

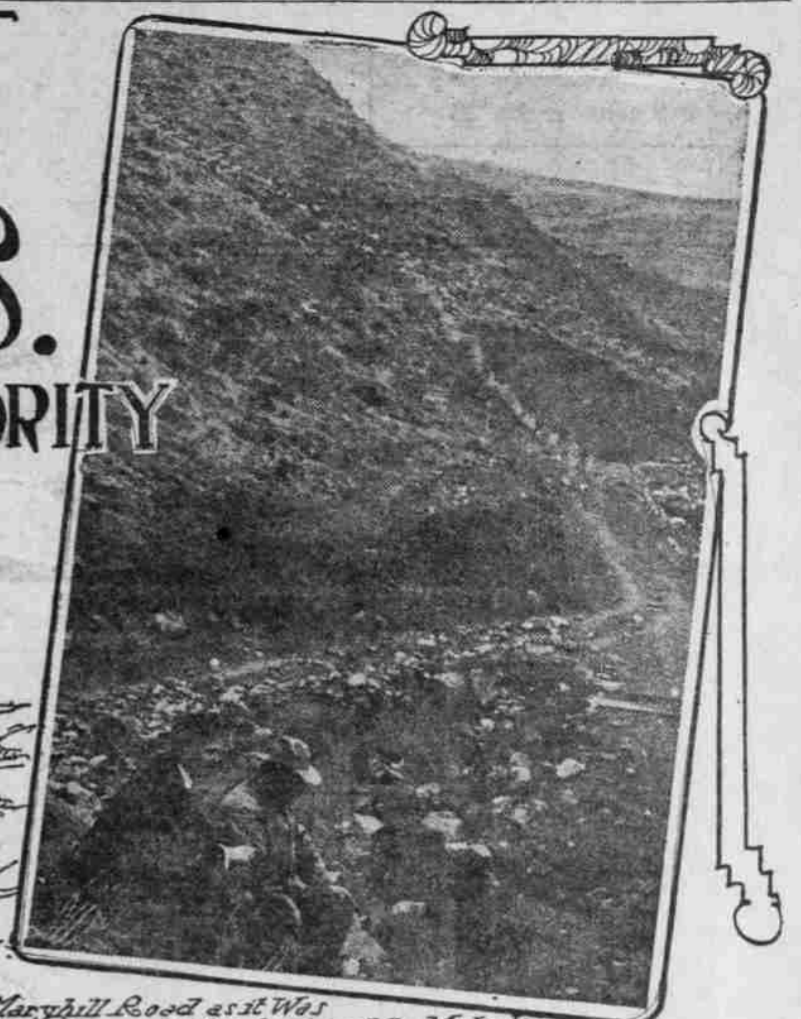
ROAD BUILDING—LEAST KNOWN SCIENCES.

SO SAYS SAMUEL HILL, LEADING AUTHORITY ON ROADS.

Thirty-Seven Years of Study Has Been Devoted by Mr. Hill in All Parts of World to Subject of Building Good Roads—He Has Spent More in Last Decade Than U. S. Government in Producing Good Roads.



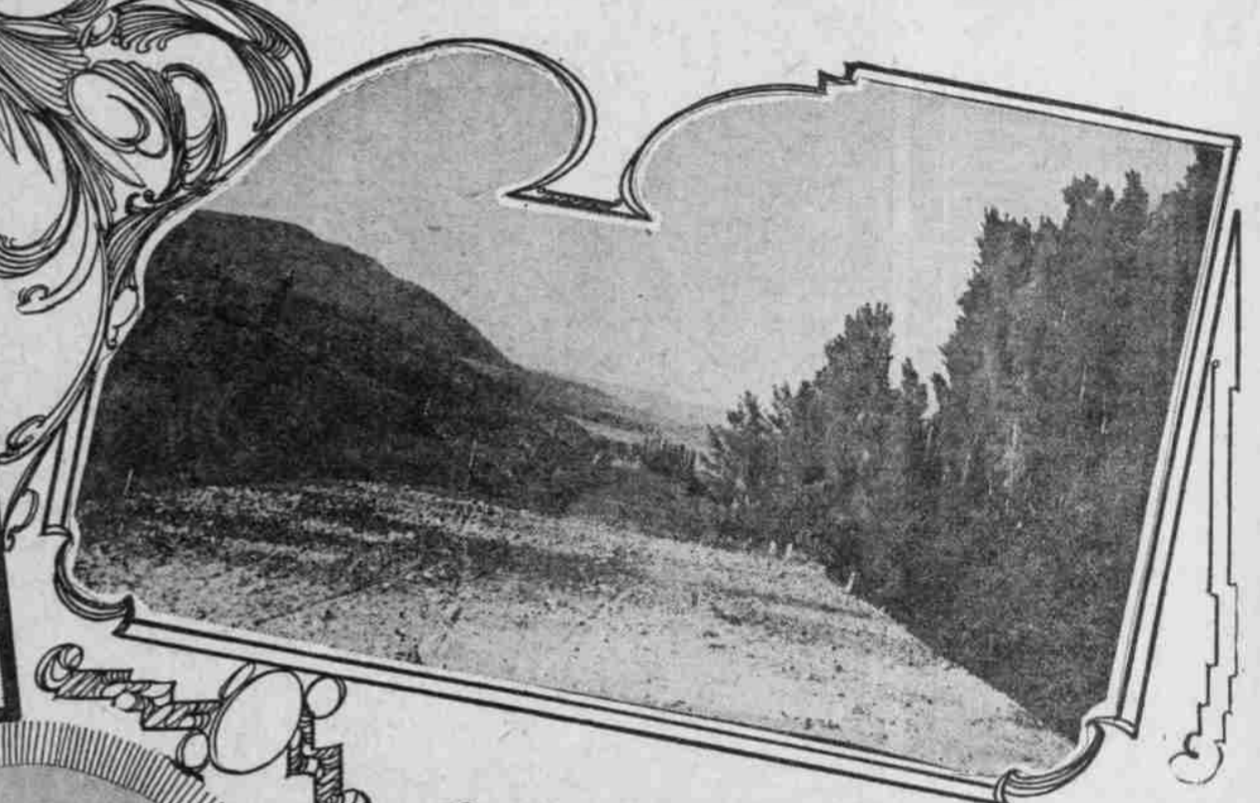
Samuel Hill, who has spent more for road building in last 10 years than United States Govt.



Maryhill Road as it Was When Samuel Hill Decided to Make It The Model of The World.



Completed Asphaltic Macadam Maryhill, Washington, Road Showing Longitudinal Curvature Idea



Showing the Vertical Curvature Idea Which Mr. Hill Says is Important.

SAMUEL HILL, the pioneer road-builder of the Northwest, has spent 37 years studying roadbuilding. He has traveled over the entire world, has studied the details of all the famous highways of the world, has made 21 trips to Europe, has spent more in roadbuilding each year in the last decade than the United States Government, is recognized as the leading road authority of the West, if not the United States, and yet, according to his own statement, he knows but little about proper road construction.

He maintains that it requires more exacting workmanship, skill and knowledge to build a road than to make a watch. He says roadbuilding is one of the least known of the sciences, it being his opinion that there are not ten men in all America thoroughly qualified, in every detail, to build a piece of thoroughly first-class road.

As a monument to the good roads cause, Mr. Hill has combined all his skill and the results of his lifetime of study in a 10-mile stretch of road at Maryhill, Wash., near the Columbia River, 100 miles east of Portland. After spending a fortune on the road, which has required 10 years to build, he has handed it over gratis to the State of Washington, with his compliments, and invites the world, and especially the people of the western part of the United States, to inspect it. The undertaking, he says, is his last contribution to the general cause, although he intends to continue the study of the subject.

Mr. Hill says there is much more to building a wagon road than merely scooping out the dirt and rock and making a straight or level plane where horses can drag along a wagon. He asserts that roadbuilding embraces exacting knowledge on the subject of conservation of motive power as well as engineering skill of a class even higher than that used on railroads. He brands many of the roads of Oregon, Washington and other Western states at present as mere trails, declaring that they are not scientifically, wisely nor economically built. He predicts better skill when the people come to realize the importance of good roads.

How Roads Are Built.
Mr. Hill began the study of roadbuilding 27 years ago, under A. J. Cassatt, one of the world's famous railroad builders. Since that time he has devoted fortunes to the work, and has gained a worldwide reputation. He is president of the Washington State Good Roads Association; first vice-president of the American Roadbuilders' Association; president of the Home Telephone Company, and is one of the most widely known men in railroad circles in the United States. He declares he has made his wagon road study on the same basis that the most eminent engineers of the world have studied out the railroad construction principles. The principles are entirely different, he says.

The money to be spent for roads will be just as sacredly regarded as the school fund. I do not mean that all these men who handle the road funds are dishonest. I do not even mean that all are utterly incompetent. I do mean that without some definite fixed plan, without some standardization, no permanent system of roads can be built.

"Let's look at the roads subject from a practical standpoint."
"In 1875, 45 per cent of the population of the United States were farmers. In 1908, only 23 per cent were farmers. How can we maintain our form of government? By putting people on the land and keeping them there. To do this we must furnish them, first, good roads; second, good telephone service; third, good rural free delivery of mail; fourth, good schools; fifth, a market for farm products.

"The freight rate begins at the farmhouse door. This Oregon and Washington country is famed, and justly so, for its fruit. If the fruit be bruised in passing over four or five miles of bad road before it reaches the market, it may change the quality from first grade to fourth grade, yet the ultimate market for which it was intended may have been London, Paris, Vladivostok, or Australia.

"Economically, no country is so extravagant as America. We have had in no sense a distinctly constructive policy. The United States has never been operated as a business corporation. We should ask ourselves, What can we make out of our farms? What can we make out of our cotton crop, our corn crop, our wheat crop, or our fruit crop? We have grown to be a great nation almost in spite of ourselves, but we have left too much to the hired man, and the hired man has not always run the farm to the best advantage. By the hired man, I mean the representatives of the people who have been sent to frame laws under which we can do business and develop the country. He has not been a trained man in city, county, state or Nation building. There are a few simple rules which we have ignored. We want the best operated government, and we still have within our borders people who believe as I do, that we have the best form of government.

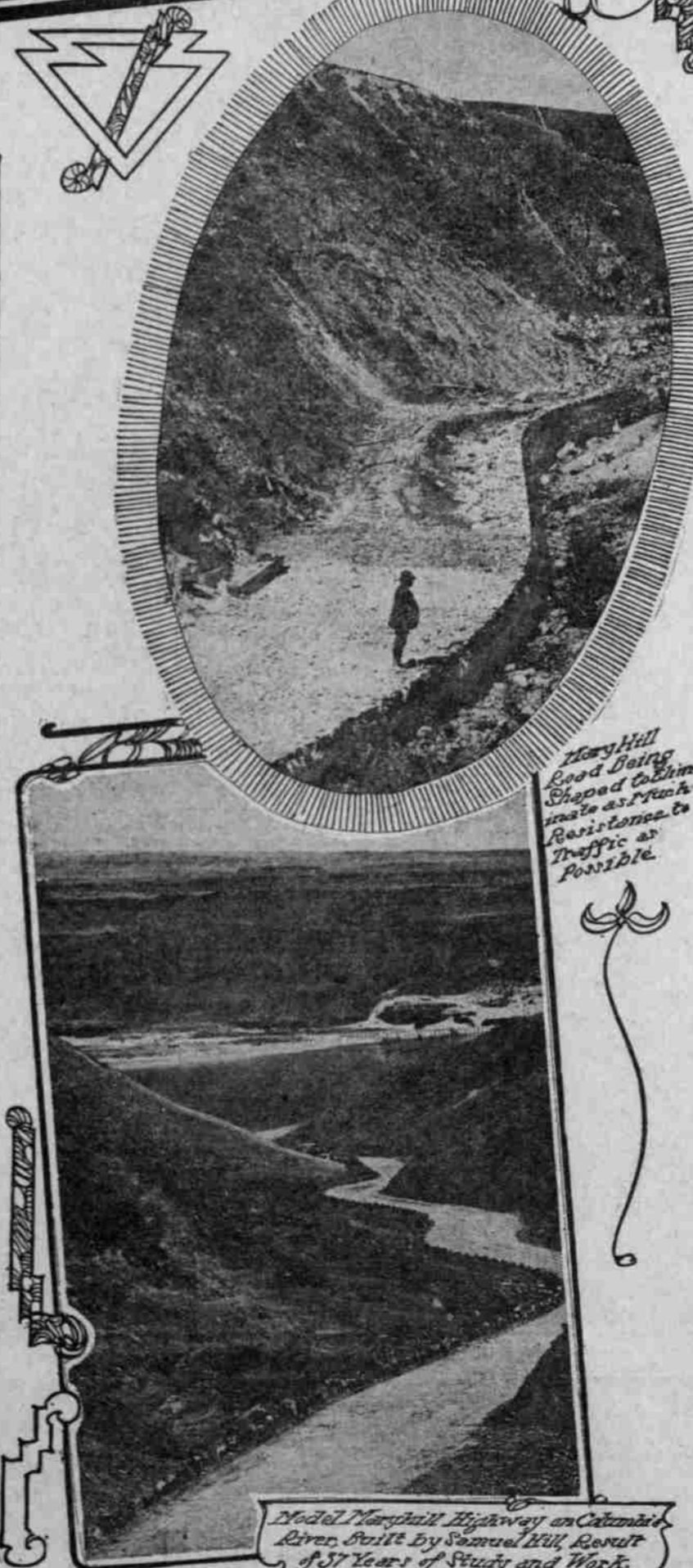
The real object of a nation should be not to be rich, but to make the best quality of citizenship. To attain this end we must so shape things that each person will have a definite interest in the country. The great conservative force in America has always been the farmer. The farmer has always proven himself equal to the emergency.

chair devoted exclusively to road building in the United States, and built the first building ever marked "Good Roads" in the history of the world. The politicians did not want good roads. No matter what they tell you, they do not. The politicians of Washington, under the leadership of Governor Hay, have practically stopped educating road builders, and have rendered the building marked "Good Roads" useless; it stands there empty and idle even so far as the purpose for which it was intended.

"You can do nothing without intelligent organization. You cannot build roads without centralized power. The efforts of individuals are as naught. They are neither equipped nor prepared for this work. Road building is a business all by itself. It is just as difficult to build a road as it is to make a watch. It requires specialized training. I have been studying the question for more than 35 years, and feel that I am only a beginner. And yet, there are legislators who have told me they know all about roads. They have given one and one-half days to the study in question.

"Now a word as to the method of road building, the kind of a road to be built, and the means with which to do it. So eminent a man as John F. Stevens wrote an article for me, which I published in a book, in which he said: 'I do not think in all America there are 10 men thoroughly competent in every detail to build a piece of thoroughly first-class wagon road.' He said: 'I could not build a mile of road myself, yet I would not hesitate the building of 1000 miles of railway tomorrow.' Yet the reader of these lines can on any street corner find a politician who will tell him just how to build any kind of road. First, then we must have the brains to locate and determine where the road shall be built; second, the road to be built so as to carry the traffic which will pass over it. By that I mean it is not necessary to build boulevards over which to drive cows; third, in locating the road it is necessary to make a careful survey with proper contour lines so as to balance the quantities both by vertical and longitudinal curvature.

"The first road I built 25 years ago I covered nicely with sand, then sent a wagon with a load of hay drawn by a pair of horses out upon the road, and then I saw what you have all seen; that to rest their muscles the horses zig-zagged back and forth across the road. Then I saw that the tractive power on a highway was unlike the tractive power on a railway. The tractive power on a railway required a tangent to get the easiest pull. The tractive power on a highway did not require a tangent. In other words, you could so curve your road lengthwise as to make the man or the animal take the obstruction where nature put it, and fold around the hill. If you built straight through and made a straight line, you would have to move great quantities of material, and when you finished, the horses would still continue to zig-zag back and forth across the straight road, and the driver, to rest his muscles, would take a long, swinging curve and your money would be wasted.



Maryhill Road Doing Good Doing Waste as Much as Traffic as Possible

Model Maryhill Highway on Columbia River, Built by Samuel Hill, Result of 37 Years of Study and Work.

line. The man zigzags; if you doubt this, the next time you pass a vacant lot, look and see how the path zigzags across the lot; or if you are not satisfied, go out yourself and try to walk on the crack of a cement sidewalk for three blocks and see how you like it, or ask any bicycle rider if he cannot go farther over a slightly rolling country in a day than he can over a level road. The horse can pull a load continuously over a moderate grade to better advantage than he can on a dull flat road. So balance your quantities

by vertical curvature. So much for the location.

"Now for the construction. If your survey has been made as it should be made, and in passing I might say that I have had surveyed in Oregon 10 such miles of road and presented the survey with my compliments to Governor West, you will be in position never to pick up a shovelful of earth until you know just where you are going to put that shovelful of earth and that stone before you lay it down. It is the unnecessary labor that costs. It is not the farmer who tries to push on the plow handle that gets over the biggest fields in the day. During the lifetime of all who read this, the great majority of roads must necessarily be earth roads, and just as much care must be used in building an earth road as in building any other kind, because the proper earth road always serves as the foundation on which the top surface of a hard-surface road is to be placed. In looking over the assets which the State of Washington had, I saw an hitherto uncaptured asset in the shape of convict labor. I saw that these convicts were eating their heads off in the penitentiary and rusting their souls out in idleness, or in planning new schemes to be used when released, and aside from the great problem of making men of these convicts, I saw that they could at the same time be utilized as an asset for the state. There is no reason why any body of men, rich or poor, convict or free, should be supported in idleness. Somebody must pay for their keep. So about 10 years ago we started the use of convict labor in making roads, and it is my opinion that better results can be obtained with convict labor than with free labor. Did you ever stop and think that it is curiously the smart man that gets in trouble? He thinks he is shrewd enough to evade the law, and if you are careful to organize your convicts, you have a chance to draw from every class and walk in life, because a prison is an epitome of the world at large. In Washington, we had at one time a bank burglar and safe blow for our powder man who handled the dynamite. You cannot in your every-day walk of life get a bank burglar to work for you; he is too high-priced a man. The convicts earned me, per man per day, on the Methow work on the Upper Columbia in Washington \$4.03 for the state; they earned on the Lyle work in Washington for the state \$2.25 net per man per day. These figures were based on the North Bank classification for money paid for moving earth and rock for the railway. So I am heartily in favor of convict labor on roads.

Raising Money for Roads.
"Now, the question comes up how to get money to build these roads. In Washington, every four years the state spends \$15,975,000, and our state hesitate to say that the great bulk of this money is absolutely wasted. There are only three ways for the public to get money: First, when it is given to them, as in the very generous gift of Mr. S. Benson, who gave \$10,000 to help build a road in Hood River County; second, to secure it by selling its obligations in the form of bonds; and the third way to raise it is by taxation. The objection to a bond issue, of course, is that the moment the bonds are issued the interest charges start to run, and that it makes a fund which in improper hands is likely to be wasted. The objection to depending on money for road building by taxation is that the sums so secured are so small relatively as to be frittered away in dribbles on small pieces of road, and the life of several separate pieces of road is relatively shorter than the life of a continuous highway.

Oregon or Washington, should ultimately be covered with a hard surface and with a bituminous binder. At Maryhill, Wash., I have finished several miles of demonstration road to serve as a model for the United States. While it may be too soon to speak, I believe that, regard being had to the traffic, those country roads will outlast any single block of paved street in Portland. I base that statement on the fact that the Great North Road of England, built by E. P. Hooley, has been down for 16 years; I have photographed it every year for the last five years and I find no appreciable wear and tear. Of course, it is kept up by intelligent maintenance. You can travel over it and you find no dust. Steam lorries or traction engines pulling loaded wagons pass over this road averaging about nine miles an hour, and I do not know of any highway in America over which you would dare run an engine. However, I am willing to have one run on the road at Maryhill. In Oregon and Washington we are well supplied with road-building material. The records have not been kept in such a way as to show the cost of roads in the country around Portland and Seattle, but I am sure that the money which has been spent on repairs to these roads, I feel safe in estimating that one-half the money so spent will be applied to road-building material.

In saying what I have, it is not my desire to in any way reflect on the men who have gone before us, but Oregon and Washington pioneer days have gone. The minds of the people are more centered on transportation methods such as should be on the North Bank road, rather than on the movement of ox carts.

Royalty and Wisdom.
It is to be feared that the good old days when Kings and Emperors frolicked around the garden spots of Europe, cutting off heads, marrying new wives every day or so, and having sleighing parties on roads covered with precious salt in imitation of snow, have gone forever. The Prince of Wales, for instance, is sojourning just now in Paris and from all accounts is having a mighty gloomy time of it. He drinks only water with his meals, eschewing the wine when it is red; rides his horse slowly when he passes pedestrians, goes to bed early, and keeps the Sabbath by attending church regularly. Paris is shocked by his conduct. It was not like this in the olden days, but times change and monarchs change with them, or else, like Manuel, late of Portugal, they have to look for other jobs. The high rollers among kings went out of fashion with Leopold, and the wise heir apparent, who doesn't believe in emptying fate, cuts out the comic opera stuff, as the sporting editor would say, and attends to business. By leading a serious life and fitting himself for the duties of kingship, which will fall to his lot some day, the Prince of Wales is taking out the best insurance policy that he could put upon the English throne.—Washington Post