

show that a forested watershed in California discharged its water only one-half as fast as a denuded watershed in the same region; that the stream from the forested watershed maintained an equable flow, while the stream from the denuded watershed was flooded after rains and dry in the summer, because of the failure of the water to soak into the ground.

Floods, as well as decreasing a stream's value for water supply and water-power, wash from the unprotected country large quantities of silt and gravel, and in preventing this the forest plays its most important part, save that of supplying wood. Flowing water has been a great influence in modifying the earth's surface—it has worn down mountains and built up plains, and yearly carries huge quantities of earth from the fertile fields out to fill the river valleys, the lakes and harbors. The forest binds the soil together and prevents the rapid washing of the earth into the streams. When the rate of flow of water in a river is doubled, its power to carry sediment is increased sixty-four times; it becomes able to carry a weight of rocks and earth greater than the rate of the water itself. Thus when the presence of leaf mould, roots and forest growth retard the water in its run-off by one-half, the eroding of the stream is decreased sixty-four times. Everyone has noticed where the removal of the timber covering has been followed by the deep gully and rapid washing away of soft loam and loose sand. All soil material washed away is carried down stream and deposited where the speed of the water decreases. Thus storage dams and ponds are quickly filled and rendered useless when constructed on streams with denuded watersheds, particularly if the tributaries of the streams flow through agricultural land, or any type of country excepting bare rock. Thus while the construction of storage reservoirs may be necessary to maintain an even flow and prevent floods on such rivers as the Ottawa and Saskatchewan, forests will be necessary on the upper tributaries if the reservoirs are to be kept from filling with silt.

Floods on small rivers in Ontario have done a great deal of damage during the past few years, by overflowing farm lands, depositing in the fields sterile layers of sand and gravel, and cutting out river beds into new channels. An investigation of the great Kansas River flood of 1903, which destroyed \$22,000,000 worth of property, showed that where timber stood along the banks the overflow into the neighboring farms was gentle, and resulted only in a deposit of fine silt, enriching the land; but that where the banks were unprotected by trees and the soil not knit together by roots, the river cut new channels through valuable farm land, washed some farms full of huge channels, and buried others several feet deep beneath sand and gravel. As a result of this lesson farmers and municipalities along the valley are planting along the river banks narrow belts of willow, cottonwood, catalpa and walnut. If willow, cottonwood and walnut were planted along the Ontario rivers which regularly flood, they would be of great assistance in protecting the banks and neighboring fields from destructive erosion.

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The Roads of England.

There was something statesmanlike in the foresight that suggested to the invading Romans the idea of building permanent roads into the remote corners of the provinces they conquered, wildernesses though many of them were. Our own age yields tribute to the great pioneer railway-builders of our Western country, and to them civilization owes a debt through their subjugation of distance, and in their bringing of wide stretches of fertile land, otherwise inaccessible, within the reach of commerce. There is something even more picturesque in the pathway that the Roman army cut through hill and forest, as it stretched its iron hand out over almost all Europe. It was much more than a "blazed trail." Great highways were constructed leading from one point of vantage to another in such manner that the supremacy of the imperial city reached out through these open arteries to the provinces and kept the confines of her empire secure. The old Roman roads in Britain have not yet passed out of use, but remain still as monuments to the Roman genius for conquest, and as object-lessons to those who have builded in after years.

Many European countries seem to have fallen heir to this heritage. Travellers from America remark this as one of the first impressions of their visit. The long, level stretches of straight country road in France tell very plainly of the value that is set there upon the commercial advantage of ease and safety of locomotion upon the public highways. In Scotland and England the roads are equally as good, even though the twists and turns in them remind one of the tracks of sheep across a pasture field. He must have been wits about him, who would follow the intricacies of a cyclist's road map. But though direction may be difficult, the roads are one with the beauty of the rural landscape and one with the

stability of the energies of the British people. The conviction grew upon me that herein the country possessed a permanent asset, and one that proved a very important factor in its prosperity. It is a question of wider significance than we think.

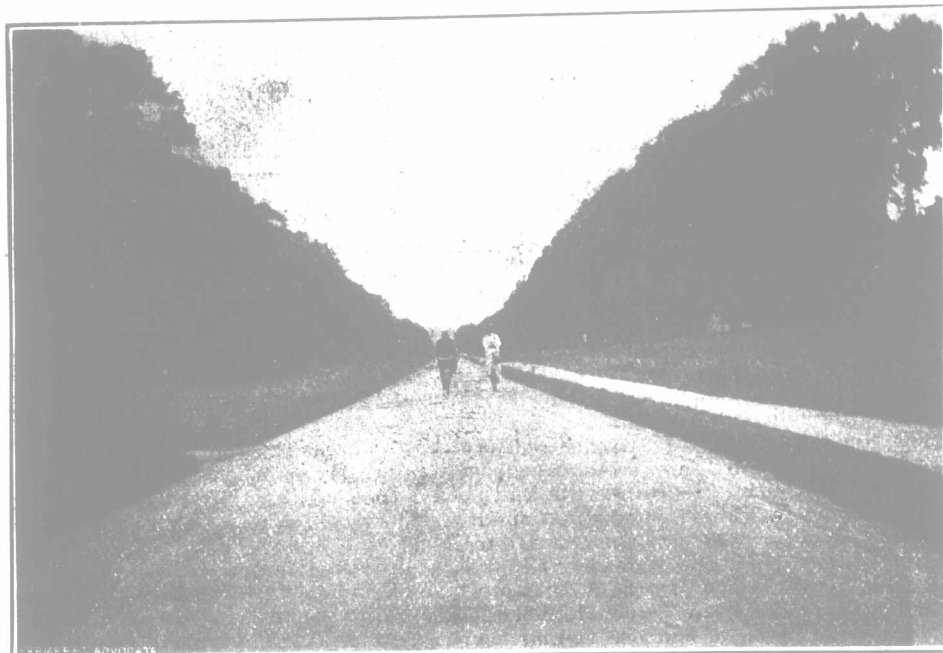
The first impression is one of delight in journeying through the country. The hedges have had their turn of bloom. The blackberries, the hawthorn, the wild rose and the honeysuckle appear in blossom one after the other, and in the spring-time make the whole air fragrant. Now and again, by the grounds of a mansion or a large estate, the hedges change to brick walls, higher than a man's head, which leave the passer-by in wonder at the gardens and grooves which lie within. Beyond the walls lies the open stretch, with the green fields on either side, and farther on is a meadow, where the skurrying of the rabbits to their burrows brings a stranger to his feet to watch them. At a turn of the hedge, we enter a woods, and the sunlight through the trees remains in the imagination as a memory that will not pass.

But it is of the roads themselves I have to speak. They are built as those of city streets. The foundation is of broken stone. Two years ago I saw the old men at work with their hammers, cracking the stone by the roadside. A slow and tedious job it seemed to be, but the square, neat piles gradually grew as the hours passed, for these old-timers had the knack of the thing, and the merry clip, clip of their hammers usually told its tale. This year there were fewer of them, the power crusher having largely come into use. The crushed stone is carted from the mill to the roadside, and left in recesses placed at intervals for the purpose. In past years, after being carefully laid, this was largely worked into a solid road-bed by the traffic, but now steam road rollers are used. The heavy stone, however, is not now

Our own country falls far short of such facilities for travel, and we have the greater need, since distances are greater, and railway lines much farther apart. There is encouragement to producers and breeders in knowing that their farms can be easily reached, and many remote and outlying farms would come into this category through the medium of good roads. Further, with travel made easy, the townspeople go much more into the country, and take a large trade with them, and indirectly create a greater demand for all that the country yields. Continual regret is expressed at the isolation of life on the farm. It would be a revelation to many to see how much real social enjoyment there is in the country districts of the Old Land, and how much evidence there is of it in the traffic upon the roads. Walking, driving, bicycling, motoring—each plays its part; and when travel is made a pleasure, people are brought nearer together. I know of men that wheel nineteen miles to business in London on a Monday morning, after having spent the week-end in the country. The week-end holiday is one of the great recreations of the English people, and city life and country life thus join hands.

One other thing I noticed: well-kept roads have given a stimulus to the production of better horseflesh. A farmer is almost ashamed to appear with a dirty carriage and a shabby-looking horse. His pony and trap are usually very smart and trim, and he takes a pride in them. His cart-horse, even, has something of the gentleman about him. And so the story goes. I need not speak of mail-delivery, access to school, obtaining of provisions, and carriage of goods to market. This I will say, that, other things being equal, a remote country district can have few things more conducive to prosperity than the easy access which is given to it through good roads.

There is a feeling abroad in our own part of the world that the rich people derive the biggest advantage from the well-laid-down road-bed. If they do, what matter? Let them pay their share of its construction. There are worse evils than in having rich people come to the country. The French peasant now takes off his hat to a motor-car, because it brings him trade. But I don't believe they do receive a greater advantage. I am convinced that the farmers and the working people in the end have much the greatest enjoyment and benefit from them, and I think I have seen the



"Fair Mile."

needed so much as formerly, except in construction. Much of the work at present consists in dressing the surface with a light layer of fine stuff, which is frequently laid down solely in the tracks left by the cart wheels, or perhaps I should say by the motor-cars. The rubber tires have a habit of sucking away the lighter material of the surface layer, and thus distinct tracks are gradually worked into the roadbed. When these are formed, the rain, instead of running off to the side, trickles down these channels, and further destroys the surface. On this account, a special tax is being placed on motors, and an effort is being made to have part of this revert to the municipalities for use in road improvement.

The work on the roads is under control of the counties, and a special tax is levied for the purpose. The counties own their own machinery, and employ their own foremen and gangs of men. These men, with their steam rollers, carts, sprinklers, etc., we saw at work in gangs all over the country. They dress the road wherever it is necessary, leaving the surface slightly rounded from side to side to shed the water. They also trim the turf at the edges, and cut channels to the ditches, as occasion may require. The illustration shows a splendidly-constructed piece of road near Henley, known as "Fair Mile," and it is a good example of what the roads are like throughout the country.

These roads are of immense advantage to the country districts, and bring them within much more convenient and easy access of markets. Buyers of farm produce, of whatever kind, find no difficulty in covering large sections of the country in a day, which fact in itself is a very great stimulus to business. I myself travelled 75 miles in a day, on a visit to different stock farms, and this would not be considered a big day's work

evidence of this. It ought not to be difficult to find a way to commence road construction in some such manner as has been followed in Europe for a century or more. All that is necessary is a concert of opinion and a will to have it so. Some of these days we shall have it, and then the wonder will be that we tarried so long.

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White Grubs in Grass.

One of our subscribers, who lives within driving distance of London, called on us a few days ago to get what he thinks should be good advice in regard to a pasture field which was infested with white grubs. He has another field which is affected to some extent, patches of about fifteen or twenty feet in diameter being destroyed; but in the other field of about 10 acres he believed that at least one-third was completely cleared of grass. The sod can be rolled up like a fleece, and, on examination, the grass seems to be all dead and decaying. After the sod is removed, one can dig down with his hands for several inches. The ground is loose, like ashes, every vestige of root to a considerable depth being eaten up.

Our friend, who, by the way, is a feeder and grazier of cattle on a large scale, was anxious to know what had best be done with the field. The field was rented, and had to be left in pasture. He himself thought of harrowing it over, sowing timothy and alsike clover, and re-harrowing to cover seed. The seed would get a start this fall, and would probably make pretty fair pasturage next year. It was suggested to him that it might be well to sow some red clover seed, in addition, on the ground next March, which would tend to thicken up the stand and, if the grubs were still at work next year, might save the situation