wall should have been strong enough to resist overturning, but that, at the ground level, the horizontal component of the thrust would be 4,500 lbs., per foot run, while the vertical component of the resultant pressure, divided by 2 to give the frictional resistance to sliding, was 4,790 lbs., without taking the vibration caused by trains into account. Had the wall been built of the dimensions given above as derived from "Trautwine," it would have appeared to be quite strong enough, according to Weyrauch's theory, to resist the extra thrust from vibrations.

It seems also that this wall would have been quite strong enough to retain the filling behind it, had it been of good material such as would stand at a slope of 1½ to 1.

The wall shown in Fig. 3 was also of dry rubble, built of the same class of stones as No. 2, the embankment behind it being of the same nature as that in Case 2.

The filling was made in the winter by train on a temporary trestle. The wall failed completely early in the following summer, and a part of the same wall, which gradually stepped down to a height of only two feet, was pushed down for part of its length, and the lowest part was so completely covered by the filling that no attempt was made to dig the stones out, as an extra strip of land was bought to give additional room.

Unfortunately the writer did not see any part of this wall until after it had given way entirely; but in a part of the wall left standing the writer noticed a large flat bedded stone which had been eight feet nine inches below the top of the wall, and which had been pushed forwards four inches beyond the course below it. This, together with the fact that the wall, when it failed, was completely buried by the filling, seems to shew that the stones were pushed forward and fell over each other, rather than that the wall failed by overturning, especially as a wall immediately adjoining it and built in cement (shewn in Fig. 4), which was a little higher and not quite so thick, did not fail altogether, though it was built with a vertical face. The courses of this wall, built in cement mortar, could not, of course, slide over each other before overturning.

The sliding noticed in this case, as well as that mentioned in Case 1, seems to contradict the statement to be found in Mr. M. A. Howe's book on retaining walls, edition of 1886, page 48, that "experience "and theory prove that if the resultant cuts the base within the "*middle third*, the wall is perfectly stable, and will not yield either "by sliding or bulging, and also that the wall has a factor of safety of "at least 2."

This statement has, however, been omitted in the edition of 1891, and the writer has concluded that Mr. Howe must have found that it was not correct for dry walls, at least when they were subject to the vibration from passing trains.

Shortly after the failure of this wall the slope of the bank was found to be from 1¾ to 1 to 2 to 1 at a place where the bank had completely covered the wall.

In digging away the debris, at a place where no extra land could be acquired, considerable masses of snow were found quite hard and fresh in the months of August and September. The clay in the bank was also quite damp and greasy, and required very strong timber to retain it while the new wall was being built.

The writer noticed in one place that a 6″ × 15″ stick fifteen feet long, with its greatest depth against the bank which was about eleven feet high against it, was badly cracked.

This stick was well braced at the foot and at a point about eight feet up from the foot, and carried a length of seven feet of the bank. Unfortunately the writer was so busy with other work that he had no time to take proper notes of the shoring of the bank.