

## Convict Labor.

The employment of prison labor in the work of highway construction is a matter frequently suggested in connection with the road reform movement. Convicts have been employed in this way in a number of the American States, notably North Carolina, where the system is said to operate with a considerable measure of success. In New Jersey, Florida, Delaware and California prisoners are employed to some extent.

Were provision made for such a measure in this province there is little doubt that much might be gained in the advancement of road improvement. There are two classes of convicts; the short term prisoner confined in the county jails, and those confined in the Provincial penitentiary at Kingston. If the latter of these, the Kingston convicts, were employed in quarrying and crushing stone, the cost would amount to about 35 cents per cord for use of machinery, explosives, fuel, etc., but not including the maintenance of the prisoners. The railways, which will be greatly benefited by improved highways, such as will permit a more regular traffic, will doubtless be willing in Ontario, as are American railroads, to transport the road metal at actual cost. The price of crushed stone could in this way be reduced very materially, for many sections of the province where road improvement is handicapped largely by the difficulty of obtaining suitable road metal. With railway transportation at an average cost of about \$1.50 or \$1.50 per cord, this, with the cost of quarrying and crushing would bring the cost of the product at any railroad station, siding, or perhaps road crossing, to \$2.00 or \$2.50 per cord. This does not include any provision for the cost of the quarry or the maintenance of the convicts, which are items generally borne by the state.

The prisoners confined in the county jails might, in some cases, be employed in the preparation of gravel or broken stone. Or, as in North Carolina, they could be given the work of grading, draining and spreading the road metal. With the latter course, there is an expense incurred in guarding the prisoners. Some counties have too few prisoners to warrant this expenditure, but in some cases arrangements might be made to collect the prisoners of several adjoining counties for the work. A county jail, fortunately, is usually in the most important town of the county, and the roads radiating from it are those which must support heavy traffic, and consequently are those most in need of such work as prison labor could perform.

Prison labor in highway construction is advocated on the ground that it would thereby be withdrawn from competition with regular employments and legitimate factory labor. It is healthful, out-of-door work, and, with the majority of convicts, would be of decided physical and moral benefit. With tramps and vagrants the

measure is one which exerts a very deterrent effect.

The State's relation to prisoners is one in which revenge has no part. The object of legal penalty is the prevention of crime, and the object of punishment should be the reformation of the prisoner. The employment of convicts, in prison garb on the highway, is opposed by some on humanitarian grounds, with the belief that the effect on the public and prisoners alike would be injurious to morals. This, however, is a consideration on which the opinion of penologists will be of value. From the standpoint of one interested in highway improvement, there can be little doubt that with the Kingston labor and the labor available from the jails of large cities, much might be accomplished.

## Over-Draining.

The opinion expressed, even by practical men, that it is possible to lay land too dry by means of underground drains, and numerous examples of grass lands so injured have been cited. The effect of drainage upon grass lands is of course to bring a change in the herbage, the water grasses and sedges common to wet land giving place to the grasses proper to dry land, but it will generally be found that, where any diminution in the produce of land has followed drainage, it is only of a temporary character, and has probably resulted from a period of drought occurring during the change of herbage, just after the water grasses had died out and before the grasses proper to dry land have had time to establish themselves. If rain fell throughout this period of change the result would show to the advantage of drainage, just as it invariably does on grass lands which have been drained for any length of time, and on arable lands.

The idea that land can be made too dry by any number of drains need not be entertained. That it is possible to make the depth of the drains beyond the capillary powers of the soil is true enough, but beyond this it is impossible to over-drain land. "The extent to which a soil can be made dry is dependent not merely on the drainage, but also to a very great extent upon its power of retaining water, in regard to which different soils vary within very wide limits. In order to illustrate this point, let us suppose a very fine sieve to be filled with a dry soil, and water to be poured upon it. The water of course will trickle through the soil, and the greater part escape by the meshes of the sieve, but a certain quantity, dependent upon the texture of the soil, will always be retained within its pores by capillary attraction. The former will represent that portion of water which flows off by the drains, while the latter will never enter them at all and can only be got rid of by evaporation."

There is very little land that is not too wet in rainy weather, and too dry in droughts, and drainage is a remedy against the last mentioned evil, as well as the first.

## An Instance of Road Economy.

A very striking example of the economy of building macadamized roads came under my observation recently. A machine weighing 16,000 pounds was drawn four miles on the Brook turnpike, a macadamized road. It required four mules (4,000 pounds to a mule) and one and one-half hours of time, at a cost of 15 cents per hour, or a total cost for four miles of 90 cents. After travelling four miles on the macadamized turnpike the route lay a little less than 2,000 feet on a dirt road. To travel this 2,000 feet it was necessary to use ten of the best mules and seven men; and with this force it took nine hours to complete the journey. The cost was \$19.80, at which rate four miles would have cost \$209.08; or, in other words, \$208.18 absolutely thrown away for want of a macadam road. A macadam road, such as would have prevented this enormous waste of money, would cost about \$100 per mile for every foot of width; that is, a 12-foot road, \$1,200 per mile; a 16-foot road, \$1,600 per mile, etc. One can well realize from this the enormous sum wasted annually by our present impassable highways.—From "The State's Duty."

## Historic Roads.

All historic accounts of roads begin with the famous Roman roads. Wherever the Roman armies penetrated, in Africa, in Thrace, in Spain, in Gaul, and even in Britain, they spent a considerable part of their time in building solid roads, and many of them are to be seen to this day. In France hundreds of miles of them serve as the foundations of the existing roads of that country. The Roman roads were about three feet thick, and consisted of four layers; first, a layer of large stones laid dry; second, a layer of rubble masonry or coarse concrete; third, a layer of fine concrete; fourth, a layer of dressed stone or paving blocks. These roads were solid and durable, and their lines were well laid out, but in no other respects were they good. They were at least three times too thick, involving a useless expenditure of labor and materials, which is the most unpardonable fault in engineering constructions. And they were intolerably rough, especially as the Romans had no springs on their vehicles. During the middle ages the roads were everywhere neglected. The art of road-building was first revived in France in the seventeenth century, and in the eighteenth century it made great progress under a celebrated engineer named Tresaguet, who anticipated by two generations the method of Telford. An enormous amount of road-building or rebuilding was done under Napoleon during the consulate and empire, and the admirable system of French roads, which are generally considered the finest in the world, was then substantially completed.