by removing a piece of this clay and holding a candle to the spot, when the flame would be drawn into the joint and extinguished. If the ground is very open compressed air alone may be of little use, especially under light cover, but with it in combination with a shield the most unstable ground can be negotiated.

Compressed air will travel great distances through open ground, and may set up quite unexpected disturbances, as, for instance, by getting into old, leaky sewers. It is never advisable to use a greater pressure of air than that which is just sufficient to balance the weight of water head. The writer has known of the waters of a pond being disturbed by compressed air from a tunnel more than half a mile away. In grouting with 30 or 40 pds. pressure it is quite a common thing to find the cement driven up to the concrete of the roadway from a depth of 20 feet, where pits had been sunk or previous excavation carried out. Of course, the shield has been used much in tunneling without compressed air, and it is a most useful mechanism, which might be more popular with contractors were it not that it has been so much associated with very difficult and expensive tunnels, such as the portion of sewer which is the subject of this article. Though the shield in this case was a costly piece of plant, its use was justified by the safety in which the work was carried out, the excellent progress made amounting to 42 feet per week.

CEMENT IN EGYPT.

The Bulletin Commercial, of Brussels, states that Egypt now offers an important market for cement. In 1911 the imports were 106,670 tons, valued at \$800,000, as compared with 87,503 tons in 1910. The great vogue for buildings of ferro-concrete has largely contributed to the remarkable development of the import trade in cement, and this trade seems quite likely to be maintained, in view of the attention which is being given by capitalists to the building industry. The extensive port works recently commenced at Port Said, and those projected at Alexandria, will necessitate the provision of large quantities of cement. The Belgian imports were the largest in 1911, amounting to 50,257 tons, followed by those from England, 35,192 tons. The remainder of the imports came from Austria, France, and Germany. Artificial cement (slow hardening) is imported in barrels of 150, 180, and 200 kilos. gross for net. Sacks are taking the place of barrels owing to the rapidity with which the cement is used. There are, however, cases where barrels are preferred. Natural cement (rapid or semi-slow hardening) is used principally by the natives and also for certain masonry work. It comes mainly from Belgium and is imported in barrels of 140 to 150 kilos. gross for net, and in sacks of 45 to 50 kilos., sacks invoiced. The question of sacks sometimes presents difficulties for the importer. Empty sacks are invoiced to him by the manufactory; if he takes care of them, or returns them only in a bad condition, they are carried to his Cement users, however, do not readily agree to account. these conditions, and the importer eventually suffers the loss. English manufacturers are in the habit of shipping cement in very light bags, which are strong enough for one voyage and for which there is no charge. This method has given excellent results.

The Commission of Conservation, Canada, has prepared a summary of rail production in Canada from 1805 to the beginning of the present year. The increase shown in the intervening years has been from 600 to 423,885 tons.

TRAFFIC CENSUS IN MASSACHUSETTS.

A summary of that portion dealing with the construction and maintenance of roads, of the Massachusetts Highway Commission's report for the year ending November 30th, 1912, was given in October 9th issue of The Canadian Engineer. There are a few points in connection with the traffic census outlined in the report, that are of great interest, inasmuch as it is of such importance to have an accurate knowledge of the traffic which any particular road has to carry. As the Commission states "The road must be so designed, built and maintained that it shall be at all times in proper condition to bear the traffic to which it may be subjected, and not only at the least cost to the user, but also at the least ultimate cost to the taxpayers, taking everything into account, viz., interest, sinking fund, yearly maintenance and occa-sional resurfacing. Without a knowledge of traffic one is really entirely at sea. The road builder is likely to make serious and costly errors by determining upon the wrong kind of construction and by selecting improper or unsuitable materials or methods."

The Massachusetts Highway Commission in 1909 had a census taken upon the State highways at 23⁸ stations, scattered throughout the State; and in 1912 a similar traffic count made at 156 stations.

While the count in 1912 was taken at fewer points than in 1909, it was felt that the percentages of increase and decrease could safely be used to indicate the traffic on other similar roads.

A traffic census was also taken at the same time at quite a number of points around the city of Boston on roadways in the metropolitan and Boston park systems.

The census was made in the following manner: The vehicles actually passing on the road were counted by observers, who were engaged for the purpose. All vehicles were counted for fourteen hours a day (7 a.m. to 9 p.m.) for seven consecutive days in August, 1909, and again for seven days in October, 1909, at 238 stations, the daily census at each station being tabulated on a card. This same census was made again for like periods of time in August and October of this year (1912). At a few important points a count was also made at night, the census at these places covering the whole twenty-four hours.

After the cards were received the number of vehicles observed at each point was tabulated and computed to show the average number of each class of vehicle passing the given point per day, the total number of vehicles and the total of each class, both motor and horse-drawn, When these figures were obtained the percentage of each class of vehicle using the particular road was computed and the percentage of the total of each class at all stations was computed as well. After these averages were computed for each of the 238 stations in 1909 and for the 156 stations in 1912, the total average number of vehicles at all the various stations was added, the numbers ascer tained, and from this was obtained the average number of vehicles passing each day at all the points where the count was made, as well as the average number of each class and kind, and the percentage that the vehicles of each class bore to the average total number.

The increases and changes in traffic from 1909 to 1912 are shown in Table I., which, by the way, shows that the traffic is changing much more rapidly than it is increasing. The figures represent a count taken in 1909 and 1912 for fourteen days of each year, and from 7 a.m. to 9 p.m. of each day. The report goes on to say that the significant feature of the census for the roadman is not the increase of traffic, but the change in the traffic.