In the summer of 1911 the truck averaged 55 miles in nine trips a day, hauling 63 tons, or more than five times the work possible with a team of horses making four trips, carrying three tons per trip, or twelve tons in the same time.

There are a number of stone quarries in the vicinity of Baltimore which could use motor trucks to good advantage and with considerable saving. MacMahon Bros., Mt. Washington, with 5-ton and 4-ton Mack trucks, with automatic dumping bodies, and the Schwind Quarry Co., with a 3-ton Packard, are using the motor truck for hauling broken stone for road building. In order to show what could be done in this line, Messrs. Hook and Ford, engineers for MacMahon Bros., ran a week's test with a 5-ton Mack truck with automatic dumping body in competition with a four-mule-team wagon, hauling broken stone for road building from the Dickeyville quarry with the results given below. The truck had to make ten miles to a round trip, as against nine for the team, on account of having to go a mile out of the way on the trip from the quarry in order to avoid a bridge which was too weak to carry when loaded. One mile of the trip loaded was up a 14% grade. The average amount of gasoline consumed was 29 gallons; average amount of oil consumed, 2 gallons; average working hours, 10; average time loading, 3 minutes; average time unloading, 10 minutes; total load carried, 60,000 pounds; number of trips, 6; total mileage, 60 miles. There were three rainy days in the test period, so that most of the time the roads were soft and in bad condition.

Another advantage in the use of the truck is in the spreading of the stone. It took the truck ten minutes to spread the stone as shown, which the contractor stated was done better than could be done by hand and saved the labor of two men working with shovels for one hour. This spreading was regulated by opening the tail board the proper distance and thus letting the truck travel slowly over the road with the body in an inclined position. The results of the comparative tests of motor trucks and mule equipment as made are:

4-Mule-Team Hauling 4½ Tons Per Day 27 Miles.

First Cost.

4 Mules at $325.00 each	$1,300.00
Harness	75.00
Wagon	250.00
	$1,625.00

Mules.

Interest on ½ investment at 6%	$ 48.75
Insurance on team	32.50
Depreciation 20%	325.00
Fixed charges per day (assuming 225 working days per year)	1.85
Wages per day	$1.84
Feeding at 60c. per head	2.40
Stable man	0.25
Veterinary's service	0.20
Shoeing	0.30
*140 days' feeding at 40c. per head, $224.00	0.99
Total daily operating cost	$6.18
Fixed charges per day	1.85
Total charges per day	$8.03

5-Ton Dump Truck Hauling 5 Tons Per Day 60 Miles.

First Cost.

Truck	$5,300.00

*Due to the mules not working, quarry being shut down owing to cold weather.

Truck.

Interest on ½ investment at 6%		$159.00
Insurance on truck 2½% on 80% of ½ value		53.00
Depreciation on truck (not including tires)		480.00
Fixed charges per year		$692.00
Fixed charges per day		3.07
Wages per day	$2.50	
Maint. 4½c. per mile	2.70	
Tires 6c. per mile	3.00	
Gasoline 4c.	2.40	
Oil	0.60	
Total daily operating cost		$11.80
Fixed charges per day		3.07
Total charges per day		$14.87

4-Mule team hauls 13¼ x 4¼ = 57.37 ton miles per day = 13.9c. per ton mile.

5-ton truck hauls 5 x 30 = 150 ton miles per day = 9.9c. per ton mile or a saving of 4c. per ton mile or $6.00 per day.

THE TREATMENT OF EFFLUENTS FROM TRICKLING FILTERS.

The effluents from two trickling filters at the Lawrence Experiment Station of the Massachusetts State Board of Health are passed through a settling tank holding about 5½ hours' flow and are then applied at the rate of 10,000,000 gal. per acre daily to a filter having 2 feet of sand of an effective size of 0.23 millimeter. This filter was operated continuously during 1910, much like continuous water filters, except that when clogged the whole body of sand in the filter was washed in place by an upward current of water from below. The filter was washed 68 times during the year, the average quantity of water filtered between washings being about 39,000,000 gal. per acre.

The results obtained with this filter and settling tank furnish an interesting illustration of the future purification of trickling filter effluents by natural means, according to a report by Messrs. H. W. Clark and S. DeM. Gage. The nearly stable worked-over suspended matters coming from the trickling filters settle out readily in the settling tank, but these suspended matters were capable of further fermentation and disintegration, as is shown by the fact that during the warm months, in spite of the frequent removal of sludge, there was some floating scum on the tank, with a certain amount of gas formation. This fermentation must not be confused with putrefaction however, as no appreciable odors were produced. The clarification begun in the settling tank was completed in the filter, and the final effluent never contained more than a slight turbidity.

The purification process going on in the settling tank and in the filter was the reverse of nitrification, the nitrates serving as the source of oxygen for further oxidation of the soluble matters. This is evident by the reduction in the amount of nitrates and increase in the nitrates and free ammonia in the applied effluents in their passage through the settling tank and through the filter. This was in a measure a retrograde process, but is undoubtedly the process taking place when such trickling filter effluents flow into water low in dissolved oxygen. The amount of nitrates remaining in the effluent, and the fact that this effluent always contained an appreciable amount of dissolved oxygen, insured a complete stability at all times, and this fact was confirmed by negative putrescibility tests throughout the year.