

MUNICIPAL DEPARTMENT

THE ECONOMY OF GOOD ROADS.

On the above subject Col. Albert A. Pope, in an American exchange, says:

Wild animals travel through the jungles and forests in paths which lead to their pasturing fields and places of safe retreat. The Indians of America and the other savage tribes of the world follow this example, going from place to place on trails which in some instances are so slightly marked that the eye of civilized man might overlook them.

Men in their simplest existence, depending for subsistence upon the skill which they develop in capturing game, need no other means for transportation than that furnished by their own sturdy limbs. As we ascend the scale, however, as man improves and broadens, the means of communication and the manner of transporting articles of necessity and comfort, multiply in number and increase in practical utility. The trail of the savages gives place to the ways over which bands of pack-laden men and caravans of animals convey the commodities of the interior to the nearest point of distribution. Then came the ruder forms of highways, with the log-wheeled conveyances as seen to-day in parts of Mexico and South Africa, and later to the scientifically constructed roads of the Macadam and Telford type, which are co-existent with, and effectual contributors to, the highest forms of civilization.

The great system of Roman roads was originally designed and executed to aid rapid military movements; these roads were one of the strongest ties that held the old Empire together for so many generations, and in later years were of great benefit to the commercial interests of Rome.

Napoleon did more for France than any other ruler by extending the public highways, which have been, and will ever continue to be, a pride of that country. He spent about six millions of dollars on bridges, over ten millions on canals, some fifteen millions on roads, and twenty millions on forts and harbors, and the French people of to-day are enjoying the benefits of these liberal and wise investments. Later on the French engineer Tresaguet on the Continent, and Macadam and Telford on the British Isles, continued the good work and improved the method of road construction.

There is a striking lesson to be learned from a comparative study of the Roman roads and those constructed by the last-named engineers. Rome spent with a prodigal hand and failed to take into consideration the higher question of engineering which studies the exact relation of strength and strain, and builds accordingly. It has been estimated that the Roman military roads cost, in terms of

our own labor, from thirty to one hundred thousand dollars a mile, and were many times stronger than their use demanded. These later engineers built many miles of good and lasting roadways at far less expense, by using large stones for foundation and several coats of smaller broken stone for the surface.

To Macadam is usually attributed the discovery that broken stone of moderate size placed upon the road surface would, in the course of ordinary wear, coalesce and form a compact mass strong enough to resist the impact of hoof and wheel. He built some roads on top of brush and peat bog, and the broken stone, with the aid of its adhesive dust, soon formed a complete shell, which would support the weight of ordinary vehicles. The difficulty in such a structure was that its foundation, being short-lived, soon failed to support the surface, which, sinking gradually and irregularly with the foundation, crumbled to pieces and became useless.

The welding together of broken stone, according to the best authorities, depends on the adhesive quality of the dust formed by the constant grinding of wagon-wheels. Professor Nathaniel Southgate Shaler, one of the Massachusetts Highway Commissioners, and Dean of the Lawrence Scientific School at Harvard University, has in his laboratory tests of road materials clearly demonstrating the fact that the value of a rock for the top dressing of a roadway depends not only upon its toughness, but upon this adhesive quality of its dust, and that the best road dust must have the power, when moistened, to adhere a second time, and thus cement together a surface which may have been broken up in seasons of great drought.

The renewed agitation for the betterment of our highways has caused a widespread interest on the subject, and led political economists, scientists, and business men to look upon the advantages of road reform from their various points of view. As a result, it may be safely said that we to-day know what a good road is, and how to build it, and we comprehend at least some of the many advantages that would accrue to all classes of our citizens from free intercourse and uninterrupted traffic.

We have built and put into operation in the United States in the neighborhood of 200,000 miles of railroads—an enterprise which has been pushed through largely upon bonded indebtedness, and has

enabled us in the east to purchase at a reasonable price the food products which, but for this cheap transportation, could not have been furnished from the great wheat fields of our western plateau.

Mr. Edward Atkinson, the well-known statistician, recently stated that in the year 1895 10½ tons of fuel, food, fibers, and fabrics were moved 126 miles over the railways of this country for every man, woman, and child in the nation, numbering that year about 71,000,000. This ought to give one a realization of what a slight saving of transportation amounts to when aggregated for the entire population; and as the most costly freight traffic is over country roads from the producing farms to the shipping centers, we must conclude that the maximum saving on railway freight represents but a fraction of what could be saved on road hauling if the public ways were kept in passable condition throughout the year.

Knowing that we must have good roads and that proper highways are an excellent investment for ourselves and our posterity, the important question of the day is, how shall we secure the best roads at the least expense?

From the experience which we of the Old Bay State have gained in handling this question, it seems fair for us to claim that the best method of procedure is to establish a permanent highway commission of men suited to and trained in this kind of work. The idea of state aid in supervision and highway construction is gaining headway. Sixteen states have, since 1892, passed laws for the betterment of their roads. The important work of the immediate future is to influence legislation in those states where action has not already been taken, so that the movement may in all places be in skilled hands, and thus insure the best results from the minimum expenditure of money.

A new standard of specifications for street paving work has been adopted by the Chicago Board of Local Improvements, recently. Under the new rules contractors will be required to guarantee all paving for a period of ten years, and to use nothing but Portland cement in street foundations. A six-inch concrete foundation will be required for all asphalt and brick pavement. On granite block pavement an eight-inch foundation will be required. Seventeen per cent. of cement must be used in all foundations.

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