

the road by frost will be as little as on foundations of other material.

The thickness of the road material depends entirely upon the traffic to which the road is to be subjected. The lightest of all roads in parks, some little turn outs to hitching places or the like, might be five inches in thickness if resting on confined sand and constructed of sound stone or good gravel. This thickness should never be less than seven inches on clay. The road material in the ordinary park road should not be less than nine inches in thickness after rolling. Not because that much material is required to hold up the traffic, but because the surface will probably be worn down at least two or three inches before it is resurfaced. At its thinnest it should be capable of holding up heavy sprinkling wagons and coaches or any vehicles which may come upon it.

A well built nine-inch road of good material is amply heavy for ordinary park uses. For boulevard roads the material should be somewhat thicker. If properly cared for in any boulevard twelve inches is ample. In some of the outer boulevards nine inches will be sufficient. The question might be asked why if a nine-inch road will hold up a traffic in the parks when frequently very heavy vehicles pass over it, is it necessary to have a heavier road in a boulevard? It is the matter of wear again. Take a busy avenue, for instance, in the busiest part, where 12,000 vehicles have frequently passed over the road in 24 hours and the traffic is always very heavy even in wet weather. The wear is, of course, great. Suppose the road to have gone two years without surfacing; nearly three inches is worn off the surface. Suppose the following winter to be a severe one on roads, that is to say a wet one, then if the road was nine inches thick to start with there would be perhaps only five or six inches of material remaining with its bond broken, utterly incapable of holding up the traffic. With a twenty-inch

road there would still be eight or nine inches of material, which would be sufficient.

The kind of material to use? There are several things to consider in determining this. Principally it must be durable and of two grades. The upper three inches should be material that will best resist abrasion, which means a hard, tough uniform granite or trap rock. The under six or nine inches as required may be any hard stone that will preserve its integrity when subjected to frost. The upper three inches should be stone broken into pieces closely approximating one and one-quarter inches in their largest dimensions, as nearly cubical as possible; the under layer into two and one-half inch pieces. The granite or trap rock as was said should be used for the upper three inches. For the much used boulevard drives this is almost imperative, but for the outer boulevards and the park roads a softer and less expensive material may be economically and satisfactorily substituted, limestone or good bank gravel.

For the roads in the park color of surface is a consideration. The glaring white surface of a limestone road is very painful during the bright days and at all times its great contrast with the surrounding dark greens is anything but pleasant or desirable. The sienna of the bank gravel is much better, but the gravel road is more difficult to keep clean and is much more liable to be muddy after the summer shower or if as frequently happens, the sprinkling is too heavy. The determination of this matter must be largely affected by the local conditions in each case as to the cost and materials found at hand. To darken the surface of limestone roads a dressing of crushed granite or trap rock, say one-half an inch thick, has been applied, but it is expensive because of the frequent renewal necessary to keep the color at all even. If it is thought necessary to darken the surface it would be economy in the end to make the upper three inches of the road of the