

houses and from the ruins and put them on the roads. We carted the stones from the broken walls. The army, as they advanced, used all the wood for fires to cook their meals, etc. We used the larger timbers, roof-rafters, etc., to fill up shell holes and to plank muddy places. It is a fact, therefore, that of many villages there is not a trace, virtually not one stone being left on top of another. One village of 2,000 inhabitants, that I have in mind, has disappeared absolutely with the exception of a piece of granite block which was laid where the centre of the village had been.

Used Planks on the Worst Roads

The road north from Albert to Bâpaume was for a time the only line of communication to the British front, and everything that went up to the army travelled over that road. At the end of the third day I drew attention to the fact that the road would not last two days more. It was built of four inches of gravel on sand foundation on clay. The caterpillars, weighing 17 tons, shook it to pieces with their incessant pounding. We had previously had 300 motor lorries on our road work, but they had taken away all but 23, and I had a strenuous time getting 200 more and stone to fix that road, but we finally got it rebuilt and in splendid condition.

Altogether, I had $764\frac{3}{4}$ miles of army roads under my care at that time. Besides the motor lorries, we had about 300 general service wagons, 56 road rollers and 12,000 men.

Many of these roads were blown to pieces by the Germans. When I first went to Flanders I saw that planks were the only thing that would save the situation, but I could not get the planks. "With five miles of plank, I will take the corps anywhere," I said, but there was no plank to be had. A plank road costs less, and can be built twenty times as fast, and over some kinds of ground will carry traffic that stone will not carry. The shell holes on some of the roads were from 5 ft. to 15 ft. in diameter. When it rained for a week, as it would, these holes would fill with water and stay full. I pointed out how impossible it was to build macadam roads under these circumstances, and asked for planks. When the new transportation department, under Major-General Sir Eric Geddes, got to work, they secured millions of railway sleepers for road-building; also 3-inch planks, which were used by all the armies in their advances on the western front. Sir Douglas Haig, in his despatches since then, has told of the value of those plank roads to the British army. At Vimy Ridge, Passchendaele and Messines, he said, the army could not possibly have advanced without them.

Road-Builders Saved Verdun

We found the method of building a Telford road in France, putting the stone on edge and then using small stone on top, did not carry the heavy lorry traffic. Even twenty or thirty inches of stone so placed did not hold the road up in place. We, therefore, changed the method and laid stones on their flattest side, then filled in 4-inch stone on top for a total depth of nine inches, putting a good crown on the stone and rolling where possible. Under these methods, we found that we were getting much better roads for one-third the cost, and that our roads would carry the heaviest kind of motor traffic.

The stone was mostly a soft limestone. In six weeks even 6 inches of this stone would be ground to powder and blown away. We found that 4, 5 and 6-inch stone were the best sizes to carry the motor traffic for soft spots. The 2-inch stone would "mush up" in wet weather,

having too small a base and not enough bearing power to carry the traffic.

In this connection I may say that the French are, in my opinion, the finest road repairers in the world. They are economical in road-building, as they are in everything else. They make a barrow-load of stone go as far as we usually make a cart-load go. Their system of incessant vigilance and of patching of small holes effects great economies.

At Verdun the French road-builders undoubtedly saved the day. The Germans had totally interrupted their railway transportation on what was then the only railroad leading up to the French front at that point. A French road engineer organized regular schedules of motor freight trains. The trains left at definite intervals, just as on a railroad, and ran to schedule. If a motor broke down or was delayed, it was shoved to the side of the road. In this way supplies of materials of all sorts were kept up for three months, and this was undoubtedly the saving of Verdun, and thereby the saving of Paris,—and probably the saving of world civilization.

Open For Traffic Every Day

In the spring of 1916, army traffic was badly held up owing to the frost coming out of the ground. All traffic is kept off the roads for three days while the frost is coming out, and often it is necessary to keep the heavier traffic off for as much as ten days, but in the spring of 1917 we were able to keep all of the roads open for traffic every day.

We used all classes of labor, including German prisoners, Indian cavalry, West Indians, Chinese and English and Canadian labor battalions, but I found the Canadian labor best of all. It is more adaptable and keener to get on with the job, whether it be fighting, building roads, or the special work for which they are using the railway construction troops so much and so effectively on the fighting fronts.

[NOTE.—In order to avoid the publication of any military secret, we submitted the full report of his speech to Col. MacKendrick for his revision. Unfortunately, Col. MacKendrick was too modest, we fear, and eliminated many of the most enjoyable parts of his address. As a result, the above abstract does not truly represent the witty and most interesting speech which he made at Hamilton, nor does it do justice to the splendid service which he has rendered at the Front and for which he was awarded the Distinguished Service Order.—EDITOR.]

The Brantford Board of Trade has indorsed a resolution calling for the immediate appointment of a town-planning commission for that city.

The industrial development section of the Vancouver Board of Trade is undertaking a special study of the problem of cheap housing of industrial employees.

The following utilities' estimates have been passed by the city council, Edmonton: Electric light, \$46,890; telephone, \$28,930; waterworks, \$17,233; street railways, \$1,541,439; total, \$1,634,492.

At a meeting of the Ontario Railway and Municipal Board held this week, a letter was received from Bowman and Connor, who were the consulting engineers to the township concerned, approving the Toronto and Hamilton Highway Commission's plans for the Bronte bridge, provided that certain very minor changes be made. As the plans also have the approval of the Ontario Government, the contract will soon be let for the construction of this bridge. Action was deferred in regard to the Etobicoke, Port Credit and Mimico bridges pending report by Frank Barber, who is the consulting engineer for the municipalities interested in those bridges.