

ing capacity. This is not the case. By practice it is shown that during a storm the greatest deposits will occur in the sewer. It was found by the author that the rainstorm of July 10th, 1912, deposited in a trunk sewer on the Terrassenufer at Dresden, a quantity of grit of 52.32 cu. yd., while under normal conditions the weekly flushing operation removes only 2.6 to 5.2 cu. yd. of grit in the same sewer.

Since through the lower parts of the sewerage system, in consequence of abolition of the catch pits, large quantities of silt will pass, there is a danger that in times of storm a greater deposit of silt will take place. The reason is that in times of storm only the suspended matter is attracted, which is taken into eddies, the remaining silt is deposited especially where the velocities vary considerably. The additional cost which the cleaning of the sewers involves would by no means be so great as that required for the cleaning of gullies. According to Herrn Kajet, the cost of cleaning gullies amounts to 30% to 40% of the total cost of cleaning sewers.

There is another reason for the abolition of the catch basins. It has often been stated that it is more rational to remove the silt from the gullies instead of the sewers, as they are more accessible. However, if it is considered that the periodical removal of quantities of silt from the gullies (in some cases weeks elapse before they are cleaned) can be executed only with difficulty and with a certain amount of nuisance, a method would be preferable by which the removal of street sweepings is obtained hygienically and aesthetically unobjectionable condition which is inevitable in the most perfect design of cleansing implements. This advantage offers the odorless and invisible removal of the street sweepings by the sewers. By this method a further advantage is obtained, viz., that the quantity of silt containing organic and mineral matter which is soluble up to 64% on its way, according to the time in which it remains in the sewer, is considerably reduced until eventually in the grit chamber at the sewage disposal plant a complete separation of the organic matter is affected, that is, the separation of the sludge proper from the mineral constituents, the heavier suspended matter. If the cross-section of the grit chamber is designed in such a manner that the velocity is never less than one foot per second, so the grit will settle while the putrescible sludge passes into the settling tanks with the fresh sewage without being affected whatsoever.

As the removal of the detritus in the grit chamber is effected principally by machinery, the result is of further economic advantages to this system, indeed a disposal plant will have, by the collection of the soluble and suspended constituents of the street sweepings, an overcharge, but the cost for cleaning would not be materially increased as the amount of soluble and suspended matter is only 36%, and but .085 per M. of the dry weather flow. Applying this to the Dresden conditions means that in the most favorable case, instead of 4154.12 cu. yd. of street sweepings which are carried into the sewer, only 2659.16 cu. yd. of mineral matter will settle in the detritus chamber. The cost of removal of 1 cu. yd. of silt amounts, in the Dresden-Neustadt plant, to about 38 cents, including the wages of men and maintenance of the dredge, while the cost for cleaning the gullies amounts to \$1.34 per cu. yd. This example may suffice to dispose of the objections of those who have doubt in the economy of the method to convey the street sweepings directly into the sewers.

If, however, in some special cases, such as mountainous districts or asphalt and macadam roads, larger collections of sand are carried off by the quantities pre-

cipitated, and find access into the gullies it may be advisable to arrange small catch basins. In cases of paved roads, however, the arrangement of catch pits must be designated as absolutely obsolete. Together with the catch pits, there would obviate the last installations which would cause the pollution of the air, and thus the air of public sewers and of all connecting pipes to these would lose their offensive odor and character. With the abolition of traps indeed we have gained a further series of low level connections which effect at least as much as the perforated manhole covers and the co-operation of which for the ventilating process, in reference to the overweight of the domestic soil and down-pipes compared with the vent openings at street level restricted by the limited number of manholes, is of an importance which should not be underestimated. Indeed, we had to make certain alterations in construction in order to use the gullies for continuous ventilation.

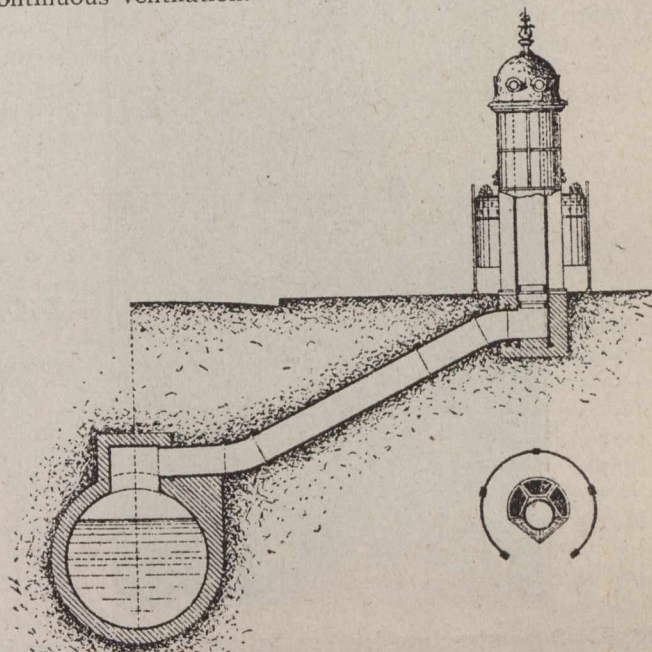


Fig. 6.—Ventilating Device on a Paris Trunk Sewer.

Gullies are generally adopted with cast iron gratings, either parallel or rectangular to the curb line. One may be of different opinion as to the advantage or disadvantage of both kinds. While it has been observed that in some cities gratings with bars parallel to the curb permit a better passage for floating matter, such as pieces of wood, paper, leaves, etc., other cities prefer, for the same reason, gratings with rectangular bars. With regard to the safety of traffic, both designs are not approved. On one side it is stated that horses with their studded shoes have been caught in gratings of the second style and damage resulted therefrom, while the opponents maintain the same gratings of the first design. In both cases the cause is probably to be found in the unsuitable construction of the gratings, too narrow slits, or their unfavorable location in the gutter. In any case, a well-designed grating has proved itself to be a rain inlet in flat streets. With the correct location in the gutter, gratings with sufficiently wide openings and rounded-off corners, which prevent the catching of studded shoes of horses, will fulfil all requirements in regard to safety both of run-off and to traffic.

Regarding the ventilation, it is more difficult to obtain sufficient results with this construction. With gratings, the experience has been found that in times of storm the large quantities of rain running off and extending over