

There is no magic or mystic formula which can bring about the control of a stream. Such control can only be accomplished through the application of tried and practical methods, based on sound and scientifically correct principles, under the direction of experienced engineers. Whether to design a mattress, retard, jetty, or other structure for any particular place depends on the condition at that particular place.

LOOKING BOTH WAYS

By the Hon. Horatio S. Earle, Ex-State Highway
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The wheel was the greatest invention of human ingenuity, for without wheels there could be no wheelbarrow, ox cart, gig, wagon, automobile, locomotive, boat, or engine. The universe is composed of wheels and it is said that many men have wheels in their heads. We are not here, however, to discuss wheels, but what they run on.

Roads as they were will not do, and roads as they are will not answer, but roads as they must be will function satisfactorily if properly made. Roads as they were when I was a boy were passable some months in the year at from five to ten miles an hour. It was a day's work for a team of horses to pull a load of wood or farm produce to market ten miles away.

To the old saying "Give the Devil his due" it is only fair to add an amendment, "And the farmers, too," for they gave the land for the right-of-way and made these roads. It was a herculean task with the equipment available at that time. I can remember how, after the crops were in, the citizens were called out to work out their road taxes. They always put the roads into such shape that for weeks they were not passable with any degree of comfort, because they would plow alongside the road and then scrape the wornout earth and sod into the road. On the steep grades they would make "water-bars" across the road a foot high that would throw you out of a buggy if you went over them at five miles an hour. My father and his boys worked out these taxes, but father had a brother who thought he was sickly and he would take a hoe to lean on and would "stand out" the taxes. This

did no damage to the roads. I also remember that down here in Indiana you assessed statute labor taxes on the railroad companies, who let out the contract to work these taxes to anyone who would do it for the least money and do the least work.

Forty years ago I came to Michigan, where the roads were as much worse than they were in Vermont as the soil of Michigan was better than the soil of Vermont. In Vermont there is always a layer of stone just a little under the top surface but in Michigan the wagons could go down until the body of the wagon would serve as a boat.

In the nineties came the bicycle craze. Because the boys wanted to get out into the country, they began advocating bicycle paths and gravel roads. As I was connected with the bicycle organization and became head of the Michigan division and finally president of the National League of American Wheelmen, I declared that bicycle racing had no more place in the league than cock fights in poultry associations or bull fights in dairy associations. The outcome was that the Detroit Wheelmen nominated and elected me state senator in 1900 and it was said that I made a good roads speech on every bill that came before the legislature in 1901. Since a majority of the legislators were opposed to the state helping to make the roads better, all I was able to do was to get a resolution passed to appoint an investigating committee, of which I was made chairman. We were given the privilege of paying our own salaries and expenses, which we did. I went to work and built sample macadam roads in different parts of the state, free of charge, the localities furnishing the stone to crush and board and bedding for the workmen. The railroads also gave me free transportation for men, machinery, and material.

First State Highway Commissioner

In 1903 I was able to get the legislature to establish a state highway department and the governor appointed me state highway commissioner, but the act was declared unconstitutional on account of an inhibition in the constitution prohibiting the state from making any kind of internal improvements. So I served two years as the unconstitutional state highway commissioner and did the hardest two years' work of my life,

carrying on the building of sample roads and campaigning for an amendment to our constitution that would permit of state aid and possibly national aid.

At the 1905 session of the legislature, I was able to get the state aid amendment submitted to the voters at the April election, where it was adopted by a tremendous majority. Then the legislature passed the bill that I had drawn without changing a word and I was appointed constitutional state highway commissioner, serving four years at the tremendous salary of \$2,500 a year.

But there was opposition yet. The mayor of Detroit declared that the roads were good enough and that if the farmers wanted any better roads, they should build them. At this time I had a photograph taken of myself standing in the ruts of Michigan Avenue just outside of the city of Detroit. My legs were just long enough to reach the bottom of the ruts and the ridges between the ruts high enough to reach the seat of my trousers. There were sixteen tracks in the lots alongside the road where drivers of wagons had sought and found better going than in the road.

Opposition at this time was strong enough so that in one town where I was to speak the business interests had men stationed near the hall to pay every man one dollar who would go home and not hear me. Some of them took the money, went home, and came back another way. At another place, drunken hoodlums were hired to come and sit on the front seats and break up the meeting. At another town, through the generosity of a railroad president, I was able to offer enough gravel for fifteen miles of road and the state agreed to pay enough state aid to grade, spread, and roll the material. Acceptance was left to a vote and the opposition carried banners on their wagons reading, "Don't vote your farms away". The offer was voted down, but since then bonds have been issued in that county to get money to build the roads and the farmers still own their farms.

I founded the American Road Builders Association, February 13, 1902, at the Cadillac Hotel, 43rd Street and Broadway, New York City. Though I had sent out 200 invitations to men in every state in the Union, only three besides myself dared to attend and be known as in favor of good roads at that time. We adopted a constitution and by-laws and for

a chief objective declared that we favored an intercapital-connection highway. Little did I think at that time that I would live to see it, yet I believe that today you can run automobiles over first-class highways to every state capital and to the national capital. So the roads that were have passed, and we have the roads that are, and we must turn our attention to the roads that must be.

Roads of the Future

We must have on arterial highways paved roads that are wide enough to eliminate danger, and we must eliminate all grade crossings on these arterial highways. You may think that we cannot make the railroad companies do their share to separate grade crossings and so stop this tremendous killing of people. Let the state legislatures pass laws compelling green and red lights to be established at all arterial grade crossings, permitting no vehicle or railroad train to pass until the red light changes to green; then the railroad companies will be willing to act. But you say, "This will be a tremendous cost". Yes, it would, but would you not rather vote for bonds to raise the money than to sacrifice the lives of your boys and girls?

I am trying to make you think of the kind of safe, usable roads we must have on account of this new transportation system that has developed in the last 30 years. The railroads have been a great factor in our development as a nation. In most cases, they purchased their right-of-way, built their railroads, and now have to compete with the busses and suffer the loss of this competition. The busses buy no right-of-way and pay mighty little for the privilege of using the roads that we built and paid for. The roads of the future must be wide enough so that we who do pay the taxes will not be pushed off these roads by busses that are competing with the railroads. Please do not misunderstand me. I am not advocating that the busses should not use our roads, but I am trying to make you realize that here is a problem to be considered and solved in justice to all concerned.

Wayne County, Michigan, in which Detroit is situated, has given to the world a sample of what the road should be for safety and for use. In 1909, Wayne County road commissioners built the first Portland cement concrete road ever built

in a rural district. I was State Highway Commissioner at that time and I inspected that road in June. The state paid the aid that was possible under the law at that time. The papers of Detroit threatened to make me put the money back in the state treasury, asserting that the road would not last a year. But it did last until thirty-five million vehicles had passed over it. When Detroit grew and surrounded it, it was torn up and replaced by pavement 100 feet wide. Yes; more than being threatened by the papers, I was called a fool by engineers all over the country. My reply was that they mentioned me in the Bible, where it declares, "It takes the fools to confound the wise."

I promoted a \$2,000,000 bonding plan for the county and the county commissioners fought me, saying they could not use so much money economically. But we were successful and they did use it and have used \$48,000,000 since. We have today the best county roads in the world. We now have in the county 592 miles of concrete roads and have installed 28 grade separations, two of which are highway grade separations. We have built 78 bridges and have 5 under construction at the present time. We have established parks, camps, comfort stations, have set out 43,000 trees, and are building an outer drive 150 feet wide and 42 miles in length to encircle the city of Detroit. All leading trunk line roads in the county either are, or shortly will be, super highways—two one-way traffic parallel pavements from 20 to 40 feet wide—thus eliminating danger and facilitating transportation. The traffic on these super highways runs from 10,000 to 40,000 automobiles during the twenty-four hours.

But we do not need this class of roads everywhere and it would be foolish to build them. What we do need is good-enough-for-the-traffic roads, and well-built gravel roads are good enough for probably two-thirds of the mileage in Indiana or Michigan. Yet I hear people complain because gravel roads need repairs every year. Yes, they do, perhaps at a cost of \$200 a mile, but when we compare this with the interest of four or five per cent on the cost of a concrete road, it sinks into insignificance.