plosive causes fewer small fractures, and the life of the road is much prolonged.

Stone is generally moved from quarry face to crusher, either by dump cart, hoist or the old-fashioned wheelbarrow. The hoist is probably the most efficient, but in most portable outfits this does not exist and dump cart or wagon takes its place. Considering the latter two, the dump cart is certainly to be preferred; one horse will do the work of a team. Two or three dump carts at most can keep a crushing outfit working full capacity, with one man driving carts and two men feeding crusher. Dump carts are handy to handle in quarry, quick to unload, no time being lost on crusher platform, and generally more efficient than any other method of moving material, except probably in case of gravity method explained previously.

A raised platform should be built, slightly elevated above the crusher mouth, making it convenient to shovel in loose material and allowing the men to move stone from platform to crusher jaws without being required to lift it. The crusher should be run to its full capacity at all times and special care should be taken to arrange outfit that material may reach crusher and be taken away with the same speed. The efficiency of the operation of the outfit depends upon crusher, and as a result it demands greatest attention.

The traction engine to run the crusher will be required to develop approximately 20 h.p. and probably more, providing it is required to run the drill and hoist as well.

We must not think when speaking of the portable crushing outfit that its sphere of usefulness exists only in the quarry; far from it. Probably over 50 per cent. of the metal being applied to roads at the present time consists of crushed field stone or gravel. Field stone is used extensively in parts of Eastern Ontario and the northern counties, this stone being piled in winter convenient to the road. This is an economical method; labor is cheap and teams more easily obtained at that time. The stone should be piled in two rows, between which the outfit operates, the crusher being fed from both sides. Granite or trap boulders should never be broken with sledge after they have been placed in jaws of crusher; this not only has a detrimental effect on machinery, but helps to decrease the output. Crushed field stone makes good road metal, the only objection being its lack of uniformity. Crushed gravel is a metal which may give excellent service under medium travel. Pits containing coarse gravel which would not be used in its natural state on the road may be put through the crusher, fine and coarse together, and separated in screens, as other metal. The only extra equipment required is a wire dust jacket wrapped around part of the 1¼-in. section of the screen. This wire jacket of ⅜-in. size removes sand, dust and loam. This fine material should not be used on the road surface.

A method of feeding crusher operating in gravel pits which has found considerable favor in Western Ontario is by elevator buckets as used in ordinary crushing outfits. These bucket elevators are placed against bank of gravel pit and operated from crusher, material being fed directly into crusher jaws. Wheel scrapers are also used to bring the gravel on to the elevated platform and are probably as efficient as any other method. In this case, platform is built over jaws of crusher, and only one man is required to regulate the feeding.

The life of a quarrying and crushing outfit depends partly upon the local conditions, but principally upon the kind of material it has to handle. Field stone generally contains varieties of trap rock, limestone, sandstone, etc., all of varying hardness. The crusher operating under these conditions would be subject to greater wear than one working in quarry under practically no change. A crusher working in limestone would have much longer life than one in trap rock. Regardless of kind of material a crusher will depreciate rapidly if not properly handled; careful management will practically double the life. It has been estimated by some engineers that crushers will depreciate probably 16 per cent. and entire plant about 10 per cent. per season, but this, as stated above, depends entirely upon conditions under which plant operates, and no hard and fast rule can be made.

In conclusion, the different stages of quarrying operations have their own importance; stripping, drilling, conveying material to crusher, operating crusher with its equipment, all are a special problem in themselves. It is only after years of experience that a man becomes acquainted with all the kinks in quarrying and manufacturing stone. Efficiency in loosening material, in getting it to crusher and to wagons, mean low cost of road construction.

MONTREAL SEWAGE SUIT SETTLED.

In connection with city drainage into the Little St. Pierre River, a long-standing controversy between the city and the Harbor Commissioners has been settled in which the former's claim against the Harbor Board for $150,000, representing the cost of a new sewer, was dismissed.

The city, in its plea, submitted that it had, by law, an absolute right to conduct its sewers to the river; that the works executed by the Harbor Board, since 1890, were the sole cause of the nuisance leading up to the present case, and that in consequence the harbor authorities were responsible for the costs of effecting a remedy.

The Harbor Commissioners on their side denied that the city, either by common or statutory right, had authority to drain the waters from its territory into the river, and urged that if a nuisance resulted from this being done, it was the city's responsibility to effect a remedy. Even if it were to be admitted the city enjoyed the rights claimed, and even though the nuisance might have resulted from alterations in the harbor, the Harbor Board could not be held responsible, inasmuch as the works had been executed under the orders of the Federal Government.

Justice Martineau said the city had the right to drain into the River St. Peter, and from thence into the St. Lawrence, sewage from its territory; but, at the same time, it was within the rights of the Federal Government, which controlled the harbors, to execute in the port of Montreal all the works it believed necessary, and even if these works rendered the city's drainage impossible in those places, neither the Government nor the Harbor Board, to which it delegated the execution of these works, would owe any indemnity to the city. It devolved upon the city, and the city alone, to effect a remedy to any existing nuisance by placing the outlet of its drains lower down the river. Therefore the city's action was dismissed.

Incidentally, the harbor commissioners questioned the legal right of the city to drain into the river, but on this point the judge's ruling favored the city. Municipalities bordering on a river, he said, could conduct their sewers into navigable rivers in virtue of the right which every subject enjoyed of making such use of these waters as was not incompatible with their natural and public destination. But when it came to a question of conflict between the municipal and harbor authorities, as had arisen in the present instance, his Lordship found that the Gov-