tile trap to serve a 4-inch soil pipe is about the same as plugging up the end of the drain to prevent anything passing through to the street sewer. The 9-inch drain was too large for the work, but it might answer if the soil pipe was made to enter as shown in Fig. 1, and the trap dispensed with, which was unnecessary in this case, and not demanded by any town by-law.

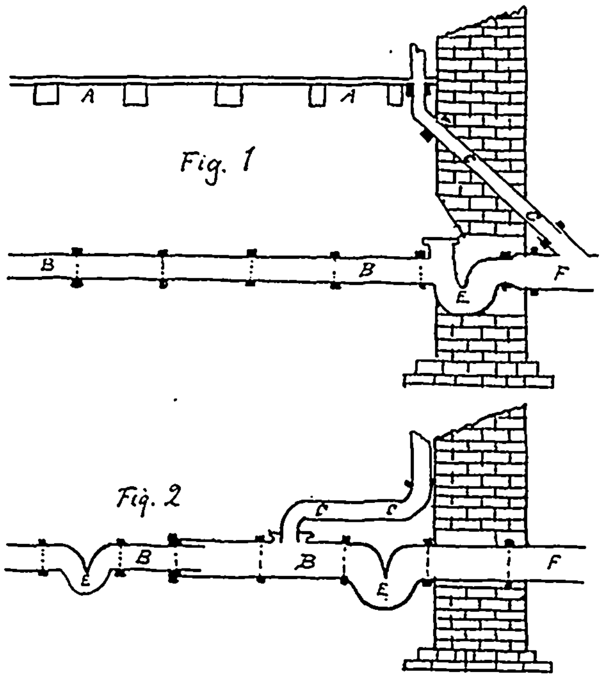

Fig. 1—Plumbing arranged in a satisfactory manner. Fig. 2—Plumbing as actually installed. A A—Factory floor. B B—Tile drain below floor. C C—Soil pipe. E E—Traps. F F—Street drain.

When drains are almost level and in a position as found in this factory, it would be much better and safer to have a reflex flag valve in behind the soil pipe and near the trap, to prevent excrement backing under the factory or the sewage coming back when the flood occurs. No doubt the idea of laying the 9-inch portion of the drain was to leave plenty of room for the contents of the soil pipe when the 6-inch drain was delivering the storm water at full bore, but it was not necessary on that account, because the soil pipe would only deliver occasionally, and then only about three gallons at one time, and that small amount would have very little effect on a stream passing through a 6-inch pipe, and a good rush and flush four times in a year, which is as often as an extra large rain storm comes. When the plumber who did the work, when newly erected, saw the square T junction and 9-inch pipe to connect his 4-inch soil pipe to, he ought to have declined to join the drain in that way. And if his instructions were imperative that the soil pipe should have an intercepting trap and breather, he might have attached a 6-inch, or, better still, a 4-inch hand-hole trap and breather pipe, and after connecting them the pipe might have been coupled to the line of 9-inch drain pipes by a side junction. By making this mistake a large amount of expensive first-class work was rendered dangerous by the error of connecting the soil pipe into the square T junction, and behind a useless 9-inch interception trap, as shown in Fig. 2.

—A correspondent, who is a member of the Canadian Electrical Association, writes to express his admiration of the electrical and mechanical experimental plants at McGill University, Montreal, and to convey the thanks of himself and friends for the courtesy shown by the faculty on the occasion of their visit during the recent convention. Our correspondent was particularly struck with the clearness and simplicity of the answers given by Dr. L. A. Herdt to every question asked by the members when visiting the electrical laboratory. This faculty in Prof. Herdt has struck many others since his connection with McGill. To possess a profound knowledge of a subject and to be able to impart this knowledge in a way that a learner can clearly understand, is a combination of gifts possessed by few. The record which this young professor has already made, both as a practical electrician and an investigator, indicates a most promising future for him, and it should be a peculiar satisfaction to McGill to have a native-born Canadian of such talent at the head of its electrical department.

RESULTS OF EXPERIMENTS ON THE STRENGTH OF WHITE PINE, RED PINE, HEMLOCK AND SPRUCE.*

BY PROF. H. T. BOVEY, LL.D., D.C.L.

In a paper read before the Canadian Society of Civil Engineers, in 1895, the results were given of a number of experiments on the transverse strength of timber beams; but in the calculations it was assumed that the distortion, or diminution of depth at the bearing surface, was sufficiently small to be disregarded. It often happens, however, and especially when the timber contains a large amount of moisture, that the change in depth due to compression is excessive, producing a corresponding increase in the skin-stress. The method of conducting these experiments was fully described in the paper referred to, and therefore the following points only are noted:

All the transverse tests were made with the Wicksteed machine. The middle of the beam was supported on a hardwood bearing of 44 inches diameter. The two ends were forced down by rams under hydraulic pressure, which can be gradually increased at any required rate, or can be maintained constant for any given time. The end-pressures were kept normal to the surface of the beam by means of spherical joints, which allow the end bearings to revolve. In previous experiments, the wire used in observing the deflections was found to be somewhat coarse, and a special wire was therefore drawn of .002-inch diameter.

The flexure theory is admittedly unsatisfactory, and frequently gives results which are contrary to experience. Possibly, when a certain limit has been passed there is a tendency towards equalization of stress, and the so-called neutral surface may be moved towards that portion of the beam which is best able to bear the stress. It may indeed be more correct to assume that the distances of this surface from the tension and compression faces are in the ratio of the ultimate tensile and compressive strengths of the beam. This assumption at all events seems to give results which are more in accordance with practice. For example, in the case of a cast-iron Tee bar, tested in the University Laboratory, the tensile skin-stress should be 22,030 lbs. per sq. inch, and the compressive skin-stress 102,050 lbs. per sq. inch, wheras the ordinary theory gave 33,000 lbs. per sq. inch as the tensile and 20,800 lbs. per sq. inch as the compressive skin-stress.

The following tables give the breaking weights, skin-stresses, (transverse), coefficients of elasticity and specific weights of a number of air-dried, saturated, frozen and kiln-dried beams.

*Extracted from a paper read before the British Association for the Advancement of Science, Toronto, 1897.