

MASSACHUSETTS HIGHWAY COMMISSION REPORT, 1912.

THE Massachusetts Highway Commission has under its charge road work, motor vehicles and the supervision of telephone and telegraph companies, each with its own practically separate department. The commissioners are Col. Wm. D. Sohler, chairman; Mr. F. D. Kemp, and Mr. Jas. W. Synan. The highway department has charge of all road and bridge work, advice to municipal authorities, etc. At its head is the chief engineer, Mr. A. W. Dean, whose assistant is Mr. S. A. Parsons. The office engineering department which makes the surveys, prepares all plans and estimates, etc., is in charge of Mr. A. M. Lovis, and under him are employed 20 to 50 engineers, draftsmen, instrumentmen and rodmen, depending on the season of the year and the amount of work on hand.

The State is divided into four divisions, each in charge of a division engineer, who has one or two assistants in charge of particular work, like "small town" work, maintenance, etc., and as many resident engineers are assigned to his division from time to time as are necessary to supervise and inspect the actual work which is in progress. Most of the principal engineers and assistants have been in the service for over 10 years, and quite a number for a much longer period. The various departments report to the commission through its secretary.

During the year ending November 30th, 1912, the commission completed 11.25 miles on contracts that were pending at the beginning of the year and 21.57 miles of roads commenced during the year, making a total of 32.82 miles of construction for the year, or a grand total of 920.51 miles since work began. Construction was commenced, but not completed, on 20.16 miles of road in 1912.

Of the above 32.82 miles, 4.58 miles were of water-bound macadam; 6.72, gravel; 3.19, sand-bound with oil; 12.02, bituminous macadam; 3.93, water-bound mac-

adam with an oil surface applied; 2.24, gravel with the top service bound with bituminous binder. The costs of construction of these highways are shown in the accompanying Table I., in such a manner that comparisons may be made between the different costs of work in different portions of the State under varying conditions.

In Massachusetts, as elsewhere, the increase in travel by automobiles, and the use of motor trucks for long distances to and from cities, has augmented the question of maintenance into one of vital importance. The report of the commission, from which this information is derived, states that in 1912 over \$500,000 was spent in maintaining state highways, \$200,000 of which was provided by direct appropriation by the Legislature and the balance secured from motor vehicle fees. (The total expenditure by the commission up to the end of last year for the construction of state highways since the work began, amounted to \$8,379,080.) Bituminous material was used in maintenance work during 1912, on 283.55 miles, and in construction on 21.38 miles, there existing at that time 729.83 miles of state highway on which bituminous material was used either in construction or maintenance. In his report, Mr. A. W. Dean, chief engineer, states: "While there have been a few failures of bituminous roads, the use of bituminous material seems at the present time to be an economical way of preserving the roads under the present traffic, and I recommend continuing the use of this material in construction and maintenance."

The commission is of the opinion that it is absolutely necessary to-day to apply some form of dust layer or bituminous binder to macadam roads, either by a surface application or by incorporating it into the upper 3 in. of broken stone. If this is not done the roads will shortly be destroyed by the high-speed motor vehicle travel. The commission states that it has found the application of bituminous binders under pressure produces more uniform results than were formerly secured by the so-called gravity method. The cost of maintaining the roads is over \$500 per mile per year and will probably be more in the future, certainly until many miles of the older roads on through

TABLE 1—APPROXIMATE COSTS OF ROADS COMPLETED IN 1912

Town	Type of Surface	Length of calculations		Drainage, culverts and bridges total cost	Grading and foundation cost per mile	Cost of surface	
		Miles	Sq. yds.			Per mile	Per sq. yd.
Amesbury	Macadam, 4½-in., trap rock, bituminous binder .....	.28	2,464	\$ 907	\$3,564	\$7,593	\$0.86
Ashby	Macadam, 5-in., local stone ..	.60	5,280	592	3,133	5,275	.60
Ashby, 1911	Macadam, 5-in., local stone ..	.44	3,872	296	4,600	4,968	.56
Bourne	Macadam, 3¾-in., trap rock bituminous binder .....	.68	5,984	624	1,348	7,135	.81
Chelmsford, 1911....	Gravel, 5-in.	1.42	12,496	672	2,447	1,201	.13
Dighton, 1911	Macadam, 4¼-in., local stone, bituminous surface coat	1.02	8,976	141	1,140	3,727	.42
Erving	Concrete, 5-in., bituminous surface coat, concrete beam bridge .....	.03	264	2,299	4,977	10,833	1.25
Franklin, 1911	Gravel, 6-in.	1.17	10,296	467	2,915	1,795	.20
Haverhill	Macadam, 5-in., trap rock, bituminous binder .....	.43	3,784	1,140	3,602	7,116	.80
Lakeville	Macadam, 4¼-in., local stone, bituminous binder	1.24	10,912	282	2,890	5,690	.64
Lanesborough	Macadam, 4-in., trap rock, bituminous binder .....	.34	2,992	400	5,490	5,976	.66
Montague, 1910	Macadam, 5-in., local stone ..	.82	7,216	253	2,058	4,416	.50
Plymouth, 1911	Sand and oil, 3½-in., mixed ..	1.00	8,800	859	8,192	4,027	.45
Raynham	Macadam, 4-in., local stone, bituminous binder .....	.96	8,448	326	3,731	6,262	.74
Salisbury, 1911	Macadam, 4¼-in., local stone, bituminous binder	1.22	10,736	621	2,160	5,225	.59
Sandwich	Sand and oil, 3-in., mixed ....	.85	7,978	318	1,245	4,545	.48
South Hadley	Macadam, 5-in., trap rock	1.31	11,528	1,131	5,754	4,575	.52
Spencer, 1911	Macadam, 5-in., trap rock, concrete arch .....	.03	264	4,727	10,166	9,441	1.07
Swansea, 1911	Macadam, 4-in., local stone ..	.78	6,864	543	1,356	2,946	.43
Tyngsborough	Macadam, 4-in., trap rock, bituminous binder .....	.72	6,336	1,581	1,525	6,740	.76