

Hats off to him who makes the blueprint and writes the specifications which guide the workmen in building and erecting great structures! Without the engineer and architect the world would go back to chaos. The highway engineer must know his business and have the courage to umpire his game. He is a power-house. His office must be beneath his own hat.

A public policeman ought to be on the job to ensure faithful performance of contract. If this safeguard is neglected, any and every type of road will be a disappointment.

Road Officials Should Spend

A crown on a road is worth more than a crown on a kaiser. Drainage is the corner-stone of road-making. Drainage is life insurance to the roof and root of the road. Surface drainage is essential. Foundation drainage is the alphabet of every road improvement.

Maintenance is the father and mother of good roads. Mud-holes are cancers; road-ruts, a disease; dust, a pestilence. Breaks and cracks mean danger and damage. The patrol man and surface treatment are safety-first money savers. Some day we may build road vehicles so that rear wheels are wider apart than the front wheels. This will distribute the weight and wear of loads over a greater surface and lessen the chance of rut-making.

The good-road secret is "macadam and maintenance." Macadam means more miles and more service to more people for the money invested. Nations of Europe, after centuries of experiment and experience, build macadam roads. Mileage is popular. "Rightly built" and "repaired without delay" are the pass-word and countersign.

The business of road officials is to spend money, not to save money. They should make supreme effort to give the taxpayer value received for every road dollar invested. They should build roads for the benefit of road-users, and not for the purpose of making any man or set of men rich. Material men, contractors and politicians are entitled to a square deal and nothing more.

The good road sentiment is a tidal wave. It must be honestly and intelligently met and answered. If, at any time or place, there is greed, grab or graft in road-making, it should be hit, and hit hard. Road officials will do well to be wary of the fellow who wants to show them a good time. That fellow expects to grind his own axe and chop his own wood with it.

Handcuff the Excess Profits

Excess profits should be handcuffed. If any set of men attempt to manipulate underground wires to make enough profit on one job of work in one road-building season to enable them to retire and live at ease the rest of their natural life, they should be straight-jacketed and the contract held up until honesty and square dealing can be written into the records of the road improvement. Road officials should give these shysters and Shylocks a publicity shock and a chance at hard labor.

Bad roads lessen religion and increase profanity. The man who must live on a mud-road all his life won't have any fear of hell,—he will be used to it. Bad roads induce farmers to leave the farm.

Mud-roads for the many and joy-ride boulevards for the few is hardly a healthy national road policy. The hope of a good road should reach as far as the flag reaches. The hope of a good road should reach to every home that gave a son or a helping hand to win the war. The hope of a good road should reach the farm as well as town and city. There should be system. Main highways should be established. Co-operation between units or divisions of government should be the rule in road-making. This will avoid patchwork and crazy-quilt, disconnected road-building. But the meal-ticket growers should be neither neglected nor forgotten.

John Louden Macadam intended that road-building should have an economic value. Farm and food highways will give the consumer more crop for his dollar and give the producer more dollars for his crop. This double-gear gain offsets and pays off the road tax. The shortest distance between producer and consumer is a good road from farm

to market. Investigation discloses the fact that the average yield of fields increases when improved highways are built into an agricultural community. The good road does social uplift work. School, church and government improve under the influence of a modern highway. Again, these blessings offset and pay off the road tax. The good road is dollars and sense. This means common sense, not copper cents.

How can everybody have the hope of a good road? How is the farmer to be served? How will rural folks be reached? France and other nations of Europe have answered these questions. Boil the story down and the answer is made in three words: Mileage, macadam, maintenance.

In Ohio, my home state, the average cost of roads per mile, 16 ft. wide, in 1918, as shown by the records in our State Highway Department, was as follows:—

Waterbound macadam, \$16,000; bituminous macadam, \$19,000; concrete, \$31,000; reinforced concrete, \$32,700; brick, stone base, \$38,000; brick, concrete base, \$51,000.

These were war prices. The average Ohio prices before the war, 1914, were:—

Waterbound macadam, \$8,627; gravel macadam, \$8,365; bituminous macadam, \$11,064; concrete, \$14,227; brick, \$20,982.

As a rule, macadam roads are wider than other types of road. This should be kept in mind in comparing general cost prices.

Macadam at Both Ends

While the Allied armies were going to the front over macadam roads, the meat-wheat-meal-ticket was going to the front over hard-top highways over here. Mr. Macadam was a blessing at both ends of the line. We must have road mileage without bankrupting the public money-box.

War is hell painted red. When war came, railroads failed to meet the crisis. The throat of traffic choked. Terminals clogged. Freight congested. Huns laughed and rejoiced at our predicament. Again, "the Dice of God were loaded." The motor-truck appeared as a savior. Brains, mixed with lightning and gasoline, make wonder wagons. The motor-truck became an engine of war. Day and night it delivered millions of tons of freight and armies of men, on time, at the right place.

The world knows that the motor-truck was a crusader in the world war. The world knows that the motor-truck would have been helpless without the hard-top road. John Louden Macadam began, one hundred years ago to build Victory Roads that were to humble the haughty Hun and make the kaiser run from Hunland to Holland. "God moves in a mysterious way His wonders to perform." Roads are the scaffolding by which nations are builded up and saved, when they have to be saved.

Macadam, mileage and maintenance make possible the following editorial comment in "Collier's Weekly":—

"Auto-passenger mile service is greater than all our railways combined, and greater than all our electric traction service. It is almost equal to steam and trolley passenger service combined, and the ton-mile service of the railway short-haul freight."

Macadam, Mileage and Maintenance

Macadam, mileage and maintenance will make the motor-truck even more useful in peace than it was in war. In one Ohio county are 900 miles of macadam roads; 95% of its people live on or within a half-mile of a hard-top road. The engineer resurfaced old roadbeds and saved taxpayers \$11,000 per mile. It is economy to save old roadbeds where possible and reasonable.

In the United States farmers are leaving the farm. This was true before the days of war and abnormal wages in shop and factory. As Secretary of Agriculture in the State of Ohio, I asked 4,200 farmers, by letter, to give me their reason for this folk-flow from farm to city. The answers that outnumbered all the rest were, "Bad roads" and "mud roads." No nation can go on forever jamming its population into sky-scrapers, city flats, tenement houses and centres of population. High cost of living is no accident. Good roads