under the spray pipe so that the oil will strike the board and will break up into spray before striking the ground. This will make it possible to cover the surface fairly uniformly instead of in streaks, as will be the case if no board is used.

After the oil has been spread it should stand without being covered for about a day. Then it should be covered with just enough sand to keep the oil from picking up. Emphasis is placed on the importance of using sand for this purpose rather than dust from the old road surface. The amount of sand needed is only two or three loads per block and at any reasonable price the benefits derived from the use of sand justify its use, wherever it can be secured.

After the road has been put in service, it may be apparent that more sand is needed in spots, and such places should be covered lightly; the covering being repeated two or three times if necessary. Use just enough sand to keep traffic from picking up patches of the surface.

When a residence street is oiled the second time, the method to be followed is exactly the same as is followed the first time, except that the quantity of oil used may be reduced to about one-third gallon per square yard of surface. It is advisable to repeat the oiling the second year in any case and then it may be omitted the third year and resumed the fourth year. Better results would be obtained if the work were done every year, however.

Results to be Expected.—Surface oiling finally results in a street covered with a layer of granular soil which is oil saturated, and consequently does not blow about readily. The suppression of dust is the principal benefit to be expected. Beneath the thin layer of loose oil-soaked soil the firmer portion of the street is saturated with oil for a depth that varies from one inch to perhaps six inches.

Water penetrates this layer rather slowly. If the street has plenty of cross slope so that water does not stand on the surface, only a small amount of mud will form under light or moderate traffic. A street that is oiled systematically for a series of years gradually acquires an oil-soaked crust which becomes more and more impervious as the oiling is repeated. An oiled street never gets to the place where it will not be muddy in seasons of heavy rainfall, nor will the surface be stable in ordinary wet weather if the road carries heavy traffic.

Unloading from Tank Cars.—The oils used for dust suppression can be purchased so much more cheaply in tank car lots than in barrels that it is always advisable to purchase in such lots. If the town be so fortunate as to have a siding or embankment 8 or 10 feet high, the car can be placed thereon and the oil allowed to run into the sprinkler wagon from the tap in the bottom of the tank car.

Usually such a siding is not available, and in that case the oil must be pumped from car to wagon. For this purpose the ordinary tank pulp used with traction engine tanks is as good as anything. It should be placed on top of the tank car with all connections made of pipe, as hose does not last long in oil. If a small steam or gas engine driven pump be available it will, of course, be faster than a hand-pump, but it is not worth while to purchase one for a small amount of work.

Cost of Surface Oiling.—The cost of preparing a street for the oil treatment may vary from 25 cents to $1 per lot 60 feet wide, but it is hardly proper to charge extensive earth work against the oiling. The street ought to be kept well shaped up regardless of whether it be oiled or not.

Some cleaning is almost always necessary prior to the oiling, which costs from 30 cents to 50 cents for each 60-foot lot where the street is oiled about 25 feet wide. The oil can be unloaded, hauled and distributed for about $2 per lot, including the cost of covering the oil with sand. The cost of the oil will be about $1 per lot and the cost of sand about 25 cents per lot. The total cost for each 60-foot lot on each side of the street is as follows:—

Cleaning the street	$ .40
Applying oil and covering with sand	2.00
Cost of oil	1.00
Cost of sand	.25
Total	$3.65

These prices are about an average and will serve as a guide in estimating the cost of work of this class. Oiling is often done considerably cheaper and in other instances has cost more. It is assumed that the application will consist of about one-half gallon per square yard of surface and that the oil cost 4 cents per gallon.

Oiling Macadam Roads.—When oil is used to prevent dust on a new broken stone or gravel macadam it should be applied after the road has been well seasoned, but before traffic has brushed off the fine material from the surface. Usually a road will reach the proper condition within a year after it is built, but the time varies greatly. If allowed to go too long, the surface will be a little rough after oiling. If oiled too soon, a putty-like mat will form which will scab off the surface under traffic.

If an old macadam road is to be oiled it should be repaired and thus brought to a smooth, even surface. It should then be placed under traffic just long enough to get a good texture to the surface before the oil is applied.

A macadam road is in the proper condition to oil when it has a true cross section and a uniform surface whose texture is close and compact, but upon which there is very little loose binder, be it either sandy loam or stone screenings. If the surface be porous, the oil will penetrate too deeply and will interfere with the bond of the surface. If the surface be covered with fine material, the oil will mix with it and form a mat covering which is not durable.

It should be noted that the general statements made above apply only in those cases where a light petroleum oil is used for dust-laying and not to the construction of macadam by the penetration method.

GRANBY CONSOLIDATED CO. (B.C.) SMELTER EXTENSIONS.

The Granby Company has announced its intention to enlarge the smelter at Anyox, operating on ores of the Hidden Creek mine, to a capacity of 4,000 tons a day. This is the same capacity as the company's large smelter at Grand Forks, hitherto the largest copper smelter in the British Empire. Work has been started on the new additions to the plant at Observatory Inlet and the fourth furnace is under construction, to be followed by the addition of two more furnaces, each having a capacity of between 600 and 700 tons a day.

The new plant should be in operation by fall, and as soon as it is completed the Granby Company will be in a position to produce at both plants a total of 50,000,000 to 55,000,000 lbs. of copper per annum.