by the horizontal lines at *a*, Figs. 1, 2, and 3, and the space, *b* and *c*, above the average sewage contains sewer air; so long as the sewage does not rise above the average height, *a*, no pressure exists (except by the diffusion of gases, with which at present we have nothing to do). But suppose a storm occurs, and sufficient water passes into the sewer by way of the street gullies and house drains to raise the water in the sewer to the perpendicular lines, *b*, a certain amount of pressure will be the result, and the air, *b* and *c*, will be compressed into the smaller space, *c*, and in the proportion of *b* to *c*. The condition of the sewer air will now be much more dense and elastic, and press equally upon the intrados of the sewer and on the surface of the sewage, and if there were no escape for the compressed air, and the storm water rose higher and higher, the air would become denser and denser, until the pressure of the imprisoned air became equal to the entrance supply column of storm water, and then the water would cease rising; in our unventilated sewers this condition of things would exist, if it were not that a large number of house drains join the common sewer somewhat in the manner shown in my diagrams.

I have shown upon Fig. 1 an open disconnecting trap, *d*, and what would be influence of water rising (as I have described) upon such trap. The compressed sewer air is being forced into the house drains, as shown by a series of circles; in the first place, the air will force the trap at *d*, and then may escape into the open air through the perforated cover, *b*. But if the soil pipe, *c*, be open at its top, or there be any defect in it or in the house drains, there is a possibility of an up or inward current being established, and a portion of such sewer air be drawn into the house drains and escape by way of the soil pipe, or into the house; thus, to a large extent, the house drains will not be effectually cut off from the common sewers, for sewer air by entering the house drains neutralizes to a considerable extent the value of the disconnecting trap.

Fig. 2 shows a common arrangement of trapping drains, and, also, a common arrangement of four inch soil pipe ventilation by the extension of the soil pipe less in capacity than the soil pipe itself; it is not an uncommon thing to find such extension pipes varying from three-eighths of an inch to three inches in size. The effect of pressure in such cases is as I have again shown by circles (see Fig. 2). It will be seen that the compressed air ascends freely until it reaches the bend of the soil pipe at *d*, and at this point a portion escapes up by the small soil pipe extension and into the open air, as shown by small circles, but the major part forces the closet trap, and, of course, enters the house, thus showing for effective ventilation the absolute importance of soil pipes being extended their full size, and, if terminals of any kind be fixed upon their upper ends, the openings of such terminals must be at least of the same area as the soil pipe, for any less size would check the ascension of the air, and an undue pressure be put upon the closet trap water, and the chance of the water seal being broken in consequence.



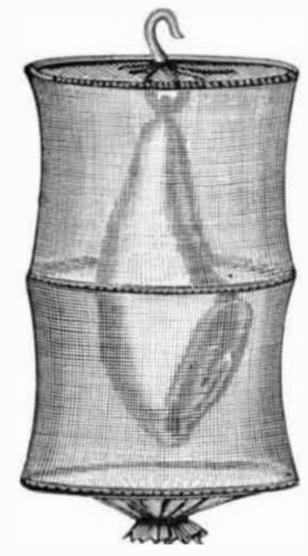
THE INFLUENCE OF STORMS UPON WATER TRAPS.

The effect of air pressure upon a double water seal trap is shown in Fig. 3, and although the compressed air, as in Figs. 1, and 2, forces its way through the trap, *d*, nearest the sewer (the escape being of the same area as the drain itself), the inner trap, *e*, will not be affected by pressure; the sewer air is effectually prevented from entering the house drains by this precaution, showing the importance of two complete water seals to a main trap, and, also, that a large escape pipe should be set between the traps.

In dealing with large soil pipe drains, great difficulties exist in effectually arranging the drainage of a house so as to exclude sewer gas, and to exclude this no one will doubt to be of primary importance. If a disconnecting chamber, or an escape pipe, be the safeguard adopted, the perforated grating, or pipe, should be of equal area to the drains it has to relieve; thus, a nine inch drain must be provided with perforations or pipe equal to about sixty-three superficial inches, a six inch drain twenty-eight inches, and a four inch drain thirteen inches. Perfect safety cannot be obtained unless this rule is made absolute.

PORTABLE MEAT SAFE.

This is a very simple invention which will prove exceedingly useful in summer to protect joints of meat from flies



PORTABLE MEAT SAFE.

or insects. The hook is intended to hold the joint, and the hoop prevents the gauze from coming in contact with the meat. As the joint is completely surrounded by the gauze it is impossible for the flies to effect an entrance.

Silico-fluoride of Ammonia as Test for Boric Acid.

Prof. Stolba says that many boron salts, especially those soluble in water, impart a fine green color to the alcohol or colorless gas flame when mixed with silico fluoride of ammonia.

Owing to the intensity of the color, this reaction can be made use of for testing for boron in substances that are totally insoluble in water and acids, as, for example, in glass, enamels, tourmaline, axinite, etc. He proceeds as follows: The substance to be tested is pulverized and mixed with an excess of carbonate of soda and fused. When the fused mass is cool, it is ground to a very fine powder and mixed with an equal part of the silico-fluoride.

When this mixture is brought into the flame on a platinum or even an iron wire, the smallest trace of boron will be indicated by a very distinct and persistent green color.—*Listy Chemicke.*

Aluminum-coated Iron.

Dr. Gehring, of Landshut, has invented a process by which ordinary iron may be rendered highly ornamental. The invention—of which, however, we have heard very little lately—of obtaining aluminum very cheaply led Dr. Gehring to coat iron with aluminum, in the same way as iron plates are now tinned, and converted into tin-plates. The inventor states that his process is inexpensive. He uses a Bunsen burner with a blast or a muffle, and is thus able to manufacture various objects of the durable metal for daily use, the coating of aluminum giving them a silver white luster. He also produces a gold luster or any other color, and even an enamel coating, all of which substances are said to adhere very firmly to aluminum. Aluminum, like tin, does not oxidize under normal conditions, and even stands the heat of an ordinary fire, while it is much more lustrous than tin.

THE production of rails of various descriptions in the United States last year was as follows: Bessemer steel, 1,438,155 tons; iron, 227,874 tons; open hearth steel, 22,765 tons; total, 1,688,794 tons. The corresponding production in 1882 was as follows: Bessemer steel, 1,330,302 tons; iron, 488,581 tons; open hearth steel, 25,217 tons; total, 1,844,100.