

COLORADO HIGHWAYS



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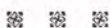
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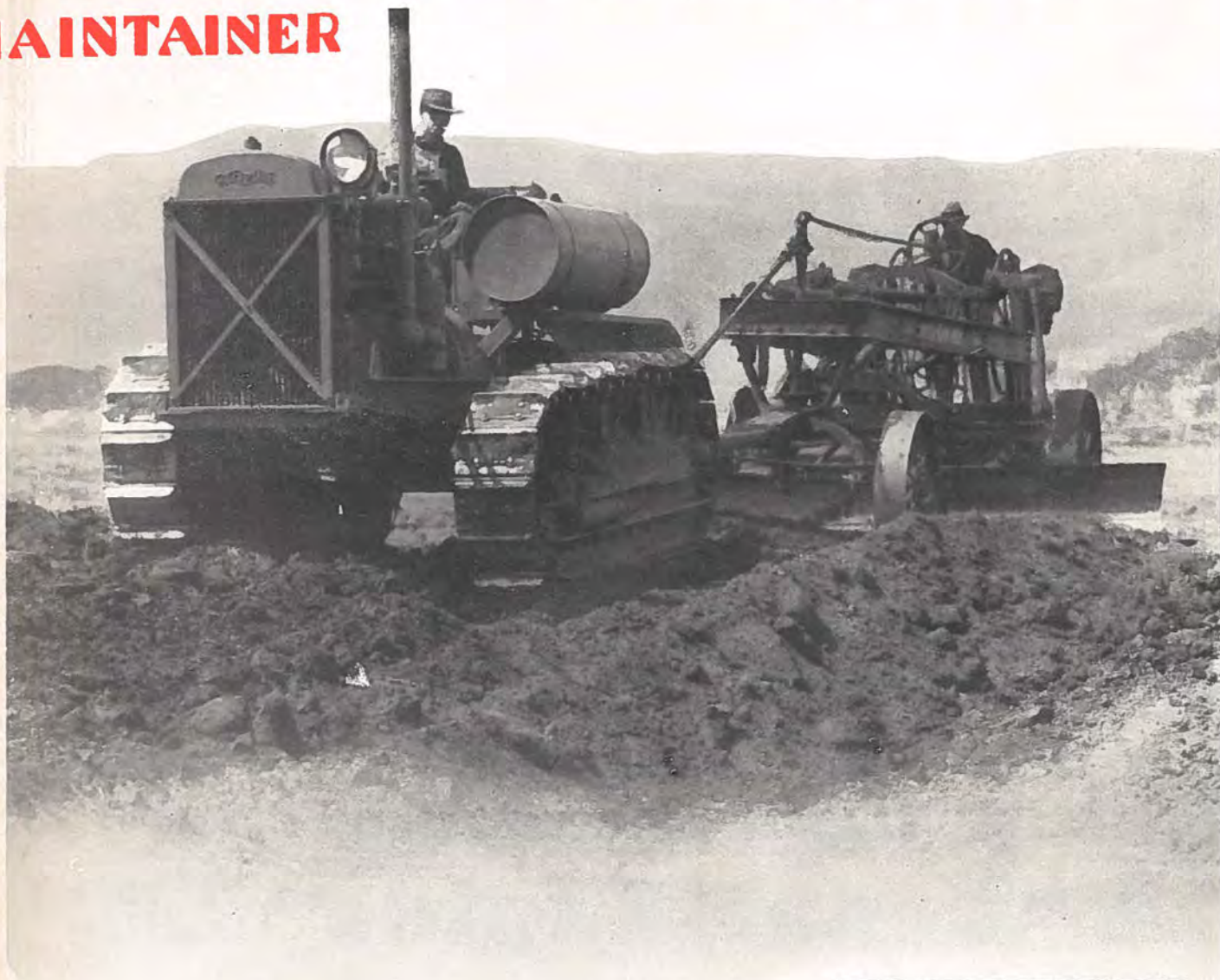
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Our Colorado

BY WILLIAM H. ADAMS
Governor of Colorado

It is natural for the citizen of any state to believe his own is the greatest of all the forty-eight commonwealths. That is state pride, and is one of the primary causes for each state being strong, and its citizens patriotic. I am making this statement as a nation-wide explanation for my own conception of Colorado.

Colorado, in my mind, offers more advantages than any other state. Here we have a climate unsurpassed, and that is recognized the length and breadth of the land. We have within our borders the precious metals, stone of every conceivable character, oil, marble and precious stones, oil shale and vast primeval forests. Scenically, the state leads the world. In the Colorado Rockies are 46 of 52 highest peaks upon this continent. Here the entire Rocky Mountain range and its component parts reaches its greatest height.

In agriculture and horticulture Colorado has high rank, being first of the states in production of sugar

beets and beet sugar; is in the front in the shipments of melons; high in the production of potatoes, grains and other products of the farm. In fruit Colorado apples and peaches are famous, while head lettuce, celery and cabbage find their places on the menu cards of famous hotels and in dining cars of leading railroads. In livestock we are preeminent.

Colorado is the sportsmen's paradise and the haven of the recreationist. In coming years will be the development of many of the more than 500 mineral springs into great resorts. The curative waters of every spa in Europe is duplicated in Colorado.

Colorado is making rapid progress in the construction of splendid highways that are opening every district to rapid transportation. This work is being continued and will continue until Colorado is in the ranks of others with their marvelous roads.

Colorado opens her arms to the world, and says: COME!

Highway Building as a Business Enterprise

BY OLIVER T. REEDY, Senior Assistant Highway Engineer

THE standard by which the merit of any enterprise is measured should be simply this: Do the returns justify the expenditures; are the dividends from the investment attractive? The necessity for transportation facilities is so fundamental that capital has always been attracted to investments having as their object the furnishing of those facilities. This is very apparent in the matter of rail transportation facilities, but most of us have to depend on information obtained from written history to realize the extent to which the building of highways appealed to investors, solely for the purpose of financial gain.

The toll road was an important institution in our country for a good many years. That this class of enterprise was a paying proposition is shown by the fact that there was no lack of capital available for toll road building, and that it was equally profitable to the traffic is apparent from the fact that there were plenty of travellers willing to pay for the use of the roads in amounts sufficient to satisfy the investors.

Road building today has for the most part passed out of the hands of the private investor and has become almost exclusively an activity of government. But the same standard by which the justification of this activity must be determined still holds. If the enterprise does not bring ample returns from the investment, it has no merit.

Practically every other governmental activity of our state is of such nature that no profit can be expected. These others require expenditures without returns in the form of profits. They are for overhead, administrative uses, and are reasonable because of their absolute necessity in keeping the machine running. If these expenditures are economically and efficiently handled the enterprise is fully justified.

But when it comes to road building, this standard

is not sufficient. It is not enough that funds are expended economically and efficiently; there must be dividends. And there are. We believe that no other enterprise brings as large dividends to the people of Colorado as their road building activities.

During the past five years the expenditures of the State Highway Department have been as follows:

1924	\$5,664,567.18
1925	4,587,089.57
1926	4,809,052.02
1927	4,164,805.03
1928	5,916,002.28

This amounts to a little over \$25,000,000, and in my own mind there isn't a doubt that the people of the state have received in return at least dollar for dollar—a dividend of 100%. Moreover, if this were the time, and the occasion, and the reader's interest and patience were favorable, I believe the truth of this proposition is easily subject to demonstration by proof.

How would I go about this? In the first place it would be necessary to tabulate from our records the mileage of improvements as to type, both before and after the improvement was made. By this is meant the miles of unimproved wagon road raised to graded and drained type; the miles of graded and drained road raised to gravel surfaced, or paved type; the miles of surfaced road raised to the paved standard. Also, it would be necessary to tabulate the total vehicle-miles that have been traveled over these respective types.

Now, the saving per automobile-mile due to raising the standard from one type of road to another is a thing that has been worked out with considerable scientific exactness, and the experiments have been repeated so often that there is no question of the credibility of the results. In a public address about two



View of Federal Aid highway south of Grand Junction, showing Palisades in the background.

Photo by Grand Junction Chamber of Commerce.



New bridge over Yampa River, south of Craig, recently completed by the State Highway Department.

Photo by H. L. Jenness.

years ago, C. C. Gates, president of Rocky Mountain Motorists, Inc., prepared a tabulation from government reports showing that the improvement by paving an ordinary dirt road with cement concrete reduced the cost of operating an automobile as follows:

Gasoline	32%
Tires	21%
Depreciation	10%
Maintenance	10%

I could hunt up several reports giving saving in cents per vehicle-mile. The only one that comes to mind just now is a report of Prof. H. G. Borden, formerly of the Ohio Northern University, who is quoted as finding that the saving between operating a motor vehicle over a dirt or gravel road and a good paved road is 2.6 cents per mile.

There are several other elements of savings in actual dollars and cents, by the use of improved roads over poor ones. One is that the improved road is usually shorter than the old one. That is one phase of improvement which is always attained if possible. If the present road between two points is 10 miles and an improved road can be built only nine miles long, the operating cost of traffic over that road for all time is reduced 10 per cent. Then there is the possibility of hauling larger loads. If twice the vehicle load can be hauled on an improved road, compared to what can be hauled over the unimproved, that element alone reduces the unit cost 50 per cent. A beet farmer in the Brighton district was asked if he believed in paved roads. "You bet," he replied. "I can haul twice the load with two horses now that I could before with four. And I always can now, and sometimes I couldn't then."

Now, here is another element of dollars and cents dividend that will surprise you. It is that of time saved and comfort secured. At first blush it may seem impossible to put a monetary value on this element, and I can't do it for anyone but myself. But you can do it for yourself and anyone else can do it for himself. For example, consider a trip to Colorado Springs over the present paved highway, as compared to the old road before any improvements were made. Suppose

that you had this trip to make and that by some magic you had the choice of taking either route. How much would you pay for the privilege of riding over the pavement? It is conceivable that on a fair day with the old road at its best, many would select this route in preference to paying anything. Even then there is the hazard of 13 (unlucky) grade crossings, and an even chance of a storm playing serious havoc with the journey, though it start ever so fair. With a storm threatening at the start, there is hardly a vehicle owner who would not pay 72 cents, one cent per mile, to travel over the paving, and with the old road at its worst, it's hard to conceive of anyone (at least, if he knew the old road) not being willing to pay ten cents per mile, \$7.20, or more, for the privilege of using the safe highway. And that, too, for saving in time and comfort alone, without any thought of the 26 cents saving in normal cost of operation. Take any stretch of road, any place, and apply this rule for yourself, and you will be able to put a mile price on time and comfort secured by an improved road.

Now, in addition to these dollars and cents dividends, there are ever so many that cannot be measured in percentage of investment. The making possible the development of rural and consolidated schools; the enrichment of both urban and rural social life through the elimination of distance, which acted as a barrier between the two; the drawing to our state of hundreds of thousands of tourists or temporary visitors, who not only add to the wealth of the state by the money which they spend, but also produce a mutual enrichment by associations; the bringing in of new citizens attracted by our resources, called to their attention while travelling our roads; these are some of the intangible profits that accrue from investment in highways. Though of immense value, they are merely mentioned and not included in our list of monetary returns.

The highway business is an immensely profitable enterprise. There isn't an industry that can compare with it from the standpoint of the enormous dividends, **in dollars and cents**, that are returned to the public for this investment.

Colorado Needs More Improved Highways

By B. B. ALLEN

Chairman Advisory Board Colorado State Highway Department

THE State Highway department has just finished a most satisfactory and gratifying year. Considering the small amount of money available annually in Colorado for road construction, a very unusual program was carried out, including the completion of several large projects of particular importance and many smaller ones of equal importance to the communities they serve.

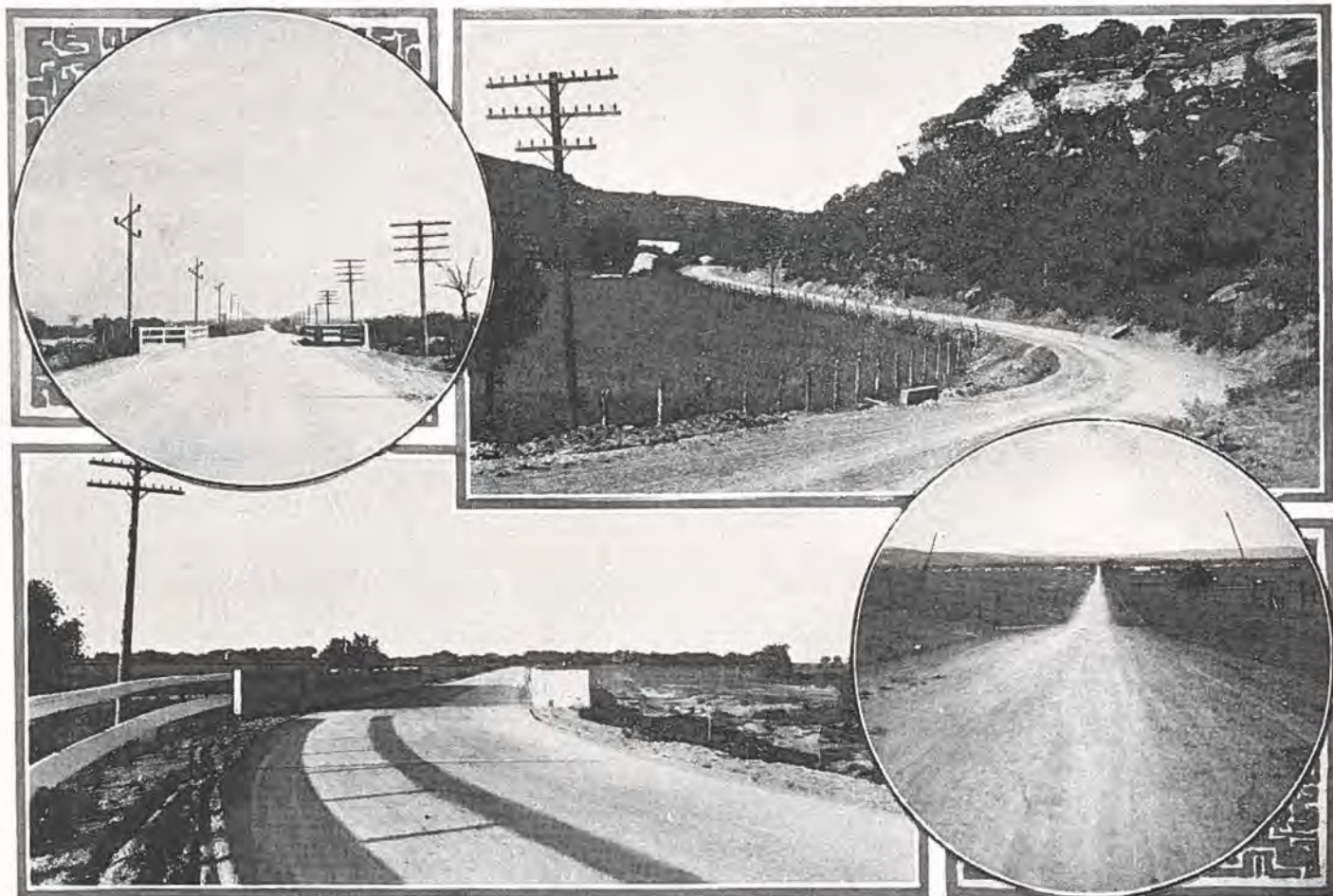
The year 1928 saw the beginning of state maintenance of Federal Aid highways in Colorado, and while it was late in the season before the necessary machinery could be assembled and the different district superintendents of maintenance could get their forces organized, every one was compelled to admit that the experiment was a success—and the results were far beyond the hopes of those responsible for this important change.

The present year will show considerable improvement in the condition of Federal Aid highways under state maintenance. The department is still handicapped by a scarcity of road building machinery, but in the matter of a very few years sufficient machinery will have accumulated to carry on the maintenance work as it should be.

A few miles of oil surfaced roads were built in Colorado last year. It is possibly too soon to know how this particular class of road will stand our Colorado climate, but those who have made a study of the oil surfaced road are firm in the belief that we will get the same good results as have some of our neighboring states! Further, that this will take the place of a more expensive construction where the travel is not heavy.

The writer, with the State Highway Engineer, attended the annual meeting of the American Association of Highway Officials in Chicago and found this meeting very interesting and instructive. Every section of the country seems to have its problems in road building, but most of them seem to have sufficient funds at their disposal to overcome these difficulties.

Colorado's greatest need at the present time is a more liberal allowance of money for road construction. During the past year the highway department received requests to build roads costing over \$25,000,000, with only \$3,500,000 at their disposal for this purpose. The roads that were asked for were not only of importance to the sections in which they were located, but were of great value to the highway system of the state.



Types of concrete and gravel surfaced roads in Colorado. Top circle—Concrete road between Swink and La Junta. Upper right—Gravel surfaced road between Dolores and Cortez. Lower left—Concrete road near La Salle. Right circle—Gravel surfaced road near Craig.

is known as the Forest Development fund, and the balance of the appropriation shall be placed in the Forest Highway fund. The Forest Development fund is apportioned between the several states and territories by the Forester, largely on the needs of the individual forests. The Forest Highway funds are apportioned to the several states and territories as follows:

Fifty per cent is apportioned to the states and territories in the ratio that the area of the forest land in a given state bears to the area of forest land in all states. The remaining 50 per cent is apportioned to the states and territories in the ratio that the value of the timber and forage resources in a given state bears to the value in all states. A total of \$58,000,000 has been apportioned under the Act to and including the fiscal year 1929. The total Colorado apportionment from this appropriation to and including the fiscal year 1929 to the Forest Development fund is \$1,294,252. The fiscal year 1929 state apportionment of this fund is \$148,012. The total Colorado Forest Highway apportionment to and including the fiscal year 1929 is \$2,581,765. The fiscal year 1929 forest highway state apportionment is \$329,208.

In addition to the above appropriations, the Act of May 23, 1908, annually makes available 25 per cent of the forest receipts for roads and schools. The fund is apportioned to the various counties within a given state in the ratio the acreage of a national forest in a given county bears to the acreage of that forest in all counties. The total appropriation under the Act to and including the fiscal year 1928 was \$19,411,794. The total apportionment to Colorado to and including the fiscal year 1928 from this appropriation was \$1,

722,621.42. The apportionment for the state for the fiscal year 1928 was \$103,842.87.

The programming of the apportioned funds is a very important step and one in which there is an increasing interest. The 10 per cent and Forest Development funds are programmed for minor roads and trails on recommendations made by the forest supervisors. The more important projects are reviewed and concurred in by the Forester, and on projects where the average estimated cost of construction is in excess of \$5,000 per mile, the construction of such projects is approved by the Secretary of Agriculture.

Summarized, Colorado's participation in these appropriations to and including the fiscal year 1929, exclusive of the 25 per cent fund over the expenditure of which the government has no jurisdiction, is \$6,004,906. The expenditures against the above amount to Jan. 1, 1929 are \$5,728,164.

The Forest Service has designed a comprehensive road system upon which the appropriations have been expended. The status of that system for Colorado at the end of the fiscal year 1928 was as follows:

	Total Miles in System	Miles Satisfactory	Miles Unsatisfactory	Miles Non-existing
Forest Highways.....	1,860	660	1,092	108
Forest Development				
Roads	1,679	591	708	380
Trails	11,693	10,492	1,000	201

The estimated cost to bring the remainder of the system to a satisfactory standard is \$18,285,196. Judging from past progress, it will require in the neighborhood of 50 years to bring the remaining portion of the system to a satisfactory standard.





Giant State Highway Department rotary snow plow working on Berthoud Pass.

Trans-State Roads in Colorado Kept Open During Winter

FOR the first time in history the Colorado State Highway Department is keeping the principal highways and mountain passes open this winter. The total cost will approximate \$50,000. Heretofore the work has been in charge of the counties. The snow removal this winter is confined to the Federal Aid highways and to one or two connecting lines, so that virtually every portion of Colorado is open to motor traffic.

Tennessee pass forms the key to the situation for the western slope, the northwestern and southwestern districts of the state. All parts of these districts can be reached over this pass. In the event the Saguache county commissioners keep open a connecting road Cochetopa pass may be included in the open passes. The mountain passes closed include Berthoud, Rabbit Ears, Monarch, Cameron, Cumbres, Wolf Creek, Independence and the Carleton tunnel highway. The "Million Dollar" highway between Ouray and Silverton also is closed.

The highway department is centering its activities on the main traveled roads in the state and are as follows:

The Platte river highway from Julesburg via Sterling and Fort Morgan to Greeley.

The main north and south road from Trinidad via

Pueblo, Colorado Springs, Denver and Greeley to the Colorado line.

The road in the Arkansas valley from the state line into Pueblo with the branch from La Junta into Trinidad.

Both roads from Kansas via Cheyenne Wells into Denver and via Burlington into Denver. The connecting road at Limon into Colorado Springs also is kept open.

The highway into Nebraska via Holyoke from Sterling is also open.

From Denver the paved road to Fort Collins is open to the Wyoming line. Also the highway from Denver up Turkey Creek via Fairplay to Buena Vista and Tennessee pass. From Colorado Springs the highway is open to connect with this road at Antero.

From Pueblo the open road is the main highway via Canon City, Buena Vista, Tennessee pass and Leadville, Wolcott and Glenwood Springs to Grand Junction and from there to the Utah line. At Wolcott the road is open to State Bridge and at Rifle open via Meeker to Craig, west to the Utah line and east to Steamboat Springs. At Grand Junction the road is kept open via Montrose to Ouray.

From Walsenburg on the main north and south highway the road over La Veta pass via Alamosa and

Monte Vista is open to South Fork and from Monte Vista north to Salida.

Robert Higgins, superintendent of maintenance of the highway department, says that in event the county commissioners keep open the road from Montrose into Durango that section also will be available for the motorist. There are several small stretches of roads that county commissioners are endeavoring to keep open to connect with the state highways.

"With the roads the department is keeping open every district in the state can be reached by motor," Supt. Higgins said. "Up to the present we have had comparatively little trouble, but we have proved that the principal state highways and the main connecting roads can be kept open thru the winter. We are keeping open La Veta, Poncha, Raton and Tennessee passes and they will be kept open, too."

It is estimated by the American Automobile Association that \$5,425,000 will be spent by the 36 states in the snow belt in the removal of snow, or keeping highways open thru the winter. The A. A. A. says this concerns 122,000 miles. The cost per mile in 1927, the association adds, averaged \$45.18 ranging from \$6.40 in Virginia to \$136.32 per mile in Wyoming.

"It is estimated," the A. A. A. report said, "that every \$100 spent on snow removal yields \$1,000 in more efficient transportation and for general business. The closing of highways in winter would mean untold loss to the snow belt states."

Minnesota highway officials announce that 2,500 men are engaged in the removal of snow and opening highways for traffic. They have 150 speed plows, 70 tractor plows and 15 rotaries and the state has more than 3,000,000 feet of snow fences.

"With the highway department opening these roads in Colorado and keeping them open means that if they so desire county commissioners can open a road to connect with them, if travel and business warrants the expense," Supt. Higgins said. "The system permits one to reach any section of the state and when starting to be assured the road will be open. Of course, a sudden storm or blizzard may close a road but as quickly as possible it will be cleared. We have our equipment 'spotted' for speedy handling of any snow blockade that may take place."

The A. A. A. reference to open roads being a boom for business is borne out in reports from virtually every part of Colorado, according to information received by the state highway department.

Gasoline Taxes and Costs to Motorists

Interest among owners of motor vehicles in Colorado and the probable cost of fuel under the proposed raise in taxes is centering in four or five cents in taxes. In all probability the Colorado tax will be raised from three cents to four cents, with the extra one cent going to the state highway department entirely. In this event the one-half mill levy for highways will be discontinued by the legislature.

W. C. Markham, executive director of the American Association of State Highway Officials, at the recent convention in Chicago, presented comparative tables as to the cost per motor vehicle of the various gas taxes in various states. There were 15 states quoted, including Colorado, where the average receipts per motor vehicle in 1927 under the three cent tax was \$11.69 for Colorado and as high as \$15.19 in Tennessee and as low as \$10.29 in Iowa.

The report said for the country the average gas tax per car for two cents was \$9.63. Using this as a basis, the report stated, the income would be expected to be \$4.81 for one cent; \$9.63 for two cents; \$14.45 for three cents; \$19.24 for four cents and \$24.05 for five cents; but the actual receipts were two cents, \$9.63; three cents, \$13.85; four cents, \$21.34 and five cents, showing but little over \$1 per car gain over the four cents, and he added: "This naturally raises the question as to whether a five cent rate is not at the point where patronage is curtailed."

The latter statement is of especial interest as it is one of the debatable questions on the four or five cents tax in Colorado.

There was submitted in the report a table comparing the receipts per car from the four and five cents taxes on gasoline, as follows:

5-Cent Tax—6 States

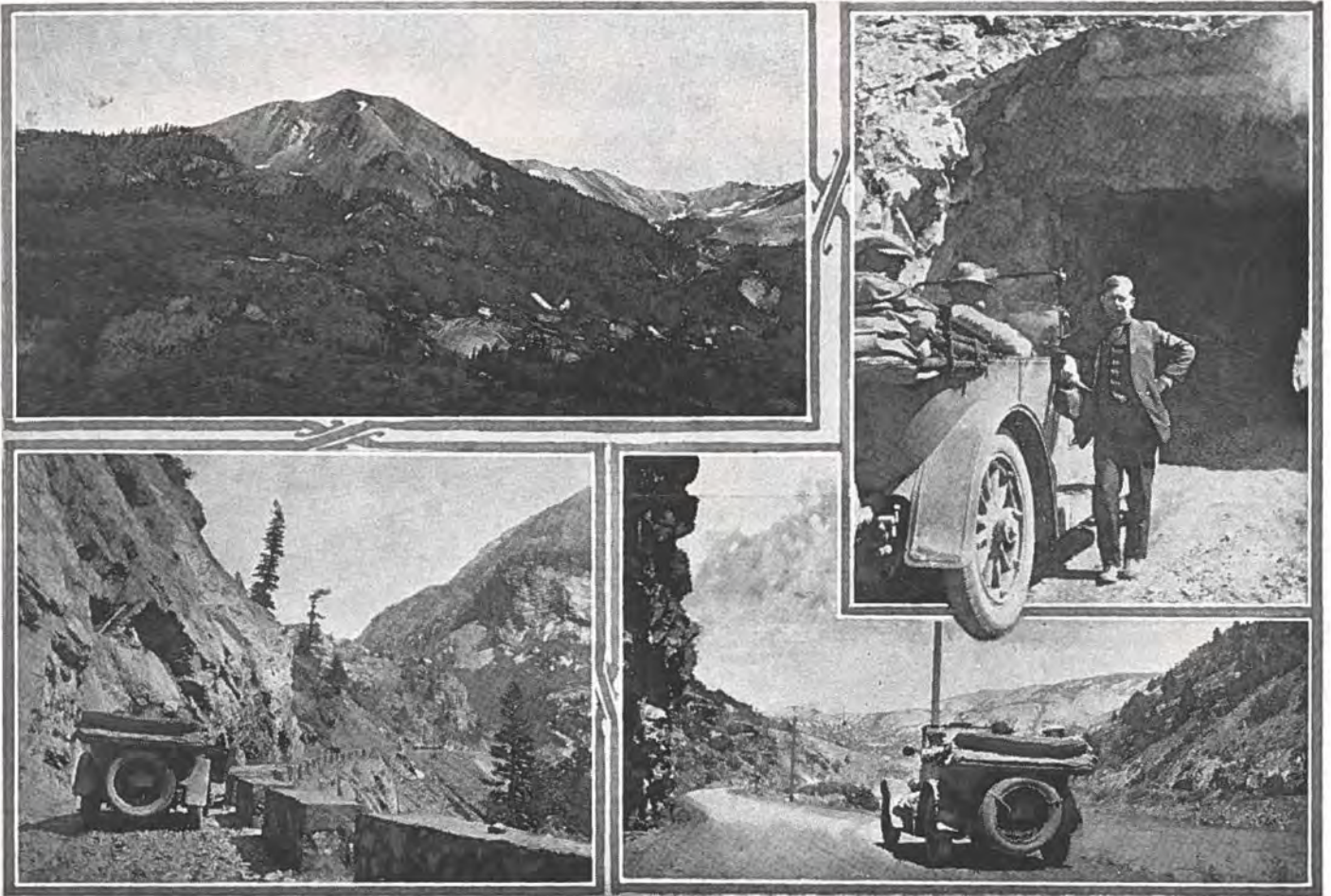
Florida	\$27.81
South Carolina	25.44
New Mexico	23.87
Virginia	21.14
Arkansas	21.00
Kentucky	20.70

4-Cent Tax—12 States

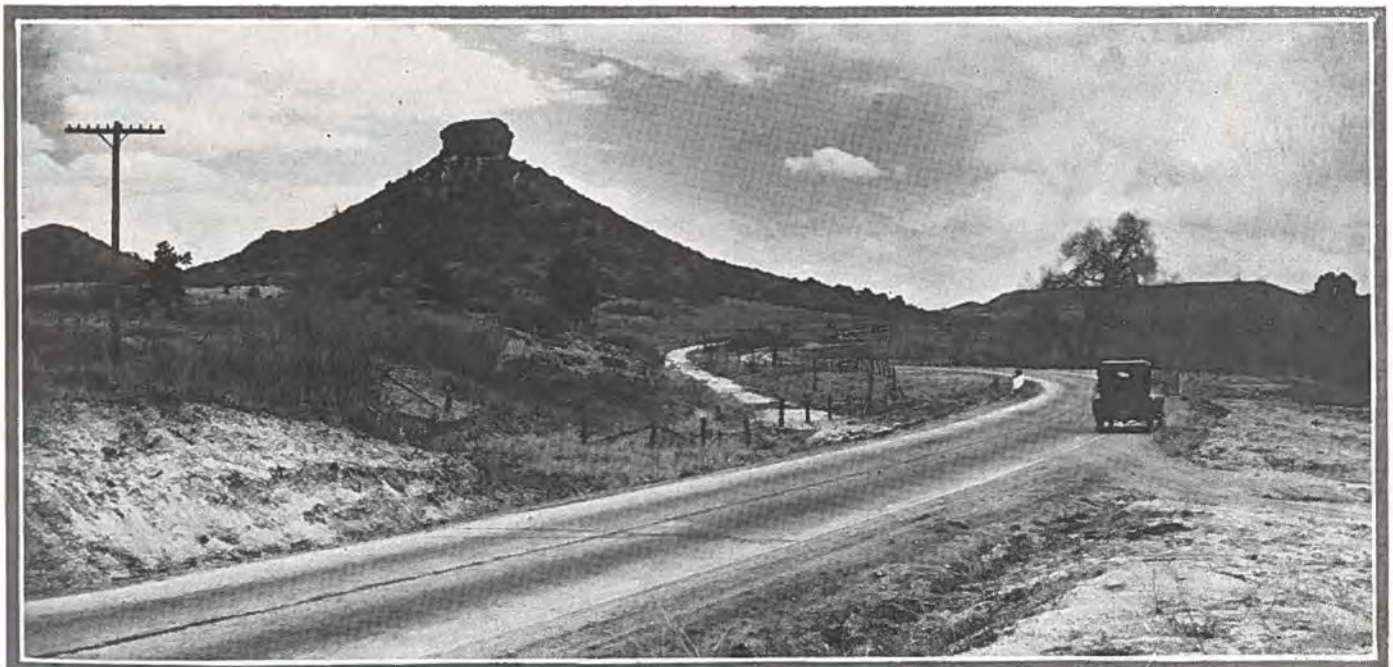
Alabama	\$24.26
Georgia	23.53
Mississippi	22.42
North Carolina	20.41
Nevada	18.29
Arizona	17.13
Idaho	15.51
West Virginia	15.43
Maryland	15.38
South Dakota	14.11
Maine	13.98
New Hampshire	13.20

The Windsor Poudre Valley newspaper is urging the county commissioners to continue the graveling of the road between Windsor and Lucerne. Part of it has been graveled. The paper also urges that several dangerous curves be taken out of the road. It is an important highway in Northern Colorado.

Improvement of the Rainbow Route from Salida to Montrose is being urged by the Gunnison News and other papers in that district. This is one of the projects down for improvement during the coming year.



Upper left—Red Mountain as viewed from Ouray-Silverton road. Upper right—Showing mouth of tunnel near Bear Creek Falls on the Ouray-Silverton road. Lower left—New road over Mother Cline Hill. Lower right—View in Glenwood canon.



Castle Rock as seen from the Denver-Colorado Springs concrete pavement.

Motor Vehicle Collections in 1928

MOTORCYCLES are rapidly disappearing from the streets and roads in Colorado, according to the annual report of Charles M. Armstrong, secretary of state, for 1928. In 1916, for example, there were 4,731 such machines registered in the state, and in 1928 there were only 1,234. There has been a steady decrease shown each year for the last 12 years. The same report shows that in 1928 there were in Colorado 958 busses; 85 trailers; 3,465 motor vehicle dealers and 65 truck dealers and only 17 motorcycle dealers. There were 7,977 drivers' licenses issued; 6,018 replacements of licenses; 27,282 special permits and 2,194 special engine numbers issued. Guest licenses for the year amounted to 11,098. There were 259,948 passenger cars that were registered, compared with 245,107 in 1927; 232,308 in 1926 and 83,244 in 1918. The registration of owners, trucks and total fees collected by counties for 1928 follows:

Counties	Owners	Trucks	Fees Collected
Adams	5,701	999	\$ 44,508.85
Alamosa	1,908	229	12,826.81
Arapahoe	6,545	547	40,778.74
Archuleta	456	52	2,727.66
Baca	1,892	271	12,675.53
Bent	1,932	156	11,730.81
Boulder	9,846	937	67,269.30
Chaffee	1,720	130	10,879.72
Cheyenne	810	92	5,160.47
Clear Creek	575	48	4,334.95
Conejos	1,518	203	10,128.58
Costilla	715	62	4,499.68
Crowley	1,486	144	9,329.50
Custer	542	114	4,255.52
Delta	3,542	534	26,571.58
Denver	74,681	4,764	519,831.80
Dolores	242	43	1,977.54
Douglas	1,151	123	7,463.79
Eagle	781	106	5,373.21
Elbert	1,838	175	12,172.29
El Paso	14,011	912	97,271.17
Fremont	5,062	469	33,802.32
Garfield	2,237	235	15,806.86
Gilpin	230	18	1,362.71
Grand	660	96	4,130.72
Gunnison	1,156	56	6,441.06
Hinsdale	81	14	609.73
Huerfano	3,468	195	21,232.02
Jackson	458	48	2,631.71
Jefferson	6,299	640	41,406.33
Kiowa	898	129	6,117.30
Kit Carson	2,519	396	17,901.64
Lake	910	11	5,212.84
La Plata	2,490	208	17,147.98
Larimer	10,265	945	71,620.29
Las Animas	6,402	461	41,414.47
Lincoln	2,091	364	15,286.96
Logan	5,530	830	40,533.30
Mesa	6,316	572	41,367.19
Mineral	155	20	1,157.27
Moffat	1,202	120	8,980.84
Montezuma	1,545	181	10,834.85
Montrose	2,532	297	17,344.85
Morgan	5,333	163	38,760.13
Otero	5,837	507	38,751.62
Ouray	402	25	2,245.70
Park	600	77	4,375.19
Phillips	2,022	420	16,137.68
Pitkin	305	15	1,641.50
Prowers	3,343	235	20,931.07
Pueblo	14,711	1,046	96,329.80
Rio Blanco	638	42	3,754.06
Rio Grande	2,550	470	19,680.37



View along Cameron Pass highway, altitude 10,000 feet.

Routt	1,990	175	11,556.89
Saguache	1,240	181	7,936.30
San Juan	224	11	1,458.19
San Miguel	646	54	4,235.26
Sedgwick	1,794	356	14,702.26
Summit	312	8	1,567.50
Teller	1,007	87	6,342.57
Washington	2,172	510	16,641.22
Weld	17,027	1,455	124,157.72
Yuma	3,347	578	24,866.96
Total	259,948	23,361	\$1,790,182.73

The Moffat county newspapers are rejoicing over the many road improvements that will be carried out in that part of Colorado during the year. The Bear river-Mount Harris; Muddy creek extension to the Victory highway; Oak Creek-Sidney; thru the Yampa river canon and other roads are proposed.

Extension of the main highway from DeBeque west along the Colorado river to the mouth of Plateau creek will save eight miles in the distance between Grand Junction and Rifle and will eliminate the curves and rough road over the hills south of DeBeque.

Public Highways and Schools

By KATHERINE L. CRAIG

State Superintendent of Public Instruction

Millions are being spent each year for the improvement of public highways; millions are being spent each year for the development of education.

Highways and schools are equally the crying needs for human advancement, human development.

Education makes the people what they are, good roads lend opportunity to the people to do what they do. The two go hand in hand for mental development, for growth and opportunity.

Good roads are necessary for the building up and continuation of county high schools, consolidated schools, union high schools, centralized schools all of which are made up of an aggregation of pupils from every locality in the county.

These schools must be made accessible to the pupil, transportation must be furnished and transportation can only be given where roads are made passable.

Today, good roads are as necessary to education as good buildings, good teachers, and modern equipment.

Children must be able to attend regularly, laws must protect their safety, by control of traffic, by guarding crossings, by speed limit, by precaution at sharp curves, and make it possible to obtain the training which can be given only in youth.

People do not fully realize how closely allied are good roads and education. They go hand in hand and one is in a large measure dependent upon the other.

Let us spend our money for good roads, let us spend our money for good schools. Both render invaluable service to mankind.

COLORADO LEGISLATURE PLANNING FUNDS FOR STATE HIGHWAYS

In all probability the present session of the Colorado legislature will take care of finances for a continuation of present highway improvements together with funds for new work. It is presumed by the legislators that a gasoline tax bill raising the tax from three to four cents will be passed, the one cent going entirely to the state highway department.

Governor Adams in his inaugural message advocated good roads. On this subject he said:

"The people of Colorado have been expending millions of dollars in the construction of highways and will continue to add greatly to these expenditures. Nothing effective has so far been done to protect these highways from damages and destruction by improper and destructive use. I suggest that you give serious consideration to this situation and enact needed legislation to preserve our system of costly highways."

In private conversation the governor has expressed himself as heartily in favor of the present highway program for the state and the continuing extension of good roads in all parts of Colorado. While he has not committed himself, yet he is quoted as saying that he will do all within his power for the extension of highways.

Members of the legislature also have expressed



View of Monarch Pass road, altitude 11,000 feet.

themselves in favor of a continuance of highway construction and to provide sufficient funds for carrying out not only present projects, but new ones. From every part of the state these members assert that the people demand good roads.

GOOD ROADS AND PROSPERITY

What good roads mean to increasing wealth and development of Colorado was disclosed by Dr. Royal W. Calkins, Speaker of the House of Representatives, who is a citizen of Cortez, in Montezuma county.

The completion of six miles of graveling the state highway between Cortez and the New Mexico line will be in the present year. This highway will connect with the one in New Mexico via Shiprock to Gallup, N. M., where it connects with the transcontinental highway through Colorado and to Los Angeles.

"The completion of this highway in Colorado will mean a graveled or paved road from Cortez through to Southern California and opens the way for trucking products of the Montezuma valley into Southern California," Dr. Calkins said. "Our products now are handled by truck to Phoenix and other communities in New Mexico and in Arizona where we find our apples, turkeys and the like are in demand. This new road will let us into Los Angeles."

Improvement of the Tennessee pass road east of Gypsum for 25 miles will eliminate railroad crossings between Red Cliff and Pando. This will have an important bearing on keeping the pass open the year around.

Denver is to construct additional roads and improve those now in the Park of the Red Rocks near Morrison during the year. The park recently was purchased by the city and added to the mountain parks system of the city. Surveys have already started.

State Highway Mileage in Colorado

THE report of the Colorado State Highway Department as of December 31, 1928, shows that Colorado has 343.2 miles of paved roads; 3,797 miles of graveled and sand-clay surfaced roads, and 4,732.5 miles of graded roads. This report also shows that the department is now drafting plans and has under way an additional 247.2 miles of standard type highway.

With the exception of about 15 miles, all of the paving has been completed during the past seven years. The paving completed during this seven-year period includes the paving from Littleton to Colorado Springs; paving from Denver to Boulder and Fort Collins; the paving from Denver to Eaton through Greeley; the paving from Wiggins through Fort Morgan and Brush to Sterling; 22 miles of paving north of Trinidad on state Road No. 1; 15 miles of paving between Pueblo and Colorado Springs; 20 miles of paving on the Santa Fe Trail between Pueblo and Lamar; the paving between Denver and Morrison, also the paving from Petersburg to Fort Logan; the paving from Aurora to Fitzsimons General Hospital, and the paving from Denver to Arvada.

Included in the total mileage completed during the past seven years there has been several miles of concrete and steel bridge structures, costing approximately \$5,000,000. Also, the state has constructed during this period twenty railroad underpasses and overhead railroad crossings, costing an average of \$50,000 each.

The mileage report in detail by districts and counties follows, with the omission of District No. 1, which comprises the City and County of Denver, hence is not included in the highway department statement:

DISTRICT No. 2

County	Pro- jected	Graded	Surfaced	Paved	Total
Delta	.....	65.1	53.1	.....	118.2
Eagle	8.9	95.3	24.4	.....	128.6
Garfield	7.5	86.5	62.1	.....	156.1
Gunnison	10.5	171.3	49.4	.....	231.2
Mesa	.....	154.0	53.7	5.9	213.6
Montrose	6.2	172.0	57.7	.....	235.9
Ouray	.....	24.8	24.7	.....	49.5
Pitkin	6.7	81.4	.....	.....	88.1
Rio Blanco	13.3	151.5	41.5	.....	206.3
San Miguel	12.0	128.8	8.3	.....	143.1
Summit	17.9	63.0	11.8	.....	92.7
Totals	83.0	1,187.7	386.7	5.9	1,663.3

DISTRICT No. 3

County	Pro- jected	Graded	Surfaced	Paved	Total
Alamosa	40.7	30.7	32.6	.....	104.0
Archuleta	.....	81.7	21.6	.....	103.3
Conejos	.....	82.0	33.2	.....	120.2
Costilla	21.5	64.4	44.4	.....	130.3
Dolores	.....	71.5	.....	.....	71.5
Hinsdale	.....	48.6	.....	.....	48.6
Huerfano	6.5	90.7	43.7	.....	140.9
La Plata	.....	28.9	72.4	.....	101.3
Las Animas	18.0	142.4	90.8	19.7	270.9
Mineral	.....	67.1	.....	.....	67.1
Rio Grande	.....	43.3	42.9	.....	86.2
Saguache	.....	86.0	84.4	.....	170.4
San Juan	4.5	5.0	35.1	.....	44.6
Totals	91.2	936.1	550.1	19.7	1,597.1

DISTRICT No. 4

County	Pro- jected	Graded	Surfaced	Paved	Total
Baca	221.2	16.1	.....	237.3
Bent	34.1	32.5	6.7	73.3
Chaffee	47.2	46.4	.....	93.6
Crowley	24.2	39.6	.....	63.8
Custer	87.0	8.5	.....	95.5
Fremont	16.0	83.3	73.7	2.2	175.2
Kiowa	88.7	57.4	.....	146.1
Otero	55.2	27.9	11.0	94.1
Prowers	108.4	83.2	1.7	193.3
Pueblo	60.5	113.4	20.0	193.9
Totals	16.0	809.8	498.7	41.6	1,366.1

DISTRICT No. 5

County	Pro- jected	Graded	Surfaced	Paved	Total
Cheyenne	.....	38.3	89.1	.....	127.4
Douglas	.....	44.9	82.2	36.1	163.2
Elbert	.....	74.6	52.3	.....	126.9
El Paso	6.0	70.6	136.7	34.2	247.5
Kit Carson	.....	71.5	103.3	.....	174.8
Lake	.....	22.0	52.7	.....	74.7
Lincoln	.....	212.9	108.0	.....	320.9
Park	8.7	90.1	116.4	.....	215.2
Teller	12.3	38.2	52.7	.....	103.2
Totals	27.0	663.1	793.4	70.3	1,553.8

DISTRICT No. 6

County	Pro- jected	Graded	Surfaced	Paved	Total
Jefferson	17.1	64.7	122.8	22.5	227.1
Larimer	1.3	120.2	114.0	21.7	257.2
Moffat	.....	166.2	19.0	.....	185.2
Boulder	.....	29.5	55.9	32.7	118.1
Clear Creek	5.2	47.6	55.7	.....	108.5
Gilpin	.....	32.1	4.0	.....	36.1
Grand	0.1	146.6	46.7	.....	193.4
Jackson	.....	116.4	19.7	.....	136.1
Routt	2.0	134.1	33.3	.....	169.4
Totals	25.7	857.4	471.1	76.9	1,431.1

DISTRICT No. 7

County	Pro- jected	Graded	Surfaced	Paved	Total
Adams	4.4	65.8	26.9	97.1
Arapahoe	22.8	67.6	12.7	103.1
Logan	14.0	140.6	15.7	170.3
Morgan	18.7	69.4	28.7	116.8
Phillips	19.0	85.6	.....	104.6
Sedgwick	65.9	.....	65.9
Washington	97.8	158.0	7.4	263.2
Weld	4.3	75.1	223.2	37.4	340.0
Yuma	26.6	220.9	.....	247.5
Totals	4.3	278.4	1,097.0	128.8	1,508.5

Improvement work has been made and is being made on the road between Florence and Chandler. Grading, surfacing and straightening of curves is under the direction of County Commissioner Bald.

The state highway up the Conejos river is to be kept open all winter by the state highway department as far as Elk Creek. The Antonito Ledger remarks that this will be "good news to the residents of the Fox Creek district" and predicts that in co-operation with New Mexico that the highway thru and over Cumbres pass will be kept open in another year.

Corrugated Culverts

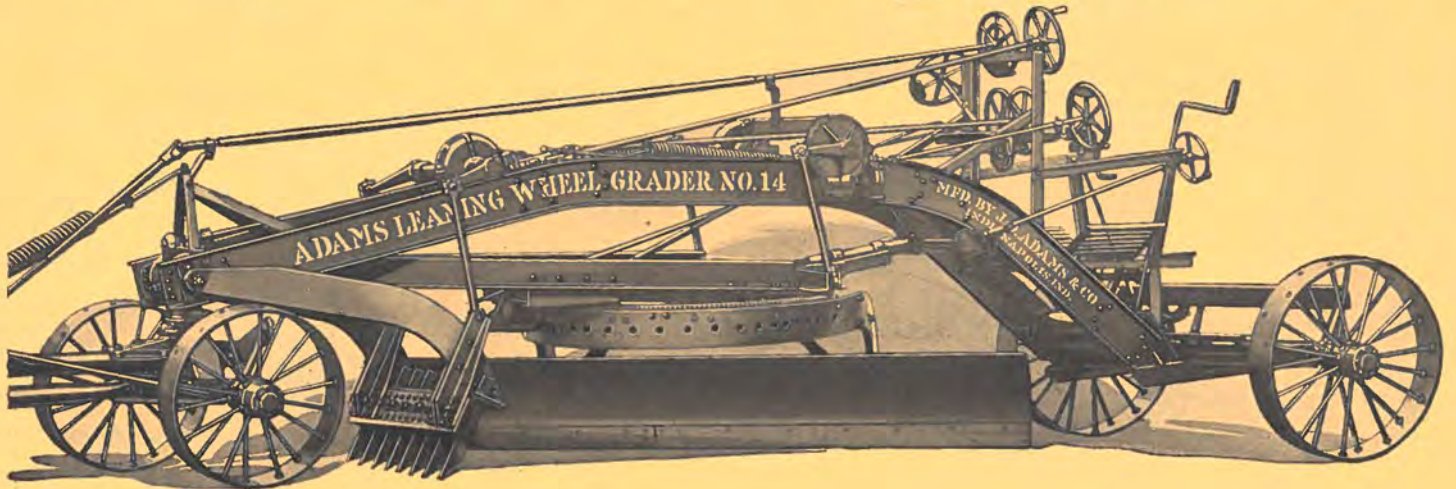
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The R. Hardesty Manufacturing Co.

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The Strongest Gr



THE NEW ADAMS GRADER No. 14 is the most powerful grader ever built and has the largest dirt moving capacity and yet it handles with the utmost ease. A new method of frame construction gives tremendous strength and rigidity—no frame twisting or weaving—the blade is held to a smooth, steady cut, *always*.

A new type blade control makes possible surprising ease in raising and lowering the blade—and the gear reduction used gives tremendous leverage to force the blade into hard ground. Through machine-cut, enclosed gears and adjustable ball and sacket joints, all lost motion is eliminated from the blade control.

The No. 14 is furnished with or without the independently controlled scarifier shown and with 12 or 14 ft. blade. Approximate weight with scarifier, 12,000 lbs. Alemite lubrication and Hyatt roller bearings are standard equipment. Write for special circular.

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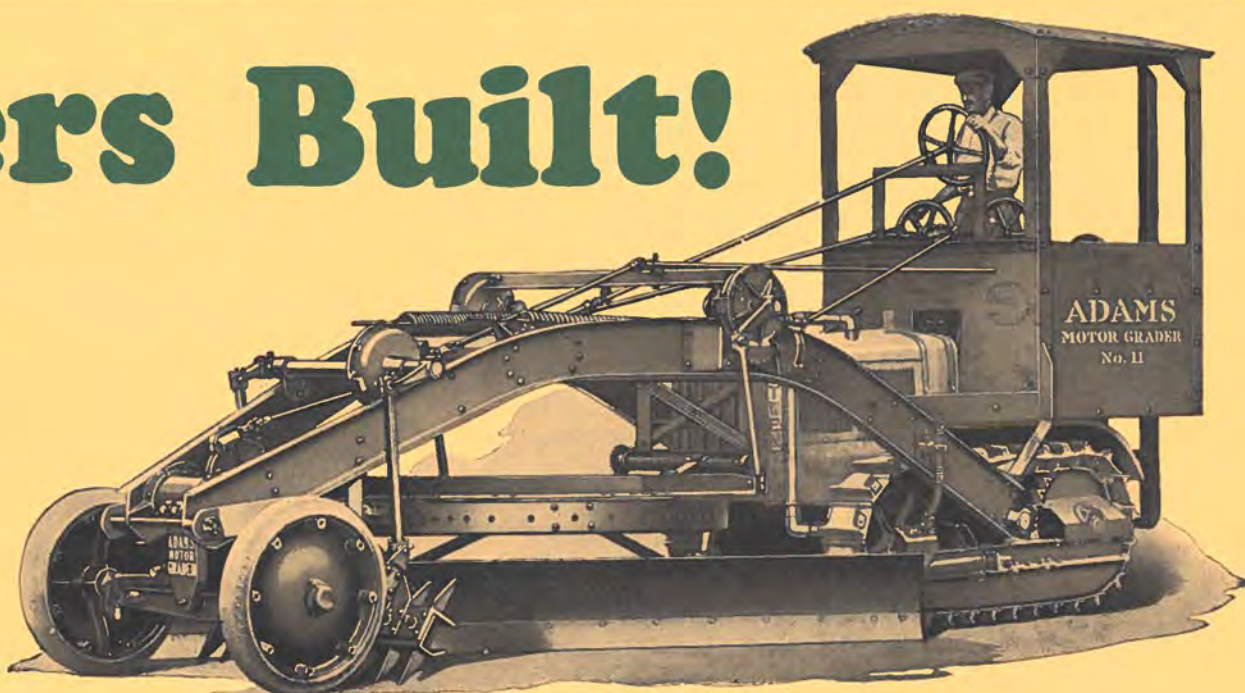
Motor Graders

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Graders Built!



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THE ADAMS MOTOR GRADER No. 11 sets a new high standard in motor grader construction, combining great strength, rigidity and easy operation with abundant power. Through 6,400 pounds effective weight on the blade, the No. 11 will cut smoothly and steadily over the roughest and hardest roads.

The new ADAMS frame construction gives tremendous strength and rigidity—no twisting or weaving. The new type blade control is easier and 50% faster than others. Machine-cut, enclosed gears and ball and socket joints, adjustable for wear, are used throughout.

ADAMS Motor Grader No. 11 uses the new Caterpillar "20" Tractor with 20 drawbar horsepower. Weight of complete outfit, approximately 15,500 pounds. Alemite lubrication throughout. Furnished with 10, 12, 14 or 16 ft. blade—with or without scarifier and with or without cab. Write for special circular.

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THIS appointment assures a continuance of good service to our present D-A customers and will make it possible for all owners of Tractors, Graders, Shovels, Trucks and other heavy duty equipment to take advantage of D-A Lubricating Service.

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| 1 Clings to metal—hot or cold. | 6 Lubricates better. |
| 2 Lasts four to six times longer. | 7 Saves you money in grease bills. |
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| 4 Will stand up under intense heat. | 9 Saves time spent in lubricating. |
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Four densities for all heavy-duty lubrication, varying from the consistency of light transmission oil to that of heavy cup grease.

Car load stock carried in our Denver warehouse.



D-A LUBRICANT COMPANY, INCORPORATED

MANUFACTURERS

INDIANAPOLIS, INDIANA, U. S. A.

Farm to Market Roads

By S. R. Rigg

President Colorado State Association of County Commissioners



THE first of another year is again here with its many problems confronting us, and we wonder how many realize the close contact we as commissioners have with those problems.

Have you ever thought of the fact that of all the elective offices, county, state, or federal, ours is about the only one requiring no (at least temporary) change of residence. This means we are at all times accessible to our constituents by a simple lifting of the telephone receiver, and don't think they neglect the opportunity!

As most of these calls have to do with road conditions, this brings us to the subject of rural roads. By these we mean those roads not receiving Federal or State aid.

These latter are the thoroughfares used by pleasure seekers and tourists who demand cement roads. Few imagine that the cost of a mile of cement road eighteen feet wide ranges from \$30,000 to \$35,000.

Our neighborhood roads over which the products of the farm find their way to market must be kept in condition that will enable quick delivery of crops, when matured, or profits will be diminished very materially.

We have found screened gravel to be the only solution so far, and if the road to be improved is graded

well in a manner to keep gravel from rolling off, it does not take more than about \$1,000 per mile on the average road, and upkeep in the way of occasional loads of gravel on seepage spots, soon produces a good surface that grows more solid with each year's necessary additions.

The only objectionable feature we have had with these roads so far, is that with limited budget it is hard to keep up with the demand for them. There will simply be no stopping place until all these roads have been graveled. This will take time, but the farmers are considerate for they know it can't all be done in one year or two.

In the meantime I expect in the remaining years I am in this office to adopt for my slogan "GOOD ROADS FROM THE FARM TO MARKET."

GASOLINE TAX COLLECTIONS

There was a total of \$6,929,191.67 collected from gasoline tax in Colorado in 1928, according to figures announced by the state auditor. Of the total amount \$1,113,824.98 was received from two cents on gas and \$5,813,366.69 from three cents on gas. Of the total amount, also, \$340,429 paid was paid under protest and part of this amount has been released.

The county portion of the tax amounted to \$2,628,089.03, and for the state highways \$4,406,006.13.

Of the total collections in two years it is stated that \$384,881.44 was refunded on trucks, tractors and such equipment as is exempt from taxation.

GASOLINE TAX APPORTIONMENT TO COUNTIES

Counties	1927	1928
Adams	\$ 16,284.37	\$ 11,994.48
Alamosa	9,315.47	10,169.87
Arapahoe	15,968.57	12,678.67
Chautela	17,362.00	12,760.31
Baca	38,039.86	28,869.24
Bent	12,335.66	9,054.54
Boulder	19,998.81	14,613.27
Chaffee	15,733.23	11,562.10
Cheyenne	21,507.83	15,735.08
Clear Creek	18,100.65	13,402.65
Conejos	20,255.19	14,847.98
Costilla	19,188.42	16,611.60
Crowley	10,843.50	7,880.97
Custer	16,088.15	11,796.79
Delta	19,995.19	14,600.91
Denver .....	.....	.....
Dolores	12,045.96	8,832.22
Douglas	25,523.38	20,072.24
Eagle	21,737.36	15,885.58
Elbert	21,371.20	15,675.58
El Paso	41,692.18	30,574.50
Fremont	29,216.45	21,629.57
Garfield	25,982.65	19,233.12
Gilpin	5,990.41	4,459.68
Grand	32,390.84	23,858.76
Gunnison	38,632.63	28,608.86

Counties	1927	1928
Hinsdale	8,168.63	6,003.48
Huerfano	19,737.38	16,582.69
Jackson	22,975.70	16,812.04
Jefferson	36,851.14	27,558.89
Kiowa	24,547.58	18,047.33
Kit Carson	29,322.62	21,592.55
Lake	12,814.15	9,227.45
La Plata	17,623.96	12,579.99
Larimer	43,254.63	31,758.65
Las Animas	42,593.52	33,302.80
Lincoln	53,884.53	39,565.71
Logan	26,251.71	20,883.96
Mesa	36,344.63	26,385.36
Mineral	11,350.53	8,288.86
Moffat	31,113.19	22,877.25
Montezuma	23,788.27	17,355.54
Montrose	39,832.23	29,127.69
Morgan	19,959.32	14,416.91
Otero	13,725.46	11,523.63
Ouray	8,320.09	6,114.68
Park	36,226.66	26,583.02
Phillips	16,035.93	11,978.22
Pitkin	15,008.36	10,882.77
Prowers	32,657.52	23,877.72
Pueblo	32,873.66	23,939.54
Rio Blanco	35,016.96	25,508.36
Rio Grande	14,523.16	10,648.03
Routt	28,658.99	20,974.88
Saguache	28,997.95	21,296.03
San Juan	7,543.05	5,509.35
San Miguel	24,223.45	17,684.99
Sedgwick	11,172.33	8,251.64
Summit	15,668.03	11,451.00
Teller	17,401.50	12,747.89
Washington	43,861.35	32,512.32
Weld	55,370.35	42,638.37
Yuma	42,352.73	30,539.66

Total \$1,505,651.21 \$1,122,437.82

COLORADO PROPOSES LAW TO REDUCE AUTO DEATHS

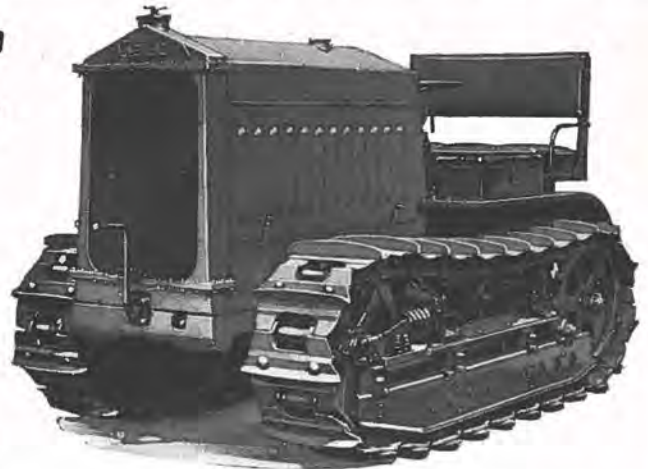
It is expected that the present session of the Colorado legislature will pass a law intended to reduce the number of automobile accidents and deaths not only in the streets, but on public roads. Governor Adams in his inaugural address called special attention to this problem as follows:

"It seems to me that injuries and deaths from automobile accidents have reached such appalling numbers that drastic steps must be taken to remedy the condition. I am reluctant to have legislation attempted or demanded to meet every problem of modern life but reckless driving of automobiles has become such a menace, not only to those who ride in them but to pedestrians and especially to children, that there seems no other recourse for relief. (I understand that the deaths from automobile accidents in the United States are now nearly 100 per day, of which number a large percentage are children.)"

The governor's reference to fatalities in the United States is witnessed in a recent report that in Cook county (Chicago) 1,000 persons lost their lives in automobile accidents in 1928.

CLETRAC CHOSEN!

Byrd Expedition Selects Cletrac Crawler Tractors for Trip to South Pole



NEW HONORS have come to CLETRAC—honors merited by the quality and performance of this mighty tractor and its ability to do well not only the every-day tasks in industry and road construction, but the hardest kinds of jobs under the most unfavorable conditions.

CLETRAC will literally pave the way to the South Pole. When Commander Byrd and his intrepid companions push their way into that icy, trackless waste, CLETRAC will aid in battling the way onward. From the base camp of the expedition at the Bay of Wales, two CLETRACS will go out to build relief shelters for men and storehouses for materials—grading and packing thousands of feet of landing fields for airplanes.

Only a tractor of thoroughly demonstrated ability could be selected for this hazardous enterprise. CLETRAC is built to stand the extremes of working conditions, not merely the every-day work, but the severest use and hardest jobs in road building, earth moving, exacting general industry service and agriculture.

See the duplicate of the CLETRAC CRAWLER TRACTORS selected by the Byrd Antarctic Expedition in our display rooms.



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DENVER, COLO.



Artist's conception of an expeditionary base camp. Notice tractors leveling airplane runways.

Design and construction by the State Engineer and Surveyor of New York; C. H. Wood, Senior Assistant Engineer, in charge of plans and specifications; E. D. Hendricks, Division Engineer, in charge of field work; J. C. Bell and R. B. Smith, Resident Engineers. Construction contractors: Du Bois, Bennett and Son, Schenectady, N. Y.; American Pipe and Construction Co., Amsterdam, N. Y.; American Construction and Dredging Co., Cleveland, Ohio; and J. W. Holler, Inc., Hudson Falls, N. Y.



*"It Couldn't Be Done"—
But Reinforced Concrete Made It Possible*

VALUABLE realty considerations made necessary a short-radius curve in the Western Gateway Bridge over the Mohawk River near Schenectady, N. Y. As usual, there were many who said, "It can't be done" in an arch bridge. The State Engineers Department of New York answered by designing two skewed, curved, reinforced concrete barrel arch spans, of 96-foot openings. The center line of the roadway has a radius of 242 feet, curving through a central angle of nearly 55 degrees. Unusual problems in thrust and impact loading were involved, once again demonstrating the wide adaptability of reinforced concrete for important and unusual structures.

PORTLAND CEMENT *Association*

Concrete for Better Roads

DENVER

NEWS OF THE MONTH

Current Events in the Field of Highway Engineering and Transportation—State, County and Municipal Activities

The Brush Tribune commenting on the work of the Colorado State Highway Commission says that "We are convinced that on the whole Colorado has obtained excellent value for the money expended during the past eight years for highways. But Colorado is not keeping pace with other progressive states of the Union. Its highway program is exceedingly modest as compared with other great states."

Two suits have been filed in the Jefferson county court against the county commissioners involving the width of roads. Whether the wagon trails of old days or the statutory width of 60 feet granted by the legislature in 1883 for public roads is the correct law is the question raised in these suits for damages. The suit alleges damages by county taking land for the road to 60 feet.

Breckenridge and other towns affected are rejoicing over the appropriation made by the highway department of \$20,000 for carrying on the road to the top of Loveland pass. This is the continuation of the highway up Clear creek canon to Silver Plume. The highway has been constructed beyond Silver Plume, considerable work was done in the last year and in 1929 the appropriation may carry it even beyond the summit of the pass.

Gardner Brothers and Glenn were the low bidders for the road work on Fool's hill between Grand Junction and Delta and work is to be pushed, according to information given out by the contractors.

In 1928 Boulder completed twelve blocks of city paving making a total of 16.4 miles of paved streets, or 213 blocks. The cost of the new paving was \$55,576.99. The Mapleton hill district of eight blocks was the most expensive, costing \$37,878.71. Concrete is the material in all Boulder paving.

E. G. Middlekamp of Pueblo, member of the advisory board of the state highway department, submits the following outline of improvements in the Pueblo district for 1929: Hold over from 1928—Lamar bridge, \$170,000. Clay Creek bridge, \$15,000. Manzanola subway, \$78,000. New work for this year—Grading and bridges from pavement to pavement on Colorado Springs highway, \$635,000. Paving to be laid before Aug., 1930, \$650,000. Paving at Rocky Ford, \$91,000. Paving at Canon City, \$75,000. Surfacing Two Buttes, \$7,000. Surfacing, Chaffee county, \$3,500. Surfacing, Crowley county, \$5,000. Surfacing, Custer county, \$2,500. Improve Phantom Canon bridges, \$5,000. Surfacing, Kiowa county, \$4,000. Grading, Granada to Holly, \$8,663. Bridge at Boone, \$4,000. Bridge at Siloam, \$4,000. Paving, Santa Fe to Northern, \$5,000.

Road from Greenhorn to Apishapa, 61½ miles, \$100,000. In addition—Wolf Creek pass, \$175,000. Road from Stonewall to San Luis, \$60,000.

Denver is planning an extensive use of oil for graveled streets in 1929 and D. D. Wallace, division superintendent of the city's highway department, is touring California to study the kind of oil used and other points relative to this treatment of city streets. He will spend some time in Los Angeles and other cities and also will inspect the state highways that have been oil treated. He will return to Denver Feb. 1.

Colorado, crossed by the Victory Highway, is interested in that transcontinental road. Word comes from Reno that the Nevada state highway commission is making plans to oil approximately 100 miles of the highway early in the coming spring. The commission reports that this will not only be a preventative measure but will make a much better road.

Legislators in Denver express the belief that at least a four cent gasoline tax will be passed by the present session. They say the proposed notes alone defeated the amendment for good roads in the November election and that no objection will be raised to a gas tax.



New highway on Cochetopa Pass in Cochetopa National Forest. Photo by U. S. Forest Service.

Announcing

The H. W. MOORE
EQUIPMENT CO.

AS DISTRIBUTORS OF



A 100%^o Densified Mineral Lubricant.

For your Tractors, Trucks, Rock Crushers. A car load in stock in Denver for immediate shipment.

Steel Drums—Average net weight 420 lbs. 16c

Steel Half Drums—Average net weight 300 lbs. 17c

We guarantee Dixoyl No. 200 to operate at 20" below zero. The perfect lubricant for all models of crawler type and wheel type tractors, trucks, etc.

MANUFACTURED BY

DIXOYL, Incorporated

ST. LOUIS, MO., AND MINNEAPOLIS, MINN.

The only gap in the concrete highway between Denver and Boulder is a 500-yard stretch at the Goodview crossing. This will be filled next summer and allowed to settle. No provision was made in the 1929 highway budget for paving this bit of road this year.

While no paving is contemplated in Logan county for the present year, yet there will be considerable road work in the county. Plans are made for straightening the road between Julesburg and Iliff and straightening the Sterling-Holyoke road northeast of Sterling. Several miles of this highway have been graded and it is reported that 10 miles must be completed before the link from the Dailey to the LeRoy road can be made. This work was started last fall.

The Colton-Oddie bill providing for \$3,500,000 annually for three years to build roads thru the public lands in western states has been introduced in both branches of congress, in the senate by Senator Oddie of Nevada and in the house by Representative Colton of Utah. This measure was passed by the last congress but vetoed by Coolidge. In Washington the opinion is expressed that it will pass. Non-taxable lands comprise the larger part of eleven western states, it is pointed out, and this bill, if passed and approved by the President, would compel the government to build roads across these lands.

The Denver Tourist Bureau estimates that in the 1927 tourist season automobile tourists in Colorado spent \$17,000,000. The auto camp in Denver, Overland park, had 31,426 campers and cottage camps around Denver accommodated 40,000 persons, the bureau reports. The bureau statement also cites that "good roads bring auto tourists" and that the more the roads and more extensive they are they will become better known thruout the country and attract additional thousands of motor tourists.

The Pueblo Star Journal has begun a campaign to have nails and other obstructions on public highways removed. Rocky Mountain Motorists, Inc., A. A. A. member, looks after this removal in the vicinity in which A. A. A. clubs are located. In all probability a bill in the legislature may seek a fund that will permit a systematic removal of such obstructions, and it is also proposed to force motorists who suffer accidents whereby glass is dropped on a public highway to remove the glass.

The Denver Tourist Bureau is authority for the statement that 50 cottage camps around Denver in the 1928 tourist season accommodated 40,000 motorists and from 150,000 to 200,000 motorists were accommodated in hotels and camp grounds throughout the state.

The citizens of Odel and the farmers of the community cooperated in graveling eight blocks of the streets of their town. The town board paid for the gravel and the towns people and farmers hauled and spread the gravel.

Attention of Colorado legislators and others to this: If only half of Nebraska's present highway mileage



Stretch of new road in South St. Vrain Canon.

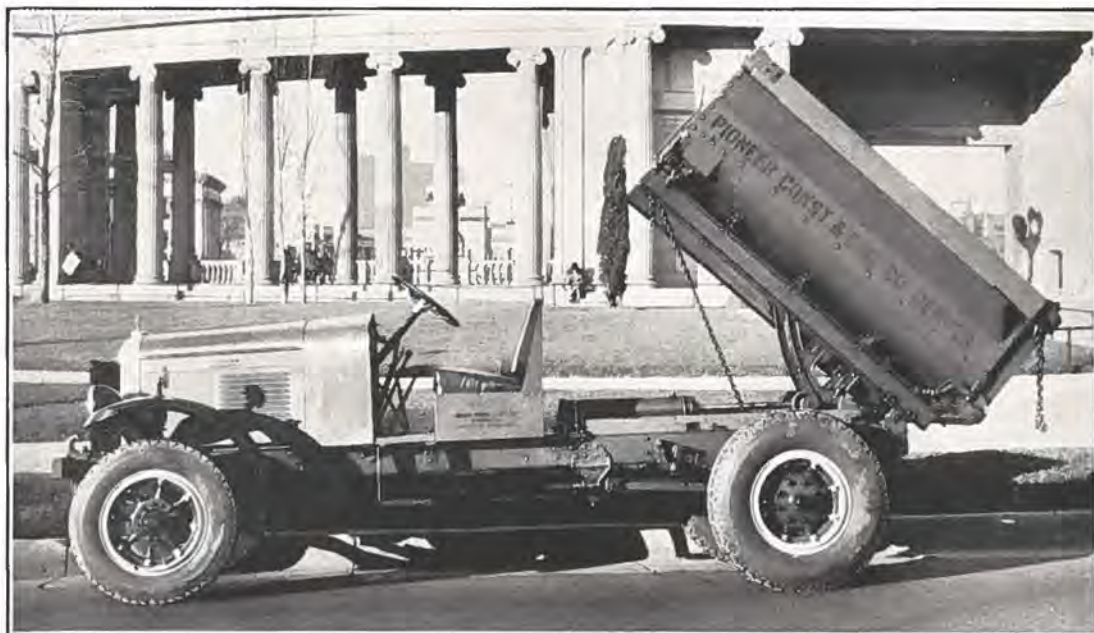
were hard surfaced it would save \$5,000,000 in the cost of operating motor cars each year, urged Clifford Shoemaker, district engineer of the Bureau of Roads for Iowa, Kansas, Missouri and Nebraska, in his recent address before the annual convention of Nebraska county commissioners.

TOTAL OF \$1,159,836,000 ROAD BONDS VOTED BY 24 STATES

Up to Nov. 6, 1928 it is officially reported that 24 states had passed bond issues for highway improvement totaling \$1,159,836,000. This sum is not included in \$240,000,000 voted in the November elections with Iowa, \$100,000,000; Missouri, \$75,000,000; West Virginia, \$35,000,000 and Louisiana \$30,000,000.

In the report Colorado is credited with bond issues of \$5,000,000 in 1920 and \$6,000,000 in 1922. Of western states Wyoming is credited with \$4,600,000; Utah with \$4,000,000; South Dakota with \$4,500,000 and New Mexico with \$2,000,000. California shows \$40,000,000 voted in 1919; Illinois a total of \$160,000,000 in 1918 and in 1924.

Of the southern states, as an example of highway construction in that part of the country, Alabama has had bond issues of \$48,000,000; Arkansas, \$52,000,000; North Carolina, \$115,000,000; Tennessee, \$51,131,000 and West Virginia, \$93,500,000.



PAY LOADS

Dumps the Loads -- Builds the Roads

All good roads come out of dump truck bodies. The better the body, the more efficient the entire dumping unit.

Truck manufacturers, dealers and owners are pretty well agreed that the sturdy construction features of Wood bodies are a guarantee of satisfactory performance and service—until the last load is dumped.

Wood Hoists are recognized as standard equipment by contractors, state, county and municipal officials throughout the country.

The Wood line is complete. A Wood Hoist and All-Steel Dump body for every make, model and capacity of motor truck.

Complete Information Upon Request.

WOOD HOISTS-BODIES

Manufactured by

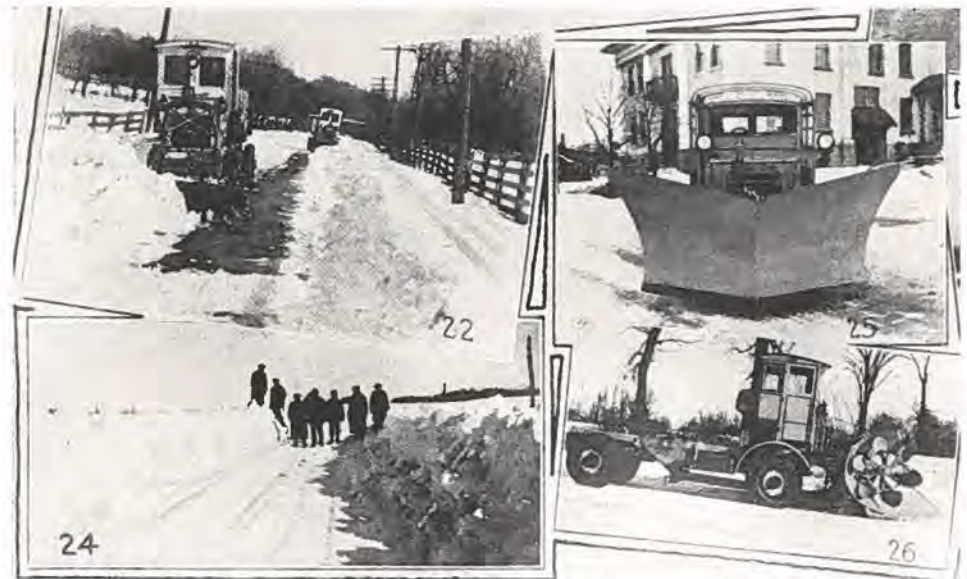
WOOD HYDRAULIC HOIST & BODY CO., DETROIT

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Liberty Trucks & Parts Co.

1532 Sixteenth Street DENVER, COLO.

Fleets of FWD Trucks



for Snow Removal

And Year-Round Maintenance

WHETHER the job in hand is general hauling, building and maintaining roads or pushing snow off the highways; if it means work in April, June or December, the FWD is the truck for the job. It is an all-purpose truck, fit for any class of work at any time of the year.

The FWD is accepted throughout the snow belt as *the* truck for removing snow. Its four powerful driving wheels push the plow through seemingly impassable drifts and it is easily handled under any condition. It is speedy. No time is wasted getting to the job and no time is wasted in performing the work. It does a straight, clean job the first time through; there is no need to go back over the road to "straighten it out."

The FWD will handle any type of plow. And it steers as easy as a touring car. That's a fact. It removes snow exceptionally well without extra effort, for by virtue of its very construction the FWD *fits* into the work.

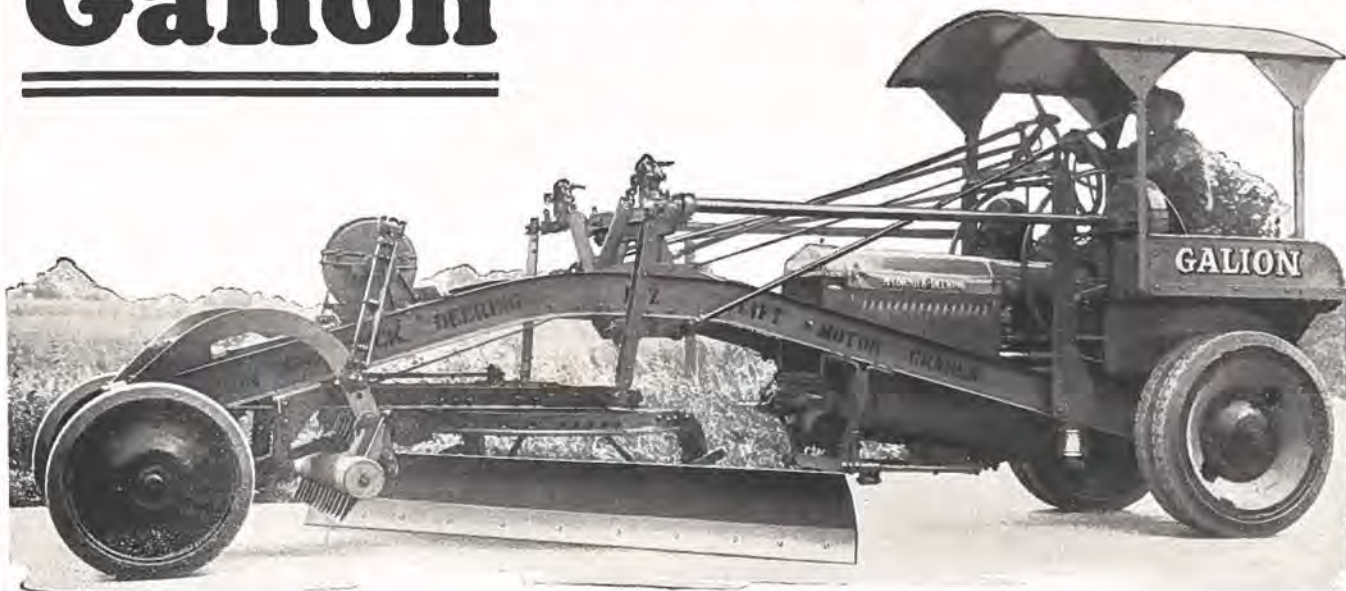
Pulling drags and graders is conceded to be hard work at best and requires a truck that is able to "stand the gaff." Such a truck is the FWD. Here is the reason: The pulling stresses are not concentrated on the rear of the truck.

The truck is not confined to snow removal only; it can be used at any time for other work. Hundreds of these trucks are being used by states and counties throughout the country. Let us tell you some of the reasons why!

Liberty Trucks & Parts Co. Distributors
Sugar Building, 16th and Wazee Streets, Denver, Colorado

Galion

One Man Maintainers, McCormick-Deering Powered



With either 10, 12 or 14-foot blades, or planer attachment (a special Galion feature). Can be used all winter maintaining your roads or streets. Remember, your grader is as good as the power behind it. Galion McCormick-Deering One-Man Graders outlast, outperform any other McCormick-Deering Power Grader built. A Car Load in Stock at All Times.

**H. W. Moore
Equipment Co., Denver**

Pierce Tested

PIERCE CONCRETE TESTING SERVICE is designed for contractors and builders—a SERVICE devoted to increasing profits and cutting their costs by designing economical concrete mixtures.

The Montgomery-Ward building is—

The Sears-Roebuck building is— *Pierce Tested*

Pierce Testing Laboratories

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Telephone Champa 7236

Truck Parts Depot

We carry the largest stock of parts in the West for

Liberty Heavy Aviation
Nash Quad F. W. D.
Woods Hydraulic Hoists

We can save you money on parts for Buda and Continental motors, Stromberg and Zenith carburetors, Eisemann and Bosch magnetos, Rusco brake lining, also other parts and accessories carried in stock. Prompt shipment on all orders.

Liberty Trucks & Parts Co.

1532 Sixteenth St.

Denver

Phone Main 7847

New Highway Equipment and Materials

NEW MOORE CONCERN OPENS OFFICES IN CHEYENNE, WYO.

George Meffley, general manager of the H. W. Moore Equipment Co., was unable to attend the National Road Show in Cleveland. John Moore and W. W. Sullivan, the service manager, represented the Moore concern at the big show. Mr. Moore was accompanied by his wife. While "back East" they visited several factories represented by the Moore firm in the Rocky Mountain territory.

Announcement was made of the organization of the H. W. Moore Equipment Co. of Wyoming, Inc. Headquarters will be located in Cheyenne. George Meffley is president; John Moore, vice-president; and John Werthan, secretary-treasurer. Mr. Werthan will also be business manager. A complete stock of the same lines as carried by the Moore concern in Denver will be carried at Cheyenne.

A merger of the Lakewood Engineering Co. and the Jaeger Mixer Co. is announced. H. W. Moore & Co. will continue to represent the combined lines in Denver, according to Mr. Meffley.

WILSON REPRESENTS THREE BIG LINES IN DENVER

Beginning January 1, the Wilson Machinery Co., with headquarters located at 1936 Market St., will sell the products of the companies listed below, in Colorado, western Nebraska, southern Wyoming and southwestern South Dakota: The Koehring Company, Milwaukee; Insley Mfg. Co., Indianapolis; the T. L. Smith Co., Milwaukee, and the Parsons Co., Newton, Iowa.

"Every customer will receive everything he has always received, but to an increasingly greater degree," says Harry P. Wilson, president.

The Koehring, Insley, Smith and Parsons concerns recently were merged into one holding company, with each operating as a separate unit. The Koehring Company manufactures pavers, mixers, gasoline shovels, cranes and draglines; the Insley Company manufactures mast hoists, steel derricks, concrete placing equipment and excavators; the Smith Company manufactures concrete mixers and pavers, while the Parsons Company manufactures trench excavators and back fillers.

Mr. Wilson was one of the visitors to the Cleveland Road Show.

DAN STRAIGHT JOINS FAIR COMPANY FORCE

Dan Straight, former Weld county commissioner, has joined the sales force of the Elton T. Fair Company. Mr. Straight will travel in southern and eastern Colorado for the Fair concern, selling Adams graders and DA lubricants. He is one of the best known former county officials in the state, having served several terms as commissioner in Weld County, and was president of the Colorado Association of County Commissioners one term.

On January 1 the Fair concern became sales agents for DA lubricants in Colorado. These lubricants are designed especially for hard usage on tractors, trucks, etc.

The Adams Company announce a new model to their grader line, the No. 14, which is built for heavy mountain grading work. One of these models is now on display in the Fair show rooms, at 1611 Wazee Street.

NEW CLETRAC TRACTORS ON DISPLAY BY LIBERTY FIRM

A new six-wheel drive FWD truck has been introduced on the market, according to Richard Carlson, manager of the Liberty Trucks & Parts Co., Denver. This truck is designed to comply with all of the load limit truck laws enacted in various states during the past few years. They also are designed to handle high-speed snow plows.

Carlson also announces a new Indiana modern truck, designed for contractors and road builders. It is called Model No. 615-A, and is equipped with dual wheels and a six-cylinder high power motor. A fleet of these trucks was recently purchased by the Pioneer Const. & Eng. Co. of Denver.

Two Cletrac crawler tractors, exact duplicates of the machines which Commander Byrd will use on his Antarctic Expedition, are now on display in the Liberty display rooms.

CATERPILLAR TRACTOR CO. TAKES OVER RUSSELL GRADER CONCERN

Beginning the first of the year, the Caterpillar Tractor Co. took over the business of the Russell Grader Mfg. Co., of Minneapolis, Minn. The Clinton-Held Co., Denver, have been appointed sales agents for the combined lines in Colorado. This concern also are agents in

this territory for the "Holt" Combine Harvesters.

During the week of the Stock Show in Denver the Clinton-Held Company held a "Tractor School," under the direction of A. J. Held. More than a hundred "Caterpillar" operators and prospective operators attended the classes. The men were instructed in all phases of the operation and maintenance of Caterpillar tractors and Russell graders.

Immediately following the merger of the Caterpillar and Russell concerns, announcement was made of a reduction in the prices on Russell graders.

L. L. Clinton, president of the Clinton-Held firm, was one of the Denver dealers attending the National Road Show in Cleveland the week of January 12.

GOOD ROADS MEAN SAFETY

Improved highways assure safety, asserts Frank T. Sheets, chief engineer of the division of highways of Illinois. He was speaking before the American Association of Highway Officials in Chicago and explained the system of roads that Illinois was building. He asserted the highways in that state now were the safest in the United States because all curves are super-elevated. He went into the details of construction of these roads to assure safety to motorists.

GAS STATIONS AND PUMPS IN U. S. NUMBER 921,000

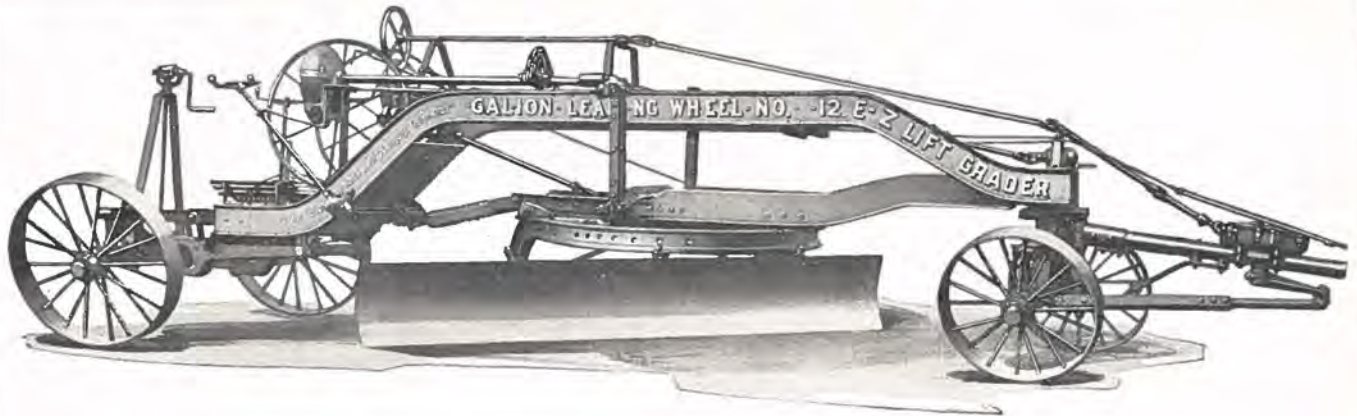
The United States has a gasoline pump for every mile of improved highway and a gas station to every one and eight-tenths miles.

The figures are based on a survey of stations and pumps showing a total of 317,000 retail gas stations and 604,000 pumps. The comparison is based on a total of 575,000 miles of improved roads.

A total of \$838,000,000 is invested in gas stations, pumps and tanks, the survey shows, representing seven and six-tenths per cent of the total of eleven billion dollars invested in the petroleum industry.



New six-wheel type FWD truck designed to carry the heaviest loads without damage to modern pavements.



Galion *Leaning Wheel* and Galion Straight Wheel Graders

Are built in sizes from seven-foot blade to twelve-foot blade and represent more pounds, more value per dollar than any other grader built. Enclosed gears in oil-tight gear cases for E-Z lift and E-Z steer make it easier for the operator. Result—more work per dollar invested. We have all sizes in stock for immediate delivery—ask our salesmen.

H. W. Moore Equipment Co. 120 West 6th Ave. Denver, Colorado

Phone Tabor 1361



100 ft. Riveted Low Truss Span, Dillon, Colo.

Bridges and Structural Steel

For every purpose

Plans and specifications gladly sent upon application

Minneapolis Steel & Machinery Co.
Denver Office, 15th & Wazee
Denver, Colorado

HERCULES HELPS FOR HIGHWAY BUILDERS

The Hercules Powder Company depends for its business on satisfied customers. Part of its service to customers is the dissemination of knowledge on better blasting practices, safety, and new developments in explosives. Below are some Hercules booklets which should be helpful to road builders. Send for those you are interested in.

HERCULES HERCOMITES

This booklet describes a new series of six powders which often save from 10% to 30% in explosives cost.

HERCULES DETONATORS

A handbook on blasting caps, electric blasting caps and electrical blasting circuits.

LAND DEVELOPMENT

An agricultural booklet which describes the handling of explosives and blasting supplies and gives information helpful to contractors.

HERCULES POWDER COMPANY

(Incorporated)

1822 California Street
Denver, Colorado

617 Kearns Building
Salt Lake City, Utah

INDIANA TRUCKS

One to five tons capacity



Indiana Model 615-A, with hydraulic hoist and dump body—one of a fleet owned by Pioneer Construction & Engineering Co., Denver.

Twenty Years At It!

Proved By Proofs

Wouldn't you like to know just where Indiana Trucks are in use? Write for a copy of handsome booklet—"Fleets of Indiana Trucks."

Specializing in the manufacture of Highway Construction and Contractors' Trucks. Designed and built to meet the exacting requirements of unusually severe service.

Model 615-A, two 7-bag batch capacity, shown above, is the ideal truck for general highway construction and maintenance work where speed and ability are required. Twenty-four State Highway Departments and hundreds of large job contractors are using INDIANA TRUCKS.

Indiana dump truck models do carry pay loads. They have a never-failing ability to work well, work at low cost and keep on working. Let our representative give you further information. He is a transportation authority. See him!

Liberty Trucks & Parts Co.

DISTRIBUTORS

Sugar Building, 16th and Wazee Streets •• **Denver, Colorado**

We carry a complete line of parts for all government released trucks, ready for immediate shipment.



Official Publication of the
COLORADO STATE HIGHWAY DEPARTMENT
 Denver, Colorado

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L. D. BLAUVELT,
 State Highway Engineer.

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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,
 1803 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

RAYMOND A. EATON, Associate Editor

Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
10 CENTS A COPY. \$1.00 A YEAR.

Our Cover Picture

COLORADO HIGHWAYS takes pleasure in presenting the photograph of Berthoud Pass and the state highway upon the front of the January magazine. The picture is not only inspiring, but interesting. It gives to the stranger in Colorado an idea of the high character of highways that the state is constructing across the Rockies, and also of the rugged grandeur of the mountains. This pass is familiar each tourist season to many thousands of motorists from all parts of the country. At this particular point the snow in winter fills up until from the top of the bank in the right foreground it is level into the canon across the road. Here the state highway crew last June broke through 25-foot drifts to open the road. The pass has an elevation of 11,315 feet above sea level and is one of the highest in the state and lies in Clear Creek and Grand counties. It derives its name from E. L. Berthoud, an engineer, who with Kit Carson, famous scout, mapped out a road from Denver over it through to Salt Lake for Ben Holliday, stage coach king of this country, before the advent of railroads. The photograph is courtesy of the Denver Tourist Bureau and the engraving by the Burke-MacMillin Company of Denver.



Keystone
 2621

BURKE-MacMillin
 ENGRAVING
 CO.



1803 1/2 Broadway
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COUNTY SUPPLIES
 LEGAL BLANKS
 GENERAL PRINTING
 BLANK BOOKS



**The
 Bradford-Robinson
 Printing Co.**

J. (RED) WILLIAMS
 Traveling Representative

1824-26-28 Stout St.

Denver

PLANS BEING DRAFTED

Proj. No.	Length	Type	Location
78-R	0.5 mi.	Overhead R. R. Crossing and Approaches	South of Minturn
97-R	.....	Bridge	East of Lamar
150-A	6 mi.	Gravel Surfacing	West of Craig
248-B	2 mi.	Gravel Surfacing	South of Buena Vista
253-D	4 mi.	Gravel Surfacing	West of Steamboat Springs
258-H	4 mi.	Gravel Surfacing	West of Sapinero
292-C	3 mi.	Gravel Surfacing	North of Minturn
272-D	2 mi.	Concret Pav't and R. R. Underpass	Manzanola east*

* Plans completed.

PLANS SUBMITTED FOR APPROVAL TO U. S. BUREAU OF PUBLIC ROADS

Proj. No.	Length	Type	Location
57-R	0.464 mi.	Bridge	North of Lamar
68-R	1.9 mi.	Gravel Surface (Oil Processed)	North of Monte Vista
282-H	7.029 mi.	Gravel Surfacing	North of Rifle
292-B	2.640 mi.	Gravel Surfacing	South of Minturn
295-D	1.818 mi.	Gravel Surfacing (Oil Processed)	North of Antonito

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT, 1928

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
2-R7	South of Aguilar	1.224 mi.	Paving	H. C. Lallier Const. & Eng. Co.	\$ 66,990.60	47	2-R7
2-R8	Aguilar, South	1.633 mi.	Paving	J. Finger & Son	66,660.00	87	2-R8
134-B	East and West of Vona	3.352 mi.	Gravel Surfaced	W. A. Colt & Son	32,605.00	27	134-B
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	79	138-A
144-C	Bet. Fort Collins and Laramie	2.934 mi.	Gravel Surfaced	Bedford & Woodman, Inc.	37,911.35	5	144-C
147-A	In Ute Mt. Reservation, S. of Cortez	15.896 mi.	Surfacing	E. J. Maloney	119,100.10	97	147-A
147-B	South of Cortez	4.833 mi.	Surfacing	E. J. Maloney	59,447.44	50	147-B
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	12	149-A
208-AR	E. of Grand Junction	0.507 mi.	Gravel & R.R. Grade Separation	Harry A. Roush	59,568.00	81	208-AR
242-C	West of Fruita	6.011 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	56,344.50	21	242-C
251-C	E. of Boulder	4.000 mi.	Pavement	J. H. Miller & Co.	150,263.60	90	251-C
253-C	West of Milner	4.502 mi.	Surfacing	Mountain States Con. Co.	83,108.40	96	253-C
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	95	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	16	258-G
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	25	262-I
266-D	South of Bondad	4.111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	96,075.30	9	266-D
271-C	West of Portland	2.430 mi.	Surfacing	J. Finger & Son	54,843.40	40	271-C
277-C	N. of Pueblo	4.363 mi.	Conc. Pavement	J. Fred Roberts & Sons C. C.	120,789.25	64	277-C
279-F	North of Baileys	3.444 mi.	Graded	J. Fred Roberts & Sons	126,000.00	80	279-F
282-AR1	South of Craig	600 ft.	River Protection Work	Hinman Bros. Const. Co.	11,925.00	94	282-AR1
282-E	N. of Meeker	6.421 mi.	Gravel Surfacing	Luke E. Smith & Co.	88,384.20	81	282-E
286-BR1	S. of Wyoming-Colo. Line	14.474 mi.	Gravel Surfacing	A. R. Mackey	38,978.00	95	286-BR1
286-C	Between Greeley and Eaton	5.566 mi.	Paving	New Mexico Const. Co.	126,360.35	100	286-C
287-D2	East of Kersey	0.921 mi.	Paving	S. & S. Const. Co.	25,269.80	88	287-D2
293-C	North of Ouray	3.661 mi.	Grading	C. V. Hollenbeck	62,997.80	50	293-C
296-C	N. of Greenhorn on S. H. No. 1	6.606 mi.	Surfacing	H. C. Lallier Constr. & Eng. Co.	115,466.80	91	296-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssier	38,426.00	20	298-B

WYOMING COMPLETES MARKING FEDERAL HIGHWAY SYSTEM

Wyoming is one of twenty-eight states which has completely marked the Federal highway system within its borders, while Colorado has marked approximately 75 per cent of its main roads, according to Rocky Mountain Motorists, Inc., the Denver A. A. A. club. The signs are of two general classes—standard route markers and caution signs.

This information is contained in a report by the Bureau of Public Roads of the United States Department of Agriculture. Standard signs for use on the United States highway system were adopted in September, 1925, and since that time twenty-eight states have completed the marking of this system within their borders. Wyoming is included in this list.

Colorado, California, Kentucky and Utah have marked 50 to 75 per cent of their roads, while Arkansas, Oregon, Connecticut, South Carolina, Louisiana, Delaware, Nevada and Idaho have marked 75 to 99 per cent. Texas expects to begin marking the roads in January, and Montana will begin in the spring of 1929. This system, when completed, will give the motor traveler an easy method of following main highways from coast to coast or from north to south.

The twenty-eight states which have completely marked the system are: Arizona, Georgia, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode

Island, South Dakota, Vermont, Virginia, West Virginia, Wisconsin, Wyoming.

COLORADO AND THE WEST TO ATTEND WICHITA SHOW

Colorado and the West will be well represented in Wichita February 26 to March 1, inclusive, for the 28th annual power farm equipment show of the South-west. Reports received from the state and West give these indications, while all advices from Wichita are that the show will be the largest ever given. The exhibits and displays will cover more than five blocks, not including those in municipal buildings and other rooms.

The exhibits will consist of and include all modern, up-to-date machinery and equipment from the smallest garden tools, such as garden tractors, plows, seeders, weeders, etc., to the mammoth tractors, combine harvesters, attachments and accessories used on the largest farm or ranch.

Manufacturers will have their latest advanced 1929 models and equipment on display at this exposition. This will be the largest exhibit of power farm equipment machinery and accessories in the United States.

IOWA REPORTS PROGRESS IN "GETTING OUT OF THE MUD"

The perennial tourist joke about Iowa mud roads will soon have to be discarded if this famous state where the "tall corn grows" continues to maintain its highway building record.

From April 1st to September 1st, 1928, highway construction work in Iowa was concentrated on 600 miles of state highway upon which the pavement was com-

pleted, while an additional 700 miles of pavement were under contract October 1st and are now in process of completion.

Iowa state engineers' estimate is that the daily record of completion for the year 1928 will approximate six miles of pavement per day.

MISSOURI STATE AUTOMOBILE LAW TO UNDERGO REVISION

Missouri is facing a complete revision of its automobile code and the street and highway rules of the state, which come under the jurisdiction of state officials. These revisions are included in a bill presented to the Missouri Legislature by the Missouri Street and Highway Safety Conference.


The purpose of the bill is to establish a state highway patrol, the patrolmen to have jurisdiction only over traffic offenses on the public roads; to fix a speed regulation which is tentatively suggested to be 45 miles per hour, with a severe penalty for careless driving; to provide for the issuance of a license to every individual driver of an automobile and to provide specific safety regulations covering practically every phase of vehicular traffic within the state.

ARKANSAS ROAD FUNDS

A recent report from Little Rock announces that Arkansas' good road program has been resumed with a rush, following the sale of five million dollars worth of short term notes issued by the State Note Board to a syndicate of Arkansas banks. This action is taken in connection with recent state legislation passed at the special session of the Arkansas Legislature.



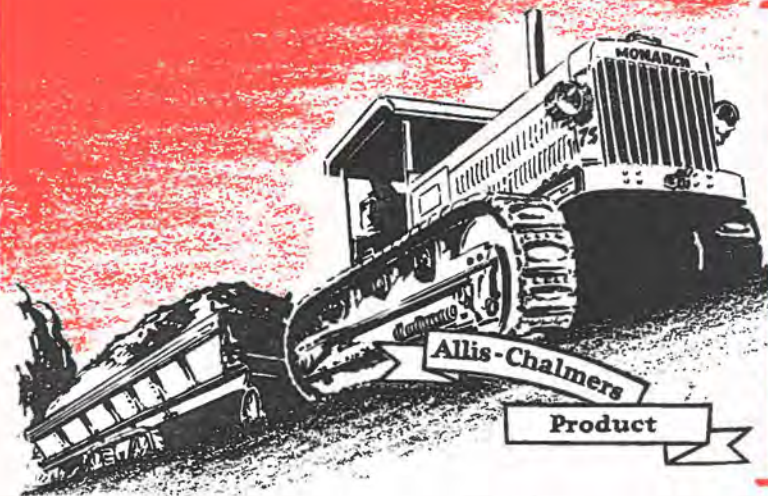
KEYSTONE
COPPER STEEL



The first Keystone Culvert installed in this territory was designed for the future that was about 17 years ago. The future has become the present. You who are called upon to think in terms of culvert life today have the past as evidence. Evidence your predecessors chose wisely when they specified Keystone Culverts.

COLORADO CULVERT
and **FLUME COMPANY**
Pueblo

*Built to
Serve
and Satisfy
Survive*



Buy

♦ ♦ your Tractor Power where Industry buys power machinery ♦ ♦

FOR eighty-one years industry has looked to Allis-Chalmers for leadership in the development of power machinery. In every quarter of the world its products are supplying towns, cities and communities with light, heat, water and power.

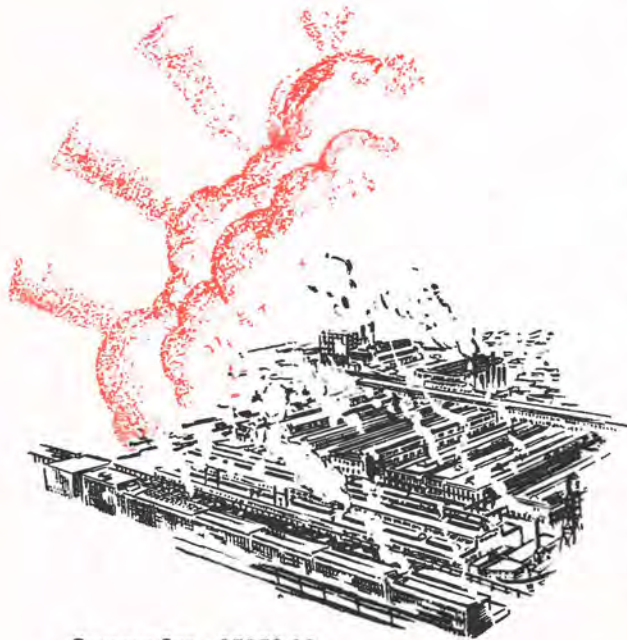
Everywhere the result of Allis-Chalmers mechanical advancement is known and vitally present, reducing costs for manufacturer and consumer, opening the way for greater conveniences and providing a measure of public service never before possible.

It is inevitable that the vast facilities and resources of Allis-Chalmers should be turned to the development of economical tractor power in the now nationally acclaimed Monarch "50" and "75" Tractors. You can buy in the Monarch, power for every tractor need. For hard jobs on the farm, road building, construction, pulling, threshing, driving—the Allis-Chalmers-Monarch is without equal in power or performance.

It does these jobs economically by providing the lowest priced drawbar horse power of any tractor on the market. You can do better if you buy your tractor where industry buys its power machinery—from Allis-Chalmers-Monarch.

Send for details.

Wilson Machinery Co.
1936 MARKET STREET, DENVER
Telephone Champa 438



Seventy-five - \$5350.00
Fifty - - - - - 3625.00
F. O. B. Springfield, Illinois

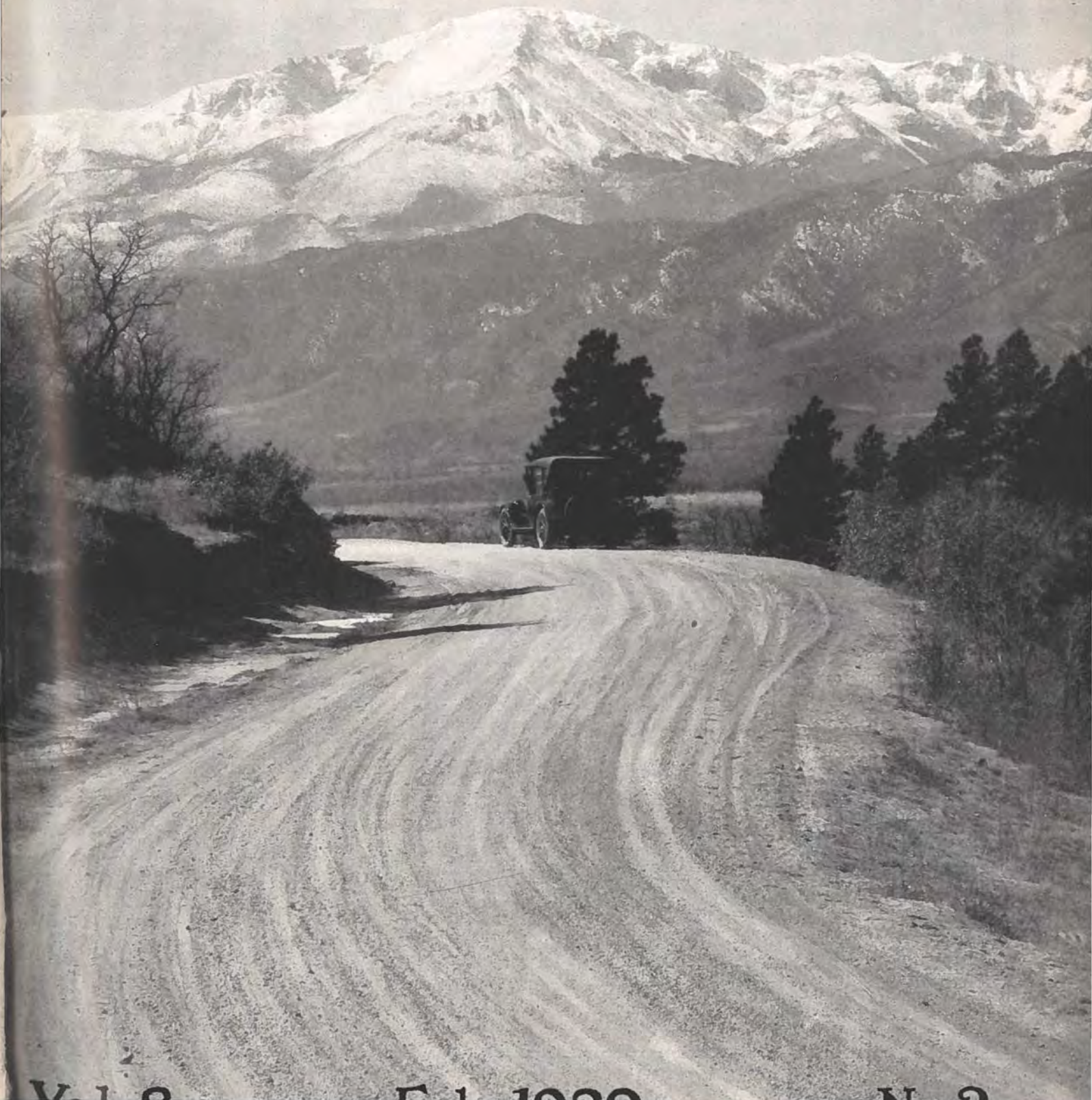


Monarch M Tractors



See our Exhibit at the 1929 A. R. B. A. Convention and Road Show — Cleveland, January 14 to 18.

COLORADO HIGHWAYS



CATERPILLAR

REG. U.S. PAT. OFF.

ANNOUNCEMENT

BIG REDUCTION IN PRICE of "Caterpillar" Tractors and "Caterpillar" owned Russell Graders

The enormous production and large sales in 1928 make the low price possible.

Caterpillar Tractor Company will manufacture a size Grader for every size "Caterpillar" tractor, and the "Caterpillar" policy of a low price and better Grader is already in effect.

There is built into the "Caterpillar" tractor twenty years' experience in manufacturing track-type tractors.



Beat Bad Weather

With "CATERPILLARS"

"CATERPILLAR" SIXTY has ample power for largest dirt moving machinery built.

Throughout Colorado there are hundreds of "Caterpillar" tractors giving evidence of their continuous and dependable performance, and low upkeep.

Can this be offset by a promise?

Is it a record of performance—or, a promise that determines what you will use?

New F.O.B. Denver Tractor Prices

Model 10	\$1,175
Model 2-ton	1,565
Model 20	2,065
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Official Publication of the
COLORADO STATE HIGHWAY DEPARTMENT
 Denver, Colorado

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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,
 1803 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

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Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
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Our Cover Picture

UPON the cover page of COLORADO HIGHWAYS this month is a view of Pikes Peak that is possibly new to the reader. It is from a point on the Black Forest road east of Colorado Springs and presents the famous mountain in all its majesty. The Black Forest road out of Denver is via Melvin, Parker and Franktown, and is graveled to a point east of Monument. Then it is a graded road in splendid condition to a point east of Breed and thence is graveled into Colorado Springs. It derives its name from the Black Forest through which it passes. The motorist who wants a pleasant drive, free from congested traffic, will find this road to his liking—and there's this view of Pikes Peak at the end of the highway. The photograph is courtesy of Jack F. Lawson, of Colorado Springs, and the engraving by the Burke-MacMillin Company, of Denver.



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[EDITORIAL]

"More Miles for Less Money"

This is the slogan upon which the Colorado State Highway Department has been working for the last seven years.

Results already attained are in evidence throughout the state.

Free from politics and conducted in a business-like way, the department has won the favor of farmers, merchants, citizens and road-users everywhere.

By this good roads program Colorado has been placed among the progressive states of the country. A trunk line system of roads was planned and is being carried out. An efficient patrol system has kept the roads connecting the principal trade centers of Colorado in the pink of condition.

These are indisputable facts. Any motor vehicle owner will verify them. Particular attention has been given to roads in the rural districts, and this same attention continues today and will be the policy of the future.

Stress has been laid by the department upon constructing major roads in those districts of the state where there is the heaviest traffic—the main centers of population. An example of this policy are the paved highways extending from Fort Collins, Greeley and Boulder into Denver and thence into Colorado Springs. Construction of the highway into Pueblo is under way.

One glances at the highway map of Colorado and observes that the mountain passes are crossed by standard highways and that these highways and the connecting roads spread over the map, reaching to every locality in the state. One observes, too, the extension of these lines of transportation until today even remote communities are upon or near to a state highway.

One of the rather startling facts is that for the seven years of the department under the present administration a total of only \$37,330,845.46 has been expended, and the state presents today 343 miles of paved highway and 3,797 miles of surfaced road, while there has been graded, and this progress made toward surfacing or paving, a total of 4,732 miles.

In view of the many millions of dollars being spent in other commonwealths, in many of them as much or more in a single year as Colorado's total, can one doubt but the department has and is making good that slogan: "More Miles for Less Money."

The farmer has welcomed the good road. It has meant cheaper and more rapid transportation of his

products to market. The good roads have brought the rural communities and the adjacent towns into close communion. No longer is the farmer isolated by reason of snow or mud.

This winter the department maintenance force is keeping the main roads of the state open, including Tennessee pass. The problem of mapping out the highways so that every district in the state could be reached by an automobile in the winter was one seemingly impossible of solution, but it has been done.

The work of the department laid out for the current year is extensive, and the end of 1929 will see completion of a large number of projects.

The eastern highway departments have not the problems to meet as has the Colorado department. It must be borne in mind that the Rocky Mountains bisect the state and that in Colorado this range reaches its greatest height. This giant barrier must be crossed, and to do so calls for the greatest of engineering skill, and a vast expenditure of money.

The work of the department is far from complete. Rome was not built in a day. Herodotus tells us that an Egyptian king built a magnificent road across the sands for the transportation of materials for the Pyramids, employing for this construction job 100,000 men for ten years. It was built of massive stone blocks.

One must take into consideration that even in that far distant time standard highway construction was a big undertaking. Today we have modern equipment of every character to expedite the construction of a highway, but the engineer never has solved the problem of grading a road today and surfacing it or paving it the day following.

Nature demands the right to govern highway building as she does everything else in this life. Nature cannot be changed. Hence, time must be given for a road prepared for surfacing or paving to settle. Unquestionably, the Egyptian king stormed over the delay in completion of his great highway without the realization that Nature insisted on taking her time to settle herself for the stone blocks, as we of today fret because she will not permit the immediate laying of gravel or concrete.

But one thought should be held by every Colorado citizen, the slogan of the Colorado State Highway Department—

"More Miles for Less Money."



Twin Lakes is no longer isolated and requiring a long and tedious trip to visit. The picture shows the lakes, the marvelous scenery and the state highway that is like a boulevard.

Marked Progress Made in 1928 in Colorado Highway Work

MARKED advance in the construction of standard highways in Colorado in 1928 is revealed in the annual report of the Colorado State Highway Department. The completion of projects during the year, the work under way at the end of the fiscal year, November 30, 1928, a large part of which is nearing completion, and plans for the year 1929 show the progress made in placing the roads of the state up to a parity with those of other states.

Not only has this progress been made on Federal Aid highways, but upon state highways in which the Federal fund does not enter. The work of the past year has included cement paving, surfacing and grading and also has included standard constructed bridges and underpasses to avoid railroad crossings. Outstanding among paving projects was the completion and opening of the pavement to Colorado Springs, forming a continuous stretch of cement highway from Fort Collins and Greeley on the north, each road through Denver and to Colorado Springs. Paving also was started north of Pueblo, and in the present year the grading will be finished and all structures installed on the stretch between Colorado Springs and Pueblo, opening the way for the paving in 1930.

The annual report of the department discloses that all districts in the state witnessed highway development in 1928, and this will be continued through 1929. It is carrying out the detailed plans of the department for making Colorado famous for its roads.

The report of the department on Federal Aid projects for the fiscal year ending November 30, 1928, shows

35 projects completed in the year, including 23 major structures of over 20-foot span. Five of these were underpasses at railroad crossings. The 35 projects were: cement paving, 62½ miles; oil treatment, 5¼ miles; surfacing, 43 miles, and grading, 32½ miles. Under construction at the end of the year were six paving projects of 18½ miles virtually completed; oil treatment, 14½ miles, with a little more than three miles finished; surfacing, 88¼ miles, with three-fourths completed, and three grading projects of 9½ miles with three-fourths completed. The completed oil treatment of 5¼ miles is from Alamosa to Antonito, in Conejos County. The oil treatment under construction is a little more than 14 miles and from the Wyoming line, out of Cheyenne, through Weld County.

Federal Aid projects, in which the government pays 50 per cent and the state 50 per cent, included the paving on the Colorado Springs highway south of Castle Rock; between Tomah and Palmer Lake; Palmer Lake and Pring, and also in Las Animas County between Trinidad and Aguilar; between Lafayette and Boulder, in Boulder County; on the Colorado Springs-Pueblo road in El Paso County; the stretch in Morrison to avoid a dangerous curve; west of Fort Morgan in Morgan County; between Las Animas and Fort Lyon in Bent County, and the Brush-Merino work in Morgan and Washington counties.

Federal Aid surfacing projects were carried out in Larimer, Garfield, Mesa, Grand, Gunnison, Montrose, La Plata, Rio Blanco and Moffat counties, while grading was done in El Paso, Douglas, Park, Weld and

Eagle counties. Grading between Palmer Lake and Pring, south of Castle Rock, and between Larkspur and Monument in these projects were paved.

Federal Aid projects under construction at the end of the year included six for concrete paving, being between Trinidad and Aguilar, between Lafayette and Boulder, north of Pueblo, north of Greeley, and east of Kersey.

Surfacing operations on Federal Aid projects under construction at the end of the year were in Kit Carson, Grand, Larimer, Montezuma, Elbert, Mesa, Routt, Gunnison, Montrose, Costilla, La Plata, Fremont, Rio Blanco, Pueblo and Archuleta counties, which gives one familiar with Colorado an idea of the wide extent of this work. There were only three grading Federal Aid projects under construction, totaling nine and one-half miles, being north of Baileys, in Park County; north of Ouray, in Ouray County, and north of Chattanooga, in San Juan County.

Aside from the Federal Aid projects, the Colorado State Highway Department has the state roads to improve, for which the state alone pays. In the last fiscal year the department paid for a quarter of a mile of paving at Sedalia and Pueblo. Oil treatment was applied to a mile of road west of Alamosa, and a fraction over three miles west from Rock Rest on the Mount Vernon canon route into the Denver Mountain Parks.

Surfacing entered largely into the activities of the department on state roads. Thirty surfacing projects were completed in the year in Delta, Gunnison, Dolores, Custer, Cheyenne, Jefferson, Washington, Weld, Yuma, Alamosa, Archuleta, Lincoln, Grand, Routt, Logan, Las Animas, Ouray, San Miguel, Conejos, Huerfano, Rio Grande, Sedgwick and Arapahoe counties, another example of the widespread work of the department. Of these projects, there were 20 miles from Wray east to the state line; 16 miles north and south of Alamosa; 17 miles south from Yuma; 20 miles between Trinidad and Stonewall; 10 miles west from Alamosa; and 10 miles from Monte Vista east and north, and from Del Norte north.

State grading projects numbering twenty-one were carried out in Garfield, Gunnison, Rio Blanco, Summit, Hinsdale, Mineral, Baca, Teller, Clear Creek, Weld, Jackson, Mesa, El Paso and Eagle counties, and included 32 miles between Springfield and the Oklahoma state line in Baca County, and 19 miles in Weld County between Wiggins and Roggen.

Included in the annual report is one by Paul S. Bailey, bridge engineer, who has charge of construction of all bridges and underpasses on both Federal Aid and state projects. The report shows that five underpasses were completed in the year, being near Swink, two near Monument, and one each near Larkspur and Kersey. Two overheads were under construction as the fiscal year ended, one being near Aguilar and one near Clifton. An underpass east of Manzanola and an overhead east of Minturn are being planned. He also remarks that "no serious floods occurred during the year."

In bridge construction by the state, there were twelve projects completed and included structures over the Ariekaree river near Cope, in Washington County; over the Cache la Poudre river west of Fort Collins, in Larimer County; over the Conejos river east of Romero, in Conejos County, and south of Deckers over the South Platte river. Of distribution of costs in the



Showing stretch of newly completed pavement near Fort Morgan on U. S. Highway No. 38.

bridge department, Mr. Bailey, in this report to the department, says:

"The estimated costs of the major structures amount to \$571,778; of this amount \$438,886 was for Federal Aid projects and \$68,262 was for state projects, with \$64,630 for county and forestry projects.

"The estimated cost of the major structures amounted to \$345,850, making a total of \$917,678 for all structures. The bridge department salaries for the year amounted to \$10,610.

"Equipment and supplies amounted to \$90.50, making a total expenditure of \$10,700 for the bridge department. This amount equals 1.17 per cent of the total amount represented in the structures and includes all drafting, inspecting and supplies for the year."

Surfacing under construction at the end of the year numbered seventeen projects and included roads in La Plata, Crowley, Kiowa, Cheyenne, Elbert, Clear Creek, Jefferson, Delta, Logan, Las Animas, San Miguel, Lincoln, Boulder, Washington and Gunnison counties. The three largest projects are: 27 miles between the Kansas state line and Crowley county line; 20 miles north and south of Limon, in Lincoln County.

Fifteen grading projects under construction included Garfield, Saguache, Baca, Clear Creek, Jefferson, Routt, Gunnison, Montezuma, Mesa, Huerfano, Lincoln, Phillips and Pueblo counties. Structure building included bridges over the Dolores river, in Montrose County; between Rangeley and the Garfield county line in Rio Blanco County, and five timber bridges in Washington County.

The annual report, speaking of Federal Aid roads, says that specifications and estimates have been recommended for approval by the district engineer of the U. S. Bureau of Public Roads, but contracts have not been awarded for two projects, one between Parlin and Sargents and the other northwest of Delta, the total mileage being about seven miles. Projects which have been submitted but had not been approved by the district engineer on November 30 include a stretch north of Lamar to the Arkansas river; approximately two miles of the Gunbarrel road in Rio Grande County; a fraction more than a mile between Sapinero and Montrose, and seven miles between Rifle and Meeker.

(Continued on page 14)

"Then and Now" --- Motoring Across Colorado

STERLING B. Lacy, former lieutenant governor and now budget commissioner of the state of Colorado, sat in his office in the Capitol building reading a clipping from a newspaper, and laughing. From time to time he only smiled, then came a ringing laugh. Two or three visitors observed him, and finally one of them wanted to know why all the humor.

"I'm reading a clipping from the Grand Junction Daily Sentinel of August 17, 1911, about a trip that Howard I. Piatt and I made in that month and year from Denver to Grand Junction," Lacy replied, "and while at the time it really was a wonderful achievement, yet today it produces humor. This is the heading of the story: 'Complete Trip from Denver in Hupmobile'; and this: 'Howard I. Piatt and Sterling B. Lacy Make 100 Miles a Day in New Car—Great Trip and Also the First to Be Made in Hupp.'"

"Of course, when I read the story it awakens memories and incidents of this trip, which was looked upon as a marvelous one in motor transportation across the state. And it was. I'll just read you the story the Sentinel had on this trans-state tour seventeen and one-half years ago."

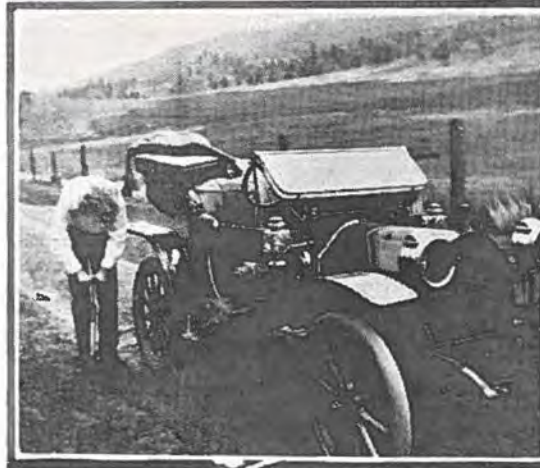
Mr. Lacy then read this story:

"Driving a new 1912 model 20-horsepower Hupp from Denver to Grand Junction, Sterling B. Lacy and Howard I. Piatt reached this city last night at 7 o'clock after having averaged 100 miles a day on the road.

"The car held up under the heavy trip in good shape but they lost a tire through a nail puncture which held them up for some time just before entering Buena Vista. Both of the tourists declare that they had the time of their lives.

"The scenery through the Rockies cannot be appreciated from a railroad car, but from an auto it is too beautiful for description," said Mr. Lacy this morning.

"They left Denver Saturday afternoon, stopping in Colorado Springs that evening. They took the Ute Pass route through the South Park country from Colorado Springs. The Wolcottson pass, just before reaching the park, provided some hard work for the car, but after a good bit of effort the climb was negotiated.



Photos snapped by Lacey party en route from Denver to Grand Junction seventeen years ago—the good old days of motoring in Colorado.

"Buena Vista was reached that night, the tourists running into the reformatory ground in the dark. Piatt, Mr. Lacy declares, could hardly be coaxed away and Warden O'Neill insisted on his indefinite stay in the commodious building.

"They stopped in Leadville the following day, staying all night in Red Cliff. A stop was made in Glenwood Springs yesterday and they reached here shortly before dark last night.

"The convict road in the Plateau valley proved to be one of the best stretches they passed over in the whole journey. On the other hand, the trail from Grand Valley to DeBeque was the worst on the trip.

"Messrs. Piatt and Lacy have prepared a log of the journey, showing where stops can be made for water, gasoline, food, etc., for the benefit of other local tourists who might want to make the trip."

"Perhaps you noted," the state official continued, "that we left Denver Saturday afternoon, stopped that night in Colorado Springs, went to Buena Vista Sunday and stopped for the night; Monday made Leadville and put up that night in Red Cliff and reached Grand Junction Tuesday evening at 7 o'clock. Today

(Continued on page 16)



Showing method of handling sand and gravel by contractor on Fort Morgan paving project.

Federal Aid Projects Efficiently Constructed

By A. B. Collins, Division Engineer

THE construction of Federal Aid Projects 287-A3 and 287-A4, west of Fort Morgan on State Highway No. 2, offers a good example of what may be accomplished through the use of modern equipment, sound business methods and effective organization in the construction of concrete paving. The successful application of this combination by Edward Selander, the contractor, has resulted in the placing of 8.64 miles of pavement of exceptional quality and in exceptional time.

These two projects are continuous and are 3.55 miles and 5.087 miles in length. They form the continuation of Federal Aid Project 287-A2, a 4-mile paving project, west from Fort Morgan city limits, and extend the improvement of Highway No. 2 to a point approximately 13 miles west of Fort Morgan.

The contract was let to Mr. Selander for Federal Aid Project 287-A3 on May 14, 1928, and for 287-A4 on June 7, 1928.

Having more or less control over the matter through being the successful bidder on both projects, Mr. Selander considered it expedient to start paving operations at the west end of the last project to be awarded, and extend his work east to its connection with the previously constructed paving west of Fort Morgan.

Paving on this project started July 16, and the 5.087 miles were completed August 28, a total of 40 paving days being consumed on the work. The average daily output was 671.4 feet per day.

Paving on the adjoining project, F. A. P. 287-A3, 3.55 miles in length, was started August 30 and completed September 29. The actual paving time was 26 days, with an average daily output of 720 lineal feet of 18-foot paving.

In the spring, prior to coming on to this work, Mr. Selander, as contractor on the construction of Federal Aid Projects 288-A and B, completed some eight miles of standard paving, giving this one outfit a net output for the season of about 17 miles of pavement, a most satisfactory achievement for one season.

A central proportioning plant was used throughout these operations, consisting of a 30 cu. yd. Butler bin, with volumetric measuring devices, and a $\frac{3}{4}$ -yard

Koehring dragline, with clamshell bucket, for unloading coarse aggregate from cars, and charging bin with both fine and coarse aggregates.

Lyons crushed sandstone, railroad delivery, and Platte river sand, truck delivered, was used throughout the work, all material used being of exceedingly good quality and grading. This plant was operated with five men—a shovel operator and oiler, a batcher man and two laborers cleaning car bottoms.

Proportioned material was hauled from the plant to the road by Coleman trucks batched for three seven-bag batches. Depending upon the length of haul, a fleet of six to twelve of these trucks was used. Subgrade on these projects was extremely sandy and it is felt that the performance of these trucks was a big factor in the successful completion of the work.

Equipment on the grade consisted of a 27-E Multi-foote Paver with subgrade attachment, an Ord Finishing machine, a 5-ton turntable, two teams and a utility truck.

Labor on the grade consisted of a mixer operator, truck dumper, four subgrade finishers, two center joint men, three concrete placers, one finishing machine operator, three hand finishers, three form setters, eight curing men, one sack salvager, two form haulers, one teamster, two form movers and one utility truck driver, a total of 33 men. The excellent co-ordination which the contractor was able to inject into this organization resulted in an impressively simple operation which seemed to work with clock-like precision—no one in a hurry, no one overworked, and still recording a high daily output—organization exemplified.

The output on these projects was not only high in quantity, but high in quality as well. A careful water-cement ratio of .70 was maintained throughout, and with the excellent aggregates used, resulted in uniformly high-test concrete.

Seventy-two test cylinders from F. A. P. 287-A3 developed an average 28-day breaking test of 5,116 pounds per square inch.

One hundred and eleven test cylinders taken from F. A. P. 287-A4 developed a 28-day average of 4,644 pounds per square inch.

What Colorado Has Received for Little Money for Highways

By a Motor Gypsy

I AM signing my story as I do because it fits me. Perhaps there are some who would call me a "tourist nut," for in the summer months I ramble all over Colorado in my car. It is my vacation and my recreation. I am prompted to wonder if the average citizen of Colorado knows what he has in the way of roads, created in the last seven years by the present Colorado State Highway Department, and averaging under \$5,000,000 a year.

Pioneers, like myself, recall the days of freighting outfits, stage coaches, burro trails along the side of a mountain—and they were mere paths—toll roads and all the stiff grades where four mules bent low in the collars to pull the load and four yoke of oxen struggled slowly to make the grade with the big wagon behind them.

What a difference today! In an automobile one rolls easily over the high passes, through the valleys and everywhere on highways that are boulevards and on easy grades, and this winter the department maintenance division is keeping roads open so that you can go anywhere in the state, with possibly one or two exceptions, in your car. No longer are many communities isolated in winter by snow.

One to fully realize the marvelous system of highways that Colorado has today must be a motor gypsy; he must travel over Colorado and not only realize the system as it stands today, but hear of the plans for the future and thereby realize that no other state in the Union can offer a more wonderful system of highways for the money that has been expended. I know this for, being a motor gypsy, I have motored over a number of other states, from coast to coast and north and south.

When one gets down into figures, with the realization that \$5,000,000 a year has been the general average expenses for the department—and not all of this amount could go strictly into road construction—one should know what some of the states expended for highway improvements in 1927, for which figures are available, and these states have not the Rockies to consider. In 1927 Iowa spent \$43,000,000; Kansas, \$26,000,000; Nebraska, \$18,000,000; California, \$45,000,000; Oklahoma, \$25,000,000; Missouri, \$32,000,000; Michigan, \$57,000,000; Wisconsin, \$41,000,000; Oregon, \$19,000,000; Arkansas, \$17,000,000; Texas, \$21,000,000. The list could be extended.

One sees splendid highways leading in from the Lincoln Highway via Cheyenne and Laramie, the former to Greeley and the latter to Fort Collins, and at these cities connecting with a concrete paved road that carries the motorist through to Colorado Springs—said to be the longest straight bit of concrete paving in the United States. One must also consider the paving into Boulder from this highway.

The stage coaches and emigrants of pioneer days followed the South Platte river into Denver. Long



Views from Lookout Mountain have caused exclamations of delight from many thousands of visitors—and the view from this point is one of sublimity.

and other explorers traversed this route. Today there is paving or graveled road along this route through to Greeley. Extension of the paving is continuing and there is also to be a straight paving job east of Sterling to further improve transportation.

There are men living today who remember the old stage and freighter road to Morrison, up Turkey Creek canon and on via Conifer and Shaffers Crossing to Leadville. Today the road is paved to Morrison and beyond is a graveled road that is a boulevard, opening, also, to the motorist some of the grandest scenery in the state. It connects near Buena Vista with a boulevard that is a connection with two transcontinental highways out of Colorado Springs and continues on through Leadville, over Tennessee pass, along the Eagle and Colorado rivers to Glenwood Springs and through the Grand valley to Grand Junction, a scenic road unexcelled on this continent and solving a transportation problem for many thousands of people.

There is the wonderful highway along the Arkansas river, a route famous in history, through Pueblo, along the Royal Gorge, Salida, and on through the famed Gunnison valley to Montrose and to Grand Junction. From Walsenburg is that marvel road over La Veta pass to Alamosa and the San Luis valley, over Wolf Creek pass and into Durango and to Mesa Verde. From Durango the motorist will find the highway to Silverton and to Ouray, the "Million Dollar Highway," that

has earned the applause and caused the wonderment of world travelers.

One may follow the Berthoud Pass highway into the Moffat country and into a vast territory still young and which highways are rapidly opening to settlement and future wealth.

The motor gypsy in Colorado knows the marvel of the highways and their construction. Cumbres pass, Independence pass, Rabbit Ear pass, Mosca pass and others have been traversed by them, and up north Cameron Pass highway has opened a new and spectacular highway into the North Park country. The Poudre canon is traversed on this route—a canon rich in history and romance. There also is the Big Thompson highway out of Loveland and other towns into the great national playground.

Where there was a trail for the Indians, known as Ute trail over Ute pass out of Colorado Springs, that forms another of the wonderful highways constructed in Colorado, and from Cripple Creek one may travel the highway that takes the place of an old railroad grade and is known as the Phantom canon road, as awe inspiring and thrilling as any in the state. Another old railroad grade, that of the Colorado Midland, forms the Midland trail that is via the Busk or Carleton tunnel through the mountains.

Perhaps a better idea may be conveyed of the extent of the system of highways built in the last seven years by the statement that on the Western Slope one may motor for 1,300 miles on state highways—boulevards virtually all the time—and that carry you over the rugged San Juan range.

Aside from the purely scenic attractions and the highways one is traversing, one notes that standard bridges have been erected everywhere; retaining walls are seen along streams; stone walls guard especially dangerous places; there are underpasses and overheads to avoid railroad crossings; most roads are two-way roads and safe driving even for the inexperienced man or woman.

There is, say highway officials of other states who have toured Colorado, just reason to marvel "that you have such a wonderful system of highways created in seven years and under such obstacles to overcome as you have in Colorado, and have done it under an average of \$5,000,000 a year."

Aside from these highways there are those maintained by the state and without Federal Aid funds. You will find these, too, wherever you go, some graveled, some graded and made ready for surfacing, and the state, I am told, has plans for oil processing several hundreds of miles of these roads.

I speak of the pleasure of the motor gypsy, but of far more interest is the commercial importance of this system, opening all districts in the state to rural communities and meaning real money to every citizen, regardless of the occupation of the citizen. The isolated community today is unknown in Colorado.

WICHITA SHOW DRAWS CROWD

Attendance at the power equipment exhibition and road show in Wichita, opening February 26 and closing March 1, is said to exceed any previous display of road machinery as well as interest in the road school. It is stated that men from all the western and southwestern states have registered, and many of the eastern states are represented.

The road show has attracted unusual attention, with the subjects discussed covering virtually every phase of highway construction and administration. Automobile and truck operating costs was the subject of a paper by H. B. Shaw, director of Engineers Experiment Station of the North Carolina State College. Among the subjects of papers were: "State Responsibility for State Highways," by Clifford Shoemaker, district engineer at Omaha of the U. S. Bureau of Public Roads; "Construction of Low Cost Surfaces in New Mexico," by W. C. Davidson, chief engineer of the New Mexico Highway Commission; and "Construction of Low Cost Surfaces in Wyoming," by W. A. Norris, formerly materials engineer of the Wyoming Highway Commission.

"An Analysis of the 5-Cent Gasoline Tax" is the subject of a paper by O. T. Reedy, senior assistant engineer of the Colorado State Highway Department.



Stretch of new pavement and concrete bridge near Aguilar on State Road No. 1.

Oiled Roads Interest Engineers

INTENSE interest was manifested in oil treatment of roads by those attending the highway engineering conference in Boulder, January 24 and 25, with the engineers asserting that the work would be continued and with prospects that this system would solve a problem in cheaper types of standard highways.

Of all the subjects down on the program for the two days of the conference, none attracted a more general discussion than did this one. The great tendency among highway engineers in the last year was toward developing some method of improving economically a standard of roads not quite as high in type as paving. There has been an insistent demand for something along this line and it is now believed that what is known as oil processing of gravel roads will meet the requirements.

The subject of oiled gravel roads came up as the last subject on the program for the conference. E. B. Bail, construction and maintenance engineer of the New Mexico State Highway Department, opened the discussion. He went into the details of the work carried on in New Mexico, stating that more than 100 miles had been oil processed, or work was in progress, and that very satisfactory results had been obtained. He stated that he was so well satisfied that the method would be continued through 1929 and probably until all gravel roads in his state were given the treatment.

C. H. Bowman, district engineer of the Wyoming State Highway Department, made a similar report for his state. He said that he had also found the method very satisfactory and that Wyoming would continue to oil process gravel roads throughout the state.

J. E. Maloney, assistant engineer, Colorado State Highway Department, said that Colorado had taken up this method only in the last year, but results thus far were very satisfactory. He called attention to oil processing of roads in the San Luis Valley and of progress made in oil processing the state highway into Greeley from the Wyoming line. There will be 14 miles of this road oil processed, and Mr. Maloney said that plans were being made for similar treatment of from 30 to 40 miles for the present year.

Another discussion of especial interest was the use of power shovels in highway work. This subject was treated in papers by F. H. Riebling, of the Colorado State Highway Department, and Henry M. Roberts, of the J. Fred Roberts & Sons Construction Company, of Denver. Mr. Roberts considered the subject from the viewpoint of the contractor and praised the co-operation of the U. S. Bureau of Public Roads. He said the contractors had been aided by the time and efficiency studies through which the U. S. Bureau of Public Roads had been instrumental in paving the way to reduction of operating costs to contractors. He paid especial attention to the effect of these studies in his own work in the last year near Baileys.

Other subjects that were presented were:

Design and Control of Concrete Mixes, by R. S. Phillips, Portland Cement Association.

Forest Roads, by J. L. Brownlee, District Engineer, U. S. Forest Service.

Subgrades and Subgrade Studies, by W. D. Ross, Materials Engineer, U. S. Bureau of Public Roads.

Analysis of Maintenance Costs, by George W. Marks, District Engineer, Wyoming State Highway Department.

Important Developments in Highway Research, by L. C. Campbell, Materials Engineer, New Mexico State Highway Department, and R. L. Downing, Assistant Professor of Engineering, University of Colorado.

Economic Analysis of the 5-Cent Gasoline Tax as Applied to Road Construction, by George W. Marks, New Mexico, and O. T. Reedy, Senior Assistant Highway Engineer, Colorado State Highway Department.

Extensive discussions followed each subject presented. The conference was opened by J. W. Johnson, District Engineer of the U. S. Bureau of Public Roads; an address of welcome by George Norlin, President of the University of Colorado, and the response by L. D. Blauvelt, State Highway Engineer of the Colorado State Highway Department.

Fort Collins and Windsor commercial organizations are still carrying on a campaign to obtain a direct and graveled highway between Fort Collins and Greeley via Windsor and following the Colorado & Southern railroad tracks. The organizations have made this one of the major points for the year. Fort Collins is particularly interested in the proposed road as a feeder out of Greeley for the Poudre Canon-Cameron Pass highway and as a route into the Rocky Mountain national park.

Kiowa County, Colorado, will not impose a tax levy this year for county purposes except .33 mill to finance the county fair. This is a county traversed by state highways where the state keeps up these highways, which gives another view of the importance of state highways in a county.



Concrete paver at work on Selander contract near Wiggins on U. S. Highway No. 38.

NEWS OF THE MONTH

Current Events in the Field of Highway Engineering and Transportation—State, County and Municipal Activities

The road between Denver and Pine has been made a continuous winding boulevard by the completion of the Pine Gulch road, six miles in length. This new road joins the Turkey Creek-Leadville highway two miles above Shaffers Crossing. The Turkey Creek highway, or Turkey Creek-Leadville highway, as it is called more frequently outside of Denver, forms one of the most interesting scenic journeys to be made in the state, and the road into Pine now affords additional scenic grandeur for the motorist.

Total expenditures on county roads in Teller County in 1928 amounted to only \$32,168, although a vast amount of important work was done. The Mt. Pisgah road west of Cripple Creek was finished; surfacing of the road out of Florissant and the final grading and surfacing of Comstock Hill, west of Woodland Park; widening and cribbing done on Four-Mile hill and on the shelf road above Tenderfoot hill on the Colorado Springs highway was some of the work. The Cripple Creek-Victor road was improved and part of it widened, eliminating some of the bad curves.

Gunnison is proud of the fact that all roads around that city were in excellent condition for the Christmas holidays, following a drop of 30 degrees below zero shortly before Christmas Day. Webster Whinnery, widely known resident of that part of Colorado, and his wife are quoted in the Gunnison Republican as having driven over from Lake City for a Christmas dinner in Gunnison and found the roads in fine shape.

Completion of eight and one-half miles of paving by the state highway department west of Fort Morgan "will effect a saving of thousands of dollars annually in transportation costs to farmers near here," according to statements made in Fort Morgan. Sugar beet growers and farmers have been enthusiastic boosters of the good roads movement, and especially of the paving projects in Eastern Colorado.

"Dead Man's Curve," on the lower Poncha road near Salida, will be eliminated. The state highway department has appropriated \$3,000 for the purchase of a right of way and construction of a straight road that will do away with two corners that have long been a terror to motorists. Work on the road will, it is said, start early in the coming spring. This improvement is one that has been stressed by Salida citizens and others in that part of the state.

The census of travel over state highway No. 2 north-east from Sterling to Julesburg was taken on three different occasions during the last summer, and the report was that from 1,200 to 1,500 vehicles pass over the road daily.

Can a Rocky Mountain pass with an elevation of 10,276 feet above the level of the sea be kept open in winter? The question is answered by reporting that on January 2 there were 15 inches of snow on Tennessee pass, but the state highway department force promptly removed it and automobile travel was not delayed. This pass is the connecting link in the department's plan of keeping roads free from snow so that all parts of the state can be reached throughout the winter by automobiles.

J. R. Cheney, division engineer of the state highway department at Durango, reports in the Durango Herald that the department has, including those projects completed in 1928, constructed 21 Federal Aid projects covering 82 miles, and in addition 88 miles have been improved as purely state projects and without Federal Aid. Among the completed works cited are three steel bridges, one over the San Juan river at Pagosa; one over the Piedra river and one under construction over the Las Animas river below Bondad. These highways and improvements, the engineer points out, are carrying out the plans of the highway department for a complete and up-to-date system of highways for the San Juan valley and San Juan basin.

Improvements of the Wolf Creek Pass highway, vital artery connecting the San Juan basin with eastern and southern sections of Colorado, are to be carried out, according to announcement.

When money is available work will be pushed on the construction and improvement of the Sterling-Holyoke highway. The last work done on this road was five miles south of the town of Dailey, and this bit forms an interesting point for highway builders and county commissioners. A large elevator grader was used, the dirt being piled several feet above the surface of the old road to insure a highway elevated enough to avoid drifting snow. In several districts in the plains region the highway is raised to lessen the dangers of snow.

Alamosa county residents are rejoicing over the promise of a state highway to Mosca pass entrance and to the famous sand dunes, the "American Sahara," near Alamosa. The highway is reported fixed to start from the Blanca-La Veta Pass highway about three miles east of Alamosa.

County commissioners may have an idea that they alone have trouble in snow removals. However, F. J. Altwater, superintendent of the city highway department in Denver, reports that it cost \$35,000 for clearing the streets of the Thanksgiving storm. It was the heaviest snowfall the department has had to handle in eight years, Altwater reported.

Considerations in Selecting Roadway Types

By C. N. Conner, Engineer Executive,
American Road Builders' Association

THE selection of type for low cost road surfaces is based on two principal factors, necessity and adequacy. Necessity is evidenced by the immediate need of a long mileage of roads of this class in communities which have insufficient funds for long connected mileages of high type surfaces.

The adequacy of certain materials for surfacing has been demonstrated by states which have used them extensively either as untreated surfaces or with surface treatments. They will quickly become inadequate without careful construction and intelligent maintenance.

Selection of untreated surfaces is based primarily on the availability and cost of suitable local aggregates for construction. They should be of such quality and gradation that their immediate surface can be bladed or dragged at frequent intervals by motor-driven equipment. Untreated surfaces which meet these requirements are sand-clays, gravel, shale, chert, disintegrated granite, traffic bound surfaces of fine stone, slag or gravel and caliche.

Macadams and lime rock need a layer of gravel or fine crushed stone before they can be maintained by blading. Surface treatments with non-bituminous dust preventives are adequate when maintained by frequent blading or dragging.

Bituminous surface treatments or surface courses are considered adequate provided they are susceptible to scarifying, reshaping and retreating at periods of from one to three years and do not exceed about \$1,200 per mile for this work and the materials. Such types are the dual bituminous surface treatments and the mixed-in-place bituminous surfaces.

Surfaces which approach or include the pavement types, such as bituminous macadams, natural rock asphalt and the pre-mixed bituminous surfaces which are laid hot or cold are not as readily maintained by scarifying, reshaping and retreating, and they are not as frequently selected for low cost surfaces.

The riding qualities of a surface are of prime importance. These types, which include blading, dragging or screening in their construction or maintenance have better riding qualities than those which do not. Types are desirable which under maintenance or reconstruction can be renewed by the addition of small quantities of new materials as required and without serious interruption to traffic.

The reconstruction and resurfacing of old existing surfaces which have been compacted through years of traffic is frequently possible and advisable. This new surface is usually one of the low cost bituminous types.

Progressive or stage construction is now recognized as a sound economic policy. It means the gradual improvement of a highway, first by proper grading and draining; second by the addition of untreated surfacing aggregates either in this layer, placed at periodic intervals as required, or placed to a greater depth in one operation.



View of paved street in Fort Collins connecting with state highway

As traffic demands increase this untreated surface is given one of several types of surface treatment. When traffic requirements become still more severe, a pavement type of surfacing may be indicated. By this method of stage construction, the original investment has not been lost because the materials already in the road have given adequate service for the changing conditions of traffic and the weak spots in the subgrade have been corrected under maintenance. In the last stage, the existing untreated or treated surface is of value as a subbase for the pavement type.

While it is true that tests have shown a greater cost of vehicle operation and tire wear on gravel and stone surfaces than on pavement types, yet it has not been shown by research or test what it costs the owners of vehicles to be without these gravel and stone surfaces. It is also probable that tests on surface treated gravel and stone would show a considerable reduction in vehicle operation costs below those for the untreated surfaces.

There is small doubt but that expensive pavement types have been constructed where a surface of less than half the cost would have been adequate. The desire to cut maintenance costs, to avoid the inconvenience of perpetual surface maintenance, and the lack of knowledge or of equipment to perform this maintenance have been the principal reasons for such selections.

Climatic and soil conditions apparently have not been of major importance in selecting low or high type surfaces because treated and untreated gravel is found in nearly every state regardless of the local conditions.

There is no doubt that the unit weight of vehicles is a factor which cannot be ignored in the selection of type. If the present or probable traffic is to include even a small number of heavy trucks, equipped with solid tires, low type surfaces will frequently become inadequate. Recently, busses, the milk trucks and gasoline trucks have become a factor which must be considered or regulated when making a selection of surface.



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Marked Progress Made in 1928 in Colorado Highway Work

(Continued from page 5)

Of the Federal Aid projects under construction, possibly the one that has attracted the most attention outside of Colorado is that of surfacing the highway between Cortez and the New Mexico line. This comprises a total of a little more than 20 miles, of which 15 miles was completed November 30. This highway connects with the Mesa Verde road from Durango and the east, and also at Durango with the highway via Silverton to Ouray and Montrose.

Interest outside of the state has been attracted to this road for the reason that at the New Mexico line it connects with the New Mexico highway to Gallup, which is on the main southern route to Southern California. The Automobile Club of Southern California has given this route particular publicity as a way through Colorado, and taking in Mesa Verde national park, for the motor tourist going to or returning from Los Angeles. Montezuma Valley citizens are especially interested in this road as opening a splendid highway from the valley into Southern California and over which, they claim, they can truck their products to California at a profit—another example of the importance of good roads from a commercial point of view.

Convict labor was not employed upon any Federal Aid or state project during the year.

The U. S. Forest Service participated in the work done on the Echo Lake-Chicago Creek highway in the Denver Mountain Parks area. This is the road from Echo Lake over into Clear Creek canon at Idaho Springs, forming a circle trip out of Denver through the mountain parks.

Among the state projects for the year was a continuation of construction of the highway above Silver Plume to cross Loveland pass. The highway was completed to one and one-quarter miles of the top and will be carried over the top the coming year. This is the "short cut" route out of Denver up Clear Creek through Georgetown and Silver Plume via Dillon into Leadville. At Wheeler a road is across to Red Cliff and is known as the "Holy Cross" and has been given publicity as a route to Red Cliff, where a shrine is proposed facing the Mount of the Holy Cross.

The Loveland Pass highway now is graded from Georgetown to the foot of the pass and from Dillon southwest to beyond Fremont pass, where it is surfaced into Leadville. From Dillon south the road is graded to beyond Alma, where it connects with a surfaced road into Fairplay and beyond.

The Federal Aid highway system in Colorado comprises 3,500 miles, and state highways 5,500 miles. Of the total Federal Aid mileage, a total of 1,200 miles have been paved or surfaced. The year just ended was the first in which the Colorado State Highway Department took over the maintenance of all highways, Federal Aid or state, and this is the first winter that the maintenance division is keeping highways open so that all districts of the state can be reached by motor vehicle.

The department books reveal that in the period from 1910, when the department was organized, to and including 1928, a total of \$50,408,461.51 has been ex-



Ord Finishing Machine at work on Selander contract near Wiggins

ended. The receipts for this period totaled \$51,146,800.56, showing a book balance of \$738,339.05 on November 30, 1928.

The cost of paving averages approximated \$35,000 a mile, including grading and drainage structures, while gravel surfacing, including bridges and culverts, is around \$17,000 a mile. At present the department is interested in oil treatment of surfaced roads, with indications that this will be carried on extensively. The oil, from reports made, solidifies the surface and the more it is traveled the tighter it becomes, and the firmer. It is also dust proof and is not affected by water.

It is estimated probably 20 years will be required at the present progress to complete all the Federal Aid projects, after which there will be for these highways only maintenance, and the department's activities can be centered on state highways.

Naturally, the report does not go into some of the striking facts in highway construction in Colorado. Notably is the cost of mountain highways; grading wagon roads to the type of a surfaced or paved road; elimination of curves that makes a more direct route; construction of cut-offs that save mileage and therefore money in building; erection of standard bridges; underpasses and overheads to avoid railroad crossings. One construction item included in the 1929 program is a direct road on the South Platte river from Dorsey to Julesburg, eliminating a number of turns. Innumerable "short cuts" have already been made and are being made on all projects.

CALIFORNIA FAVORS COLORADO

The Automobile Club of Southern California during the last tourist season routed many of the motor tourists returning east through Colorado. These came via Gallup, N. M., and Shiprock to Colorado, with Mesa Verde as their first objective. The club called especial attention to the "Million Dollar Highway" between Silverton and Ouray to these tourists. From Mesa Verde they went into Durango and thence by the state highway to reach the Silverton-Ouray highway. Their routes from Ouray across the state varied.



Etowah County Memorial Bridge, Gadsden, Alabama. Designed by H. H. Houk, Bridge Engineer. C. B. Moore, Resident Engineer. Built for Alabama State Highway Department by C. G. Kershaw Contracting Company.

Structures *of* uniform strength, durability *and* economy

THE new Etowah County Memorial Bridge over the Coosa River at Gadsden, Alabama, exemplifies the many advantages and economies attainable by recent improvements in design and control of concrete mixtures.

The bridge is 1400 feet long; the roadway of the span above the navigable channel is more than 80 feet above the elevation of low water. The arch over the channel affords 150 feet horizontal clearance at low water elevation.

By the use of designed mixes, accurate field control and skilled inspection, economies were effected which permitted the development of the architectural possibilities of the structure within the available funds.

Of 150 test cylinders of concrete taken from the superstructure, every one exceeded the expected strength more than ten per cent, while the average exceeded this strength more than fifty per cent.

PORTLAND CEMENT *Association*

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TRUCKS ARE MOUNTED ON SKIIS OVER IN KREMMLING

Over in Middle Park they put trucks on skis for the winter, and with the caterpillar tread the depth of the snow has no terrors for the driver, regardless of the load he may be carrying.

C. O. Murphy, of Kremmling, who submits the accompanying photograph, used his truck recently for a trip to his homestead, several miles away. Of this trip, W. A. Whitney, resident engineer of the Colorado State Highway Department at Kremmling, wrote that "Murphy's homestead is several miles up the mountain side and his going was over excessive grades and lots of snow, but he said he had no trouble whatever. He told me that he would have no trouble to keep running over Berthoud pass no matter how deep the snow might lay," and that gives an idea of the capabilities of the ski-truck.

The photograph shows an attachment for the Chevrolet truck. A steel caterpillar tread running on inflated tires and runners replacing the front wheels "makes it an absolute success in snow and fluffy, crusted snow, slush, ice and drifts from five to nine feet deep and unbroken roads are some of the conditions under which this truck has worked successfully," Murphy writes.

Attachments also are reported by Murphy as used on Model T Fords, including the Ford one-ton truck, and a speed of from 18 to 25 miles an hour is easily attained with all models, he says, and adds: "No snow conditions have been found where the truck hasn't proved a success."

Similar trucks are said to be in use in Michigan, New England and parts of Canada as a solution of the problem of transportation in winter.

GOOD ROADS LURE TOURISTS

Good roads lure motor tourists. That fact has been established by Rocky Mountain Motorists, Inc., A. A. A. member, in a survey of service rendered in the Denver headquarters during the last tourist season. The report shows there were travelers from Alaska, Siam, Egypt, England, Germany, Hawaii and Mexico. There was a large number from Canada and from every state in the Union. There was a marked increase in travelers from the Pacific coast.

"Then and Now," Motoring Across Colorado

(Continued from page 6)

that trip can be made in 15 hours and is made easily in two days, allowing for a night's rest in Leadville, or in Glenwood Springs.

"In August, 1911, the roads across the state from Denver to Grand Junction were called roads, and they were—mere roads—and in many places little better than trails. Some of you may recall the road from Denver to Colorado Springs in that day—just dirt, hilly and crooked. Today it is concrete pavement. From Colorado Springs we puffed up Ute pass—a boulevard today—and into South Park. The Sentinel speaks of some hard work for the car and a bit of effort to climb, and I recall that this reference doesn't tell a third of the tough time we had negotiating that bit of the road from Colorado Springs to Buena Vista, now made on a road more like a Denver parkway than a state highway.

"Imagine today going from Buena Vista by Leadville and stopping for the night in Red Cliff, but we had to do it, and we pushed on into Red Cliff to save time! From Red Cliff we motored into Glenwood Springs and then pushed on into Grand Junction.

"Throughout this trip we attracted a world of attention. Teamsters along the route pulled out for us, and the horses shied; in the towns people left the stores to see the car, and we were frequently stopped while people asked us how we were getting along; if the car was affected any in the higher altitudes; how we managed to make some of the grades, and if we expected to make Grand Junction. One or two streams we had to ford, too, and we had several hard fights to get through mud.

"Of course, we had to traverse the old Battle Mountain road—some of you may recall it. It was terrible and was dangerous, but today the state highway department has a regular boulevard in its place. Tennessee pass was another horror, and here, too, the motorist finds today a boulevard. While we averaged 100 miles a day, yet there were times when we didn't make the hundred, but that average was one of the sensations of 1911 in trans-state motoring.

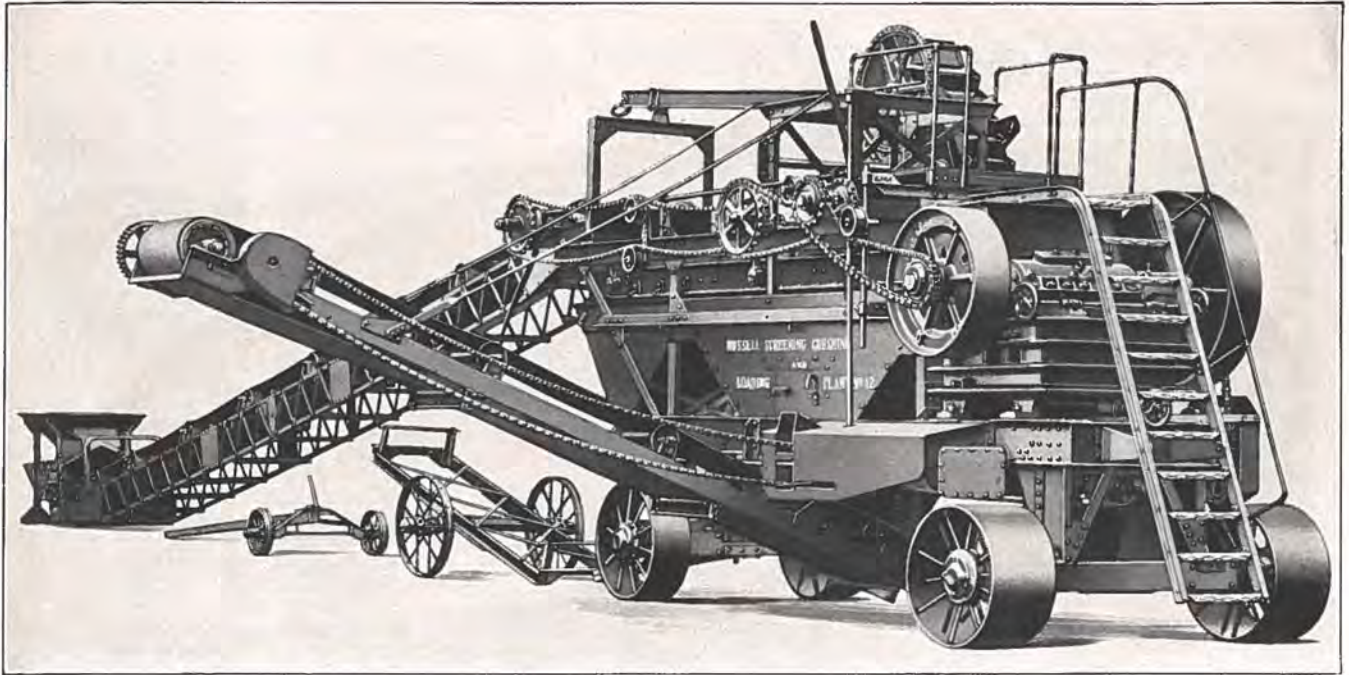
"That puncture the Sentinel speaks of before we reached Buena Vista hung us up for an interminable time. A puncture in those days meant loss of time and a lot of labor. You may recall the old clamps that fastened a tire to the wheel. Perhaps some of you have had that road experience with the cars you first owned and know what we had to go through. I look back on that puncture as one occasion when Piatt and I probably endangered ourselves for entrance into heaven!

"I shall never forget 'the trail from Grand Valley to DeBeque,' as the paper dubbed it, and it was a trail, too; the very worst bit of road we had on the entire trip, but today—like motoring over a Denver street.

"Our arrival in Grand Junction was in the nature of an ovation. Crowds gathered and plied us with questions. I recall today that our log of the trip was in great demand and proved of vast benefit to others who followed us in this trip across the state."

"How about such a trip today?" one of his auditors asked Mr. Lacy, and he replied:

"With the splendid highways it is a tour of speed and pleasure."



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MINNEAPOLIS, MINN.

New Highway Equipment and Materials

SCREEN STAR IS CROWNED "QUEEN OF GOOD ROADS"

Miss Lily Damita, the new star of the film world, was recently given a unique title when road builders of the world acclaimed her "Queen of Good Roads" at the International Road Show at Cleveland. This title was spontaneously coined by the "Caterpillar" delegation from fifteen nations and every state in the Union and Canadian province after Miss Damita had mounted to the seat of a "Caterpillar" Thirty and driven it to the municipal auditorium, where the show was being held.

The throngs of delegates met the star of "The Rescue" on the steps of the auditorium and gave her a cheer as she stepped from the big "Thirty" in a sub-zero wind. Mrs. Alberta Olson, of Regina, Canada, then handed Miss Damita a big bouquet of roses on behalf of the Canadian delegation. Big six-foot-six John Fitzhugh leaned down from the heights and draped a collar of roses and sweet peas around the neck of the little blonde French girl on behalf of the road builders of the world and pronounced her "Queen of Good Roads."

CLETRAC CRAWLER TRACTOR HAS MANY NEW FEATURES

Richard Carlson, sales manager of the Liberty Trucks and Parts Company, has received the specifications of the new model 30 Cletrac crawler tractor. A notable feature of the machine is that it has small rollers that aid the movement of the track and there are several other new features that will appeal to the buyer. It has all the power that is characteristic of Cletracs.

ELTON T. FAIR CO. NAMED GRAVEL EQUIPMENT DISTRIBUTOR

The Elton T. Fair Company of Denver has been appointed distributors of the Pioneer Gravel Equipment Manufacturing Company of Minneapolis for the equipment manufactured by the company including the No. 12 crushing and loading "One Unit" plant. This equipment was formerly manufactured and sold as "Russell" gravel equipment and includes a complete line of "One Unit" plants.

NEW KOEHRING PAVER DESCRIBED IN HANDSOME BOOKLET

The Wilson Machinery Company is distributing an illustrated booklet describing the new 27E paver brought out by the Koehring Company of Milwaukee and shown for the first time at the recent Cleveland road show. It is built to meet the most exacting conditions in paving work. The booklet gives the details of this new equipment.

Automatic operations on the new Koehring has brought a complete mixing cycle,

including charging and discharging, down to 69 seconds with a one-minute period allowed for mixing. The operator has only to lower the skip and operate the bucket control lever.

Ball and roller bearings are found throughout the power transmission line, as well as in idler sheaves and drum and bucket rollers, to reduce friction to a minimum. All gear units are enclosed and operated in oil. The frame is simple and of great strength and the total height is only 11 feet and three inches and weight is 22 tons.

COMBINATION STONE CRUSHER DISPLAYED BY MOORE FIRM

The H. W. Moore Equipment Company has received and is showing the new model Cedar Rapids portable screening and crushing outfit and it is attracting much attention among highway officials and contractors. The new model has two crushers. The equipment has been given thorough tryouts and all reports received by the Moore Company state that it has more than exceeded the expectations not only of the builders, but of highway contractors. The simplicity of the machine and the rapidity of its work are two notable performances, according to George Mefley, sales manager.

THE CHAIN BELT COMPANY

Has announced the addition of a centrifugal pump to its line of Rex Contractors' Equipment. This pump is made in three sizes with capacities of 325, 650 and 800 gallons per minute respectively on a total head of twenty feet. The features of these pumps are an open type impeller, which allows the handling of dirty water; an automatically lubricated center bearing; the same size suction and discharge flanges, allowing the use of the same size hose for both; and a unit construction which provides absolute alignment and rigidity. The addition of this

pump to the Rex line makes the line most complete and includes single and double diaphragm pumps, single and double plunger force pumps, and a road pump.

TURNPIKES FIRST IMPROVED HIGHWAYS IN UNITED STATES

The first improved roads in the United States were the turnpikes or pike road, as it was commonly known. These were toll highways, built by private capital, with collectors placed at specified distances to collect a fee for traveling over the road.

The origin of the word turnpike came from England. In 1346 the pike was the chief weapon of the infantry. It was a wooden shaft from 15 to 20 feet in length, with an iron head. It was also made with a revolving head and then became a turnpike. When these first privately built highways were constructed a barrier was dropped across the road to stop the traveler for payment of the toll. This barrier had several horizontal bars, sharpened at one end and revolving and from them came the name turnpike for the highway, which was shortened into the word pike. These barriers were later succeeded by single or double bars dropped across the road, but the name continued in use for the road.

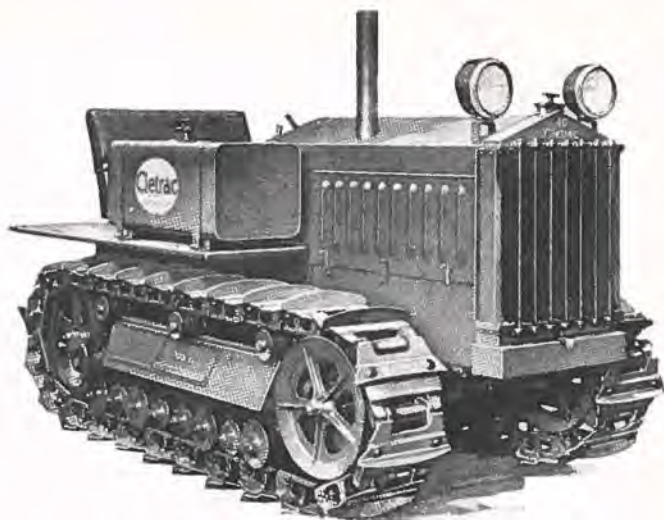
The most famous of all such highways was the National pike, built by the government, from Cumberland, Maryland, to Vandalia, Illinois, and was also known as the Cumberland road. It was free, the first of free improved roads in the country. With the coming of railroads the government relinquished this highway to the states through which it passed and it still is a heavily traveled road.

The pikes were constructed with crushed rock or gravel, the first to be built in the United States being in 1785 in Virginia, from Alexandria to Sniggin's Gap.

*Lili Damita,
movie star,
who was crowned
"Queen of
Good Roads" at
Cleveland Road
Show.*



Cletrac Tractors



Maintenance, the Big End of Road Duty, is Where Cletrac Shows Capacity!

Each year the seasons take their toll of the nation's roads and highways. Winter's alternating "freezes and thaws" play havoc with bed and surface alike. Summer traffic with its thousands of rolling tons is no less considerate. The work of maintenance must go on *throughout the year*—an all-important job in an all-important industry.

Made in four sizes—20, 30, 40 and 100 models—for every power need in highway and general industrial service. Write for detailed information regarding any of the Cletrac models and their capacities for any given type of work.

Year by year, in greater numbers than before, Cletracs are swung into action for this work. In large fleets and in single unit patrols they are operated by State Highway departments, counties, towns and road contractors. Theirs is the service of keeping roads and highways smooth and safe—and of making road appropriations go farther and last longer.



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Proj. No.	Length	Type	Location
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97-R	Bridge	East of Lamar
150-A	6 mi.	Gravel Surfacing	West of Craig
248-E	2 mi.	Gravel Surfacing	South of Buena Vista
253-D	4 mi.	Gravel Surfacing	West of Steamboat Springs
258-H	4 mi.	Gravel Surfacing	West of Sapinero
292-C	3 mi.	Gravel Surfacing	North of Minturn

PLANS SUBMITTED FOR APPROVAL TO U. S. BUREAU OF PUBLIC ROADS

Proj. No.	Length	Type	Location
57-R	0.464 mi.	Bridge	North of Lamar
68-R	1.9 mi.	Gravel Surface	North of Monte Vista
272-D	2 mi.	Conc. Pav't and R.R. Underpass	Manzanola East
295-D	1.818 mi.	Gravel Surface (Oil Processed)	North of Antonito
287-AR5	6.590 mi.	Concrete Pavement	West of Fort Morgan

BIDS OPENED

Proj. No.	Length	Type	Location	Date Bids Opened	Low Bidder
282-H	7.029 mi.	Gravel Surface	North of Rifle	Jan. 29, 1929	Winterburn & Iumsden.
292-B	2.640 mi.	Gravel Surface	South of Minturn	Jan. 29, 1929	O. J. Dorsey

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT, 1928

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
2-R7	South of Agullar	1.224 mi.	Paving	H. C. Lallier Const. & Eng. Co.	\$ 66,990.60	49	2-R7
2-R8	Agullar, South	1.633 mi.	Paving	J. Finger & Son	66,660.00	90	2-R8
134-B	East and West of Vona	3.352 mi.	Gravel Surfaced	W. A. Colt & Son	32,605.00	44	134-B
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	79	138-A
144-C	Bet. Fort Collins and Laramie	2.934 mi.	Gravel Surfaced	Bedford & Woodman, Inc.	37,911.35	8	144-C
147-A	In Ute Mt. Reservation, S. of Cortez	15.896 mi.	Surfacing	E. J. Maloney	119,100.10	97	147-A
147-B	South of Cortez	4.833 mi.	Surfacing	E. J. Maloney	59,447.44	34	147-B
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.86	20	149-A
208-AR	E. of Grand Junction	0.507 mi.	Gravel & R.R. Grade Separation	Harry A. Roush	59,568.00	81	208-AR
242-C	West of Fruita	6.011 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	56,344.50	21	242-C
251-C	E. of Boulder	4.000 mi.	Pavement	J. H. Miller & Co.	150,263.60	90	251-C
253-C	West of Milner	4.502 mi.	Surfacing	Mountain States Con. Co.	83,108.40	96	253-C
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	95	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	16	258-G
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	25	262-I
266-D	South of Bondad	4.111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	96,075.30	34	266-D
271-C	West of Portland	2.430 mi.	Surfacing	J. Finger & Son	54,843.40	66	271-C
277-C	N. of Pueblo	4.363 mi.	Conc. Pavement	J. Fred Roberts & Sons C. C.	120,789.25	90	277-C
279-F	North of Balleys	3.444 mi.	Graded	J. Fred Roberts & Sons	126,000.00	86	279-F
282-AR1	South of Craig	600 ft.	River Protection Work	Hinman Bros. Const. Co.	11,925.00	94	282-AR1
282-E	N. of Meeker	6.421 mi.	Gravel Surfacing	Luke E. Smith & Co.	38,384.20	81	282-E
286-BR1	S. of Wyoming-Colo. Line	14.474 mi.	Gravel Surfacing	A. R. Mackey	33,978.00	95	286-BR1
287-D2	East of Kersey	0.921 mi.	Paving	S. & S. Const. Co.	25,269.80	100	287-D2
293-C	North of Ouray	3.661 mi.	Grading	C. V. Hollenbeck	62,997.80	50	293-C
296-C	N. of Greenhorn on S. H. No. 1	6.606 mi.	Surfacing	H. C. Lallier Constr. & Eng. Co.	115,466.80	91	296-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssier	38,426.00	20	298-B

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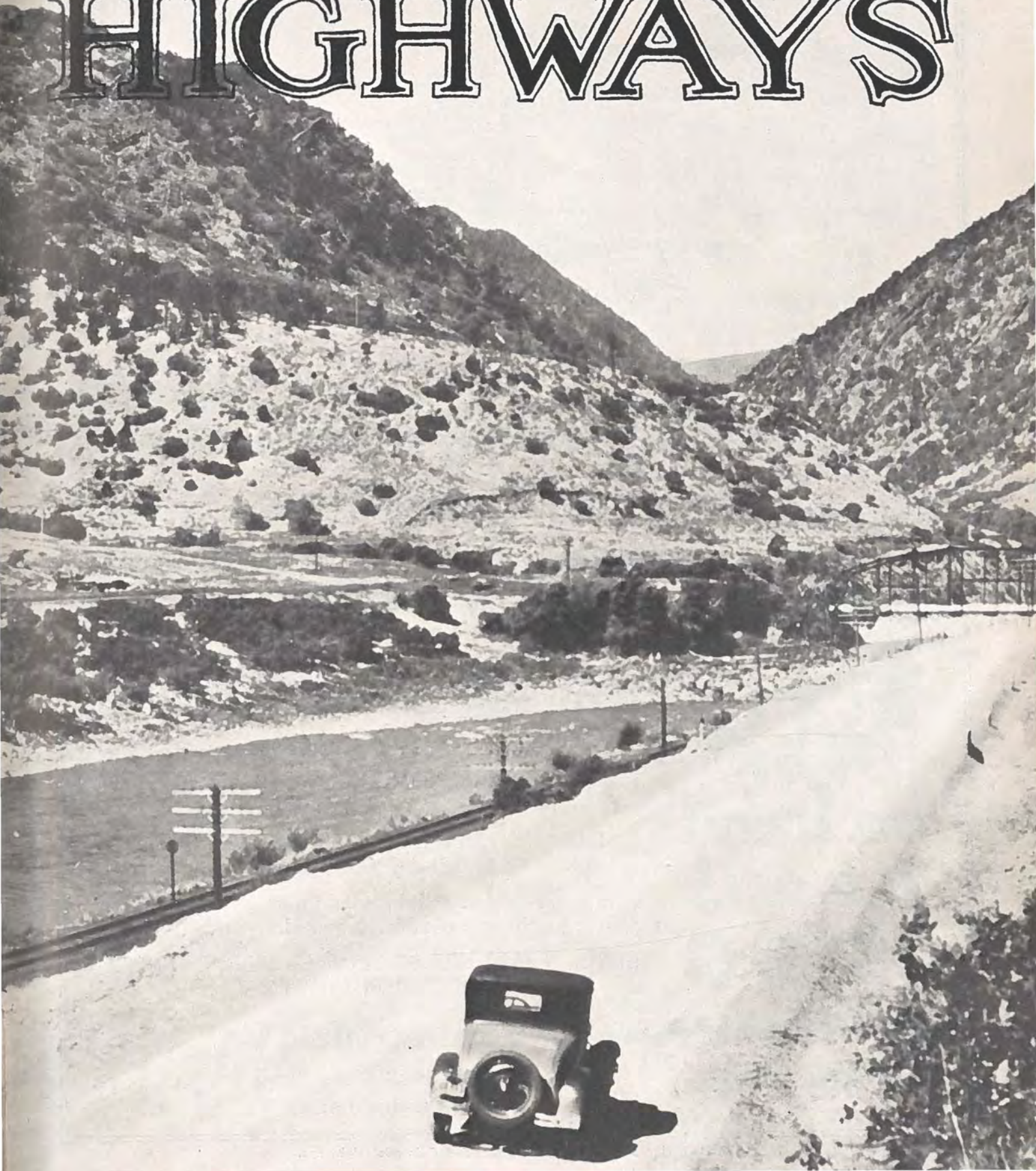
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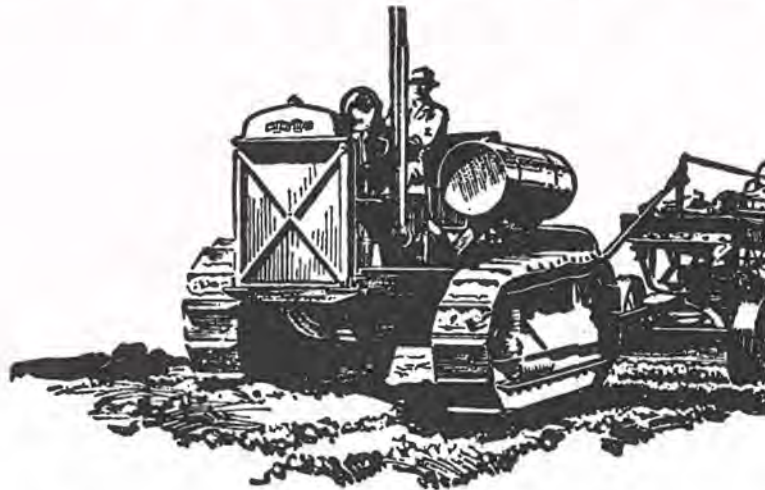
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Official Publication of the
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 Denver, Colorado

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Published Monthly by the

COLORADO HIGHWAYS PUBLISHING COMPANY,
 1803 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

RAYMOND A. EATON, Associate Editor

Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
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Our Cover Picture

COLORADO HIGHWAYS presents this month on the first page a view looking west from Glenwood Springs of the recently completed highway. This is one of the most heavily traveled roads in the state, passing through Grand Junction to connect with highways into Utah, into southwestern Colorado and also to the Grand Mesa and Colorado National Monument. The new road is one of the best in the state. The photo is courtesy of H. L. Jenness, Glenwood Springs, and the engraving by the Burke-MacMillin Engraving Company, Denver.



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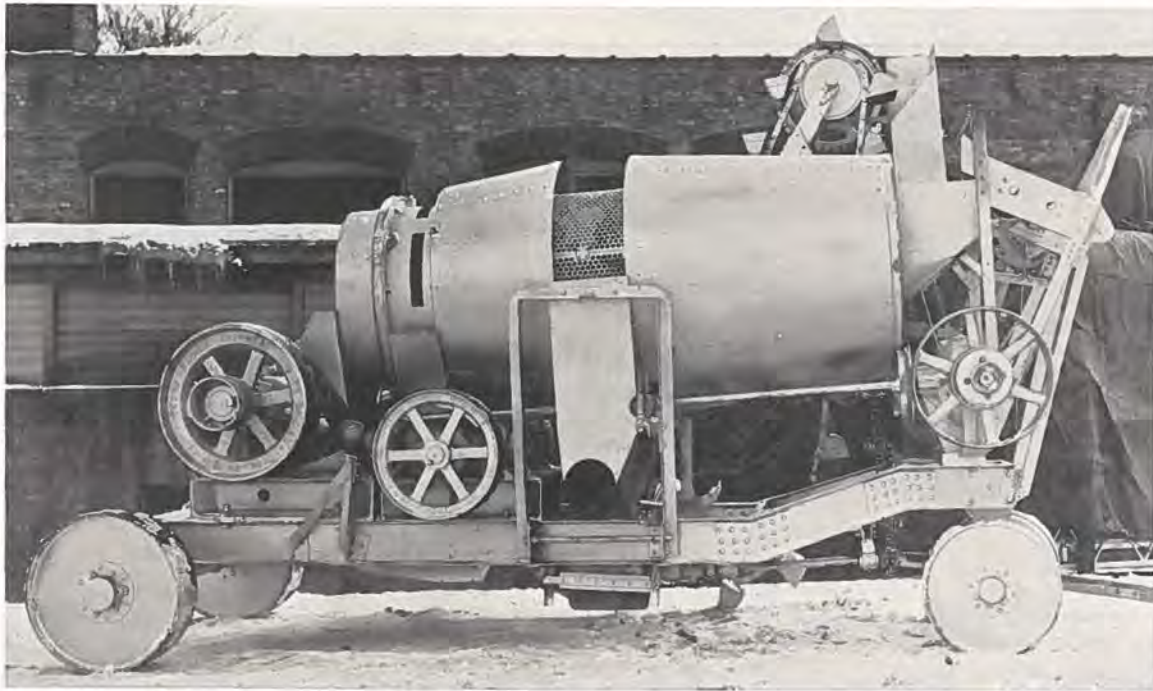
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Editorial

TRAFFIC SERVICE to the citizens of the state is the business in which the Colorado State Highway Department is engaged. There is possibly prevalent the erroneous idea that the chief function of the department is the construction and the maintenance of highways. That, of course, is the basic function of the department, but the real work is this service to the citizens.

The construction of a highway is merely the means provided by the department for the citizens of Colorado to have as fine a system of highways as modern engineering can provide, and that is service.

In probably no other state in the Union has there been such a transformation in vehicle transportation as that which has taken place, and is taking place, in Colorado. One may hark back to a period in the memory of many living today, to the roads that were little less than trails that led from the plains to various mining camps.

Conditions Existing on Old Highways

These roads increased year by year in mileage, but not in improvement. Aside from these were trails that burros alone could negotiate, with mine timber and mine equipment, food and supplies strapped to their backs—threading a trail that wound around and over the Rockies.

There were stage roads, to be sure, that were steep, rough and dangerous. There was some improvement made as years rolled by in the construction of toll roads, especially in the San Juan district as built by Otto Mears. These were difficult for horses and mules to travel—rough going, too, for occupants of the stages and other vehicles.

In a not far gone day travel even in the automobile was one of hard driving and harder wear and tear on the machine. In times of rain, hundreds of miles of public highway in Colorado were closed, and in winter a very considerable portion of the state was isolated from other districts by snow.

Open Passes Unknown in Winter in Former Days

An open pass in the winter for motor travel was unknown and even undreamed of except by a few far-

seeing highway engineers. That crossings of the Continental Divide two miles or more above sea level could be kept open through several months of the winter season was considered an impossibility, even by the oldest residents of the state. They called attention to depths of snow from 10 to 25 feet deep.

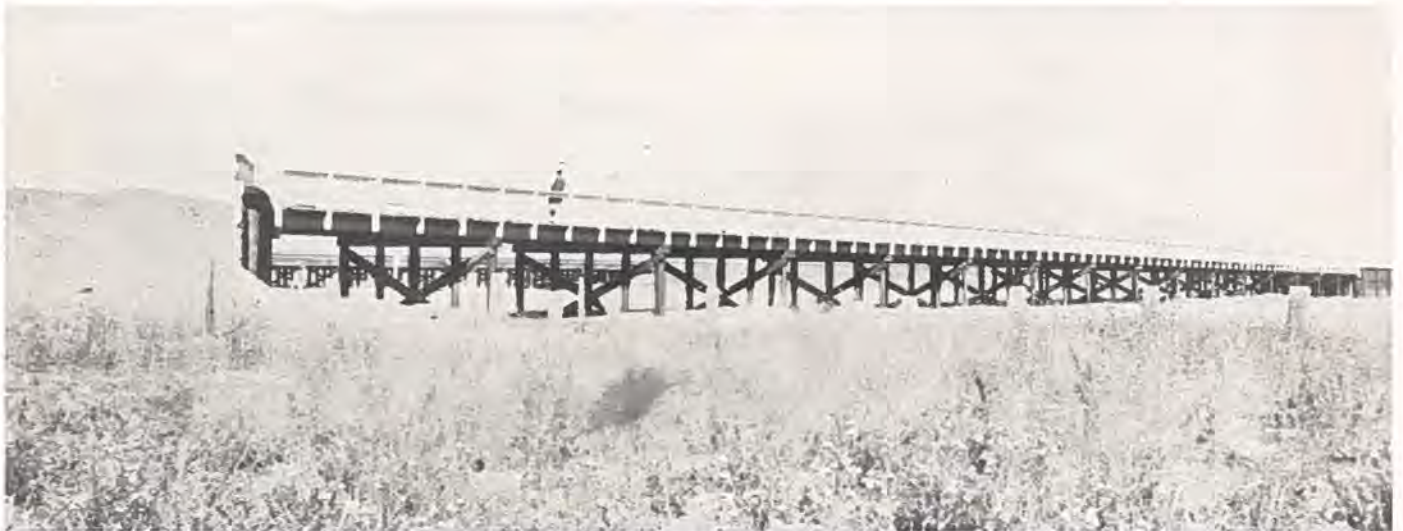
The valleys, and that portion of the state east of the mountains, had their roads in that day now past, but there were seasonal problems in vehicular transportation that shut the farmer away from the towns a week or more at a time. Denver was as far away to many of these communities in the eastern districts as though in another state.

Today the transportation problem has been solved. There is no part of the state that cannot be reached by automobile at any season of the year. There are graveled highways that have eliminated mud; there are paved stretches to speed up intercity communications and connecting the more important settled sections. There are highways that cross the passes. This winter there is a system of connecting highways that includes passes that have been, are and will be kept open.

Highway Service Noted in Tourist Travel

What has come to be known as the tourist season in Colorado, centering in the summer months, has seen the realization of the dream of several thousands of citizens of the state, and through the system of highways. The throngs of motorists from other states, with throngs from Colorado municipalities, camps and farms, the large number of resorts, cottage camps and almost countless summer homes, bespeak praise and prosperity for the state, and all has been made possible by splendid highways.

This traffic service for the citizens of Colorado and citizens of the country is the business that has been done by the Highway Department. It is a service that makes for a greater state, greater prosperity and greater happiness. It is a service that is being continued and extended, and as it extends and spreads out, so will prosperity and pleasure for the people not only of Colorado, but of other states.



This is a 1,000-foot timber treated bridge located east of Watkins on U. S. Highway No. 40, one of the main highways between Denver and Kansas in Eastern Colorado.

Plains District of Colorado Transformed by Highways

"The building of good roads is one of the most practical forms of aiding agriculture."—HERBERT HOOVER.

THERE has been a transportation transformation in that part of Colorado from the Wyoming and Nebraska state lines south to Oklahoma and New Mexico borders, and east from the main north and south highway to the Kansas line. It has been a transformation that has made of the plains section a network of highways, and it has taken place in the last seven years.

The old timer traversing this district would have cause for amazement. He would travel over paved, surfaced and graded roads, whereas his mind would hark back only a few years to the time when mere roads, little better than trails, only could be found. He would recall fording streams where now are standard bridges, with few towns where today there are scores of them, and whereas back in his head would be the memory of cattle and sheep alone being found, he will see many hundreds of prosperous farms and ranches.

This transportation transformation has been wrought virtually in the last seven years by the Colorado State Highway Department in construction of highways. Here on the plains the department found its problems to solve—and did. The entire country was drilled in testing for sand, gravel and clay, and these necessary components of a highway were found where the pioneers said none existed. The discovery of these beds materially reduced the cost of construction of these roads.

An idea of the problem may be gained from one example: North of Wray, on State Highway No. 51, miles of sand were encountered. The drilling tests revealed nearby a bed of clay. The clay was mixed with the sand and the construction problem settled. On this same road, farther north, gumbo was found. This time sand was located close by and it was mixed with the gumbo, forming a perfect highway. Similar examples by the score were found throughout the territory between the Nebraska and Oklahoma-New Mexico lines.

While the average citizen has heard a great deal about highway construction in many parts of Colorado, comparatively little has been heard of these activities in the plains districts, across which moved the covered wagons, freighting outfits and stage coaches of the pioneer periods. Here has been centered a vast amount of work and today there is a total of 3,923.6 miles of paved, surfaced and graded highways in the 23 counties comprising the territory. A detail of this mileage by counties follows:

County	Graded	Surfaced	Paved	Total
Adams	4.4	65.8	26.9	97.1
Arapahoe	22.8	67.6	12.7	103.1
Baca	221.2	16.1	.....	237.3
Bent	34.1	32.5	6.7	73.3
Crowley	24.2	39.6	.....	63.8
Cheyenne	38.3	89.1	.....	127.4
Douglas	44.9	82.2	36.1	163.2
Elbert	74.6	52.3	.....	126.9
El Paso	70.6	136.7	34.2	241.5
Kit Carson.....	71.5	103.3	.....	174.8
Kiowa	88.7	57.4	.....	146.1
Lincoln	212.9	108.0	.....	320.9
Logan	14.0	140.6	15.7	170.3
Las Animas.....	142.4	90.8	19.7	252.9
Morgan	18.7	69.4	28.7	116.8
Otero	55.2	27.9	11.0	94.1
Prowers	108.4	83.2	1.7	193.3
Phillips	19.0	85.6	.....	104.6
Pueblo	60.5	113.4	20.0	193.9
Sedgwick.....	.....	65.9	.....	75.9
Weld	75.1	223.2	37.4	335.7
Washington	97.8	150.0	7.4	263.2
Yuma	26.2	220.9	.....	247.5

No better idea of the work done by the highway department in the last seven years can be gained than by a review of these districts.

East and west are completed Federal Aid projects. These include one along the Arkansas river via Holly, Lamar and La Junta into Pueblo, and at La Junta is a branch through to the New Mexico line via Trinidad; one via Cheyenne Wells and another via Burlington, the two meeting at Limon and continuing as one into Denver. These are from the Kansas line. At Limon is a Federal Aid highway via Ramah into Colorado Springs.

Above these are two from Nebraska, one via Holyoke through Haxtun to Sterling and the other through Julesburg, the latter being the main connection with the Lincoln Highway in Nebraska. It extends through Greeley. From Wyoming a Federal Aid highway from Cheyenne leads into Greeley, connecting and forming its part of the main north and south highway. These Federal Aid highways are surfaced or paved for nearly their entire length in the state.

Aside from these noted, State Highway No. 102, from Byers, a connection with the Cheyenne Wells-Burlington highways, extending through Anton, Cope and Idalia to Gurney, in Yuma County, has been declared a Federal Aid project. It is familiarly known as the Kansas Air Line.

The revelation to the old timer would be the strictly state highways, being those in which the Federal Aid funds do not enter, and the construction costs are borne entirely by the state.

The extent of these state highways naturally would surprise one who has never been over them. Today one may start at Julesburg and travel a surfaced highway through to Holyoke, Wray and Burlington to Cheyenne Wells and from the latter town a graded road south through Sheridan Lake, Granada, Two Buttes and on to Springfield in Baca County, with the road also branching to reach Stonington and on to the Kansas line. This is State Road No. 51.

From the Nebraska line State Road No. 59 starts and passes through Sedgwick, south through Haxtun and Yuma, across the Arickaree river, joining the Kansas City Airline west of Joes, thence on to Cope and south to the Kit Carson county line, all surfaced. No. 59 continues on as a graded highway to Kit Carson; most of it is surfaced to Eads and beyond and there is a stretch of graded road, then surfacing to Wiley, a stretch of graded road, then a bit of pavement out of Lamar. From Lamar, No. 59 is surfaced south through Springfield almost to the Oklahoma line.

Starting again at the Nebraska line, there is a surfaced road, No. 113, via Peetz to the main highway along the South Platte river and into Sterling. A paved road leads from Sterling into Atwood and here State Road No. 63 goes south through Akron to Anton, the Kansas City Airline, and is surfaced; thence south to Haswell, is graded; from Sterling, also, is No. 61 that is surfaced south to Otis and graded to the Airline highway. From Brush is No. 54, that opens into No. 71, that is surfaced in districts but graded ready for surfacing south through Limon and Ordway to Rocky Ford. Between these two towns there is surfacing a large part of the way.

Within the districts cited are roads that have been graded and some surfaced, so that every part of the plains today is open to the motorist or others with splendid state roads. South of the Arkansas river there is a graded road, Nos. 101 and 100, extending from Las Animas south and east through Bent and Baca counties and west through Las Animas County



An attractive bit on a Colorado highway. Treatment of a filling station at the entrance to Brighton.

to Branson on the New Mexico line, and on northwest via Trinchera to Trinidad. Portions of this stretch of highway are surfaced.

From the Wyoming line is No. 155, graded through Grover to Buckingham and east as No. 14 is surfaced to Sterling, via New Raymer. At New Raymer No. 52 extends to Fort Morgan and is surfaced for a large part out of Fort Morgan. West of Buckingham No. 14 is surfaced for virtually the entire distance via Ault to Fort Collins.

State Highway No. 94 out of Colorado Springs, known as the Farmers Highway, is surfaced across El Paso County and into Lincoln County for a considerable distance. Then the highway is graded the rest of the distance to cross No. 71 and continues on to cross No. 109, ending at Boyero on the Federal highway out of Cheyenne Wells. State Highway No. 109 extends as a graded road from Genoa, on the Federal Aid highway out of Burlington south through Hugo, on the Federal Aid highway out of Cheyenne Wells, and south into eastern Lincoln County and west of Swift.

Aside from the highway noted, there are many connecting highways, some of them surfaced and others graded and ready for surfacing.

This work of the department in the plains district has attracted much attention in that part of the state. It is being continued and the department now can see that the time is not so far distant when every county in the territory can boast with Yuma County that all main state highways are surfaced.

One of the benefits attributed to the department comes from Kiowa County, where State Highway No. 96 follows the Missouri Pacific railroad through Sheridan Lake, Eads, Sugar City and Ordway to the Arkansas river and into Pueblo. It is surfaced for a large part of the way. This road, with No. 59 and No. 51, north and south, gives Kiowa County a highway system that in connection with other roads has resulted in that county going through 1928 without a road levy, and it is said it will do the same in 1929 and probably for other years.

Other counties in Eastern Colorado are seeing the same situation in the future.



Here is the way Longmont has beautified an entrance to the city from U. S. Highway No. 285, an example of civic pride in Colorado

Analysis of the Five-Cent Gasoline Tax

"THE levying of a tax on motor fuel as a means of raising funds for construction, improvement and maintenance of highways is today almost as accepted as is road building itself." That was the opening sentence of Oliver T. Reedy, senior assistant highway engineer of the Colorado State Highway Department, in a paper read before the fourth annual Southwest Road Show and School in Wichita, Kansas, last month. In favoring a gasoline tax for highway work, Mr. Reedy said:

"For one thing it is paid in small amounts, little dribbles at a time that are not noticed, a feature that appeals to most humans in contrast to a system that requires a year's payment at once. As an illustration of this principle take the matter of paying rent for a dwelling place. A six-room bungalow in the residential district where I live will rent for about \$60 a month, paying a tax of \$180 a year. The renter comments with gratification that one of the advantages of being a renter is that he does not have to pay that enormous tax of \$180 every year. It doesn't occur to him that 15 or 25 per cent of his monthly rent goes to paying real estate taxes, and he pays it without knowing it—and this painlessly. So is the gasoline tax."

Mr. Reedy cited that another advantage of gasoline tax was that it was paid by the non-residents motoring in the state, and others using the state highways. He asserted that "it is the most accurate measuring means yet conceived, not perfect, it is conceded, but the most accurate method yet devised for measuring the benefits accruing the individual road users." Of the tax Mr. Reedy said:

"It will be interesting to glance at the history of the development of this gasoline tax idea, which is only ten years old and yet adopted by every state in the Union except two. That statement is not absolutely true for the idea is older. It was suggested by President Wilson in one of his messages to congress about 14 or 15 years ago. But the adoption of the idea is only ten years old.

"In 1919 four states enacted gasoline tax measures though only three of them are usually listed in the tabulations of these first ventures. Those three are Colorado, Oregon and North Dakota, each of which put in effect a one-cent tax measure in that year. The fourth state, New Mexico, passed a two-cent motor fuel tax in the same year but it never became effective because its validity was assailed in the courts. Litigation in connection with the matter extended over a period of two years, ending finally in a favorable decision by the United States Supreme Court. Shortly after this decision was handed down on the legality of the principle established, New Mexico repealed the two-cent tax and enacted a one-cent law.

"Once the constitutionality of the principle was established the sentiment in favor of this method began to develop in other states. Beginning with three states in 1919 this was followed by four states in 1920; 13 in 1921; 19 in 1922; 35 in 1923; 36 in 1924; 45 in 1925 and 45 each in 1926 and 1927, to be rounded out in 1928 by Massachusetts. Illinois and New York are the only states without the gasoline tax law. Illinois passed a tax in 1927 but the courts declared the form, not the principle, unconstitutional.

"At first the rate adopted was, with the exception of New Mexico, one cent a gallon, and in 1922, with 19 states collecting the tax, in only two was the rate as much as two cents. Since 1922, 19 states have put into effect a tax of two cents or more. The total number of cents levied by all the states during the respective years was: 1919, 3 cents; 1920, 4; 1921, 14; 1922, 21; 1923, 63½; 1924, 77; 1925, 115½; 1926, 121; 1927, 139½ and in 1928, 151½ cents. This latter figure is made up as follows: 14 states, 2 cents, 28 cents; 14 states, 3 cents, 42 cents; 1 state, 3½ cents, 3½ cents; 12 states, 4 cents, 48 cents; 6 state, 5 cents, 30 cents.

"Now, all this shows not only the universal acceptance of the gas tax principle, but also that the trend of the rate is decidedly upward. The average tax in 1927 was 2.9 cents a gallon and in 1928 was 3.2 cents

a gallon. We are considering today the five-cent tax and there are six states which collect this rate. The first state was South Carolina in 1925, followed by Kentucky in 1926; Arkansas, Florida and New Mexico in 1927 and Virginia in 1928."

Since Mr. Reedy prepared this report Mississippi and Montana have put in a five-cent gasoline tax.

Mr. Reedy's statement that "the trend of the rate is decidedly upward" in gasoline taxes is borne out by a survey of bills in various state legislatures made by the Vermont State Chamber of Commerce, as follows:

Tennessee—The governor recommends an increase from three to five cents.

New York—The governor urges adoption of a two-cent tax. New York has no gas tax at present.

Illinois—A gas tax is being urged to provide funds to extend the paving program. A two-cent tax was adopted in 1927 but the act was held invalid.

Nebraska—A bill has been introduced increasing the tax from two to four cents.

Montana—The governor recommends an increase and suggests a five-cent tax. The present rate is 3 cents.

North Dakota—An increase of one or two cents is reported possible. The present tax is 2 cents.

Wisconsin—Several bills are pending, proposing increases of one or two cents. The present tax is 2 cents.

Minnesota—The governor recommends an increase to at least three cents. The present tax is two cents.

Colorado—The present tax is 3 cents. There is reported to be a good prospect for a 1-cent increase and a possibility of 2 cents.

Kansas—A bill is pending to increase the tax from 2 to 3 cents.

Vermont—A bill for a 1-cent increase is pending. The present tax is 3 cents.

North Carolina—A bill is pending for a 1-cent increase. The present tax is 4 cents.

Mr. Reedy sketched the five-cent proposition submitted to the Colorado voters last November and which was defeated. He said that during the campaign he never heard a protest against the five-cent tax, but against other provisions in the proposed bill.

"There is no fundamental relation between the value of the gasoline used as motor fuel and the price paid as a road tax," Mr. Reedy continued. "The relation is between the quantity of the fuel used and the

logical road tax. The gasoline serves merely as a meter to determine as near as possible the amount of use the motorist makes of the road in order that he may be asked to pay for this use, and it is the quantity of gasoline that measures this use, and not the value.

"It would be just as illogical to think of the price of a taxi ride as a percentage of the value of the meter as it is to think of the road tax as a percentage of the value of the gasoline.

"But is there some logical limit to the tax that may justifiably be levied on a gallon of gasoline for the purpose of improving and maintaining highways? I believe there is, and that taken with other factors it can be, in a measure, rationally expressed. I have begun studies that make me believe that this is so, but am not far enough along to give results at this time. Off hand, I will say that I don't believe that five cents a gallon is the limit; I think that some states will levy a higher tax than this. Also, I believe that probably for some states five cents is rationally high."

Mr. Reedy quoted from letters he had received from various states indicating that an advance in the gasoline tax had not decreased sales of gasoline in any one of them, but on the other hand sales had increased. Kansas, New Mexico, Wyoming and Nebraska were included in this list. He also wrote to the state highway departments in the six states having the five-cent tax as to the attitude of the people on this tax. The replies stated that there had been no complaint over the rate; that it had not reduced tourist travel; that sales of gasoline had increased and general satisfaction had resulted.

The Wichita show and school, Mr. Reedy reports, were very largely attended and enthusiasm was manifested. Among the western states highway men who attended and participated in the school with addresses were: W. C. Davidson, chief engineer of the state highway department, New Mexico; W. A. Norris, formerly material engineer of the Wyoming highway commission; J. F. Seiter of the American Wood Preservers Association, Chicago, and former bridge engineer of the Wyoming highway department; R. W. Crum, director of highway research board of the National Research Council, Washington; C. E. Mackey, professor of construction engineering in the University of Nebraska, Lincoln, and Clifford Shoemaker, district engineer of the United States Bureau of Public Roads, Omaha.



This is a view of a newly gravelled surface road east of Grand Junction. It is on U. S. Highway No. 50, the main north and south road of the Western Slope.



A view of the famous and picturesque mining city of Silverton, situated on the D-S-O "Million Dollar Highway" and sometimes called the "Switzerland Trail of America."

History and Romance Along Colorado Highways

Number 1

LONG, in his explorations in the country now included in Colorado, in the year 1820, followed the path of traders and trappers who had preceded him. This took him up the Platte river to the junction with the South Platte and along that river. Following Long this was the route of the gold seekers into Denver. It is, perhaps, the outstanding highway in Colorado for historical interest.

Long, in his official reports, said that the country was "unfit for agriculture" and "unfit for human habitation except for savage and nomad tribes." He could not have envisioned the future. In 1858 was the first gold excitement, that resulted in thousands rushing to the new Eldorado, followed by rumors of its failure and a turn back of the people. Then, early in 1859, came the real discoveries, and the South Platte route came to the front, where it has remained to this day, as one of the most heavily traveled highways in the state.

The South Platte highway follows the old trail in from Nebraska, at present by Julesburg, but originally the route in was by Old Julesburg, southwest of the present town. Old Julesburg was founded in 1859. This is the place of which Mark Twain wrote in "Roughing It" and which he characterized as the toughest town in the United States. He gave a few incidents relative to the characters of that period that spread the fame of Old Julesburg.

When the Leavenworth & Pikes Peak Express Company changed the route from the Smoky Hill route into Denver to the South Platte route, it built a station at the crossing of the river opposite the mouth of

Lodge Pole creek in 1859. It was named for Jules Beni, a pioneer of the plains region. Julesburg was the terminus of the telegraph line out of Denver in 1861-3 and here the Pony Express turned north. Letters and other mail for Colorado were transferred here to the Concord coaches. Old Julesburg's heyday, of which Mark Twain wrote, was when it was the terminus of the Union Pacific and during the construction of that road in the late '60's.

A mile west of Julesburg was Fort Sedgwick, built of sod in the fall of 1864 during the Indian uprising. It was named for Major General John Sedgwick, killed at Spottsylvania Court House in May, 1864. Troops were withdrawn and the fort abandoned in 1871. The name, however, endures in a county and town.

Near Hillrose was the American Ranch, that became known in history as Fort Wicked, and more familiarly as Godfrey's station. Old Man Godfrey was a fighter and a man of determination. In the 1864 Indian uprising his fort was attacked by the redskins. There were three other men with him and four women. The women put the hats of the men on sticks which they held above the adobe wall, carrying the impression to the Indians that there were many men within the enclosure. For two days and a night the Indians were held off and a large number of them killed. Then they abandoned the attack. The place became Fort Wicked to them and retained the name for many years thereafter.

At Fort Morgan was Camp Wardwell, that was established in 1865 and was the center of the days of Indian warfare on the eastern plains. Here, too, after

the establishment of the Platte river route as the stage line from the east into Denver, was where the road branched off southwest and into Denver. It was known as the "cut-off road."

Continuing along the Platte river route, however, one comes to the site of Fort Latham, east of Evans. It was an army post founded in 1862 and also was a stage station. During the Indian uprisings in the '60's it was an important military post.

The end of the highway at Fort Collins marks the site of Camp Collins, founded in 1863. It became a military reservation in 1864 and was abandoned in 1872. It was named for Lieut. Col. William O. Collins, of the 11th Ohio Regiment of Volunteer Cavalry, and played a very important part in the Indian uprisings of the '60's. In 1872 the reservation was thrown open to entry and the present city of Fort Collins was incorporated in 1873.

Tragedy of the Indian wars marks the entire length of the South Platte highway from Julesburg into Fort Collins. Along it or adjacent to it were fought some of the bloodiest battles of that period. There were scores of encounters between the regular and volunteer soldiers with the redskins, and at one period several of the stage stations along the road were burned and persons slaughtered by the Indians.

In one of these tragedies Godfrey figured, and the incident is presumed to have led to the determination of the Indians to wipe out his place and which resulted in Fort Wicked. Godfrey was riding behind a stage coach out of Denver when the Indians attacked the coach. Godfrey urged his horse onward to escape them and was pursued. He succeeded in killing a number of them before he reached his stronghold.

Later Godfrey, ascertaining that the Indians had fled, went back on the road and found that the passengers and driver of the stage had been murdered. Godfrey station also figured in one of the early day stories of vigilantes. Two members of the Montana vigilance committee had traced the driver of a stage who had driven his stage into a trap of bandits, the occupants murdered and robbed and the mail stolen. This stage was enroute from Salt Lake City to the Montana mines. The driver alone escaped. The two vigilantes traced

the man to Salt Lake City and found that he had fled east. They suspected that he would go to Denver, under the impression his pursuers would believe that he had continued on into Omaha and east. The two men came to Denver and saw their man in a hotel. He saw them. To make sure of the identification the avengers left the hotel to obtain a Denver officer to check him. During their absence the hunted man fled in a stage coach bound east.

The Montana men, ascertaining this fact, hired a speedy team and wagon and overtook the stage at Godfrey station. They brought the man back with them; reported the case to the Denver Safety Committee. He was given a trial, convicted, and the two officers took him to the edge of town, hung him and buried the body without a coffin.

Today the Platte river route of the pioneers and of history is a state highway, paved for a large part of the way and graveled the rest. Where Long in 1820 saw only a desert which prompted his report to the government, there are prosperous farms and towns. It traverses one of the most highly cultivated districts of Colorado and where there has truly been a fulfillment of the biblical prophecy that "the desert shall blossom as the rose." Where the covered wagon rolled along are motor vehicles and there remains today only traces of some of the historic stage stations and forts that opened the way for the prosperity and happiness of the people of today.

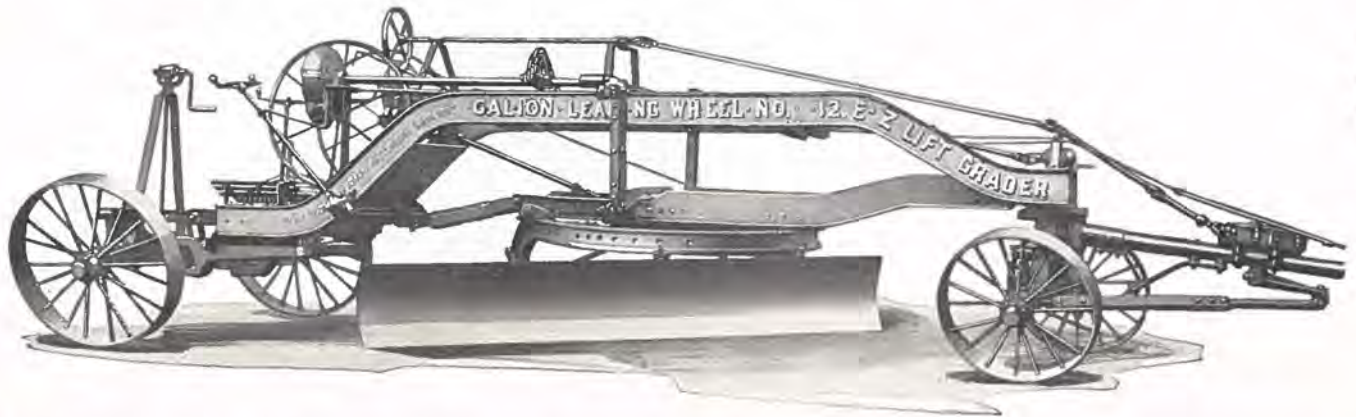
Long, probably unaware that he was doing so, pioneered this route and from a point near the site of Fort Latham he got his view of the mighty peak that was to bear his name. At this site Long turned south, traversing present state highways—also as a pioneer trail breaker, though for a portion of the way along the present paved highway he was following in the footsteps of traders and trappers.

Clifford Shoemaker, U. S. road engineer, told the Nebraska county commissioners in session in Omaha that should the total of Federal Aid roads in the state be paved it would save more than \$10,000,000 a year for the state.



Rustic scenes like this are found in all parts of Colorado along the improved highways. The picture shows the farmer with his automobile on a paved road and evidently the cows enjoy a smooth path.

They Both Were Right and



TWO knights in the days of chivalry met at a roadside fountain. As they sat facing each other a cross stood almost between them. In their conversation, one of the knights referred to the cross, calling it gold. "Begging your pardon," said the other, "this cross is silver." "I will stake my life on it," said the other, "that it is gold."

The dispute grew until the knights came to blows. They fought back and forth beneath the cross until they fell exhausted on opposite sides, when from their position they discovered the cross was gold on one side and silver on the other. Thus they both had been right and both had been wrong.

There is another story almost as ancient about two great principles in road graders, one the skew or pivotal axle on one side, the other the adjustable leaning wheel, first applied to plows on the other side. Both of these principles have been developed separately by manufactur-

ers for years, each contending that he was right and that the other was wrong.

They fought back and forth, the field of combat extending from the Atlantic to the Pacific, each contender claiming that his principle was right and all that was necessary to make a perfect road grader.

They were both right and both wrong, inasmuch as each is a mechanical principle and can only take care of certain forces. However, the Galion Iron Works & Mfg. Co. were the first to discover that the two great principles both were necessary to make a perfect machine.

So the combat closed by the Galion Iron Works & Mfg. Co. building into their machine the Leaning Wheel principle to take care of the gravity load on the incline on which the machine is working, and the Automatic Skew Axle to take care of the offset pull load at the angle at which the blade is working.

The H. W. Moore Equipment

GALION E-Z Lift *Leaning*

They Both Were Wrong

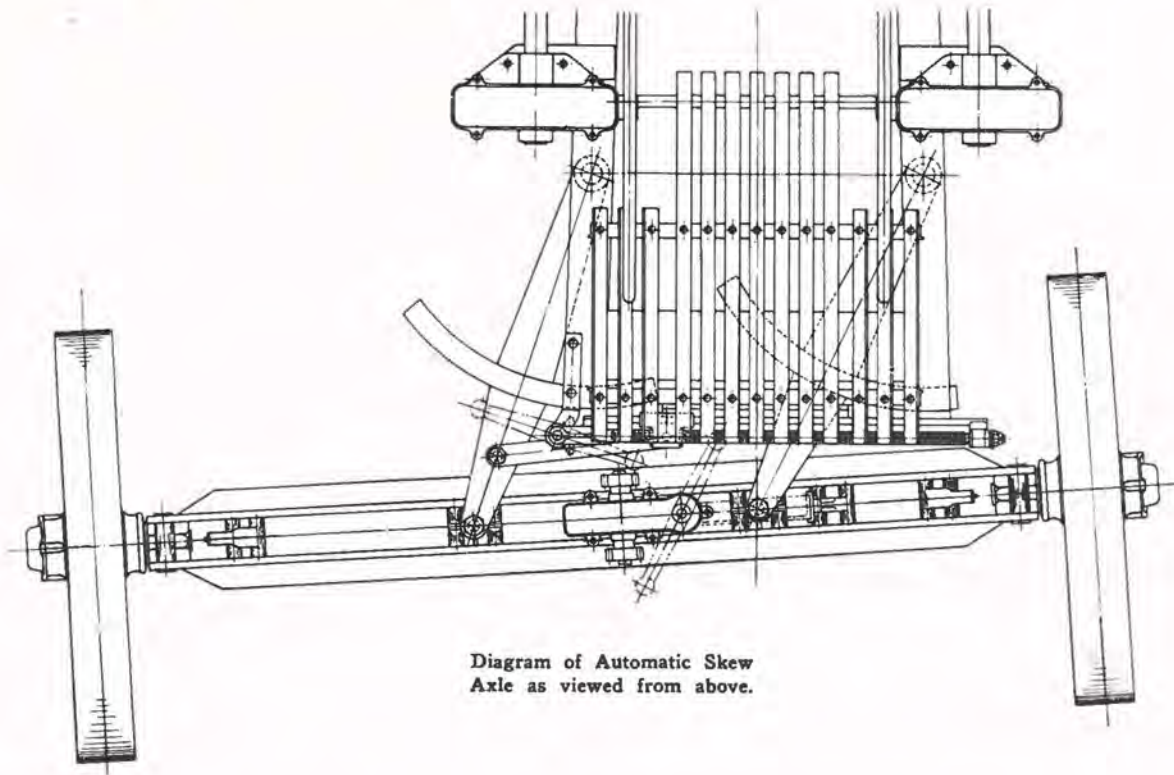


Diagram of Automatic Skew Axle as viewed from above.

The Greatest Advantage

To hold the loaded mouldboard against the work has always been one of the biggest problems in grader construction. Leaned wheels help to do it; pivoting the rear axle is another effective method.

THESE GALION GRADERS COMBINE

BOTH METHODS. The attachment of the radial bars to the rear axle is so adjusted that adjusting the frame automatically pivots the rear axle just enough to effectively aid the leaning wheels in holding the blade to its work.

The combination of the two principles gives Galion Adjustable Leaning Wheel Graders an ability to hold to heavy work never before attained in a drawn grader.

t Co. 120 West 6th Avenue Phone Tabor 1361 Denver, Colo.

Wheel Skew Axle Graders

Highway Building Calls for Work and Privation

“WE worked in snow two and three feet deep during the month of January and the first week in February. It was 30 degrees below zero all during January and 45 degrees below on one occasion. For five weeks we worked on snowshoes.”

Horace T. Reno, resident engineer of the Colorado State Highway Department, wrote that paragraph in May, 1922, detailing the experiences of himself and three others in a surveying party. They had left for the work in October, 1921, to survey a short road below a 7 per cent grade and that road is today identified by the Sapinero Arch—a bridge over a Denver & Rio Grande Western railroad structure at the mouth of Black canon.

This bridge is a part of the Rainbow route and it was completed in the summer of 1924. Reno wrote of the difficulties of its construction that “We hung by ropes to make the final survey and measured the distance across the canon to a ‘gnat’s heel’; the massive steel blocks weighing a ton each were set with frozen fingers in December.”

Stories similar to these can be told of a hundred or more experiences of the surveying parties running the lines for state highways. One may recall, close to Denver, that the surveys for the Mount Evans road, in the Denver mountain parks area, were run by men walking waist deep in snow and surmounting obstacles that even are avoided by the mountain climber in August.

These are merely examples to show that highway building is not a loafing job in Colorado. The report of the department shows that construction is carried on for virtually every month in the year and that December is the month marking up the largest number of miles of completed projects. In March and April, the reports disclose, there is virtually a tieup in construction work. These are the two months of the year

when weather conditions preclude construction work of all kinds.

While surveying parties are out throughout the winter months, as well as the summer, there is a vast amount of work being carried on in the general offices of the department and by the division engineers of the seven districts of the department in the state. As to the latter work, District No. 7, comprising the counties of Adams, Arapahoe, Logan, Morgan, Phillips, Sedgwick, Washington, Weld and Yuma, has completed all the surveys and that district is now complete and ready for the construction work. This latter job is now being carried out. Other districts in the state are close up, as a rule, on all surveys for Federal Aid projects.

For a better understanding of the work of the department, exemplifying the statement that it is not a job for a loafer, it may be explained that the work is divided into Federal Aid projects and strictly state projects. In the fiscal year of 1928 there were, in round numbers, 144 miles of Federal Aid projects completed, and of state projects 214 miles.

This last fiscal year Federal Aid projects were completed in every month of the twelve except March and April, and state projects in all months except February, March and April.

Contrary to what probably is a general belief, the largest mileage of Federal Aid projects was completed in the months of August, September, October and December, and of state projects in July, September and December. May mileage was next in rank in the state and February in the Federal Aid.

For Federal Aid the completions exceeded 30 miles in August, 19 miles in September, 19 miles in October and 20 miles in December, and in state projects exceeded 44 miles in July, 58 miles in September and 54 miles in December.



Where a paved road makes money for the farmer. The photograph is of trucking sugar beets to the dump near Fort Lupton in the Northern Colorado sugar beet district.

In explanation of the December mileage completions, it may be stated that in this month is the "mop up," as it were; the month when contractors push the work to have it completed, if possible, before the first of the year. This work also is sometimes termed "hang-over" by contractors. All work cannot be completed in December, hence some of it runs over into January, as, for example, last year the state completions in this month were 18 miles and Federal Aid 14 miles.

May witnesses the actual beginning of highway construction in Colorado, as in a majority of other states, though in Colorado May is not spring by the weather though it is by the calendar. Completions last year in this month of Federal Aid projects exceeded four miles and of state projects exceeded 23 miles.

The foregoing has reference only to highway construction and does not include the bridges, underpasses and overhead crossings. Of these there were completions of 23 Federal Aid and 12 state major structures in the last year.

The Sapinero Arch, previously referred to, may be taken as one example of what the engineers have to contend with. In Reno's report he says that: "Tales were told of a bridge across the Lake Fork at some point above the mouth and measurements taken, but the idea was given up as impracticable." However, there was the road to be built that would be easy to negotiate by a motor vehicle. Three different parties surveyed the proposed route.

"The canon of the Lake Fork had been studied for possible bridge sites from below," Reno wrote. "As it happened, we never got above the mouth of the canon to run a line. Standing on a ledge of rock on the east side, a projecting ledge on the west side caught the eye and a possible bridge site was seen. Hasty preliminaries were run and submitted, and the result is the Sapinero Arch."

In a score or more places in the Rockies engineers have faced problems to solve on a par with the Sapinero Arch, but of a different character. Theirs was the elimination of grades instead of a bridge crossing to be considered. When one takes into consideration that these highways cross such passes as Berthoud, Cameron, Cumbres, Cochetopa, Hoosier, Independence, Monarch, Tennessee and Wolf Creek, each of which has an elevation of more than two miles above sea level, one may gain an idea of the problems that have been met and solved by the engineers. Over each of these and lesser passes the department has carried highways that are like boulevards. Each of these, too, has tested the genius of the engineer and winter and summer have seen them working in these high altitudes.

In the construction of a system of highways, state and Federal Aid in Colorado, rivers and streams, canons and gorges have had to be crossed or avoided—and the road had to be of a low grade, conditions that are not met with in any other state in the Union.

Another angle to the department work is the statement that during 1928 plans, specifications and estimates for 40 Federal Aid and nine state projects were finished and classed as follows: Graded projects, 13,640 miles; surfaced projects, 111,639 miles, and paving projects 47,370 miles, a total of 172,649 miles.

There is no employment in the department, the reader probably will observe, that is a loafing job.



The famous Sapinero Arch bridge across the Lake Fork of the Gunnison River leading to the Blue Mesa, overlooking the famed Black Canon.

MOTOR LAWS CONSIDERED BY STATE LEGISLATURES

Legislatures in more than one-half of the states in the Union have before them bills for corrections or additions to their present motor code, and many of them are proposing an entirely new code. Safety is the watchword in each legislature. During 1928, 27,000 persons were killed in automobile accidents, and this fact has had an impressive effect upon lawmakers in the states.

In the Colorado legislature is a bill drafted on the motor code prepared by the Hoover conference; Illinois proposes examination and licensing of drivers; Ohio plans modifications in the law and the licensing of drivers; West Virginia is considering the Hoover code; a uniform code is proposed in Utah; Idaho plans a model uniform operators' and drivers' act; Wisconsin is considering the Hoover code; Tennessee also has the Hoover code up for action; Montana wants a drivers' license law and so does Minnesota; Missouri seeks a uniform code and a highway patrol; Kansas plans changes in motor registration; Delaware seeks a license act for drivers and several other changes in the law; Indiana seeks a uniform code; Michigan proposes an operators' license; Oklahoma wants a uniform code, backed by chambers of commerce; Iowa also considers a uniform code. Nebraska, North and South Carolina, Nevada, South Dakota and New Mexico are among others in favor of a uniform code based on the Hoover conference.

The Georgia legislature does not meet until June, but there is talk of a special session to consider motor laws. Several other states have the subject up for consideration.

The basis of all these activities is the Hoover conference report and for the protection of life not only on the highways, but in city streets.

Twenty-seven miles of state highway between Holly and Lamar will be graveled the coming season. This will put that highway in first class condition, the Lamar Sparks says, and adds that it "will add much to the road in the east end of the county."



Where a paved highway passes through La Salle, junction point of the Union Pacific Railroad, and one of the oldest towns in Northern Colorado. It is U. S. Highway No. 85.

Federal Aid Funds for Western States in '29

WESTERN states have fared well in the apportionment of Federal Aid funds for highways for the fiscal year to begin July 1, next. The apportionment to the 48 states totals \$73,125,000. Of this amount more than \$20,000,000 is for the 13 western states, each of which, with the exception of Nevada, is credited as being in the Denver trade area. The apportionment follows:

Colorado	\$1,388,755
Arizona	1,061,111
Idaho	933,902
Kansas	2,058,305
Montana	1,554,060
Nebraska	1,586,299
Nevada	960,375
New Mexico	1,189,085
Oklahoma	1,748,857
South Dakota	1,229,282
Texas	4,531,162
Utah	848,592
Wyoming	939,526

An idea of the use of Federal Aid funds in highway development is revealed in the official statement that in the last fiscal year improvements were completed on 8,184 miles. The cost of these improvements amounted to \$205,000,000, of which the government contributed \$88,000,000. From July, 1916, to November 30, 1928, there had been completed 73,715 miles of Federal Aid projects at a cost of \$271,700,000. Advanced stages were made on 2,014 miles.

The apportionment for the fiscal year beginning July 1, 1929, gives Texas the largest amount of money, with New York second with \$3,617,748, and Pennsylvania third with \$3,325,854, and Illinois fourth with \$3,118,949. The smallest appropriation made was \$365,625 each to Delaware, New Hampshire, Rhode Island and Vermont.

The Federal Aid act became a law July 11, 1916, and one realizes how slow the states were to take advantage of the law when it is stated that up to June 1,

1919, less than 45 miles of Federal Aid road had been completed in the United States. This, too, in the face of \$48,000,000 of government money that was available. In June only eight states had reported completions of Federal Aid projects. They were, with the mileage: Arkansas, 5; California, 6; Louisiana, 4; Massachusetts, 13; North Carolina, 8; Vermont, 1; Washington, 3; West Virginia, 2. This totals 42 miles, the fractions omitted making up the three additional miles.

Since the passage of the law, however, Federal Aid projects were under way in a number of states where mapping was done or being done; surveys were under way and finances being figured to take advantage of the law, which calls for half the cost to be borne by the government and half by the state. Colorado was included in this list, and it was not until the spring of 1921 that the 7 per cent of the 48,000 miles of road in Colorado was submitted to the U. S. Bureau of Public Roads.

T. J. Ehrhart, who was state highway commissioner, reported in 1919 that Federal funds available for the state amounted to \$1,375,920.29; for 1920 would be \$1,648,384.71, and for 1921 would reach \$1,735,141.80. Colorado, in common with a large number of other states, was not in position to match dollars with the government for road construction.

That progress has been made in Colorado in meeting Federal Aid apportionments is seen in the report of the Highway Department as of December 31, 1928, showing more than 3,000 miles of completed Federal Aid projects.

Marked progress also is reported in the western states named above in Federal Aid construction, with reports from each of them that 1929 will see a vast amount of work done.

The extent of highway activities today in the United States is revealed by statistics for 1928. In that year the 48 state highway departments reported nearly 30,000 miles of construction. Reports of 46 states reveal there was 7,763 miles of unimproved road that

were improved; 12,366 miles were surfaced and 8,800 miles paved. In 1927 there were 7,571 miles graded, 12,580 miles surfaced and 5,293 miles paved. The trend today throughout the United States, including Colorado and other western states, is for the paved road or hard surfaced road. The latter designation is oil processing, which has been found very satisfactory where traffic is not heavy. Paving only is to be considered where traffic is heavy.

There are 3,000,000 miles of roads in the United States that are classed as highways. Of these, 163,000 miles were reported surfaced a year ago. These figures indicate the interest in highway construction in every state. Colorado began last year the maintenance of Federal Aid highways with strictly state funds. This maintenance in the United States now covers approximately 250,000 miles with regular patrolmen.

The national road bill in 1928 was \$1,300,000,000, exclusive of city streets, and the share of the states of this sum was \$756,000,000. That the road highway activities will continue through the present year and in coming years was manifest in the November election, when \$240,000,000 in bonds were voted by four states; that legislatures are increasing the funds for their respective highway departments to carry on the work, and numerous means proposed for increasing the available money for highway departments.

Aside from the highway departments, the statistics show that in 1928 county and township expenditures amounted to \$552,000,000, involving approximately 100,000 miles of roads.

Gasoline Taxes in Force February 1, 1929

Amount Per Gal.	States	Number of States
5c	Arkansas	SEVEN STATES
	Florida	
	Kentucky	
	Mississippi	
	New Mexico	
	South Carolina Virginia	
4c	Alabama	TWELVE STATES
	Arizona	
	Georgia	
	Idaho	
	Louisiana	
	Maine	
3 1/2c	Utah	ONE STATE
3c	California	FOURTEEN STATES
	Colorado	
	Delaware	
	Indiana	
	Iowa	
	Michigan	
	Montana	
	Ohio	
2c	Connecticut	TWELVE STATES AND THE DISTRICT OF COLUMBIA
	Kansas	
	Massachusetts	
	Minnesota	
	Missouri	
	Nebraska	
	New Jersey	
	North Dakota Rhode Island Texas Washington Wisconsin District of Columbia	

How Snow Problem Is Solved

BATTLE MOUNTAIN road, that was a terror to travelers from the days of the buckboard, and for motor vehicles until the completion of the state highway in October, 1922, presented another problem to the Colorado State Highway Department in February. It was the removal of snow.

Under normal conditions, and many abnormal conditions, snow removal is comparatively easy for the department maintenance crews, but this was the problem at Battle Mountain:

The highway is 500 feet above the main line tracks of the Denver & Rio Grande Western Railroad, with the Eagle River adjacent.

The problem that faced the maintenance crew engaged in keeping the main highway open through the winter was the disposal of the snow. It could not be shoveled over for the simple reason that it would fall on the railroad tracks and thereby tie up trains.

Solution of the problem was reached after a study of this condition. It was simple, too. The snow was bladed into windrows in the center of the highway and then a big rotary plow was used. The plow threw the snow not only clear of the highway, but of the railroad tracks and into the Eagle River.

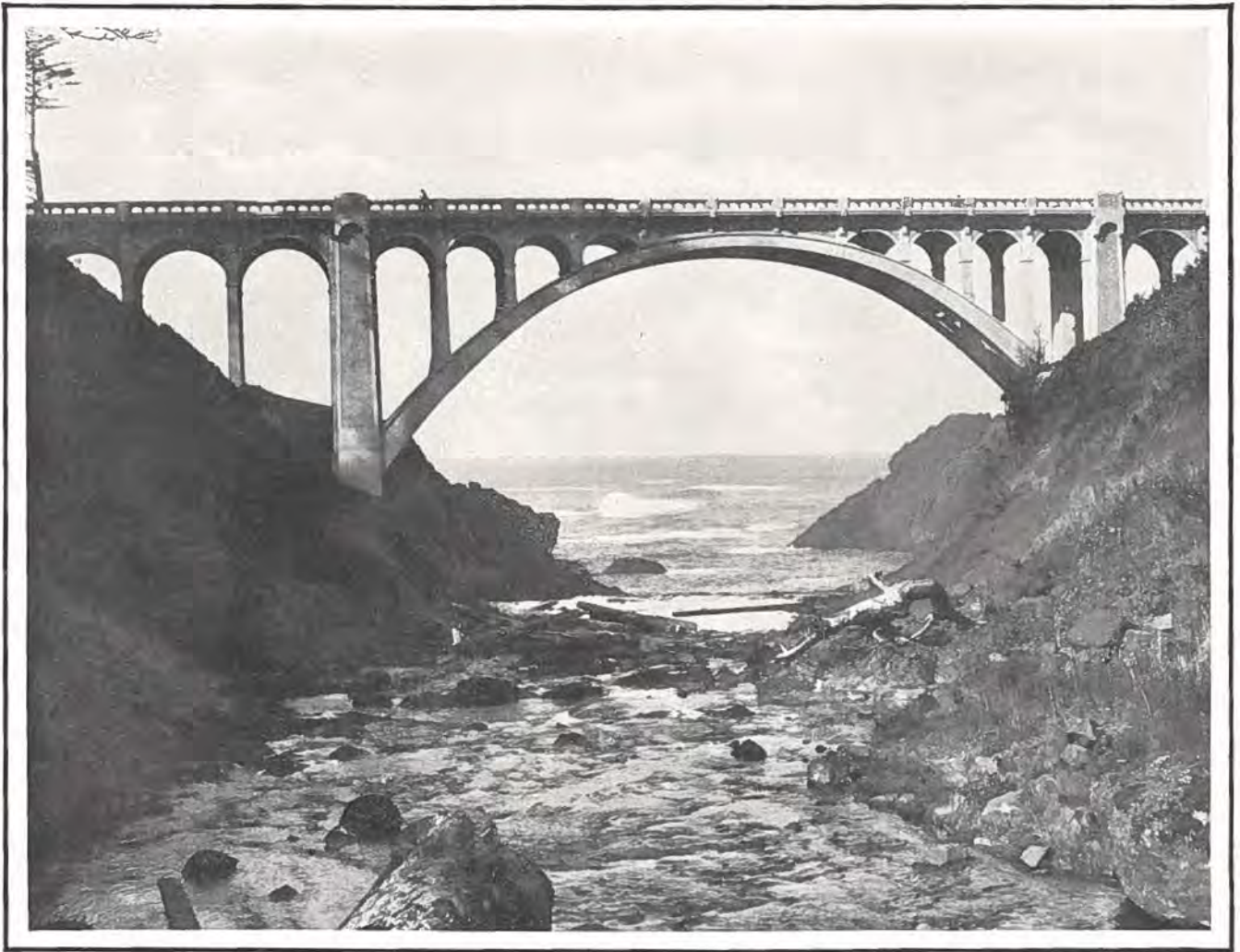
"It is conditions like this faced at Battle Mountain that are unlike those departments in other states have to contend with in winter," Robert H. Higgins, superintendent of maintenance, said, "In many sections of the Rocky Mountains in Colorado we have had to face difficulties in snow removal that would, I believe, appear appalling to an eastern man. In the East the

roads are level and naturally there is no worry over losing equipment; that is, in equipment rolling down a mountain side. We have that all through the Rockies in Colorado.

"As a rule, however, shovelers can remove the snow and the rotary plow is available under virtually all conditions. The Battle Mountain problem was one merely of quickly removing the snow and without dumping it on the Rio Grande tracks. To have shoveled it into trucks and carried it away would have been not only a big job, but a difficult one."

Reference to Battle Mountain recalls that its highway construction was one of the most difficult encountered in Colorado. The road is six miles long, extending from Redcliff to Minturn. In the old days it was one of the most dangerous roads in the state and scene of hundreds of accidents. Construction by the state highway department on the road began early in 1920 and was completed in October, 1922, at a total cost of \$270,000. Engineers were three months in locating a line of six per cent grade. More than 75,000 cubic yards of solid rock were blasted and 45 tons of high explosives were used.

In the construction some of the TNT sent huge rocks high in the air, to fall upon the Rio Grande tracks, necessitating a steam shovel and men to keep the tracks open. Telegraph and telephone lines along the railroad were taken down and encased in heavy cables to preserve them. At one point on the road eight tons of explosives were used in the removal of a single stretch for the highway. There are 2,500 yards of stone retaining wall in the construction of the road.



*Ben F. Jones Memorial
Bridge over Rocky Creek,
Roosevelt Coast Highway,
near Newport, Oregon.
H. E. Doering, Contractor,
Portland. Total length, 365
feet; main arch, 160 feet.*

Concrete arches
of wonderful symmetry and grace carry the Roosevelt Coast Highway across chasms which formerly barred all travel along Oregon's rugged shores.

The exposure is severe. Lashed by the salty gales of winter storms, concrete in these structures *must* endure with a minimum of attention and upkeep expense. Concrete of *predetermined* strength and characteristics was specified, and economically attained, by engineers of the Oregon State Highway Department.

PORTLAND CEMENT Association

Concrete for Permanence

412 Denver National Bldg., DENVER

NEWS OF THE MONTH

Current Events in the Field of Highway Engineering and Transportation—State, County and Municipal Activities

THE LIONS CLUB in Canon City has undertaken a campaign for the improvement of the famous Skyline Drive. G. G. Shumway, speaking to the Lions, asserted that "the condition of the Skyline Drive is a disgrace to the community in its present shape," and that it "is one of the greatest scenic assets of Canon City and hundreds of summer visitors come here to get a glimpse of the beauty which the view from it reveals." The club agreed that it was a community project, and it is said efforts will be made to have Warden Crawford, of the state penitentiary, cooperate in the improvement of the road. It is one of the most famous and spectacular roads in the Rockies.

Coming of spring is arousing the people in the Cedaredge district to plan highway improvements, according to the Cedaredge Champion, which says: "The residents north are circulating a petition to shale the main highway to the first Kiser creek crossing. Another petition is looking to the surface of the main road east to the foot of Cedar Mesa grade. Cedar Mesa people are again talking of surfacing the main roads in that vicinity."

Counties in Colorado shared \$64,000 in the gasoline tax collections in January, according to the announcement of John M. Jackson, state auditor. This represents 30 per cent of the collections, the other 70 per cent going to the state highway department. Denver, having no state highways, does not participate in the gasoline tax distribution.

The Ridge road at Colorado Springs is being widened, a work that started last spring and which will be continued until the desired width is reached. This statement comes from G. Hennenhofer, superintendent, in charge of the work. The road is one of the scenic routes around Colorado Springs.

County commissioners of Chaffee County have solicited the co-operation of Pueblo, Lake and Fremont counties for improvement of roads in these counties and of the highway up the Arkansas Valley to Leadville and Tennessee Pass. There are places in Chaffee and Lake counties, it is said by the Pueblo Star Journal, where the roadway is narrow.

The U. S. Forest Service has reconstructed and widened the Mount Herman road at Cripple Creek. It has been extended to a width of 14 feet, with a large number of passes and reconstructed on a solid rock shelf. The old road was slipping away on the outer edge, according to E. S. Keithley, supervisor of the Pike National Forest. Originally planned as a road to serve the forestry department in its tree-planting oper-

ations only, so many motorists made use of it that the service felt an injustice would be done the general public if the highway were not made safe and more serviceable.

The Salida Record reported February 12 that "Cochetopa Pass is now open, and the road's in fine condition across it, according to a report given out by the Gunnison County shops. The Blue is still closed, as are the highways toward Crested Butte beyond Jack's Cabin, beyond Ohio City on the way to Pitkin, and below Iola on the way to Sapinero." These highways are not among those that the Colorado State Highway Department is keeping open this winter.

State highway patrolmen are always on the job. D. Kirk Shaw, division superintendent of maintenance in Durango of the highway department, got a message last month from Edward Hunt, patrolman, that Poncha Pass was closed, that said: "Give me equipment from second division. Too much snow and drifting." The equipment was sent him and the pass opened. All state highways in the San Juan Basin are open, with the exception of a part of the Durango-Silverton road.

J. W. Johnson, district engineer of the U. S. Bureau of Public Roads, announces that approximately \$255,000 has been appropriated for forest roads in Colorado, the money to be available July 1, next. In addition there will be \$65,000 for forest highway maintenance. Four projects are on the program. First is the improvement of four miles of the road between Leadville and Tennessee Pass, to cost \$71,000; second, a four mile stretch on the Willow Creek project between Granby and Walden, to cost \$70,000; third, improvement of two miles of highway between Dolores and Rico, to cost \$62,000; and fourth, three miles of the road in San Isabel forest between Gardner and Mosca.

Rocky Ford contemplates the rerouting of the highway through the city. The plans are to cut a road through from just east of the Welcome Arch and following Elm Avenue in a straight line. The proposed road would eliminate some curves and be along one of the leading streets in the city. Some property would have to be condemned for the new highway, it is reported from Rocky Ford.

Oil processing is to be extended on roads in the San Luis Valley the coming season, in all probability. Plans are for this treatment of the highway of the La Jara-Romeo stretch to and through Antonito, and for the 17-mile stretch between Monte Vista and Alamosa. Oil processing has been found very satisfactory for secondary roads and where traffic is not heavy.



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New Highway Equipment and Materials

ADAMS ISSUES NEW CATALOG

Adams Adjustable Leaning Wheel Graders, Adams Motor Graders, Road Maintainers, Elevating Graders, Dump Wagons, etc., are very attractively and completely illustrated and described in a new catalog now being distributed by J. D. Adams Company of Indianapolis, Ind.

The catalog includes the new Adams No. 14 Grader furnished with 12 or 14-foot blade, and which is attracting considerable attention because of several revolutionary features embodied in it, including a new type of rigid frame construction and a new type of blade control which it is claimed is much easier and faster to operate than the controls generally used.

In addition to the other Adams Leaning Wheel Graders which are offered in 6½, 7, 8, 10, 12 and 14-foot blade lengths and the items mentioned above, the catalog describes a complete line of road tools such as one-man, two-horse patrols, road drags, drag scrapers, wheeled scrapers, fresnos, road plows, roofer plows and grader blades for any make of grader.

The catalog is profusely illustrated with action pictures showing all sizes of graders at various kinds of work and will prove interesting and informative to every one concerned with road building or maintenance. A copy is gladly sent upon request addressed to Elton T. Fair Co., Denver, distributors for Colorado.

CATERPILLAR ISSUES BOOKLET ON SNOW REMOVAL WORK

The Clinton & Held Company has received for distribution elaborate booklets issued by the Caterpillar Tractor Company of San Leandro, Calif., portraying in pictures and in story the use of Caterpillars in snow removal and the handling of trees in timber operations. In reading the one relating to timber it is amazing the work of Caterpillars. As an example, 14 Caterpillars fed logs at an uninterrupted pace from 6:55 a. m. to 5:30 p. m. and the day ended with the scaler marking up 1,001,074 feet handled. Logging huge trees, handling gigantic butts, transporting a 4,100-foot California white pine to the railroad or 55,200 pounds of loaded logs, traversing the forest in picking-up jobs, constructing roads through woods and moving a cypress log six feet in diameter and 16 feet long are among the illustrations and stories told of timber operations.

In illustrations and story the other booklet gives an insight into snow removal and tells how the snow bogy is being wiped off the map by Caterpillars. This tells of work done in city streets, industrial plants, highways, relief of towns from snow blockades, opening highways to let the mail through and included is a picture of snow removal on Colorado mountain passes, including Tennessee Pass. The various activities of Caterpillars in this work are given in detail.

There are also two novelties, one showing how Caterpillars build a road and the

other of the old familiar dirt road that is a sea of mud which a Caterpillar speedily transforms into a modern highway.

MOORE TAKES OVER NEW SHOVEL LINE IN DENVER TERRITORY

Thew shovels and Universal small cranes will be sold by the H. W. Moore Equipment Co. in the Rocky Mountain territory, in the future, according to George Meffley, general sales manager. The Thew and Universal concerns were recently merged and the combined lines were given to the Moore firm to represent in this territory.

Mr. Meffley made a trip to several eastern factories during the month of February. Following his return to Denver he announced that the Wehr Company are now out with a new all-purpose one-man grader equipped with cleated rubber tired wheels, which can be changed in a few minutes from a rubber tired wheel to a cleated wheel.

He announced the addition of two new graders to the Galion line. They are known as Standard No. 10 and No. 12, carrying 7 to 14-foot blades. Galion has also completed installation of equipment for making blades for all types of graders. Scarifiers are now obtainable on all size machines, with rubber tires of disc wheels optional. The Galion Mfg. Co. was recently merged with the Jeffery Mfg. Co., manufacturers of conveyors. Their plant is located at Columbus, Ohio.

Mr. Meffley also announced that H. W. Moore will continue to handle the Jaeger and Lakewood accounts in the Denver territory. These two concerns were recently merged. The Jaeger concern manufactures a full line of concrete mixers and pavers, while the Lakewood company makes concrete finishers and chuting equipment.

It is also announced that the Iowa Mfg. Co., makers of Cedar Rapids crushers, are placing on the market a complete portable oil mixing outfit for use on asphalt road projects.

INSLEY ANNOUNCES NEW TYPE HALF-YARD SPEED SHOVEL

A new half-yard shovel, known as the type "R," is announced by the Insley Mfg. Company, according to Harry P. Wilson, head of the Wilson Machinery Co., local agents for the Insley line, which also includes all kinds of concrete chuting equipment. The Insley concern is a division of the National Equipment Corporation, makers of Koehring shovels, draglines and concrete mixers.

Mr. Wilson announces a new catalog is now being distributed on Monarch tractors, which are being brought out this year with many new features. Several booklets and a general catalog on Austin-Western graders and earth moving equipment also are being distributed. Several new model graders are announced, while the Austin-Western have a new motor grader new on the market this year which is already finding favor with maintenance men.

BURNITE TO HANDLE REX PAVER SALES IN DENVER DISTRICT

T. B. Burnite Machinery Company will represent the Rex concrete mixer and paver line in the Denver territory, according to announcement made by the Chain Belt Company. Mr. Burnite recently returned from an eastern trip to various factories making several new contracts.

The scenic Black Mesa road near Gunnison may be rebuilt through co-operation of the state, county and forest service, in the belief of Theodore Krueger, forest supervisor at Gunnison. The road is narrow and causes inconvenience to autoists. Until the three agencies can finance the project, Krueger suggests that there should be more "turn-outs" along the route.



Galion one-man grader being operated by State Highway Department between Pueblo and Colorado Springs. This outfit travels an average of 23 miles a day.

PLANS BEING DRAFTED

Proj. No.	Length	Type	Location
78-R	0.5 mi.	Overhead R. R. Crossing and Approaches	South of Minturn
150-A	6.0 mi.	Gravel Surfacing	West of Craig
151-A	6.0 mi.	Gravel Surfacing	South of Granby
253-D	4.0 mi.	Gravel Surfacing	West of Steamboat Springs
292-C	3.0 mi.	Gravel Surfacing	North of Minturn
300-B	3.0 mi.	Gravel Surfacing	North of Silverton


PLANS SUBMITTED FOR APPROVAL TO U. S. BUREAU OF PUBLIC ROADS

Proj. No.	Length	Type	Location
57-R	0.464 mi.	Bridge	North of Lamar
68-R	1.9 mi.	Gravel Surfacing	North of Monte Vista
286-AR & BR	5.267 mi.	Gravel Surfacing	North of Nunn
287-AR	6.590 mi.	Concrete Pavement	West of Fort Morgan
258-H	5.039 mi.	Gravel Surfacing	West of Sapinero
97-R	.....	Bridge	East of Lamar

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
2-R7	South of Aguilar	1.224 mi.	Paving	H. C. Lallier Const. & Eng. Co.	\$ 66,990.60	53	2-R7
2-R8	Aguilar, South	1.633 mi.	Paving	J. Finger & Son	68,660.00	90	2-R8
57-R	North of Lamar	.....	Detour Bridge	Phelps Bros.	8,888.00	92	57-R
134-B1	East and West of Vona	3.352 mi.	Gravel Surfaced	W. A. Colt & Son	32,605.00	55	134-B1
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	79	138-A
144-C	Bet. Fort Collins and Laramie	2.934 mi.	Gravel Surfaced	Bedford & Woodman, Inc.	37,911.35	19	144-C
147-A	In Ute Mt. Reservation, S. of Cortez	15.896 mi.	Surfacing	E. J. Maloney	119,100.10	97	147-A
147-B	South of Cortez	4.833 mi.	Surfacing	E. J. Maloney	59,447.44	34	147-B
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	20	149-A
208-AR	E. of Grand Junction	0.507 mi.	Gravel & R.R. Grade Separation	Harry A. Roush	59,568.00	81	208-AR
242-C	West of Fruita	6.011 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	56,344.50	27	242-C
251-C	E. of Boulder	4.000 mi.	Pavement	J. H. Miller & Co.	150,263.60	90	251-C
253-C	West of Milner	4.502 mi.	Surfacing	Mountain States Con. Co.	88,108.40	100	253-C
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	95	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	21	258-G
259-A1	Between Parlin and Sargents	3.350 mi.	Gravel Surfaced	Ed. H. Honnen	51,551.00	0	259-A1
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	25	262-I
266-D	South of Bondad	4.111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	96,075.30	38	266-D
271-C	West of Portland	2.430 mi.	Surfacing	J. Finger & Son	54,843.40	68	271-C
272-D	East of Manzanola	1.950 mi.	Pav. & R. R. Underpass	Driscoll Construction Co.	88,237.50	0	272-D
277-C	N. of Pueblo	4.363 mi.	Conc. Pavement	J. Fred Roberts & Sons C. C.	120,789.25	100	277-C
279-F	North of Baileys	3.444 mi.	Graded	J. Fred Roberts & Sons	126,000.00	89	279-F
282-AR1	South of Craig	600 ft.	River Protection Work	Hinman Bros. Const. Co.	11,925.00	94	282-AR1
282-E	N. of Meeker	6.421 mi.	Gravel Surfacing	Luke E. Smith & Co.	88,884.20	81	282-E
282-H	Between Rifle and Meeker	7.029 mi.	Gravel Surfaced	Winterburn & Lumsden.	82,589.74	0	282-H
286-BR1	S. of Wyoming-Colo. Line	14.474 mi.	Gravel Surfacing	A. R. Mackey	38,978.00	100	286-BR1
293-C	North of Ouray	3.861 mi.	Grading	C. V. Hollenbeck	62,997.80	58	293-C
296-C	N. of Greenhorn on S. H. No. 1	6.606 mi.	Surfacing	H. C. Lallier Constr. & Eng. Co.	115,466.80	91	296-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssier	38,426.00	20	298-B
299-B	Between Delta and Grand Junction	3.465 mi.	Gravel Surfaced	Gardner Bros. & Glenn	60,804.80	21	299-B

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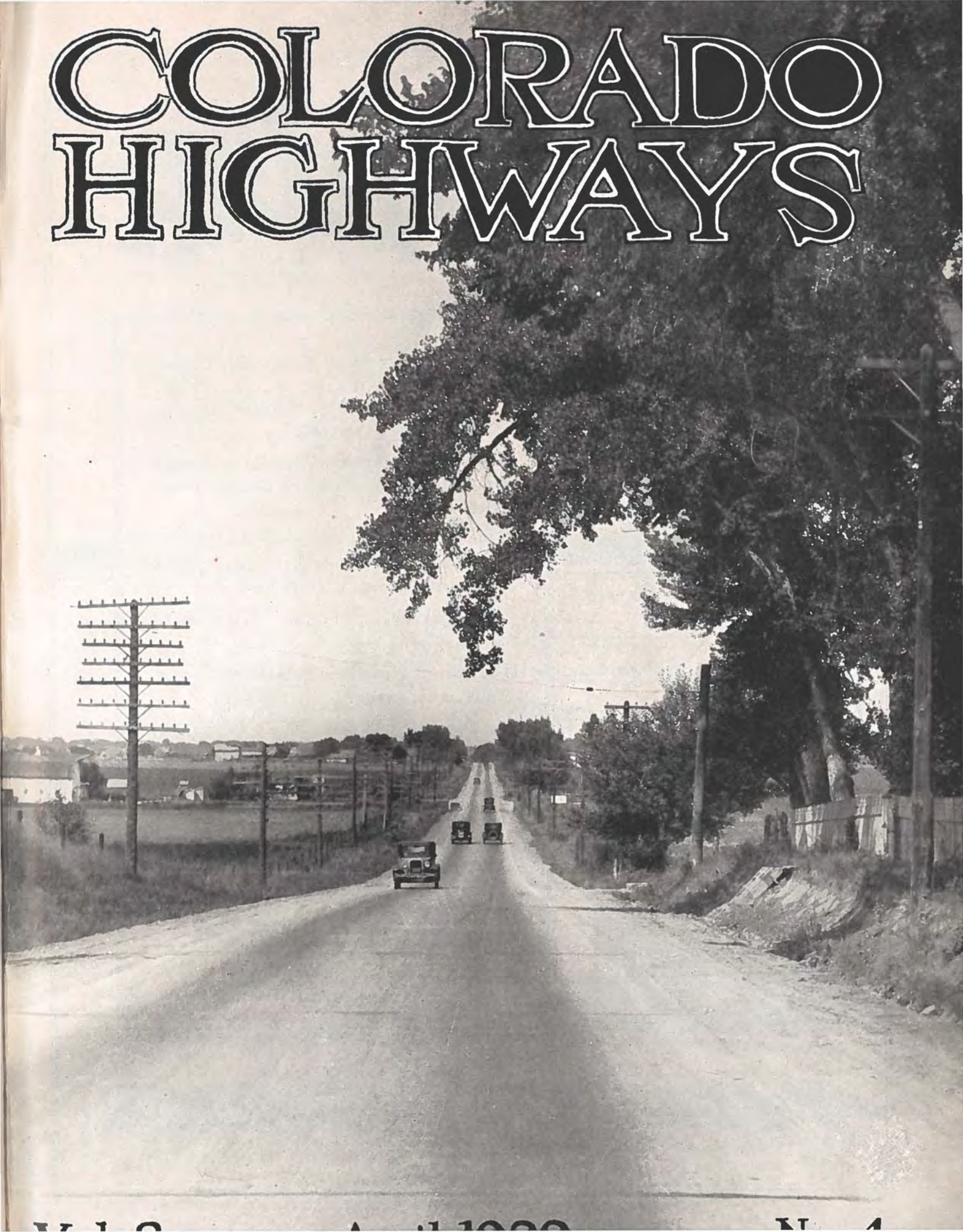


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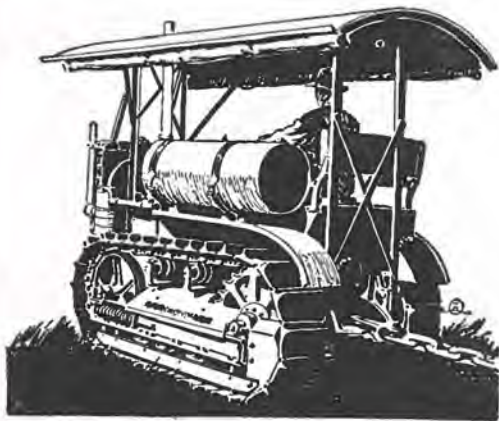
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Official Publication of the
COLORADO STATE HIGHWAY DEPARTMENT
 Denver, Colorado

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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,
 1803 1/2 Broadway, Denver, Colo.

Phone Main 4962

M. W. BENNETT, Editor
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Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
10 CENTS A COPY. \$1.00 A YEAR.

Our Cover Picture

On the cover of COLORADO HIGHWAYS this month is presented a typical scene in the heart of Northern Colorado, near Fort Collins. This is one of the most intensive developed districts of the state, and for beauty cannot be excelled any place in the United States. The road is the main paved highway between Denver and Fort Collins and forms not only a means of further development of that part of the state, but one of the principal pleasure drives. The photo-engraving is by the Burke-MacMillin Engraving Company of Denver.



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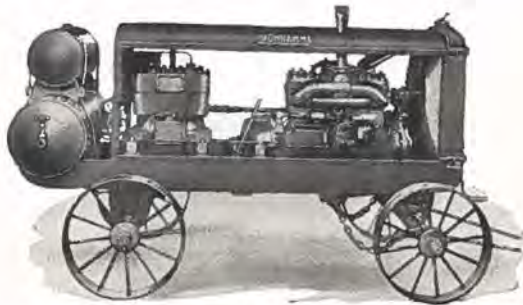
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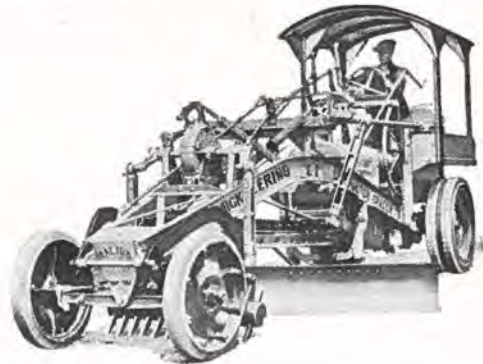
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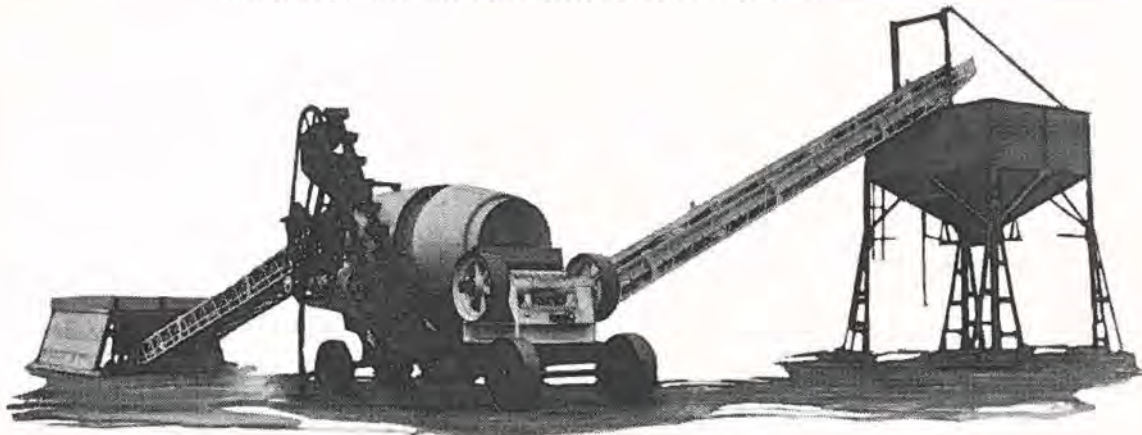


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Editorial

COLORADO HIGHWAYS believes that it is a healthy youngster as it celebrates this month its seventh birthday. It has seen a remarkable growth in modern roads in Colorado thus far in its existence, and is witnessing today an even greater improvement. With eyes that know looking into the future it sees the present system of highways in the state ranking with the best in the Union.

COLORADO HIGHWAYS believes that this is an opportune time to pay tribute to some of the pioneers in the good roads movement in Colorado that resulted after years of work in creation of the Colorado State Highway Department as it is today.

Memory recalls the names of D. W. Brunton, S. E. Norton, E. E. Sommers, Cass E. Herrington, Dr. F. L. Bartlett, Charles A. Johnson, Ralph W. Smith, Allen S. Peck, Harold Kountze and Gerald Hughes in Denver; Nicholaus Krohn, T. W. Monnell and John J. Tobin in Montrose; Burns Will and William R. Rathvon in Boulder; J. Y. Munson in Berthoud; E. E. Nichols in Manitou; Leonard E. Curtis, J. A. Hayes and Henry R. Wray in Colorado Springs; Charles R. McLain, W. H. LeGrange and Wardens Cleghorn and Tynan in Canon City; James W. McClain in Otero County; H. A. Edwards in Fort Collins; L. Boyd Walbridge in Meeker; Robert E. Norvell in Hayden; Charles E. Leckenby in Steamboat Springs; J. A. Clay in Durango; E. McLearn in Rifle; Frederick Goble in Silverton; Fred Catchpole in Pagosa Springs; "Cement" Bill Williams in Golden—and the list could be continued into at least 200 names.

Memory recalls, also, T. J. Ehrhart, first state commissioner of highways, and the Good Roads Association of which Robert Higgins, now superintendent of maintenance of the Highway Department, was its first president and one of the outstanding advocates of good roads. There is tribute, too, to be paid to C. E. Allen, Thomas H. Tully and William M. Wiley who composed the first highway commission.

The present generation little knows of the wonderful work these men and their associates accomplished in the beginning; of the time and money they

put into the problem of awakening the citizens of Colorado to the necessity of a system of highways that could be traveled the year around; a system that would be a credit to the state. They could point out in their campaigns the roads of their day—trails, most of them.

There was Dr. F. L. Bartlett, of Denver, who devoted his time and a large part of his fortune to the good roads work. He talked the subject over personally with nearly every person he met; he traveled over the state spreading his doctrine; he motored in Colorado and other states and wrote of his experiences—always with the urge for good roads in Colorado. There was Charles R. McLain of Canon City, equally as enthusiastic and equally as hard and determined a worker for good roads. He it was who originated the idea and saw that it was carried out of the now nationally famous Skyline Drive at Canon City and later of a highway to the summit of the Royal Gorge.

COLORADO HIGHWAYS presents in this, its birthday number, articles in review of the progress of the good roads movement, and of the accomplishments in highway construction under the present Highway Department management. Attention is directed to these articles, not merely as subjects of interest to every citizen, but as an enlightening story of the progress made. They also portray vividly the difference of the roads of seven years ago comparable with today.

In the last seven years problems in highway construction have been faced comparable with that of making three blades of grass grow in the place of one. This construction problem has involved the passes across the mountains, the avoidance of curves and grades, the blasting of vast amounts of rock; the tunneling through rock and countless other obstacles that seemed impossible—and every problem was solved.

The highway work now under way, and contemplated, may be visualized for the coming seven years as in that past period—a system of highways in Colorado unsurpassed in the world.

Highway Accomplishments in Colorado in Seven Years

SLOGANS like "Onward" and "Progress" adopted by numerous municipalities in the United States may be combined to cover the accomplishments of the Colorado State Highway Department in the last seven years. COLORADO HIGHWAYS, in observance of its seventh birthday with this April number, recalls what has taken place in the last seven years of its existence. The summing up of this work, with a few comparable figures, discloses that the progress made must prove a surprise to the reader as it does to this magazine.

At the end of 1921 the records disclose 57 miles of paving; 342 miles of surfacing and 373 miles of graded and drained roads, a total of 772 miles of improved road in the state.

The official records as of December 31, 1928, show 343 miles of paving; 3,797 miles of surfacing, and 4,732 miles of graded and drained roads, a total of 8,872 miles of improved roads in Colorado. Subtraction will show the present department in the seven years has constructed 8,100 miles of improved road.

The total expenditures for the seven years has been \$37,330,845.46, an average of only \$5,332,977.92 a year. The expenditures by the years were:

1922.....\$6,735,882.75	1926.....\$4,809,052.02
1923..... 5,453,446.63	1927..... 4,164,805.03
1924..... 5,664,567.18	1928..... 5,916,002.28
1925..... 4,587,089.57	

Of the total mileage of improved roads, 8,872, the Federal Aid projects participated for 3,238 miles, leaving a total of 5,634 miles of these roads in which the state alone bore the expense of constructing. For December 31, 1928, the total mileage of the department was 9,119 miles, including 247 miles of projected roads

scattered over the state and upon which some preliminary work had been done at the end of the year.

Between December 1, 1921, and August 15, 1922, the Highway Department completed ten miles of cement pavement; 528 miles of sand clay or gravel surfacing and 300 miles of grading and drainage roads, a total of 838 miles. Comparable figures show completion of similar roads in 1919 to have been 204 miles; 1920 of 301 miles and 1921 of 372 miles. On September 1, 1922, 753 miles of Federal Aid and State projects were under construction. September 22 of this same year showed a total mileage in the state of pavement, 71 miles; grading, 891 miles; surfacing, 858 miles.

On March 31, 1922, the completed Federal Aid projects omitting fractions of miles in Colorado amounted to 220 miles and were: paving, 49 miles; surfacing, 77 miles, and grading, 93 miles.

The statistics given, however, do not convey to the average reader all that has been accomplished in the last seven years. They are mere figures, but back of them is the story that COLORADO HIGHWAYS visions as having taken place since it came into being.

The year 1922 saw the completion of 210 miles of Federal Aid road, and included the now famous Battle Mountain Highway. The old timer recalls that road as do the engineers of the department and the contractor who built it. It has gone down in highway construction history of the United States as one of the most difficult pieces of work ever encountered in the country. But it's a boulevard, and safe. In this year the great bridge over the Arkansas River at Las Animas was opened; marked progress on the Ouray-Silverton highway was checked up, and this included a mile of blasting through



That popular song of another day, "Waltz Me Around Again, Willie," would be apt at this bit of state road on the Million Dollar Highway, extending from Ouray to Silverton, one of the world's scenic motor routes. This photograph taken by M. W. Bennett displays notable art with a camera and gives an idea of the width and ease with which the highway follows the old toll road built by that genius, Otto Mears. The scene is near Ironton, today a ghost city, but in early mining days a bustling camp. In the foreground are some of the workings from the Red Mountain group of mines.

solid rock. There was paving, too, from Littleton to Wolhurst; six miles of the Brighton road; two miles south of Greeley to La Salle; two miles south of Sterling; a mile east of Grand Junction, and the opening of the Raton Pass road out of Trinidad. These are mere examples of what was done in 1922.

In 1923 there were 623 miles of improved road completed, including 191 miles of Federal Aid projects, being 51 miles of paving; 85 of graveling and 55 of grading and included, also, 31 bridges and drainage structures. Strictly state projects completed took up the balance of the work.

In 1924 was the opening, October 4, of the Denver-Greeley paving and with 200 miles of paving totaled in Colorado. In the year 61 miles of paving was completed; 52 of surfacing and 20 of grading. July 4 witnessed the dedication of the Ouray-Silverton road and in June was opened the now widely known Sapinero Arch bridge and road. The year saw virtually the Cumbres Pass highway opened, Wolf Creek Pass road widened and surfacing, grading and paving carried on in all parts of the state.

In 1925 were completions of part of the Mount Evans road; dedication of the Busk-Ivanhoe (Carleton) tunnel and road following the old Colorado Midland Railroad right of way; Cumbres Pass was formally opened and the Gypsum-Dotsero road was finished. The completions for the year included 10 miles of paving; 93 miles of surfacing; construction of 13 major structures and a continuation of the Jarre Canon road.

To 1926 is credited the completion of the famous Cameron Pass highway, one of the scenic wonder roads of the continent and total completions of paving, surfacing and grading during the year of 300 miles and construction of 74 structures. In 1927, in July, the state had 1,200 miles of graded roads; 1,700 miles surfaced and 225 miles of paving.

COLORADO HIGHWAYS merely has sketched the accomplishments of these years. It may be recalled that Berthoud Pass, Independence Pass, Tennessee Pass, Rabbit Ears Pass, Mosca Pass, Le Veta Pass and others have been transformed from tough roads into motor boulevards. Denver citizens may not know it, but the department with its own funds is constructing the spur from the Mount Evans highway practically to the summit of this famous peak at an elevation of 14,155 feet.

In this brief resume of what has been done by the department in the last seven years there should be mentioned the standard bridges of concrete or iron and steel that have been built to replace the old wooden or old time iron structures; of the overhead crossings and underpasses to avoid railroad crossings; of the signs that have been put up along highways, and, also, that in the winter of 1928-29 main traveled roads, including Tennessee Pass, are being kept open for motorists.

In 1928 the department took over the maintenance of state highways from the government, installing the patrol system that already has attracted attention of highway builders and officials for the efficiency of this branch of the department.

The highway system as it is today is the subject of wonder to the pioneers. They note the paving and grading, to be sure, but perhaps more especially do they note



An example of limestone road construction is given in this photograph taken by M. W. Bennett. The scene is west of Pueblo, toward Florence. This highway has attracted attention of road builders, as it is almost as hard as concrete.

the surfacing of roads that cover virtually every district of Colorado and connecting several hundred communities with good roads. The rural residents in all parts of the state and those residing in the mountain districts now are in direct touch with the towns and cities. Improved roads have brought out the motor busses that serve the rural grade and consolidated schools, assuring ease for the children to reach these institutions; improved roads have materially increased the tourist travel to Colorado as the Denver Tourist Bureau reports disclose.

Good roads have been, and are, a boon to the farmers in the movement of their produce to market, and all reports prove that in this construction of modern highways the wealth of the state has been materially increased.

In the opening months of 1922 L. D. Blauvelt, state highway engineer, in announcing the selection of the Federal Aid roads in Colorado, said:

"The task of selecting 7 per cent of the 48,000 miles of road in Colorado for a Federal Aid system has not been an easy one. In making our selections the members of the advisory board and myself were first actuated by the desire to improve roads which would serve the most people. 'The greatest good to the greatest number' was our first consideration.

"Next we sought to select those main state highways upon which a good deal of improvement work has been done since the state of Colorado took up the matter of road building on a large scale. I believe we have designated a system of roads which will afford every section of the state ample means of transportation.

"I am going to see to it that all state roads not included in the 7 per cent system are improved just as they have been improved in the past."

The present improved roads in Colorado are a fulfillment of this promise by the state engineer. It is worth recalling that the 7 per cent roads submitted by Major Blauvelt were promptly accepted by the U. S. Bureau of Public Roads and now comprise the completed highways and those under construction. There have been, also, several additions made in the passing years to this original plan.

Modern Highways Changing Class of Motor Tourists

By HARRY N. BURHANS
Manager Denver Tourist Bureau

ONE AFTERNOON in August of last year a man drove a car in the more expensive class of automobiles up to a cottage camp near Denver. He spoke a few moments with the attendant and then drove in under the shelter adjoining one of the houses. His wife and son who were with him alighted and entered the house, while he opened the trunk on the rear of the car and took out a few articles of clothing; then joined his family. The car bore a New York license plate.

Immediately behind the New Yorker came a Missouri man with his wife and three children in a car in a lower priced class. He, too, rented a cottage for the night.

Here are two striking examples of the class of motor travelers one sees in the cottage camps, with cars from all parts of the United States. I mention these two as exemplifying the fact that improved roads throughout the United States have had a marked improvement not only on the class of motor tourists, but in the accommodations. The days of roughing it on tour have passed. The motorist today no longer wants to be bothered with pitching a tent nor with a car loaded down with the paraphernalia of camping. Comfort is the demand of the tourist, and the improved highway is the answer to his prayers.

Undoubtedly the most important factor in the development of a higher class of automobile travel is due to the fact that national and state governments have been expending millions of dollars in construction of modern highways, and the value of good roads in the development of automobile travel is an established fact. Every year state and national appropriations are greater, not by thousands, but by millions of dollars.

In Colorado we have seen this development, and the results, and today Colorado presents a total of 4,140.2 miles of paved or surfaced highways and 4,732.5 miles of graded highways, and these latter roads will in due time be either paved or surfaced. One has only to consider the roads in Colorado of eight or nine years ago to realize the vast difference in highway transportation of that day and this.

Development of good roads has had a marked effect upon accommodations that the motor tourist will find throughout the United States and in Colorado.

The first movement of motor tourists started in 1912. These nomads pitched their tents by the roadside and prepared their own meals. In 1915 Denver and Ashland, Ore., established free camps, which were necessary for sanitary reasons to take care of the small volume of travel. As these camps only furnished water and wood, they necessarily were free. Then followed throughout the country an epidemic of free camps.

Since 1920 cottage-camps have cropped out all over the United States, Colorado included, with charges ranging from \$1 to \$2 a day. Many communities have built attractive automobile hotels with a charge ranging from \$1.50 a day to as high as \$8 a day—which gives one another view of the class of motor tourists one finds following the highways of the nation.

The free auto camp is passing out of the picture, with the nomad. Overland Park in Denver began five years ago to charge 50 cents a day for a camper. With the increase in the past three years of attendance at cottage-camps, resorts and hotels, the registration at Overland Park has dropped from 70,000 to 30,000. In 1924 and 1925 there were several weeks during the



"When Wild Animals Become Tame" could be a title for this interesting photograph of deer taken by the Little Art Studio of Gunnison. The deer are responding to loads of hay scattered by the Colorado State Fish and Game Department along the state highway west of Gunnison. The photograph is unusual, as it shows the animals massed in the highway and the others on the side of the mountain.



With the Highway Department keeping roads across the Colorado Rockies open this winter the motorist has an opportunity of witnessing a scene like this. The Fish and Game Department is providing hay for the deer and here is a group of the animals feeding along the road west of Gunnison. This is a striking photograph taken by the Little Art Studio of Gunnison of a close-up of wild game.

summer when Overland Park was a city of from 3,000 to 4,000 persons for a night. I feel that in another two or three years the park will be abandoned as a motor tourist camp ground.

The New Yorker mentioned may be taken as typical of a very familiar class of motor tourists one finds today—men well to do in life; men who may be termed wealthy. If one notes the license plates in Denver during the summer, he will see cars from all parts of the United States, and of prices ranging from the highest class to the medium. These men in the New Yorker's class or the Missourian's class would not have undertaken a motor trip a few years ago. They would not have endured the trials and the tribulations of the roads of that period, and the work and trouble of making and breaking camp, nor of the free auto camp accommodations. The improved highway of today is the real reason for drawing these people to the open road, with assurance that accommodations will be to their liking, no matter where they go. The good roads alone are responsible for the cottage-camps and the automobile hotels of today.

Directly traceable to highways, not only in the nation, but especially in Colorado, is the increase in tourist travel, as noted by the Denver Tourist Bureau.

Automobile travelers in Colorado in 1928 spent \$17,000,000. The Rocky Mountain National Park, Estes Park and the Grand Lake region, all connected, had 375,000 visitors last year, comparable with 31,000 in 1915, and there were 525,000 visitors in the Pikes Peak region. The 350 automobile camps had 750,000 guests, but here as elsewhere are duplications, for Colorado hotels, resorts, private houses, apartment houses and cottage camps report a total of 360,000 guests. Cottage-camps in the Denver area report 40,000 registrations.

Colorado has four national monuments and the tourists who visited these places last year numbered 12,214. These monuments are on the western slope of the Rocky Mountains, but with boulevard-like highways

crossing the Rockies the motor tourist realized he could reach them easily. The scenery of the majestic Rockies has been opened by these highways to the tourist, and wherever he goes there are the accommodations that he wants, from the luxurious hotel to the medium priced hotel and from a wide choice of cottage or modern auto camps.

I am reminded of a friend who has made several motor tours and who has given still another view of the highways and the accommodations. Whereas the nomad must stop two or three hours before sunset to pitch his camp, put up his tent and prepare his evening meal and be ready for the night, this motorist could make 90 miles more along the road and there find accommodations at nominal cost that resulted in no personal trouble and in a real night's sleep and a bath. In the morning he and his companions were thoroughly rested for another day's traveling.

I must revert once more to good roads. Without them these tours could not be made; without them there would not be the present accommodations—and they are increasing year by year—and most assuredly Colorado must attribute the very large number of motor tourists each summer to the highways. The slogan that "Good roads make business" is true.

Construction of the proposed Evangeline road near Boulder will cost \$237,552, according to Fred Fair, in a report to the Boulder county commissioners. The road is proposed from the west end of the Maxwell road to the Hell Hole region, over which towers Lindbergh Peak. The survey was made at the behest of Denver clubwomen, who are conducting a drive among the school children of the country for funds to build the road, which is named for Lindbergh's mother. It would be one of the main scenic roads in the Rockies and a little more than 11 miles long, with a 4 per cent grade.

Highways and Motor Vehicles

"WE broke all records for an automobile run between Denver and Colorado Springs. We covered the 75 miles in five hours and 20 minutes!"

That was the report of two men who started out to get this record a little more than 20 years ago. The contest caused a great deal of comment. Today the trip is made easily in two hours, with one hour and forty-five minutes being common.

The record of five hours and 20 minutes must be considered today as another example of how highways not only increase speed of automobiles, which themselves have been vastly improved, but more especially a bearing out of the double statement that motor vehicles make highways and highways make a vastly increased use of motor vehicles.

The present Colorado State Highway Department began the active construction of good roads in 1921. In that year the registration of passenger cars was 136,336, and of trucks 10,829. In five years the registrations had reached 232,308 passenger cars and 20,905 trucks. For the fiscal year ending November 31, 1928, the registration of passenger cars shows 259,948, of trucks 23,361, and busses 958, a total of motor vehicles of 284,267.

The completed mileage of improved highways in Colorado as of December 31, 1928, shows 343 paved, 3,797 surfaced and 4,732 graded, and a portion of the graded roads have been paved or surfaced.

Today there is a continuous cement pavement from Fort Collins and Greeley through Denver to Colorado Springs. This mileage of pavement between Denver and Colorado Springs is of especial interest in considering the record of five hours and 20 minutes for that test run comparable with the one hour and 45 minutes possible today.

When the five hours record was made there were nothing but dirt roads. Old timers and many "late timers" recall that road. There were railroad crossings, steep grades, sharp turns, ruts and chuckholes—a typical heavily traveled highway of that period. The report of one of the men in this record race was that "telegraph poles flashed by like fence posts," an exaggeration, of course, but an example of the speed of the car. One who remembers that old road will have no difficulty in realizing the jolts these men got to make the record.

"The use of motor vehicles in Colorado never would have reached the present number without the system of good roads that the highway department has created," said a widely known Denver automobile dealer. "Manufacturers, of course, could have distributed their cars, trucks and busses in Colorado, but the point is there would not have been the demand for them were it not for the highways.

"There is no argument, to my mind, but good roads create a demand for motor vehicles. I believe the comparative figures bear out this opinion. The system of highways today in Colorado takes the place of old wagon roads and trails. One does not have to cudgel



Just a reminder to the summer tourist and motorist. This picture was taken by M. W. Bennett on the Mount Evans road, built by the Colorado State Highway Department, near Summit Lake. Though banked in snow today, it will be only a short time until the cars are moving over this scenic route.

the brain to realize that without a splendid highway the speed of the car cannot reach a maximum, and frequently not even a minimum.

"Can one imagine a rapid run over any of the old-time wagon roads that can be made today over a graded highway? One, in considering the relation of good roads to motor vehicles, must take into consideration that not only has the road been improved, but grades have been cut down to a minimum; curves have been eliminated and distances between two given points materially reduced by shorter mileage of the improved highways comparable with the old wagon roads.

"To my mind the important relation between highways and automobiles is that the combination of the two has brought rural and urban communities into close touch; has reduced the cost of transportation of farm products to market; has enabled the rural communities to enjoy the entertainment provided in neighboring municipalities and has thereby very greatly increased the pleasures in life for all rural residents.

"Personally, I cannot conceive how any person can fail to realize that the general use of motor vehicles must increase as the mileage in state improved highways increase."

This man also called attention to the construction of standard bridges on state highways, to road signs, to safety walls along highways in many parts of the mountains; and also that this winter the highway department is keeping roads open so that all districts in Colorado are open to motor travel. He also noted that every district in Colorado has been covered by the department and that no locality is not on or near one of the improved highways.

The California Mesa road in Delta County is to be graveled as soon as the weather permits, according to John Boyd, county commissioner. The estimated cost is about \$4,500.



Phraseology of warning signs along a highway is displayed in this photograph taken by M. W. Bennett on the state highway between Grand Junction and Delta, and shows that an unusual wording will have the desired effect on a motorist.

Tom Tully Talks About Early Struggles for Highways

“WE traveled 1,600 miles to map out a tentative system of state highways and we pushed the car 1,000 miles during the trip!”

Thomas H. Tully, member of the first state highway commission, made that remark in a general talk on the highways of Colorado in the beginning and as they are today. The remark, he admitted, may be exaggerated as to the number of miles he and C. F. Allen, one of the other commissioners pushed the automobile, yet he added:

“That gives one an idea of the condition of roads in Colorado at that time compared with the splendid system that now is found in the state.”

Back of the statement Mr. Tully reviewed briefly the story of the good roads fight that eventually led up to the establishment of the present state highway commission and the construction of highways.

In 1902 forty-two men who owned automobiles, then a rarity, organized in Denver the Colorado Automobile Club with D. W. Brunton, president, and F. L. Bartlett, vice-president, to start a campaign for good roads. Colorado Springs and several other towns organized affiliated clubs. The campaign was pushed, and July 27-28, 1905, a convention of good roads enthusiasts was held in Denver when the Colorado Good Roads Association was organized with J. A. Hayes, Colorado Springs, president; F. L. Bartlett, Denver, vice-president, and Henry R. Wray, Colorado Springs, secretary. There were 65 delegates present, and the counties were organized in the movement.

In 1906 was another convention and a bill creating a state highway commission was drafted, but it was defeated in the legislature in the 1907 session. Then began a campaign of education by the association that was carried on throughout the state. In 1908 the Rocky Mountain Highway Association was incorporated by Charles A. Johnson, Harold Kountze and Gerald Hughes of Denver, and in the organization Johnson was

elected president; F. L. Bartlett, vice-president and William H. Emmons, secretary. In the fall of that year the Colorado Automobile Clubs and the Colorado Good Roads Association consolidated with the Rocky Mountain Association. The association prepared a highway commission bill which was passed by the legislature in 1909 and C. F. Allen, William M. Wiley and Thomas H. Tully were named the commission.

“The commission, however, was without funds to do anything,” Tully remarked. “However, Allen and I started out in 1910 in his automobile, with his son driving the car, to go over the state and map out a system of state highways. We found that the people were apathetic. There didn’t seem to be any particular interest in highways. There was a disposition manifested in virtually every section of the state of jealousy of some other section. The belief seemed to prevail that all the highway commission was after was to put in a few good roads around Denver.

“Farmers we talked with were opposed to making any contribution or having any interest in roads other than in their immediate vicinity. Every community wanted to be on the main highways we sought to map out. We traveled 1,600 miles in the state and the motorist today who is not familiar with highway conditions of that day has no conception of what we had to contend with.

“I recall, especially, that we were six hours getting over the Battle Mountain road and into Glenwood Springs. We got over, but had a broken spring, smashed fenders and a few other breaks, and crawled into Glenwood Springs on the last drop of gasoline. That is a sample of the trouble we had everywhere, for we found bridges we did not dare to cross in a car, encountered mud that stuck us, found grades we managed to crawl up at a speed a snail could beat, and roads that were never meant for anything but a horse drawn vehicle.

Continued on page 18



Boulevard state highways will carry the motorist into the Mesa Verde National Park. This photograph by M. W. Bennett was taken near Mancos as an example of highway construction to this national playground and the ruins of a prehistoric people.

Old Roads Reminders of Progress in Highway Work

BY A MOTOR GYPSY

I AM TEMPTED to break once more into print. This is to be a plea that nothing whatever be done to eliminate or blot out the old roads and trails in Colorado. I want to see them preserved as a lasting and every-day reminder of what has been done in Colorado in the construction of highways.

There is nothing like the eyes and the brain working in unison to impress people of a fact. What they see and what the brain grasps thereby is more forceful, in my mind, than a page of print in a newspaper.

The motorist rolling along at ease and speed in his car on any one of the state highways today wouldn't give a minute's thought to the privilege of riding over a boulevard highway were it not that his eyes would now and then see the old road. Now I get into the depths of what I have in mind.

Traveling over Colorado along any of the state improved highways one at times is only a few feet or a few yards from the old road. He sees how it meandered along the valley or over the mountains. He observes its grade, its curves and its roughness. He may possibly recall the day when he traveled that road in a wagon, a buggy, on horseback, or in a stage coach. He will recall the rough going and the tedious trip. Naturally, he will compare it to the speed and ease of riding in his car over the present highway.

Here is where one gets a real understanding of what has been accomplished in the last seven years by the Highway Department in construction of roads.

The Denver motorist does not have to go far afield to gather this inspiration. Let him use his eyes as he motors through the Denver Mountain Parks area.

If he goes through Golden and begins the climb up Lookout mountain he will see traces of an old road down in Clear Creek canon; following the automobile

highway he will see traces of the old wagon road up the canon to the left; the road traveled by the pioneers in their first rush to the gold discoveries in Gilpin County and in the Idaho Springs and upper Clear Creek regions.

Leaving the summit of Lookout he will observe the old traveled road in scores of places; as a matter of fact, he will be viewing it on every hand. These were the roads that were traveled by stages, freighters and others. They join in with the road that is up Mount Vernon canon.

Suppose the motorist takes the Mount Vernon canon road into the mountain parks area. He hits the old trail when he leaves the paved highway at Rock Rest. He will motor over an oiled highway and will pass by the site of the now forgotten town of Mount Vernon at the entrance to the canon, and all the way he is following the route of stage coaches and freighters. He may recall that road before it was improved.

If his mind is with him he will follow part of this road up the canon, and he can see it at other places, sometimes across the creek.

If the motorist goes into the Mountain Parks area through Morrison and follows Bear Creek he will see the old-time road, and if he goes on to Turkey Creek he will see as he turns into the canon along the side of the mountains the old road far down in the bottom of the canon, winding snake-like along and he will meet it later on, but he will get only glimpses of it. The highway has eliminated virtually all the ancient thoroughfares, even over to the main trans-state highway through Buena Vista. Old-timers who traveled the road to Leadville will remember this road.

I am reminded of an article by the late Fred P.

Continued on page 20



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NEW HIGHWAY SLOGAN CAUSED BY AUTOMOBILES

"Better automobiles need better highways" was the slogan at the national exhibition of highway machinery and equipment in Cleveland. Highway engineers, highway leaders, city officials and county commissioners and manufacturers attending the show were united that as improvements are made in motor vehicles and the increased use of them comes, the demand for improved highways increases.

The road show followed the New York automobile show, and in the latter appeared the last word in cars, and served to call especial attention of the road show to the importance of high class roads throughout the United States. A very large number of those who attended the New York show were present in Cleveland and they were enthusiastic over the slogan of "better automobiles need better roads," and that formed the topic not only of conversations, but of various meetings in Cleveland.

These two exhibitions presented a striking contrast: the one composed of colorful beauty that all the wealth of Croesus could not have produced; the other, drab as far as color is concerned, embracing great lumps of iron and steel formed into concrete paving mixers, tractors, steam shovels with hungry jaws, having about them an air of capability which acclaims that the motorist will have attention.

The Cleveland display called to mind that only a few years ago road improvement programs depended in no small measure upon the limited number of contractors whose equipment would permit them to build but a few miles of pavement in a season. Nowadays road building is a great industry, with contractors everywhere ready to do well the public's bidding. It is today more a matter of the state providing work than it is of fitting road programs to road builders' equipment.

Now is the time of year when the public and its official representatives should be making actual plans for the road building season just ahead. Funds must be made available and contracts must be let, so that the road building army may lay pavements as soon as the frost is out of the ground and excess water drained away.

HIGHWAY MAINTENANCE COST IS LOW IN COLORADO

With the exception of Arkansas, Georgia, New Mexico and New Hampshire, the cost of maintenance of paved roads per mile in 1927 was the lowest in Colorado of all the 48 states, according to statistics published. The cost in Colorado was \$217 and of other western states was: Idaho, Kansas and Montana, each, \$350; Nebraska, \$513; Nevada, \$712; Texas, \$300; Utah, \$500; New Mexico, \$200; Wyoming, \$670, and Arizona, \$422. These are the maximum costs, as are other figures given.

The cost per mile of medium type highways, being treated, gravel or water bound macadam, in Colorado per mile for the year was \$227, compared with \$350 in Idaho, \$600 in Texas and \$700 in Wyoming, the only states reported. For the low type, being gravel untreated or sand-clay, Colorado's cost was \$1,770, compared with \$350 for Idaho, \$400 for Montana, \$400 for South Dakota, \$350 for Utah and \$600 for Wyoming, showing the care Colorado has taken of this class of highways.

In earth roads the report shows also that Colorado is paying attention to the condition of this class, for the maintenance cost per mile of these roads in the state last year was \$237 a mile, compared with \$150 in Idaho, \$200 in Montana, \$200 in South Dakota, \$498 in Nebraska, \$250 in Utah and \$200 in Wyoming.

COLORADO GIVEN PUBLICITY IN NATIONAL MAGAZINE

Colorado and the highways were given wide publicity in the February number of the Highway Magazine, published by the Armeo Culvert Manufacturers Association of Middletown, Ohio. On the front cover page is an illustration with the caption, "The Million Dollar Highway Near Ouray, Colorado," and attention to it is called in the magazine as follows:

"A million dollars for 80 miles of blasting and grading, nearly half for 14 miles—that's why Colorado's new scenic highway, a view of which is shown on the cover, is called the Million Dollar Highway. This new route's instant popularity has dispelled any shadow of doubt as to its economic feasibility. It connects the Pikes Peak Ocean-to-Ocean Highway with Mesa Verde National Park, making a remarkably comfortable and safe shortcut to southwestern Colorado through a region having many of the highest mountain peaks in the United States."

MOTORISTS KEEP MONEY IN CIRCULATION

Motor vehicles are putting money in circulation in the United States. Statistics released for 1929 show that more than two billion dollars were spent by owners for gasoline in the year and through gasoline tax they contributed more than \$280,000,000 to the highway building funds of the country. The reports also show that a large proportion of this gasoline money was spent for constructing high class roads.

In 1928 only three gas tax changes were made in the states, compared with 22 made in 1927. "The old belief that the gas tax would lessen travel has been dispelled," one authority on the subject says, "as tabulations have shown that motoring increases with the mileage of improved roads, largely made possible by the tax." A. E. Smith, executive director of the Wisconsin Good Roads Association, said that "the unimproved roads of Wisconsin exact a toll equivalent to a gasoline tax of 10 cents a gallon."

The expenditure by motorists in 1928 of \$280,000,000 for gasoline represents less than \$6,000,000 for each of the states with a gasoline tax.

Graveling the stretch of five and one-half miles of state highway between Romeo and Alamosa is one of a number of improvements scheduled for the San Luis Valley the coming season by the state highway department. Oil processing of this and other valley highways also is proposed.

Plans have been completed for the actual route of the Colorado Springs-Pueblo highway. The plans show that the new route will pass two blocks west of the main street in Fountain, leaving the Santa Fe Railroad tracks between the highway and the main part of the town. This has been done to avoid not only a railroad, but to shorten the mileage between Colorado Springs and Pueblo.

ATTRACTIVE architectural treatment of bridges has been made possible through the use of portland cement concrete as the basic structural material.

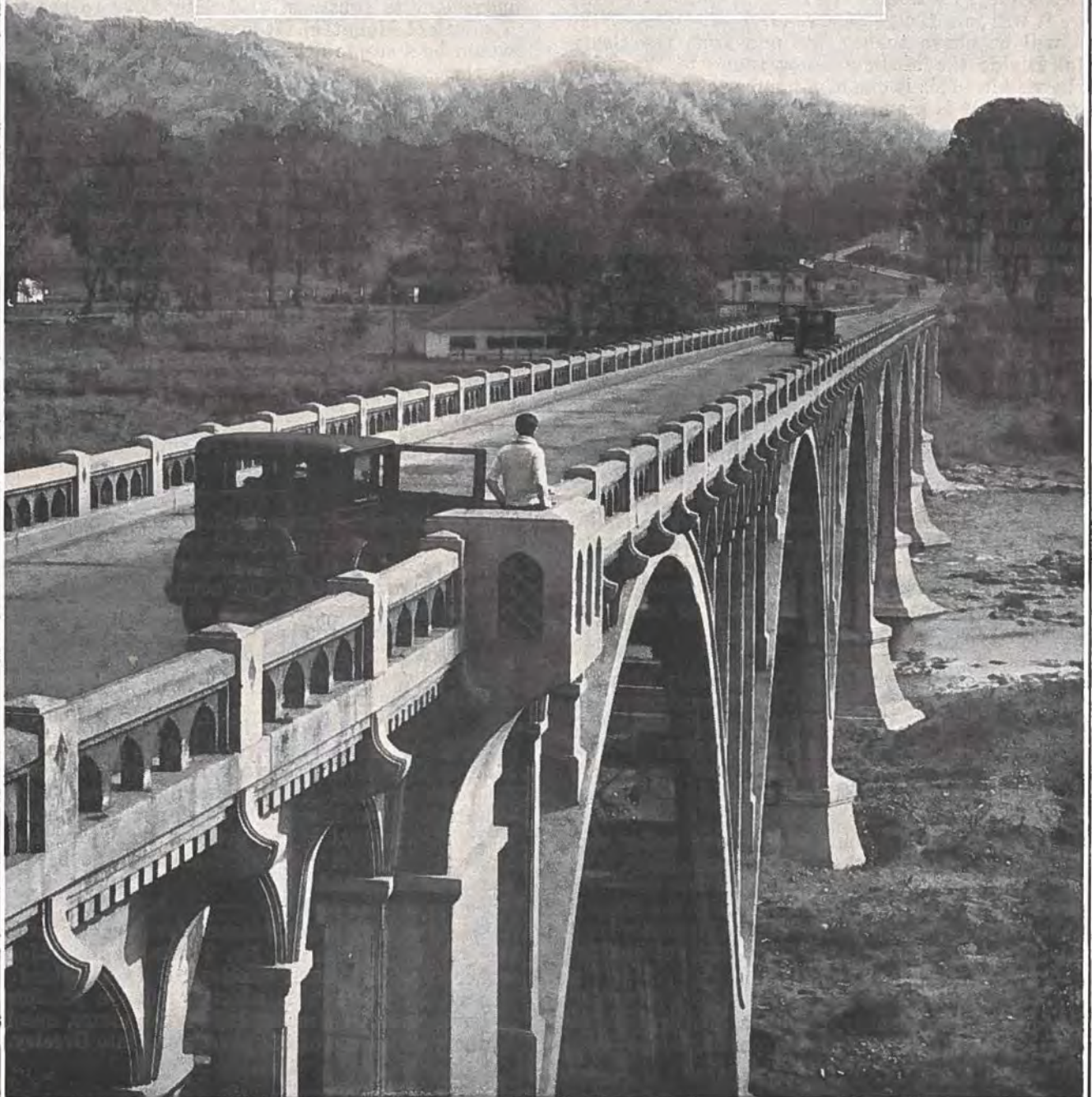
The R. A. Booth Bridge, carrying the Pacific Highway over the North Umqua River, near Winchester, Oregon, is an interesting example. The graceful arch ribs and spandrel columns have inherent beauty, which has been enhanced by ornamental details of effective simplicity.

The roadway also is concrete, providing a rigid, even-surfaced pavement for motor traffic.

PORTLAND CEMENT ASSOCIATION

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NEWS OF THE MONTH

Current Events in the Field of Highway Engineering and Transportation—State, County and Municipal Activities

THE government having finally accepted Rocky Mountain National Park, thereby clearing up a question that has been discussed for the last few years, plans are under way for several scenic highways within that national playground. It is expected that early in the coming season work will be started on one of these roads to cost \$500,000. This road will be south of the Fall River road and handle two-way traffic and extend from Deer Ridge, near Horseshoe Park, through Hidden Valley, via Long Trail ridge to Fall River Pass where it will join the present road. Eight miles of the road will be above timber line and from the Continental Divide the Medicine Bow range in Wyoming will be visible. This is one of a number of scenic roads the government is planning for the park.

By the end of 1929 there will be 75 miles of the Santa Fe Trail in the Arkansas Valley without a grade crossing. The state highway department will pave 40 miles of the road during the present year and the railroad crossing at Manzanola will be eliminated.

Pueblo business men have under consideration the construction of a toll road to the summit of Mount Baldy, one of the loftiest peaks in Colorado. The road, it is reported from Pueblo, would be a scenic attraction for tourists, opening not only an interesting highway, but a marvelous view.

Approximately \$290,000 will be spent on road work in Mesa Verde National Park in 1929, according to Superintendent Nusbaum in a statement made to Rocky Mountain Motorists, Inc. He states that this work will not in any way interfere with tourist travel within the park. The projects are scheduled to be completed late in the summer. The new main road will, it is said, permit cars for the first time to enter the park in high gear.

County commissioners of El Paso County plan improvements of the Black Forest road, according to the Colorado Springs Gazette. Plans contemplate work done on virtually all of the road in the county, including work on the road north and south and west of the Black Forest school.

Saguache County commissioners have under consideration straightening the road through Saguache. The proposal is that from the Swede corners the route be along the hillside and connecting with the Russell lane road into the town. It is stated that such a road would shorten the distance one mile and cut out ten bad turns.

Eastern Adams County residents are urging the grading of the Irondale road from Antelope Flat

grange hall west 11 miles to the Bennett highway. The Irondale road is a main traveled highway from east to west but the 11-mile stretch never has been graded, but east of Antelope Flat is open for travel. A delegation calling on the county commissioners offered to furnish the teams free to aid in surfacing the road.

The Gunnison chamber of commerce is back of a movement to construct a skyline drive to the top of Tenderfoot Mountain. It is urged that such a highway would be a scenic drive and open the place for winter sports.

Leadville reports the probability of the Tennessee Pass highway being extended by the government to Poplar Street in Leadville the coming summer. Attention is called to the recommendation for \$71,000 for this road. This amount is separate from \$68,000 already allocated for an extension of the road from Tennessee Pass to within four miles of Leadville, the contract for which was let last fall.

The Broadmoor roadway at Colorado Springs is to be widened in places and several curves are to be eliminated. The Myron Stratton estate has donated a strip of ground to aid in eliminating a curve that is considered one of the most dangerous ones on the road, and where a man lost his life recently in an automobile accident.

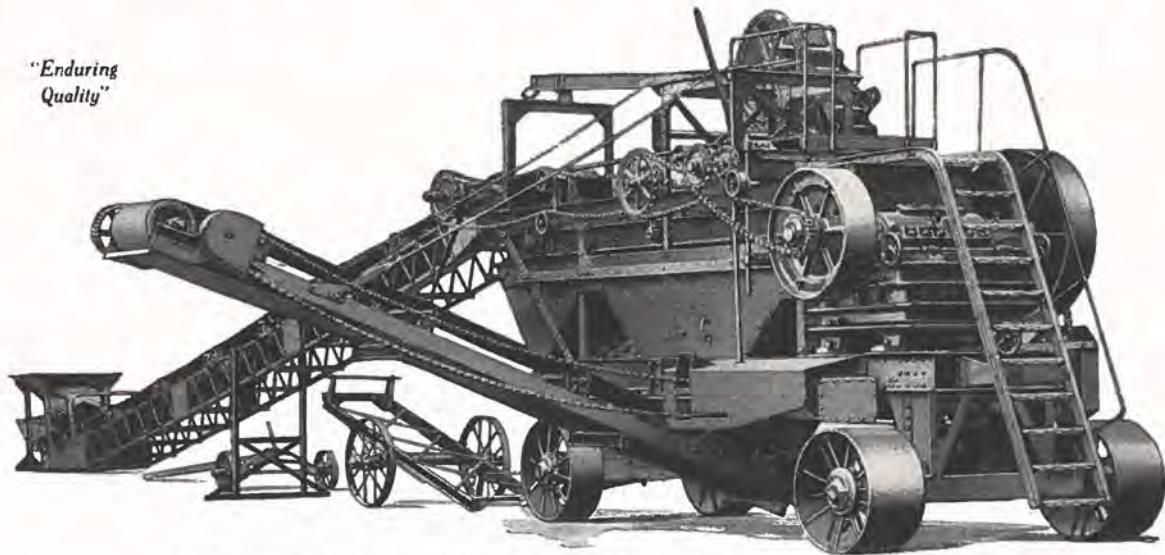
The Colorado-Kansas boulevard in Pueblo County is to be surfaced with crushed rock the coming season, according to P. G. Kay, county road commissioner. Other improvements in the county planned, he said, was to build several bridges on the Siloam road and the Siloam-Crow road is to be straightened, surfaced and drained. The Colorado-Kansas boulevard improvement will cost about \$10,000 and the same amount for the Siloam improvements.

Highway No. 14, familiarly known in eastern Colorado as the Sterling-Holyoke road, will be completed the coming season. The highway department will contribute \$5,000 and Logan County a similar amount that will provide \$10,000 for grading and graveling the highway. Considerable work already has been completed on this road.

Weld county commissioners favor continuation of the paving of Highway No. 2 west of Fort Morgan, rather than east from Greeley. It is explained that this would be more satisfactory than a possible bit of paving east of Greeley and would assure, eventually, the permanence of the paved road into Greeley.

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Highway News of the United States

In the last ten years the Federal government has expended \$614,000,000 on good roads, an average of less than \$3,000,000 each year for motor vehicles now in operation. A total of 9,753 miles of Federal Aid highways were improved in the calendar year ending December 31, 1928. Of this total 7,625 miles were new projects.

Highway construction and maintenance in the United States in 1928 cost approximately \$1,500,000,000, an increase of \$350,000,000 over 1927. A U. S. report says that more than 600,000 miles of the total of 3,000,000 miles of highways in the country have been surfaced. Up to November last, the government had participated in more than 73,000 miles, and at that time 11,000 miles additional were under construction.

Colorado road builders may not know it, but the California contractors also have problems to solve. It required six months to complete the removal of 1,900 trees from 65 acres in the redwoods to make way for a road. Sixteen choppers, with two to a tree, cut down the giants, followed by buckers or sawyers with drag saws to cut the trees into merchantable lengths, followed by powdermen, who blew up the stumps, and then came blockers to remove the stumps and branches, and next the contractor's crew.

In 1928 the Wisconsin highway commission reports construction of 339 bridges, underpasses and overheads, costing \$2,559,000, with a total combined length of 17,300 feet.

California's highway system includes 1,600 bridges with a total length of 42 miles. Inspection of bridges is one of the important duties of the commission in that state, as it is in Colorado.

After two years of use the highway across the great sand dunes in Arizona near Yuma has proved a success in preventing sand drifting over the road. This highway is a paved road higher than the fast moving sand dunes, built on sand fills to be level with the tops of dunes as high as 30 feet. The fills were oiled to hold them in place. On the old plank road maintenance men worked for hours and sometimes all day endeavoring to keep the road open because of the drifting sand.

Gravel roads in New Mexico are costing on an average of \$8,000, including grading and minor structures, according to the New Mexico Highway Journal, published by the State Highway Department. The average cost of grading and minor structures is given as \$4,800 a mile. "It (gravel) occurs more universally throughout the state, hence its more general use," says the journal.

The editor of Michigan Roads and Pavements is authority for the following figures: A mile of concrete 18 feet wide and 7 inches thick is equivalent to 2,000

cubic yards of mixed concrete. It covers $2\frac{1}{4}$ acres of ground, contains 3,400 barrels of cement, which is 17 carloads; 1,100 cubic yards of sand, or 32 carloads; 1,600 cubic yards of crushed stone, 46 carloads; 300,000 gallons of water, 38 tank car loads. The total weight of the mile of concrete is approximately 4,000 tons. To burn the cement required for a mile of road it requires 340 tons of coal and to sack it 13,600 sacks are required. To make these sacks 13 bales of cotton are used.

Construction Advisor remarks that there are astonishing facts in regard to some industries with which the average person is not familiar, and after citing that it takes more pounds of ink to make one million dollar bills than it does pounds of paper, says: "In the same way most people would be astonished to know that the equipment charge on a two-mile concrete road job is considerably greater than the labor cost. The astounding thing to discover is that many constructors do not know it."

Lee Wilkerson, patrol foreman in Otero County, New Mexico, buries the loose rock, thereby eliminating the danger of skidding and tire blowouts on his 240 miles of federal and state highway. Every foot of Wilkerson's patrol is of gravel surfacing and one of the patrolman's chief worries formerly was the "working up" of the gravel. Rainfall is only semi-occasional in this section and consequently there is not much trouble from water erosion, but wind erosion is continuous and the erosion, together with the heavy traffic, keeps the gravel creeping up.



Do wild animals like fruit? This elderly lover of deer is feeding a bunch of them apples near Glenwood Springs. That they appreciate his kindness and also the food is shown by their closeness to him. The photograph was contributed by Robert Haviland, of the Colorado State Fish and Game Department.

STATE HIGHWAY DEPARTMENT

Financial Statement for the Quarter Ending February 28, 1929

BALANCES, DECEMBER 1, 1928

State Treasurer.....	\$715,660.23
County Time Warrants	14,678.82
Revolving Fund.....	9,500.00
Total Balances....	\$ 739,839.05

RECEIPTS

Half Mill Levy.....	\$ 79,000.83
Internal Improvement	21,300.00
Gas Tax.....	539,000.00
U. S. Government....	592,510.32
Highway Receipts....	2,232.92
Bus Licenses.....	21,120.88
Total Receipts....	1,255,164.95
Total Balances and Receipts.....	\$1,995,004.00

DISBURSEMENTS

Federal Aid Projects.....	\$307,739.80
State Projects.....	63,960.19
Maintenance	170,560.70
Maintenance Equip- ment	1,974.38
Property and Equip- ment—Shop	3,171.52
Construction Equip- ment	8,055.95
Surveys	2,034.12
Traffic Signs and Census	459.46
Administration	37,480.22
Federal Aid Renewals	551.92
Total Disburse- ments	\$ 595,988.26

BALANCES Feb. 28, 1929	
State Treasurer....	\$1,375,336.92
County Time Warrants	14,178.82
Revolving Fund....	9,500.00

Total Balances.	1,399,015.74
Total Disbursements and Balances.....	\$1,995,004.00

COUNTY SUPPLIES
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Tom Tully Talks About Early Struggles for Highways

Continued from Page 9

"I am free to confess that both Allen and myself were puzzled as to what we could do to arouse general interest in the good roads movement, for Wiley was not with us on this trip. We talked it over time and again. The final result was a good roads conference in Pueblo. That is remembered. It was the most spectacular and spirited meeting ever had. That smouldering battle between south and north Colorado flamed out and there were bitter denunciations of each other, ending in the breaking up of the convention. However, the effect was a determined awakening on the part of the people of Colorado to have good roads, a case of we'll beat the other fellow to it in good roads. I really believe it was the Pueblo battle that started enthusiasm for good roads that endures to this day, and wiped out that sectional feeling."

Funds, however, still were short. The "pork barrel" still ruled in the legislature. By way of explanation the "pork barrel" was the roads and bridge funds over which the individual senators and representatives fought to gain money for roads and bridges in their immediate districts. Part of this fund had been declared for the commission, but it failed to come.

The highway commission, however, continued to struggle to build roads with the little money that was available.

"Considerable work, however, was done in 1909-10," Tully said, "but it was all preliminary work. In

January, 1911, another good roads conference was called under the auspices of the Rocky Mountain Highway Association in Denver with Johnson as chairman (later president) and Emmons, secretary. At this convention there were four road bills drawn for the legislature, the two most important being one for a \$10,000,000 bond issue and the other turning the 'pork barrel' fund over to the highway commission. The bond issue passed the legislature but was defeated by the people at the polls.

"The highway appropriation bill passed, but the legislature made 93 special 'pork barrel' appropriations from the internal improvement fund and the remainder as H. B. No. 200, was turned over to the highway commission. Governor Shafroth vetoed the 93 bills. The validity of the bill was fought through the courts and finally declared invalid by the state supreme court on a technicality—and it called for \$800,000 and this amount was tied up. Then the bill was initiated and lost, still leaving the \$800,000 in idleness.

"In 1913 the Good Roads Association succeeded in getting through the legislature the bill creating what may be termed the modern highway commission and it was approved by Governor Ammons March 25, 1913, and the \$800,000 was released for the highway commission."

Governor Ammons named T. J. Ehrhart as highway commissioner and the bill having created five highway districts he named these men for each district: No. 1, J. M. Kuykendall; No. 2, L. E. Curtis; No. 3, C. R. McLain; No. 4, C. H. Herr, and No. 5, L. H. Walbridge.



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3. Double segments and pinions for leaning the wheels.
4. Accurately machine cut gears and worms fully enclosed in dust proof gear case.
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6. Galion patented automatic skew axle.
7. Railroad rail circle—strongest made.
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PHONE TABOR 1361

DENVER

New Highway Equipment and Materials

Pioneer Gravel Equipment is the new name for an old established line. When Russell Grader Manufacturing Company recently merged with Caterpillar Tractor, the boys who had been making and selling the Gravel Equipment Line of Russell Grader bought this line and incorporated as the Pioneer Gravel Equipment Mfg. Co., located in Minneapolis.

Now the new incorporators just wish to say "Business as usual, but don't forget the new name—Pioneer Gravel Equipment." A new plant, with 36,000 square feet of floor space, is rapidly nearing completion and will house the "Pioneer" Line.

In this territory Pioneer Gravel Equipment Mfg. Co. announces as their distributors, Elton T. Fair Company, 1611 Wazee Street, Denver. This company has been engaged in selling construction equipment in the Denver territory for the last 20 years and is one of the best known in the Rocky Mountain region.

PORTLAND ISSUES BOOKLET ON CONCRETE BRIDGES

The Portland Cement Association has published an attractive and well illustrated booklet, "Concrete Bridges," for distribution among engineers, civic and town councils and chambers of commerce where bridge construction is under consideration.

The booklet presents a discussion of some of the principal requirements of bridges. Maintenance, economy and structural details of incidental parts as well as a plain discussion of the material "concrete" and the factors relative to its successful manufacture are among the subjects treated.

Copies of the booklet may be had from the Portland Cement Association, 412 Denver National Bank Building, Denver, and the association further offers the benefit of the experience of its technical staff in problems having to do with concrete.

ADAMS TAKES OVER NEW LINE

Elton T. Fair Company, Denver, has received word that the J. D. Adams Company has taken over the exclusive sales rights of Euclid track wheel dump wagons, automatic wheel scrapers and rotary scrapers in most of the central states, the Mississippi Valley and west of the Mississippi and in the northwest. The Fair Company will handle the line in this territory. The Euclid equipment is now widely and favorably known to dirt moving contractors, Elton Fair said, and added that new catalogs of Euclid equipment have been issued and will be sent on request. The J. D. Adams Company has enlarged the Indianapolis plant to meet the season demand for equipment manufactured by the company, with the official statement to the Fair Company that all orders will be promptly filled.



"Two Jacks running wild in the Rocky Mountain territory"—that's the caption found above picture. The gent in the saddle happens to be John H. Jay, president of the Iowa Mfg. Co., of Cedar Rapids, Iowa, makers of Cedar Rapids portable crushers. The picture was made on a recent trip to Denver.

EQUIPMENT FOR CONSTRUCTING NEW CITY HALL IN DENVER

H. P. Wilson Machinery Company has sold equipment to Varnum & Bate, contractors for building Denver's new city building. The sales include one Insley mast-hoist, one set of Blaw-Knox bins, two Barber-Greene 60-foot conveyors, Koering one yard concrete mixer. The company also has made sales of five 10- and 12-foot Austin graders and one Western Standard elevating grader to contractors and counties. The T. L. Smith Company of Milwaukee has purchased the Kwik-Mix Concrete Mixer Company of Port Washington, Wis., according to Mr. Wilson. With the acquisition of the company the Smith Company has one of the most complete line of mixers in the world, Mr. Wilson said.

Showing Adams one-man maintainer "turning oil mix" on highway south of Cheyenne, on State Road No. 1.



NEW CATALOG GIVES FACTS ABOUT WOOD DUMP BODIES

Richard Carlson of the Liberty Trucks and Parts Company, Denver agents of the Wood Hydraulic Hoist & Body Company of Detroit, announces a new catalog by the latter company. It illustrates and fully describes the construction and advantages of the Wood steel dump bodies. Low maintenance cost, long life and satisfactory service are the points brought out in regard to this equipment. Write to manufacturer for catalog, giving the name of our publication.

ONE MAN SNOW PLOW FOR CATERPILLAR TWENTY

L. L. Clinton, of the Clinton and Held Company, reports that LaPlant-Choate announces the development of a strictly one man snow plow designed for the Caterpillar Twenty that is hydraulic controlled by a lever located near the tractor controls. His company is agent for the new snow removal equipment and of it he said: "The moldboard has considerable overhang which prevents the snow from falling back in the path of the tractor and is used also in nudging over the side banks. Two adjustable runners to the frame permit the use of the plow without pressure on the cylinder. The plow is built close around the tractor."

CHICAGO TRIBUTE TO COLORADO

(From the Chicago Tribune)

Seventy-four miles of concrete road reaching from Denver to Colorado Springs, during the construction of which thirteen grade crossings were thrown into the discard by means of grade separation, is one of the accomplishments of Colorado last year.

Sharp turns and angles have been converted into broad, sweeping curves, and steep grades have been leveled down to easily negotiable hills, thus setting an example which other communities may consider with profit when contemplating highway building activities.

PLANS BEING DRAFTED

Proj. No.	Length	Type	Location
78-R	0.5 mi.	Overhead R. R. Crossing and Approaches	South of Minturn
150-A	6.0 mi.	Gravel Surfacing	West of Craig
151-A	6.0 mi.	Gravel Surfacing	South of Granby
253-D	4.0 mi.	Gravel Surfacing	West of Steamboat Springs
292-C	3.0 mi.	Gravel Surfacing	West of Minturn
295-D	3.0 mi.	Gravel Surfacing	North of Antonito
300-B	3.0 mi.	Gravel Surfacing	North of Silverton

PLANS SUBMITTED FOR APPROVAL TO U. S. BUREAU OF PUBLIC ROADS

Proj. No.	Length	Type	Location
57-R	0.464 mi.	Bridge	North of Lamar
68-R	1.9 mi.	Gravel Surfacing	North of Monte Vista
258-H	5.039 mi.	Gravel Surfacing	West of Sapinero
208-AR & BR	9.254 mi.	Oil Processed Gravel Surfacing	East of Grand Junction
270-AR & BR	6.263 mi.	Gravel Surfacing	East of Monte Vista
295-BR	6.622 mi.	Gravel Surfacing	South of La Jara

PROJECTS ADVERTISED FOR BIDS

Proj. No.	Length	Type	Location	Date Bids Opened
286-AR & BR	5.267 mi.	Gravel Surfacing	North of Nunn	4-22-29
287-AR No. 5	6.590 mi.	Concrete Pavement	West of Fort Morgan	4-22-29
277-D No. 1	15.566 mi.	Grading	North of Pueblo	4-22-29
144-AB & C	.....	Oil for Processing	Delivery at Ingleside	4-22-29
286-AR & BR	.....	Oil for Processing	Delivery at Dover	4-22-29
295-D	.....	Oil for Processing	Delivery at Antonito	4-22-29
295-BR	.....	Oil for Processing	Delivery at La Jara	4-22-29
270-AR & BR	.....	Oil for Processing	Delivery at Parma	4-22-29
M-4	29.678 mi.	Gravel Surfacing	West of Lamar	4-22-29
97-R	.....	Bridge	East of Lamar	4-4-29

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
2-R7	South of Aguilar	1.224 mi.	Paving	H. C. Lallier Const. & Eng. Co.	\$ 66,990.60	60	2-R7
2-R8	Aguilar, South	1.633 mi.	Paving	J. Finger & Son	66,660.00	90	2-R8
57-R	North of Lamar	.....	Detour Bridge	Phelps Bros.	8,888.00	100	57-R
134-B1	East and West of Vona	3.352 mi.	Gravel Surfaced	W. A. Colt & Son	32,605.00	55	134-B1
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	79	138-A
144-C	Bet. Fort Collins and Laramie	2.934 mi.	Gravel Surfaced	Bedford & Woodman, Inc.	37,911.35	23	144-C
147-A	In Ute Mt. Reservation, S. of Cortez	15.896 mi.	Surfacing	E. J. Maloney	119,100.10	100	147-A
147-B	South of Cortez	4.833 mi.	Surfacing	E. J. Maloney	59,447.44	34	147-B
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	20	149-A
208-AR	E. of Grand Junction	0.507 mi.	Gravel & R.R. Grade Separation	Harry A. Roush	59,568.00	88	208-AR
242-C	West of Fruita	6.011 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	56,344.50	27	242-C
251-C	E. of Boulder	4.000 mi.	Pavement	J. H. Miller & Co.	150,263.60	100	251-C
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	95	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	27	258-G
259-A1	Between Parlin and Sargents	3.350 mi.	Gravel Surfaced	Ed. H. Honnen	51,551.00	11	259-A1
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	25	262-I
266-D	South of Bonadad	4.111 mi.	Gravel Surfaced	Engler, Teyssler & Co.	96,075.30	38	266-D
271-C	West of Portland	2.430 mi.	Surfacing	J. Finger & Son	54,843.40	76	271-C
272-D	East of Manzanola	1.950 mi.	Pav. & R. R. Underpass	Driscoll Construction Co.	83,237.50	5	272-D
279-F	North of Baileys	3.444 mi.	Graded	J. Fred Roberts & Sons	126,000.00	89	279-F
282-AR1	South of Craig	600 ft.	River Protection Work	Hinman Bros. Const. Co.	11,925.00	94	282-AR1
282-E	N. of Meeker	6.421 mi.	Gravel Surfacing	Luke E. Smith & Co.	88,384.20	81	282-E
282-H	Between Rifle and Meeker	7.029 mi.	Gravel Surfaced	Winterburn & Lumsden.	82,589.74	5	282-H
292-B	Between Gilman and Minturn	2.640 mi.	Gravel Surfaced	O. J. Dorsey	29,146.80	0	292-B
293-C	North of Ouray	3.661 mi.	Grading	C. V. Hollenbeck	62,997.80	60	293-C
296-C	N. of Greenhorn on S. H. No. 1	6.606 mi.	Surfacing	H. C. Lallier Constr. & Eng. Co.	115,466.80	91	296-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssler	35,426.00	20	298-B
299-B	Between Delta and Grand Junction	3.465 mi.	Gravel Surfaced	Gardner Bros. & Glenn	60,804.80	44	299-B

Continued from page 10

Old Roads Reminders of Progress in Highway Work

Johnson in COLORADO HIGHWAYS a few years ago of his trip to Leadville over the Turkey Creek route. He was five days making the trip. Compare the road of that day with the one today.

It really does not make any difference in what part of the state the motorist goes, he will see as he speeds along the highway the old road, or traces of it—a constant reminder to him of what has been accomplished in Colorado.

I would also like to see the old bridges left, also as reminders to the people of what was, but is no more. I would like to have them left by the Highway Department as examples of old structures compared with the iron or concrete bridges that we cross today in our traveling over the state. I wonder if a very large number of persons have not made these bridge and road comparisons as I have done, but still the greater number who has not noted the changes.

I am a motor gypsy, wandering over Colorado each summer—and the state never palls on me; there is something new for me to see every time I travel a

highway, though I may have been over it several times. Perhaps I am unusually attentive to the scenery and perhaps I more deeply appreciate the comfort of the modern highways we have that I want to see the old roads and the old bridges kept up, and more especially do I urge that the old-time roads be left as they are.

Aside from these old-time highways being of interest as centering the motorist's mind and eyes on the old and the new, there is history attached to each of these ancient thoroughfares. They tell the story of the making of Colorado; of the development of the mines, of agriculture or horticulture—a history of the state.

But of the greatest importance to my mind, they are a visual reminder to us of the progress that already has been made in the construction of highways in Colorado. And this work of progress is going on today and will continue until the old roads are only a memory, unless they are retained as I have suggested.

Extensive graveling is planned on the Walsenburg-Pueblo road for the coming season, and it is reported that all roads in that part of Colorado are to be put in first class condition. This refers not only to state, but to county roads.

Specify **KEYSTONE CULVERTS**



To be sure of always securing a fine, uniform, strong, quality-made culvert, specify Keystone. Then watch the little differences---considered from the time the metal is being made---reflect themselves in longer life and less expense. It is always safe to specify Keystone Culverts.

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Shovel! — Don't Nibble!

FOR instance — in a tough, hard bank, when a dipper that makes its own choice between hoist and crowd, would do nothing more than shave away, the Koehring operator puts all the power into crowd for a good dipper load, and then puts all the power into the hoist — SHOVEL instead of NIBBLE!

Koehring *independent crowd and independent hoist* mean that the operator is always master on the job.

Know the Koehring! Know Koehring Heavy Duty construction!

Shovel Capacities

Line of plate struck measure. Shock absorber on boom. Quickly convertible to pull shovel, crane or dragline.

No. 301 — ¾ yd. dipper on 16' stick, standard. Other dippers on proportionate stick lengths.

Wisconsin 4 cylinder gasoline engine 5¼"x6½", 1000 R. P. M.

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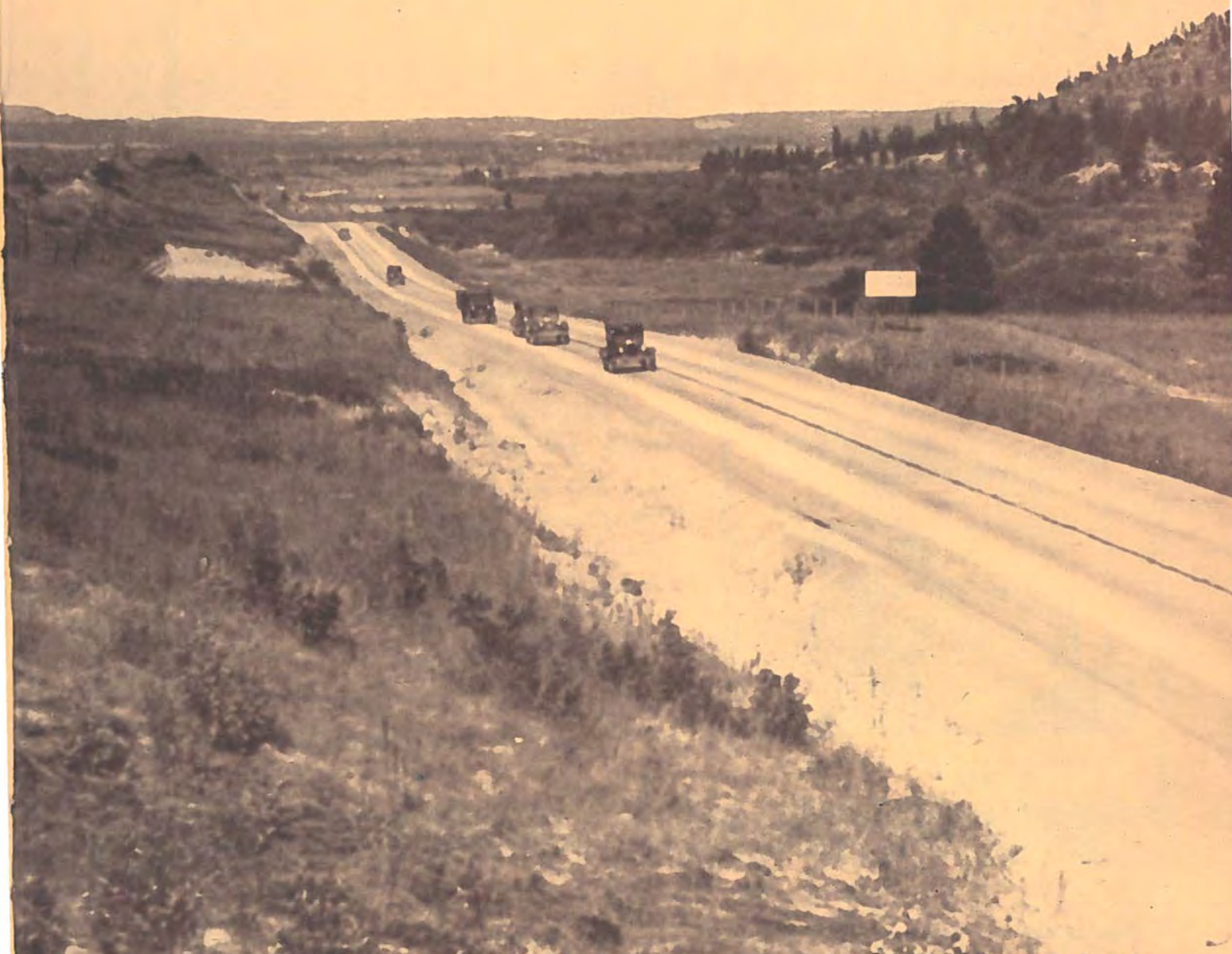
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COLORADO HIGHWAYS



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The name "Caterpillar" is your guarantee of best material, of proven design of construction.

Wherever tractors are used the "Caterpillar" is known for its dependable power and its continuous performance.

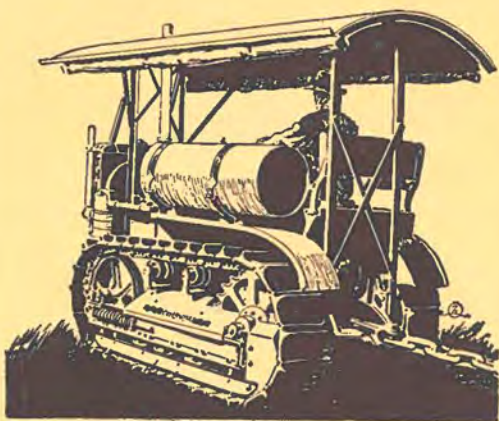
Taxpayers do not question "Caterpillar" efficiency.

They know it is their guarantee of good roads.

They know that road officials are not experimenting with public funds.

There is but one (made in 5 sizes) "Caterpillar" tractor and no substitute.

There has never been an equal of the "Caterpillar" in work done and economy of operation.



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Official Publication of the
COLORADO STATE HIGHWAY DEPARTMENT
 Denver, Colorado

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L. D. BLAUVELT,
 State Highway Engineer.

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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,
 1803 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor
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Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
10 CENTS A COPY. \$1.00 A YEAR.

Our Cover Picture

The photograph on the front page of COLORADO HIGHWAYS this month will be familiar to many readers of the magazine. It is a stretch of the paved state highway between Denver and Colorado Springs, taken by W. D. Wilder, and is presented as an introduction to this scenic Colorado number. "Scenic Colorado" is used advisedly and the belief is herewith expressed that the reader will agree with the statement after a perusal of the photographs reproduced this month.



100 ft. Riveted Low Truss Span, Dillon, Colo.

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For every purpose

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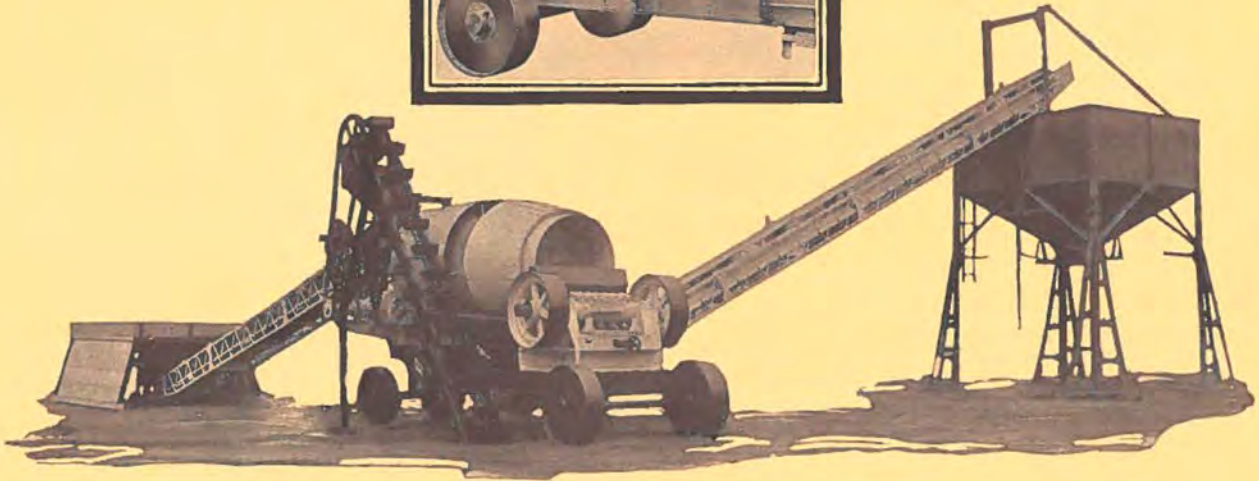
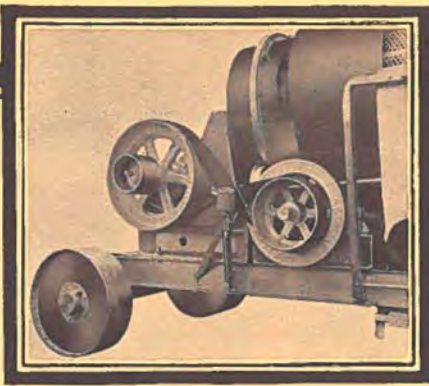
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inside screen. The smaller oversize goes to the 3 x 36 by the outside screen. The product of both crushers is returned by the elevator to the screen for re-screening, giving the same closed unit operation as the single One-Piece Outfit. *The only completely portable rig using two crushers.*

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Crushes-Screens-Loads In One Operation



VOLUME VIII.

MAY, 1929

NUMBER 5

Editorial

INTRODUCING Colorado to the summer tourist is not only a duty, but a pleasure for COLORADO HIGHWAYS. Colorado is the Eden for the lover of the great outdoors and the open road. There is no other state in the Union which presents such a variety of recreation that includes motoring, mountain climbing, golf, bathing, boating, polo, camping and fishing.

Colorado offers to the motorist more than 9,000 miles of improved state highways that will take the car over passes across the backbone of the Continental Divide, some of them more than 14,000 feet above sea level. Highways like boulevards lead to all parts of the state—to the cities, thriving communities, valleys and plains and into the primeval wilderness, where forest roads and trails will take the visitor farther into the depths of the solitudes.

There are hotels and resorts, auto and cottage camps to meet the requirements of every purse. One of the many charms of Colorado is that here one can live as one pleases, and there is the exhilarating air from peaks from which the snow never has left since first they lifted their heads above the clouds millions of years ago. There are the cool nights in the lower and colder nights in the higher altitudes, with coolness found in the shade even on the warmest days.

Here in Colorado will be found 43 peaks that tower more than 14,000 feet above the level of the sea, comparable to only eight in Switzerland, and others above 10,000 feet to lure the mountain climber. There are 15 national forests comprising more than 13,000,000 acres in the heart of the Rockies open to the camper, and recalls the lines—

*"When the north wind comes to woo me
There's a call that whispers to me
Of a solitude that beckons to the glory of the camp."*

The visitor in Colorado will find a thousand lakes to charm the eye and six thousand miles of trout streams.

Here is Rocky Mountain National Park, its 378 square miles occupying the center of the mountains, dominated by Long's Peak, 14,258 feet in elevation, and 14 others of more than 13,000 feet. Within its boundary Nature has surpassed herself in beauty and grandeur. There is Mesa Verde National Park, comprising 77 square miles, with the ruins of homes of 70,000 people in a forgotten age. There are four National monuments, each distinctive, with Wheeler showing the world's most startling and awesome exhibit of lava flow when the world was in the making; Colorado, presenting the world's most startling example of erosion in countless fantastic rock formations; and Yucca House and Hovenweep, with their homes of a race that was ancient when Columbus sailed. There is a buried city here for the marvel and the admiration of the tourist, the archeologist and the student.

One may in a day's round trip out of Denver visit living glaciers. Traveling the mountain districts the motorist may visit ghost cities—relics of the old mining days when they were teeming with activity and ranked as rivals of Denver.

There are more than 300 curative springs in the state, with the waters of every famous European spa duplicated.

One may in a day's trip out of Denver visit living glaciers. Traveling the mountain districts the motorist may visit ghost cities—relics of the old mining days when they were teeming with activity and ranked as rivals of Denver.

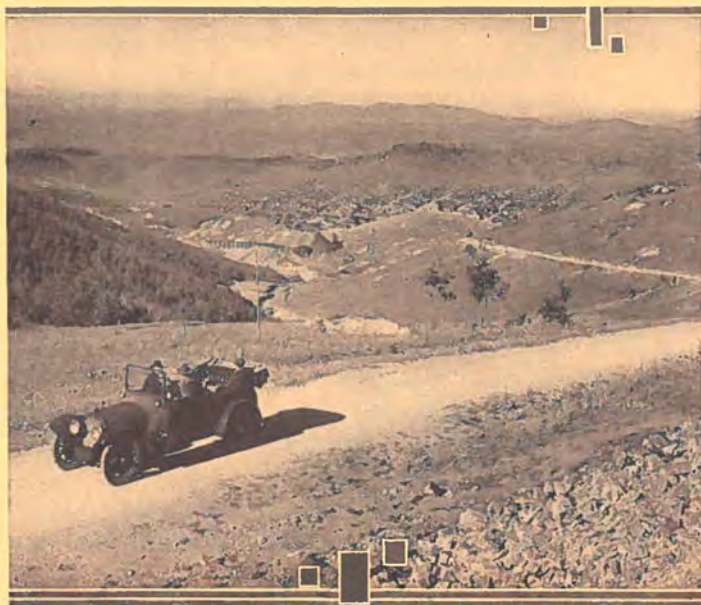
Wild game will be seen along the mountain highways, but in the summer season only to be "shot" by the camera, and a score of wild game refuges for one to motor through or camp within.

Rest and Recreation are the two outstanding "R's" in the alphabet of Colorado, and the outstanding word of the state is "Welcome."

TELL THE WORLD ABOUT COLORADO

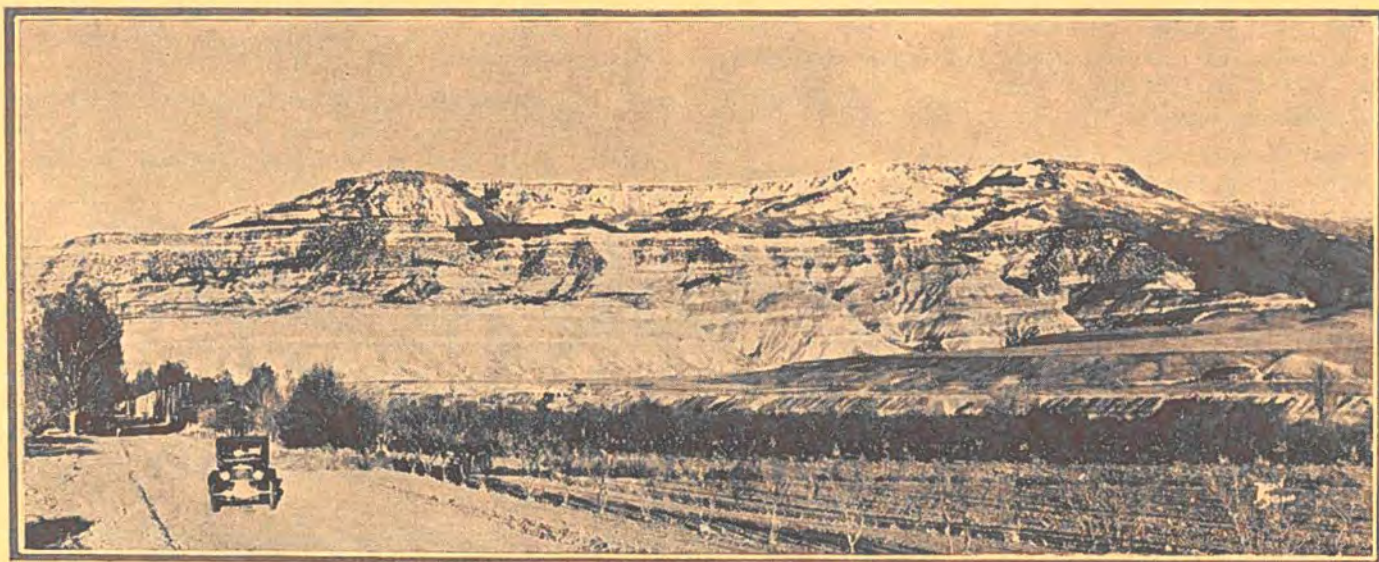
*When you are through with this issue send it to some friend
residing outside of the state.*

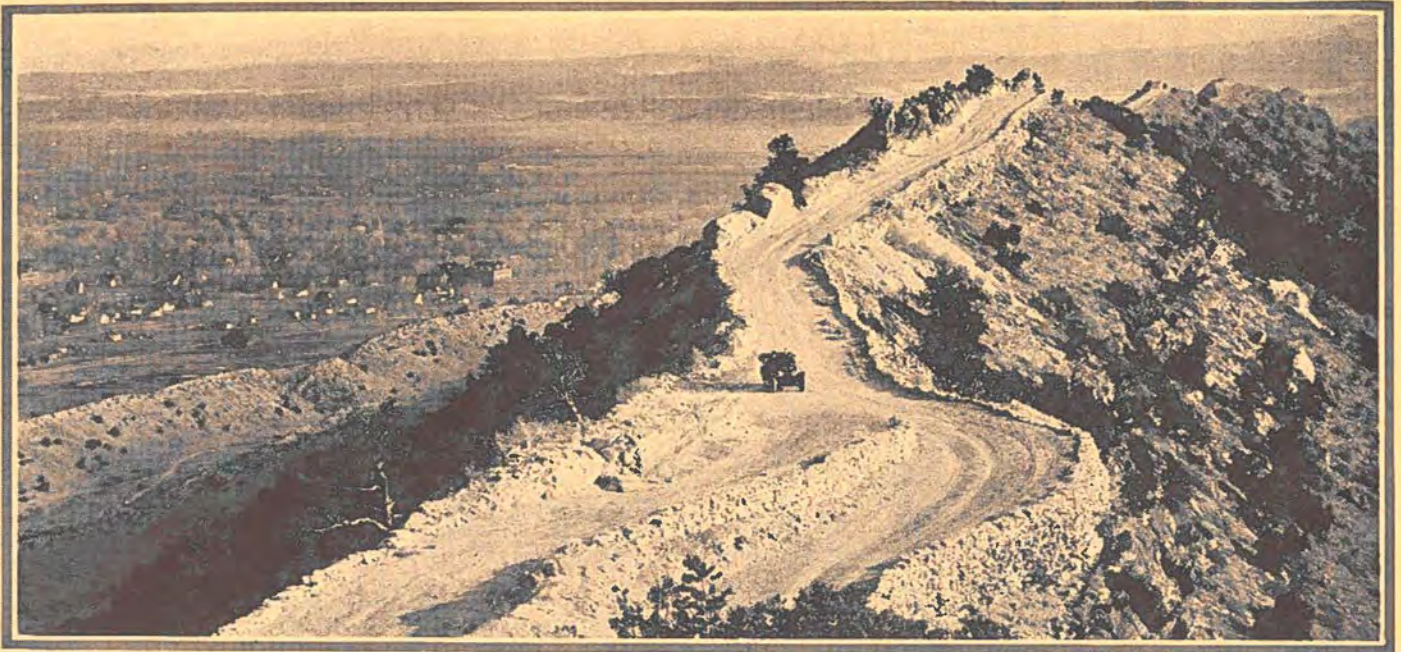
Seeing Colorado By Motor



Scenic Colorado

Is a joy to the automobilist and the pleasure seeker. There is none of the forty-eight commonwealths that has the attractions of Colorado, with its towering peaks, sparkling lakes, snowclad ranges, vast forests, sunlit plains, verdant valleys and all open to the motorist over 9,000 miles of improved roads. For the pleasure seeker there are 6,000 miles of trout streams, camping places, cottage and auto camps, hotels and resorts where one may live as one pleases. Rest and Recreation are handmaidens in the state. COLORADO HIGHWAYS submits this special pictorial number as an invitation to the world to come to Colorado and enjoy life in its fullness. Pictured herewith at the top is a view of South road from Colorado Springs; center, a glimpse of Cripple Creek, and at the bottom the palisades near Grand Junction in the heart of a great orchard district.





The famous Skyline Drive in the environs of Canon City. One of the many spectacular motor roads in Colorado.



Through the forest over Monarch Pass, on the Salida-Gunnison highway.



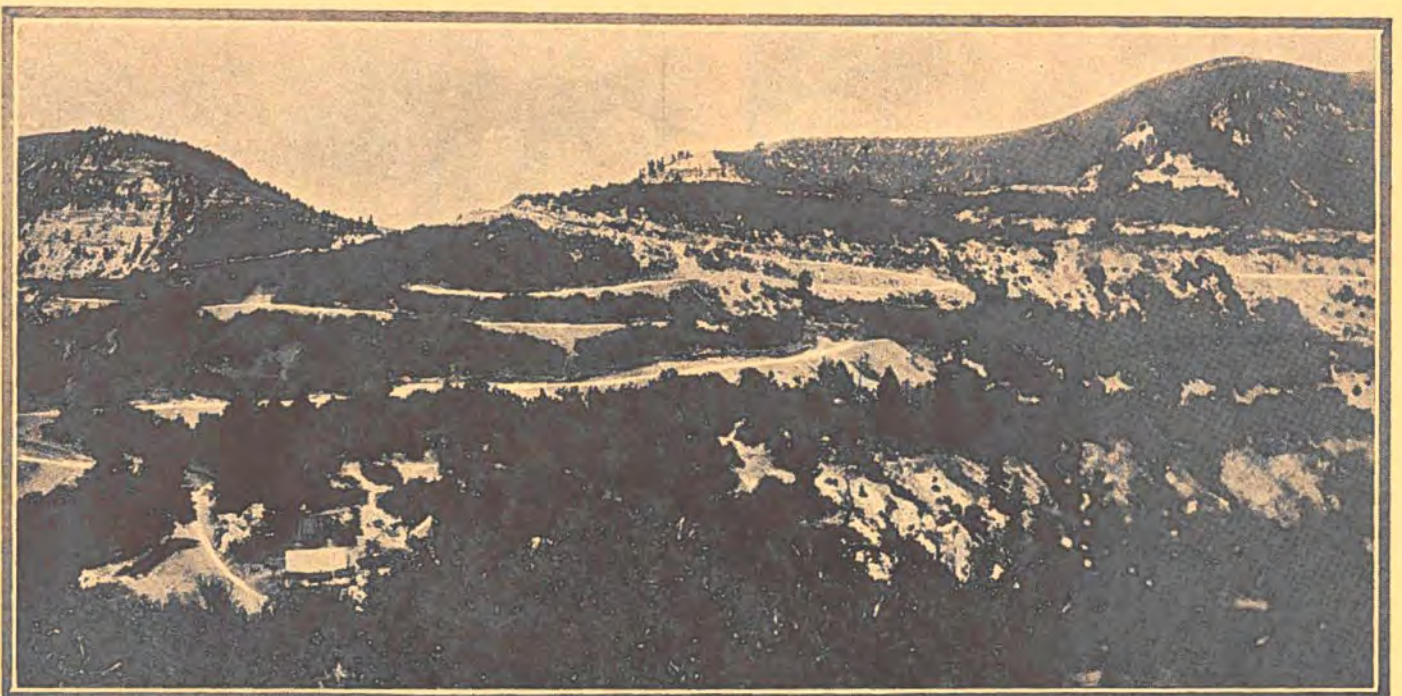
Cascade Drive through one of the most beautiful growths of aspens in the state.



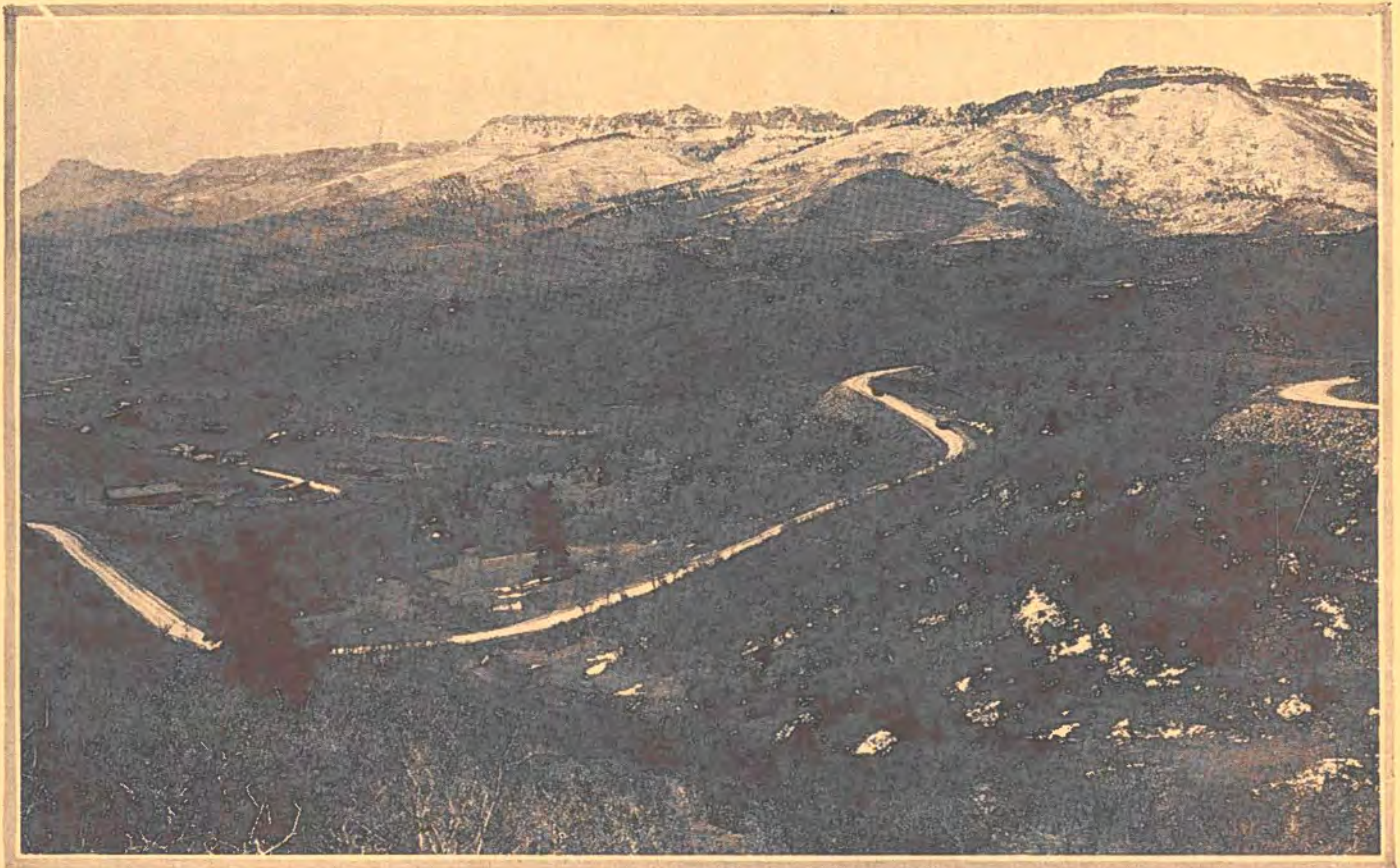
Cameron Pass, showing the new state highway into the trout fishing and hunting district near Walden.



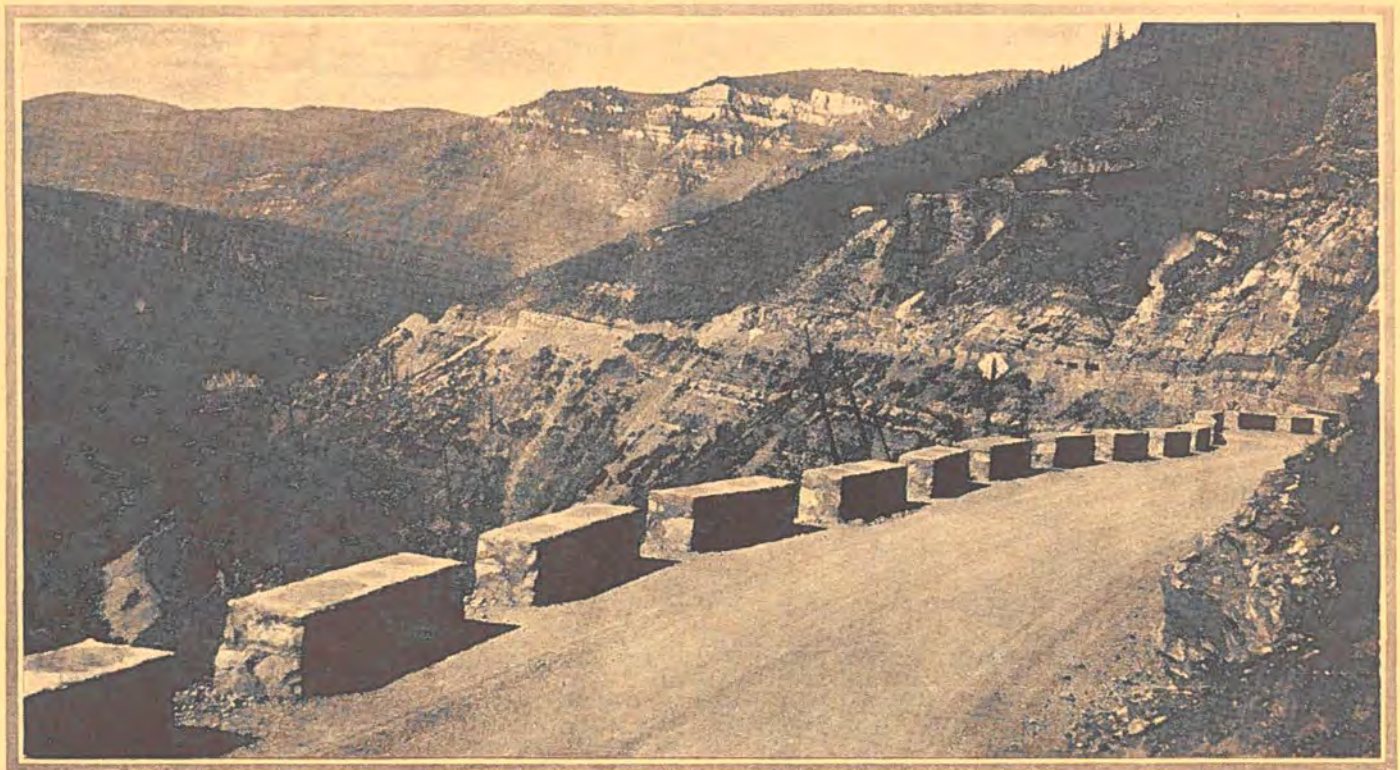
The world-famous Ouray-Silverton Million Dollar highway, showing Mother Cline Hill, one of the historical roads of the old mining days. It is traced just below the highway.



Douglas Pass, on the way into the Rangeley oil fields. Attention is directed to the serpentine course of this state highway to obtain an easy grade.



Raton Pass, on one of the main transcontinental highways, has been credited as one of the most beautiful routes in the West.

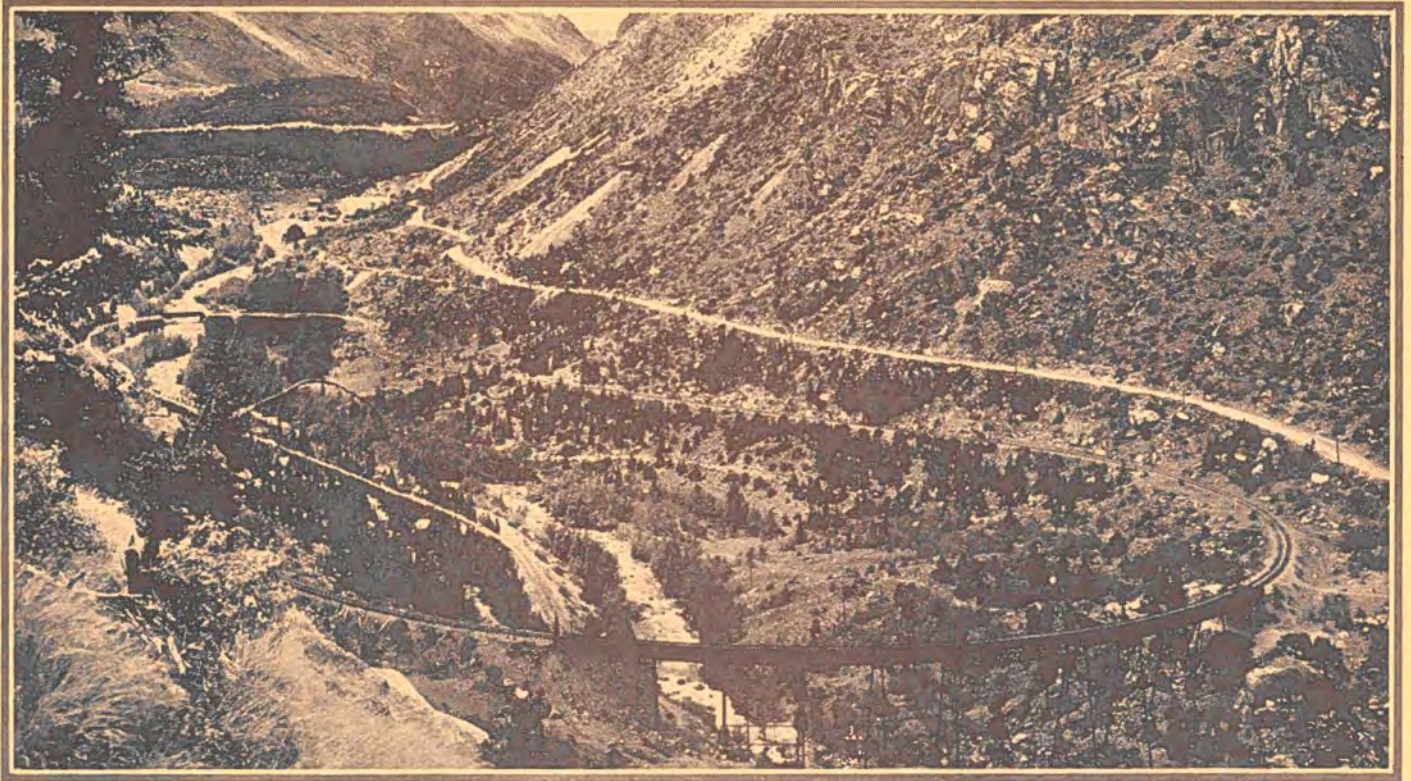


Battle Mountain highway, between Rifle and Minturn, one of the most costly road construction jobs in the United States and one of the most spectacular. In pioneer days it was known as the "Terror."

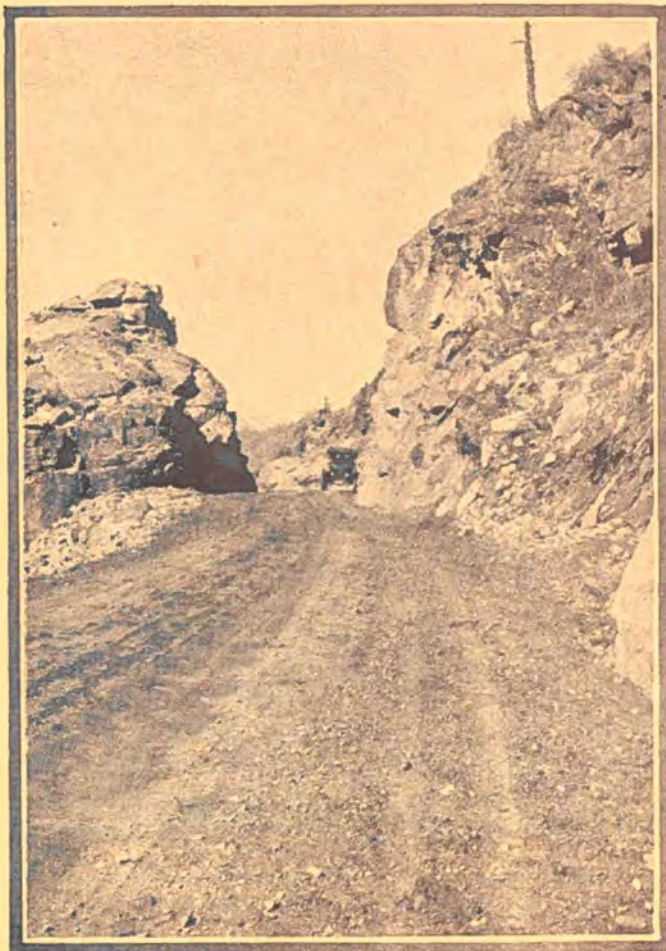


16. TUNNEL POINT. & CANON.
GLENWOOD SPRINGS, COLO.

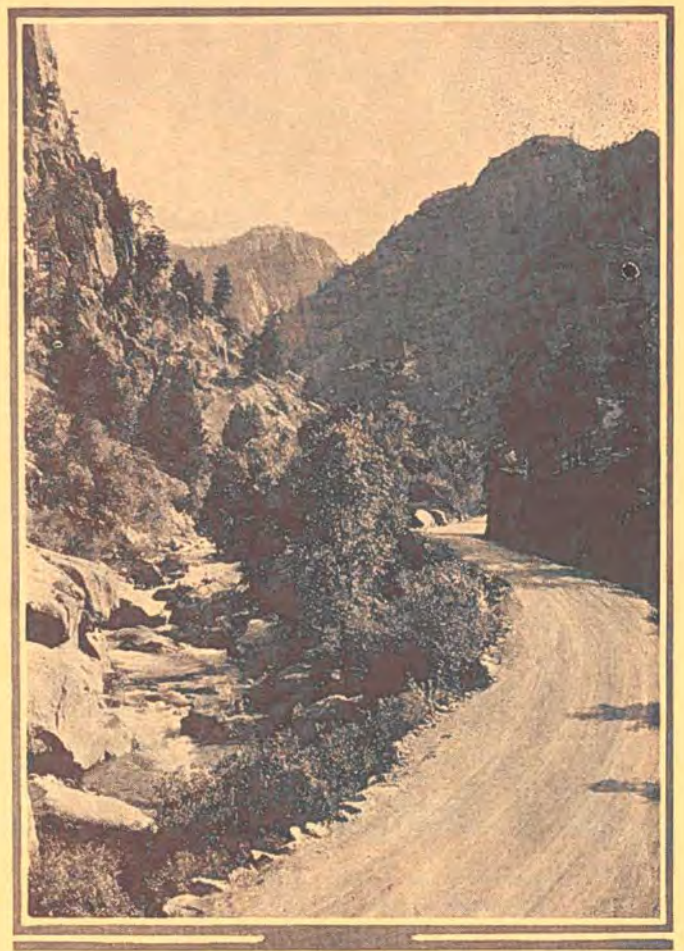
Glenwood canon of the Colorado River has been described as one of the most beautiful in the world for its rugged sides, with the stream roaring on its way out to the Grand valley. The photograph was taken near Glenwood Springs.



The world-famous Georgetown Loop, on the C. & S. Ry. in Clear Creek canon, showing the state highway to Georgetown and Silver Plume along the base of the mountain.



Independence Pass on the highway into Aspen.



South St. Vrain canon on the road into Estes Park.



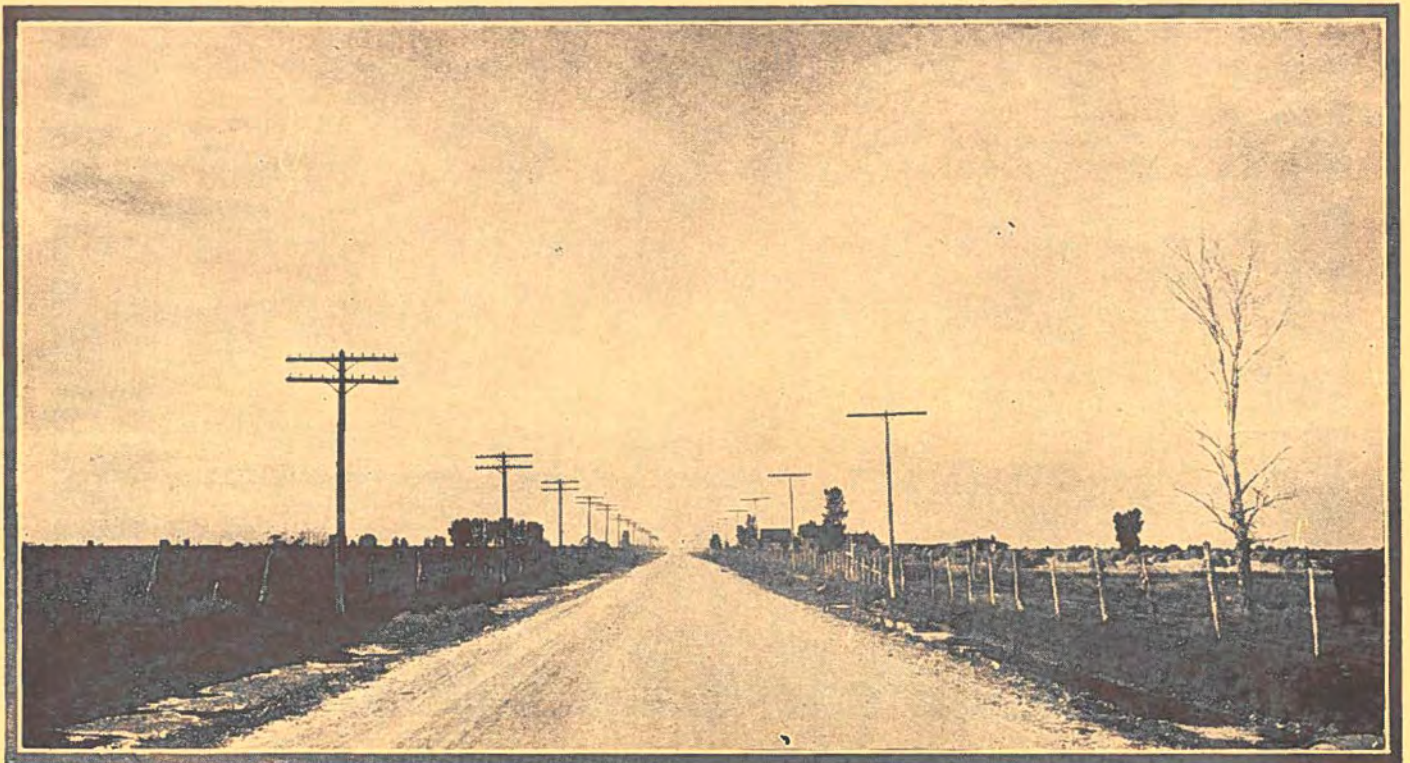
Blanco Falls, in the San Isabel National Forest, reached from Pueblo, plunging through the rocky fastnesses of the mountains, forms one of the striking water scenes in Colorado. Photo courtesy Denver Tourist Bureau.



The upper Huerfano River, reached from Trinidad, figures in history and adventure of trappers and pioneers. The view shows the stream and in the background Sierra Blanca peak, with an altitude of 14,363 feet. Courtesy Denver Tourist Bureau.



Mount Princeton and the Collegiate Range as seen from near Buena Vista, with the summits ever crowned with snow, forms one of the many entrancing mountain views in Colorado.



This scene near Wray is typical of the splendid roads the state has built in the great eastern Colorado plains district. Such highways as this give joy to the motorist.



One price

—fair and uniform treatment to every ADAMS purchaser!

NO dickering about special prices or special discounts—no long, freakish trade-ins or other forms of price cutting—ADAMS has but one price, and it is the *lowest* price consistent with genuine quality.

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ADAMS offers you “the finest grader built”—and you will find that your ADAMS GRADER will cost you *less in the long run* than any other grader you can buy—ask any ADAMS GRADER user. Write for the new ADAMS Catalog No. A-29 before you buy.

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Adjustable *Leaning Wheel* Graders

The ADAMS line includes graders in 6 1/2, 7, 8, 10, 12, and 14-foot blade lengths, Motor Graders, Scarifier Graders, Road Maintainers, Patrols, Drags, Elevating Graders, Dump Wagons, Wheeled Scrapers, Drag Scrapers, Fresno Plows, Grader Blades, Back Slopers, etc.



A winding road in Estes Park.



Towering Mount Abrams and the state highway near Ouray.



A stretch of the paved highway in eastern Colorado near Sterling.

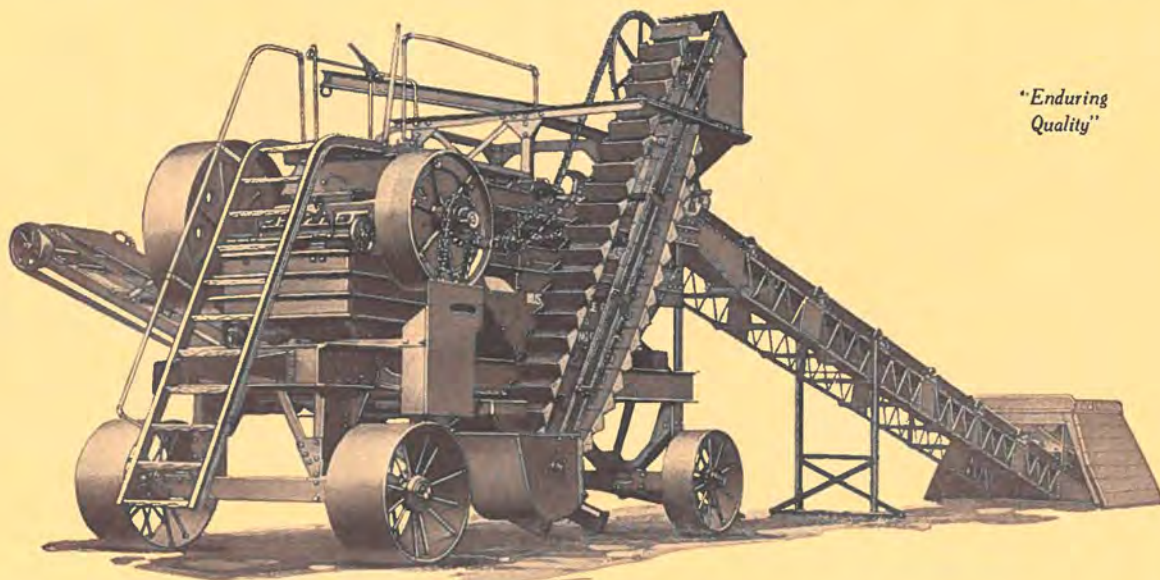


Glimpsing a bit of the Colorado Springs-Denver highway.



Entering the Big Thompson canon on the way into the Rocky Mountain National Park.

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*"Enduring
Quality"*

PIONEER SCREENING, CRUSHING AND LOADING PLANT No. 20

Crushes, screens and loads in one operation. Capacity 250 to 350 cubic yards in 10 hours. One man runs entire plant. Powered by 35 H. P. gasoline engine. Designed to be used in places where there is no sand to reject, and only medium capacity of crushed gravel is required. Often two of these plants are purchased instead of one large one, and are put at either end of a County to save time in moving equipment long distances.

Built to "Lick" the Toughest Jobs



PIONEER SCREENING, CRUSHING AND LOADING PLANT, No. 60

Capacity up to 125 to 200 cubic yards in 10 hours. Powered by 25 H. P. gasoline engine. Built just like the larger plants. Ideal for small jobs where large daily capacities are not necessary.

Road building isn't child's play. It requires "he man" equipment that can take punishment, and "like it." "Pioneer" gravel equipment is built with a strength safety factor that makes it equal to the toughest conditions.

There's a Pioneer set-up for every road building requirement.

What's yours?



PIONEER SHAKER SCREENS

No part of a gravel outfit gets more abuse than the screen. Pioneer screens are made for hard service, give positive separation and increased efficiency. All necessary sizes. Priced right.

Write for
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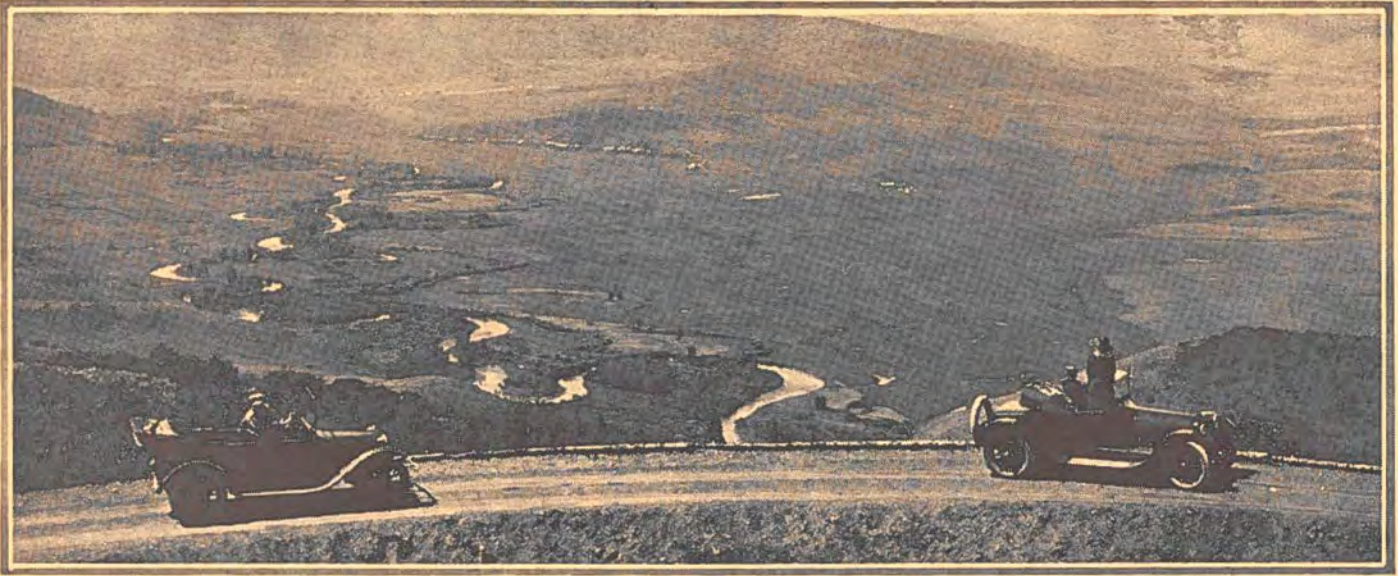
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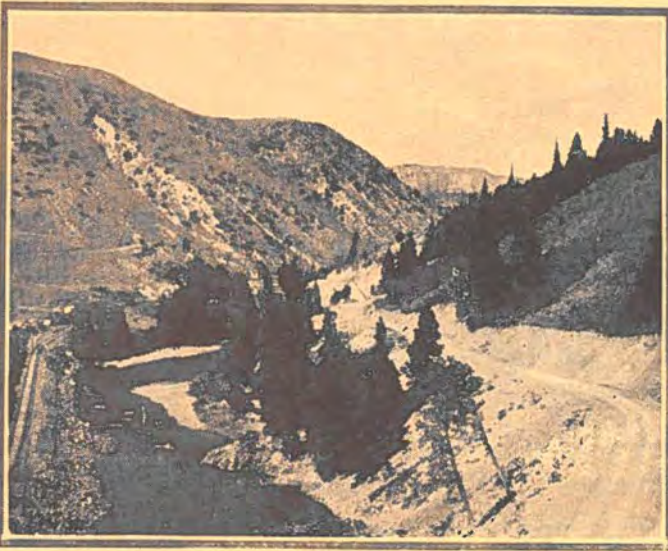
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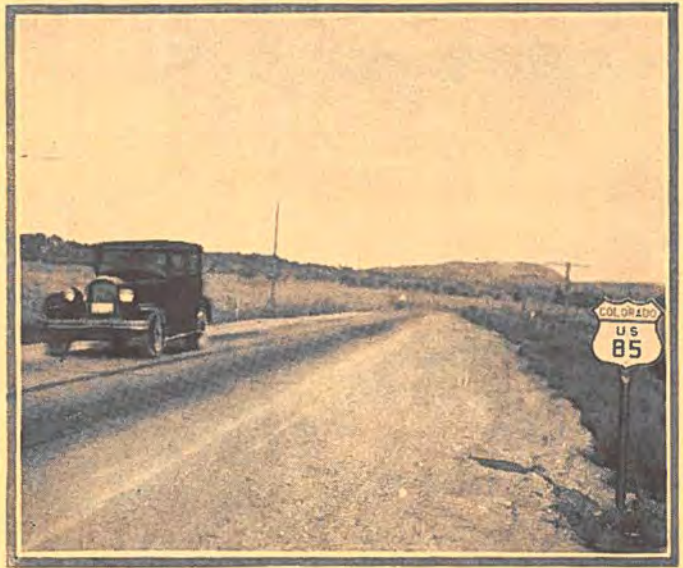
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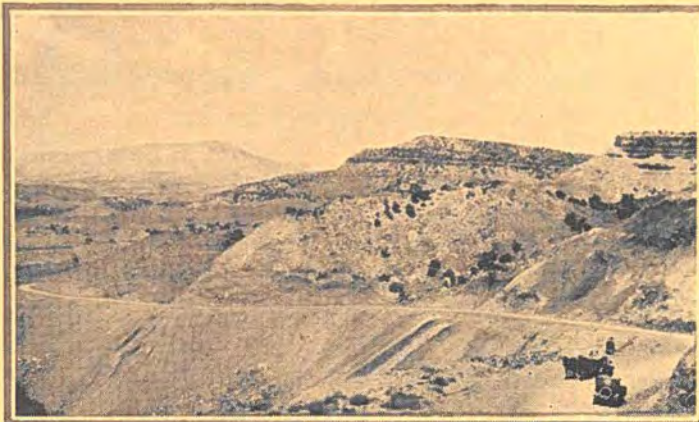
Rabbit Ears Pass in northwestern Colorado, showing the Yampa River winding its course down the valley of the same name.



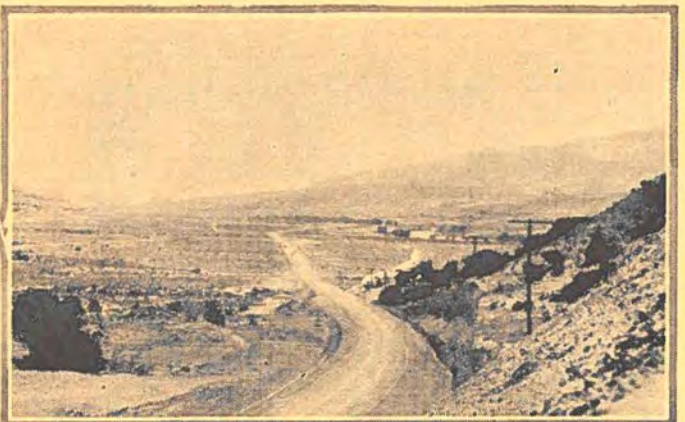
Byers Canon, traversed by Kit Carson and named for an Irish baronet, who discovered the gorge on a hunting trip with Jim Bridger as his guide.



Along the paved road near Greeley in the heart of the northern Colorado agricultural district.



Oil shale mountains fringe the state highway near DeBeque.



Where the motorist can speed on the highway west of Rifle.

International Harvester Keeps Them on the Job

ANY fine mechanical product is finer still when it has dependable Service close at hand. That fact is a strong factor in the success of the McCormick-Deering Industrial Tractor.

Behind every McCormick-Deering stands a service policy of lasting cash value to every owner. Company-owned branches are now maintained at 172 points in the United States and Canada, supplemented by special distributors in all large cities and an army of McCormick-Deering tractor dealers the country over. An unrivaled network of Service is always and instantly available to users of this International Harvester product.



The illustrations on this page show a few tractors doing road and street work. The McCormick-Deering is working today from coast to coast, delivering its liberal power through drawbar, belt or power take-off. It is ready to go onto the job for you, hauling and hoisting, pulling and pushing, working with an all-around utility and economy that cuts costs to the bone. Write for the booklet "Tractor Power in Industry."

INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave. OF AMERICA Chicago, Illinois
(Incorporated)

H. W. MOORE EQUIPMENT Co.

120 West 6th Ave., Denver Phone Tabor 1361



Last January, at the Cleveland Road Show, 24 exhibitors showed 48 McCormick Deering tractors. Each year has shown a tremendous increase. Regarding the outfit shown above, the superintendent of construction, Minnesota Trunk Highway No. 20, writes: "I never thought it possible to move dirt so cheaply and so quickly."



Thousands of McCormick-Deering-powered units are building and maintaining roads. Highway commissions in practically every state own McCormick-Deering fleets.



A glimpse of a fast-dirt-moving fleet of McCormick-Deerings, equipped for tractor-dump. This popular combination is working at hundreds of points, many of the fleets numbering scores of units.



Air-compressor outfit powered by a McCormick-Deering tractor, used by a Philadelphia contractor.



New economies in excavating. This compact outfit handles 500 yards in 10 hours, is easily and quickly moved in close quarters, and operates with remarkably low fuel consumption.



Backfilling sewer trenches in Milwaukee. This crawler-mounted McCormick-Deering puts back a great volume of dirt with ease and efficiency.



A 6-ton roller in which are seen the familiar lines of the McCormick-Deering power plant. Effective combinations of equipment with this power are almost limitless.

MCCORMICK-DEERING INDUSTRIAL TRACTORS



On the Mount Evans highway in the Denver Mountain parks, one of the greatest scenic roads in the Rocky Mountains.



Wolf Creek Pass, on the state highway into Mesa Verde National Park via Durango. Here is where the road was blasted from granite.



There is concrete all the way from Denver to Ft. Collins. This view was taken near Denver.

"Concrete All the Way"

What a welcome reply to the question, "How are the roads to the next town?" What assurance of safety, of clean, smooth travel all the way!

Soon you put the miles behind—shorter miles they seem—with scarcely a sense of moving but the whizzing air and the motor's steady hum. With nerves at rest and muscles relaxed, you can enjoy the passing scenes.

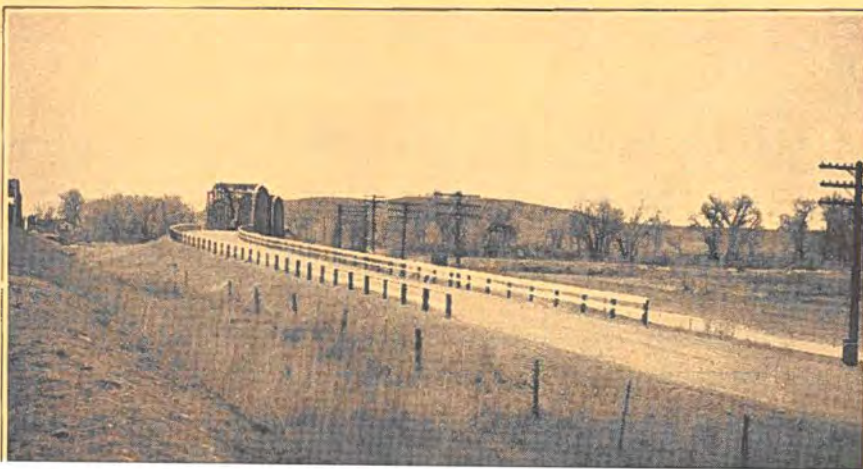
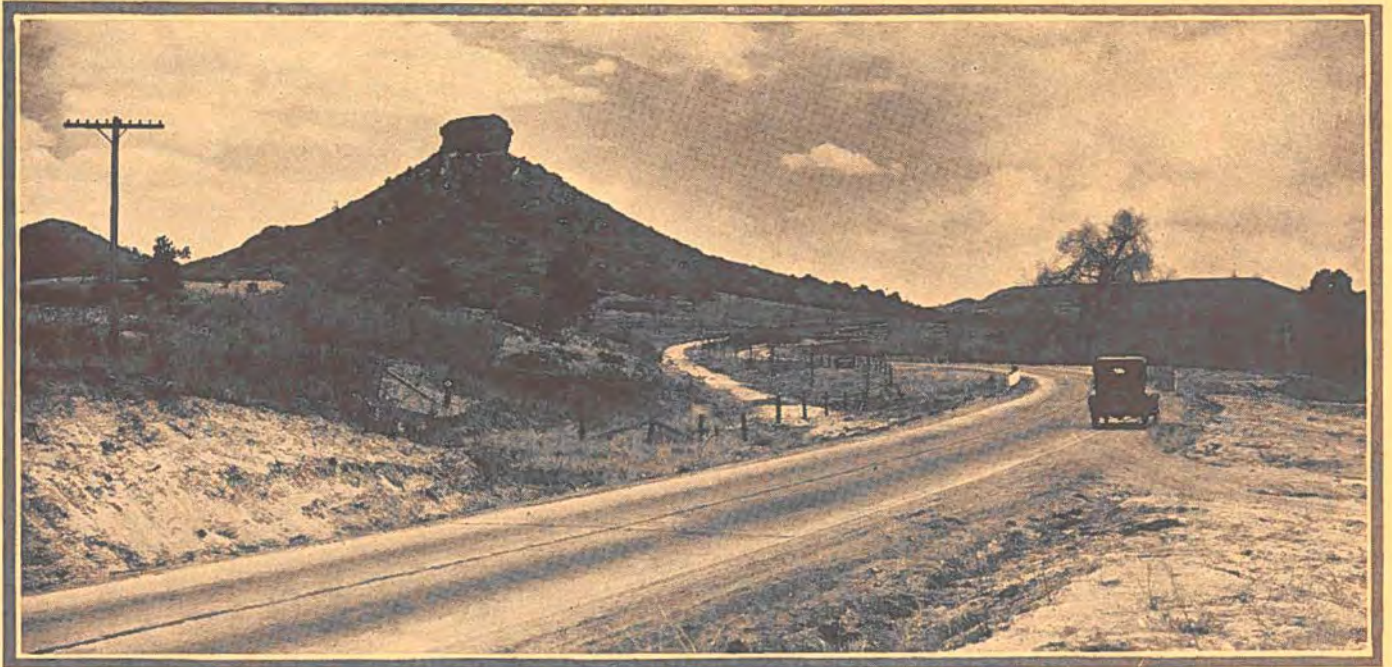
Going anywhere is a pleasure when "it's concrete all the way."

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OFFICES IN 32 CITIES



In this series of pictures COLORADO HIGHWAYS has endeavored to convey an idea of the variety and grandeur of the scenery in Colorado. The pictures upon this page are: top, Castle Rock, near the town of that name, on the Denver-Colorado Springs highway; center, a scene along the road from Durango into Mesa Verde National Park; bottom, the Buttes bridge and approach, near Fountain, typical of such construction by the Colorado State Highway Department.

KEYSTONE CULVERTS

18 years of
economical
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KEYSTONE
COPPER STEEL

Built to
SERVE
SATISFY
and **SURVIVE**



Time has written the most convincing testimony on the long life and tremendous strength of Keystone Culverts.

Their record of service, extending over more than 18 years, shows them to be the

most economical and popular culvert installed in this territory.

Their record reflects the perfect drainage structure---the important part they play in the daily protection of western highways. Specify Keystone Culverts.

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and **FLUME COMPANY**
Pueblo Colo.



Reduce Your Maintenance Costs

Allis-Chalmers Monarch tractors on your jobs will cut the cost of road maintenance to a surprising degree.

Allis-Chalmers Monarch tractors pay for themselves in short order on the tough jobs of road building, and when the time comes for maintenance the cost is reduced to a minimum.

These sturdy, powerful tractors operate

economically enough to do top maintenance work at a saving.

The Pur-O-Lator, furnished to add years of life to your tractor, and an Air Cleaner of the most modern type and of ample size, are included to insure long life and freedom from breakdowns. And, if you look still further, you will see a full pressure force feed lubrication system, designed to reduce wear on moving parts.

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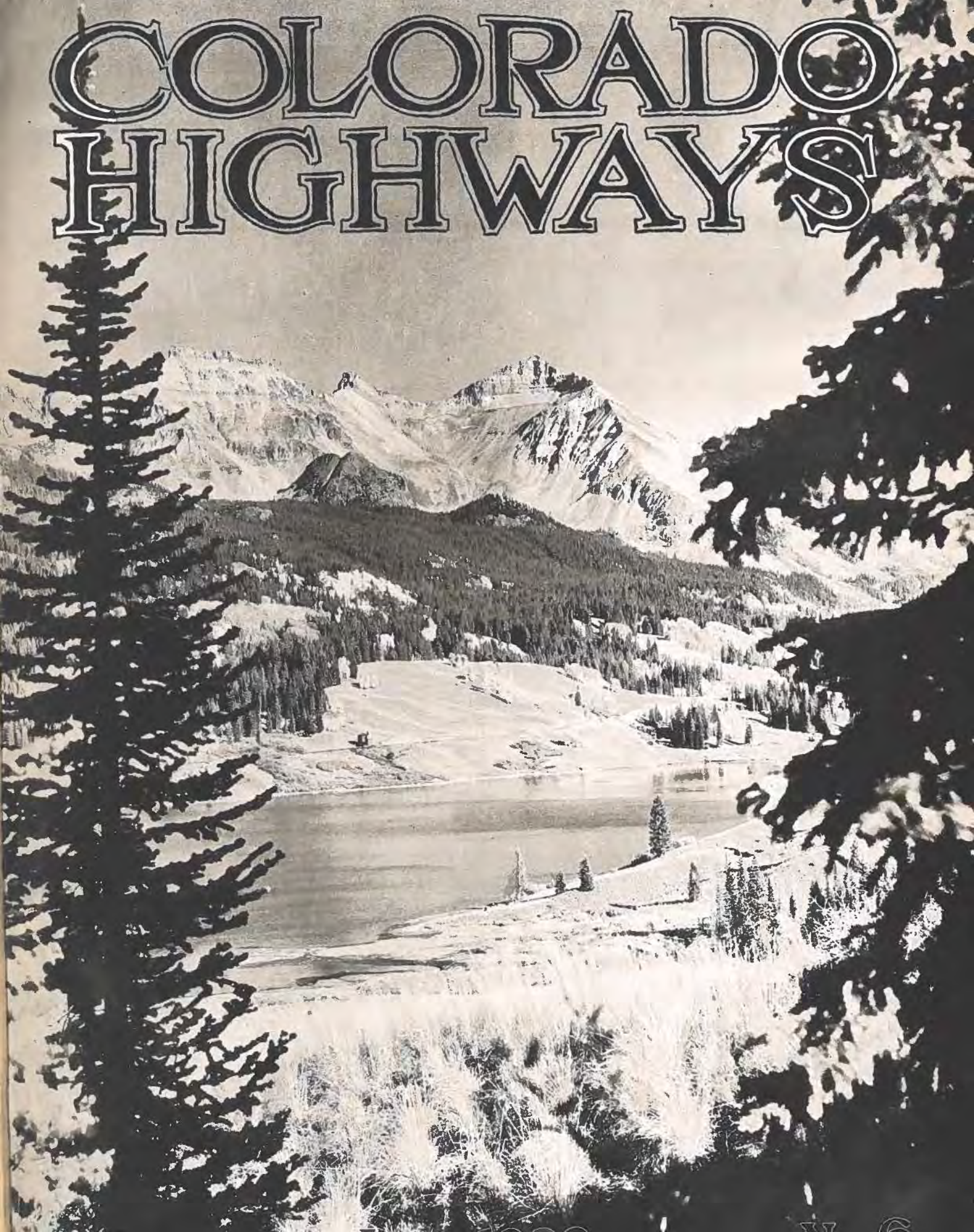


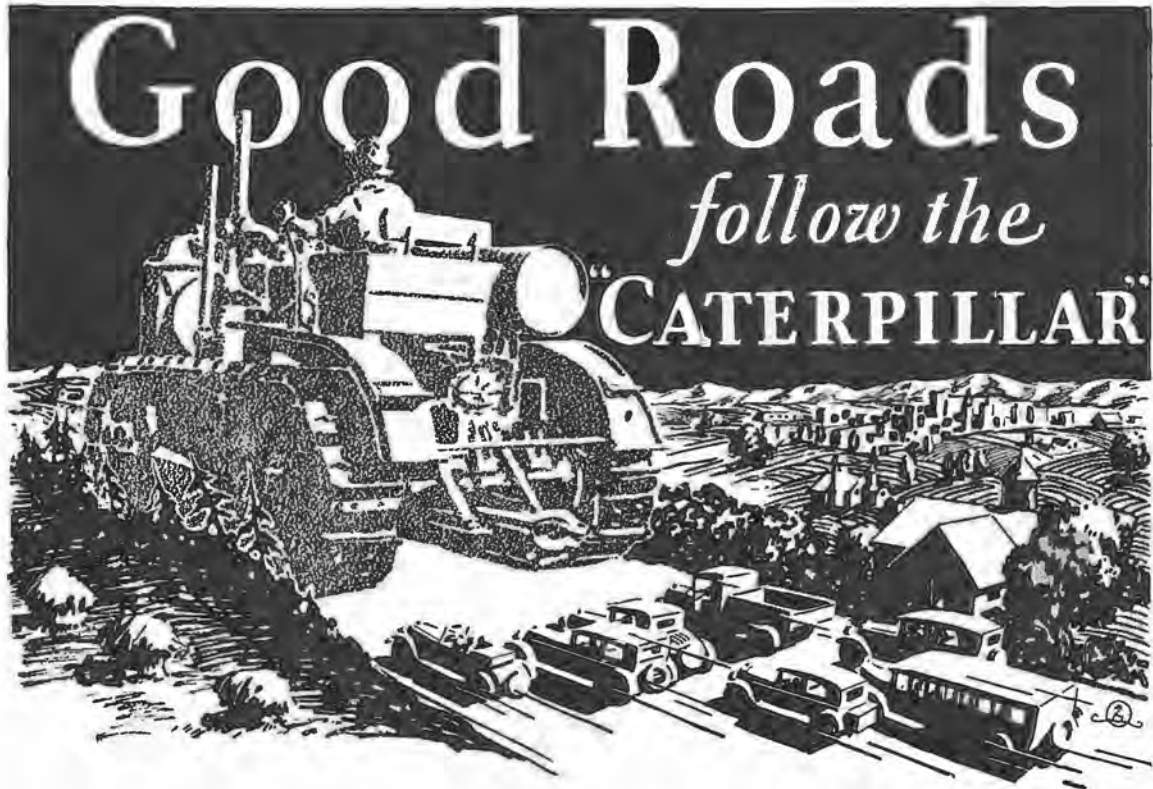
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Subsidiary of ALLIS-CHALMERS MFG. CO.

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Nearly every Contractor in Colorado uses "Caterpillar" Tractors for their earth moving jobs. They must make accurate estimates of dirt moving costs and they have found that "Caterpillar" power is the only dependable basis for their calculations.

Practically every County in Colorado is using "Caterpillar" Power for Road Maintenance.

They must have continuous operation and dependable service. County Commissioners know that they can count on the DENVER "CATERPILLAR" ORGANIZATION.

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 Denver, Colorado

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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,

1808 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
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Our Cover Picture

ON the cover of this month's Colorado Highways is shown a view of Trout Lake on State Road No. 145, located between Telluride and Rico in Dolores County. This is one of the routes leading from Montrose in the Mesa Verde country via Cortez. A section of the La Plata mountains is seen in the background. Photo by Colorado Association.



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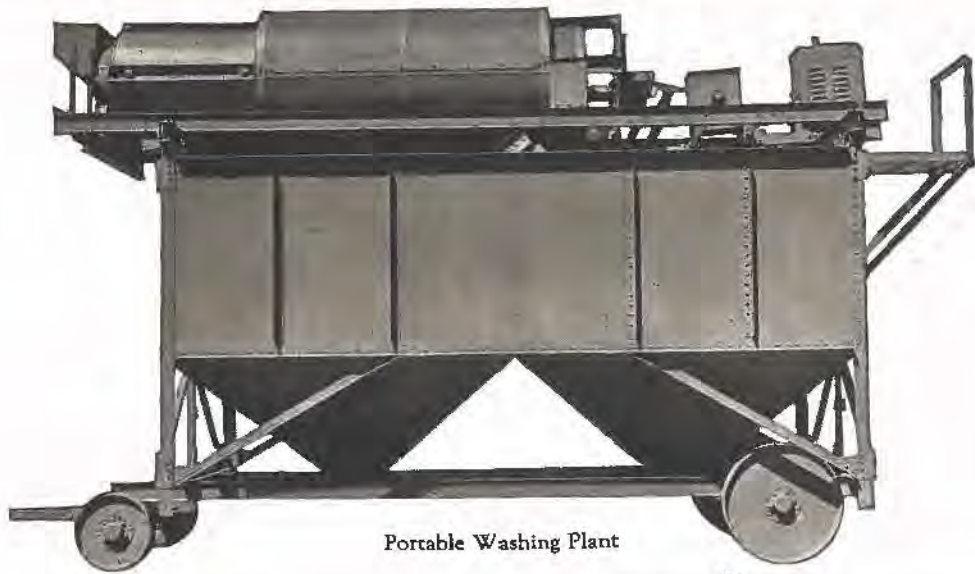
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Colorado Highways

"BETTER ROADS"

VOLUME VIII.

JUNE, 1929

NUMBER 6

Editorial

WITH the possible exception of California, Colorado is more vitally interested in good roads than any one other of the 48 states. Colorado is growing as a recreational state, and the marvelous growth of the automobile industry and the use of cars for pleasure makes it imperative that Colorado have the roads. Realizing the importance of highways Governor C. C. Young in transmitting his budget to the California legislature said:

"California spends vast sums upon her highways and does so at the dictum of her people who appreciate fully the value of good roads in the development of the state."

California in the two fiscal years from July 1, 1929, to June 30, 1931, will disburse a total of \$106,432,790 for highway purposes. The state's highway department budget calls for \$60,773,490 in the biennium with \$27,400,000 for construction of new projects.

These are figures to show what the Pacific coast is doing to attract tourists. The realization of the importance of the automobile and roads is found in statistics recently compiled that show that motor car purchasers today are adding to the highway burden of the United States at the rate of 100 miles of new cars every week. At the end of 1929 the combined length of trucks, passenger cars and busses will be 65,000 miles and there are in the United States 80,000 miles of first class roads.

The automobile industry figures reveal there will be replacements of 2,000,000 worn out cars this year and manufacturers plan sales of another 2,000,000 cars.

In 1927 there were 44,000,000 people who spent two and one-half billion dollars traveling over the United States, and predictions are that 1929 will see this number increased to an even more staggering figure. These facts give an idea of the importance of motor travelers in whom Colorado, by reason of its scenery and climate, is vitally interested.

Experts in tourist business assert that improved roads only will attract the motorist, and this fact is fully recognized not only in California, but in every state in the Union. The activity of the states in increasing gasoline tax, license fees and issuance of bonds for the feverish construction of improved roads bears out the truth of this statement.

"Colorado," said one tourist travel expert, "has all the advantages to attract visitors that Nature can provide. We have the backbone of the Rocky Mountains, a climate that is unsurpassed in the world, attractions to lure every class of people, and we are in the center of the United States. The importance of improved roads in Colorado cannot be overestimated.

"The Colorado State Highway Department has accomplished wonders in the state with the limited funds

(Continued on Page 12)



Where an artist would stand enthralled. The scene is on the state highway built by the Highway Department between Denver and Arvada. Here is the concrete road, the bridge across Clear Creek, with its foliage-covered banks, and in the background the foothills and the snow-covered Continental Divide beyond.

A section of state highway in northern Colorado now under state maintenance patrol forces. This road is heavily used by farmers.



Senator Tobin Explains Why Farm Property Is Neglected

THE motorist over the state wonders why a farmer does not paint his residence, why he does not improve his grounds, why he does not repair and paint his outbuildings and thereby materially improve the appearance of his place. The assessor is the reason."

Senator John J. Tobin, of Montrose, was the speaker. Elaborating on this subject he said:

"There is a disposition on the part of some assessors to add valuation for improvements, thereby increasing the tax the farmer must pay. A farm house that is in need of paint will be given a coat and repairs will be made. When the assessor comes he notes this improvement and promptly slaps on an additional assessment. This system of advancing the assessment as improvements are made is reacting on the state in that farmers naturally object to these increases merely because they want to keep step with improved conditions and have an attractive home.

"This system of advanced assessments takes in everything. If the farmer repairs and paints his outbuildings, or builds a new one, if he builds a better fence or improves and beautifies the yard around his residence the assessor will add an extra assessment with the contention that the improvement has added to the value of the farm.

"Correctly speaking such improvements do add not only to the attractiveness of the farm, but to its value, but in 99 out of 100 cases the farmer who makes these improvements has no idea whatever of selling his farm. He simply wants to make the place attractive for his own and his family's benefit. The system of raising the assessment is entirely wrong. It puts a premium on beautification of farm property. The farmer feels this is an injustice and permits his property to become less attractive.

"Where this system of advancing assessments prevails one will find in Colorado that lack of beautification that is found in those districts where the system is not in effect; where the assessor realizes the farmer is merely

trying to make his home attractive and to keep his farm up to a high standard, and that for his own comfort, welfare and satisfaction.

"My own experience is that the average farmer would not hesitate to improve his property if he were confident that he would not have to pay an extra tax. This imposition of an additional assessment has been carried to fences. In some localities, for example, if the farmer has replaced a tumble down fence with one with sound posts and good wire or has built a new fence in front of his residence the assessor puts on an additional assessment.

"Colorado wants and needs good roads. I consider myself a pioneer in this good roads movement. The state highways and good county roads mean wealth to every community and are of vast benefit to the farmer. The more these good roads are extended the more benefit that will accrue to Colorado and to the abutting property. That must be admitted, but I do not believe the farmer should be forced to pay an extra tax on his property simply because he realizes the road increases travel. He wants to keep in step and thereby repairs his property and paints his buildings.

"There are campaigns in many of the states for the beautification of highways. This campaign has urged improvement of farm properties along the lines I have said. There has been and is more or less of this highway beautification campaign in Colorado, and it is a laudable movement and one that should meet with the approval of every citizen. There can be no question but an attractive place adds to the charm of the landscape; no doubt the stranger along the highway will note it.

"To my mind is the question, does the value added to the general appearance of a county call for an extra assessment? I do not think so. I think that such improvements add to the attractiveness of a county and must necessarily attract people to that county. Appearances have just as great an effect on landscape as upon any building or buildings in a city. If the stranger is

motoring through a county where farm buildings are unpainted or in need of repair; if the yards are overgrown, if the fences are ruins he notes the physical appearance and his mind is turned against the county, despite the fact that naturally the land is not affected by such conditions.

"The other side of the picture is that if he is motoring through a county where farm properties are attractive and well kept, fences are firm, there is a general air of prosperity and he is immediately attracted to that county. I am quite sure if he were looking for a country home or a farm he would select this county in preference to the other.

"Isn't it possible that this man would spend many thousands of dollars in the improvement of the property he bought, thereby adding very materially to the tax receipts of the county? Would not the county that puts on an extra assessment for farm improvements be the loser in this case?

"I am not in position to say how many counties have this habit of advancing assessments. I know it is done in many of them, and unquestionably the assessor is honest in his work, but to my mind it is a very grave question if it pays.

"One thing I am positive of, and that is that the average farmer hesitates to spend money on improvements when he knows the assessor will raise the rate on him.

"Splendid state highways and better county roads naturally add to the value of a farm, and personally I do not know of any farmer who has objected to an improved road making an additional assessment on his farm, for he fully realizes the value of good roads and wants them. Good roads mean everything to a farmer, and he knows it.

"One of the primary reasons for improved roads in Colorado is to attract strangers, and to place the rural communities in closer touch with municipalities. It seems to me that following out this program that where the assessors are adding an additional assessment for farm improvements it should be abandoned. An attractive rural community certainly adds to the total value of a county and most assuredly will attract capital."

An elevating grader outfit used in constructing a new roadbed north of Nunn on State Road No. 1.

GRADE CROSSING SURVEY URGED FOR UNITED STATES

The Colorado Highway Department is marking up progress in the elimination of railroad grade crossings in the state, and the American Motorists Association has taken this subject up nationally with the Interstate Commerce Commission. The motorists body recommends that the federal and state governments undertake a comprehensive study of traffic conditions at crossings.

The Colorado Highway Department has had a survey similar to the one proposed and has been carrying out the plan of eliminating such crossings on all the heavily traveled roads in the state. Plans for doing away with many more are down for the current year, with the idea of eventually to have a clear way on all the principal highways in Colorado.

The American Motorists report to the Interstate Commerce Commission cites the progress made in the United States in eliminating grade crossings, but asserts that crossing accidents continue to increase, and this statement is made:

"For example, during the first nine months of 1928, 1,745 persons were killed in highway grade crossing accidents, as compared with 1,654 fatalities for the corresponding period of 1927. In addition to this, during the period from January to September, 1928, 4,598 persons were injured as a result of such accidents as compared with 4,507 for the same nine months' period of 1927."

Thirty-nine bridges with a total length of 1,942 feet were constructed in Morgan County in 1928 at a cost of \$29,938. In the year 228 miles of road were graded by tractor at an average cost per mile of \$24.01 and tractors were used to drag 2,518 miles at a cost of 30.2 cents a mile. Seventy miles of ditches were cut by tractor at a cost of \$2.59 a mile. The average cost of graveling a mile was \$331.58. The figures are given by the Fort Morgan Times in reporting the county work for last year.



Grand Scenic Route for Tourists

MOTOR tourists to or from California the coming season will have the choice of a trip that will take in about all worth seeing in Colorado and the Southwest districts of the United States. This is through the construction by the Highway Department of the boulevard road from Cortez to the New Mexico line to connect with a similar road to Gallup there connecting with one of the heaviest traveled of the transcontinental highways.

Rocky Mountain and Mesa Verde National Parks, Colorado, Wheeler, Yucca House and Hovenweep National monuments in Colorado; Indian reservations in Colorado and New Mexico; Aztec pueblo in New Mexico and the Grand Canon in Arizona may be taken in by the motorist, and without going out of his direct route to or from Los Angeles.

The tying in of the Grand Canon with Mesa Verde and the adjacent ruins was a plan of the Automobile Club of Southern California. Tourists have been routed over this highway for the last two seasons by the club. In addition to this the club has pointed out the wonders of the "Million Dollar Highway" between Ouray and Silverton and the other granddeurs of the Colorado Rockies. In this work automobile organizations in Denver and Colorado have been active.

The tourist arriving in Colorado would first see the Pikes peak region, Denver and the Rocky Mountain National Park. There are a half-dozen highways that will take him across the state to Mesa Verde. Going via Montrose he will reach Durango over the Ouray-Silverton highway conceded by travelers to be the most wonderful automobile road in the United States and unsurpassed for grandeur. If proceeding by Grand Junction then the Colorado monument will be visited.

From Durango, terminus of the Ouray-Silverton highway, the road is into Mesa Verde. In the immediate vicinity will be found Yucca House and Hovenweep Monuments, relics of a prehistoric race, and in the same locality those interested will find a buried city. From Cortez the motorist will cross the Ute Indian reservation and here, if he desires, can add an additional attraction to his list by visiting the four corners—the only place in the country where four states meet. There is a marker here and he can tell his eastern friends he stood on a single stone and his feet were in Colorado, New Mexico, Arizona and Utah.

Continuing to Shiprock the tourist can make a side trip via Farmington to Aztec where stands one of the largest of the communal buildings erected by a forgotten people, or he can retrace his steps from Mesa Verde to Durango, thence to Aztec and to Shiprock. From Shiprock to Gallup, New Mexico, has one of the finest highways in the country, and from Gallup the route is via Holbrook, Winslow and Flagstaff in Arizona to the Grand Canon.

There are various ramblings, each of which is spectacular in scenery, for the tourist to cross Colorado from the eastern side of the Rockies and his route depends entirely upon the time he wants to spend on his vacation.

The opening of an improved road out of Cortez to Gallup has, from all reports, given a boom to the Monte-

zuma Valley of which Cortez is the center. Products of the valley now are being trucked through to Gallup for rail shipment to points in New Mexico, Arizona and Southern California, so aside from a tourist road it has become one of prime commercial importance to that southwest corner of Colorado.

Ceding of the Rocky Mountain National Park to the government is calling for many hundreds of thousands of dollars in road and trail construction in that playground by the government, and Mesa Verde also is coming in for its share of highway construction. This work coupled with that of the Colorado State Highway Department in building improved roads in all parts of the state is making Colorado prove to the world that it is the "Playground of the Nation" as Theodore Roosevelt said.

"Every dollar that can be raised ought to be put into state highways until the highway system is complete. Every raid on the highway treasury ought to be defeated by whatever means," asserts the Colorado Springs Gazette in an editorial with the heading: "Spend the Gas Tax on the Roads." The Gazette, speaking of tourists in Colorado, also says that "the tourist need not come to Colorado, and will not, lacking good roads."

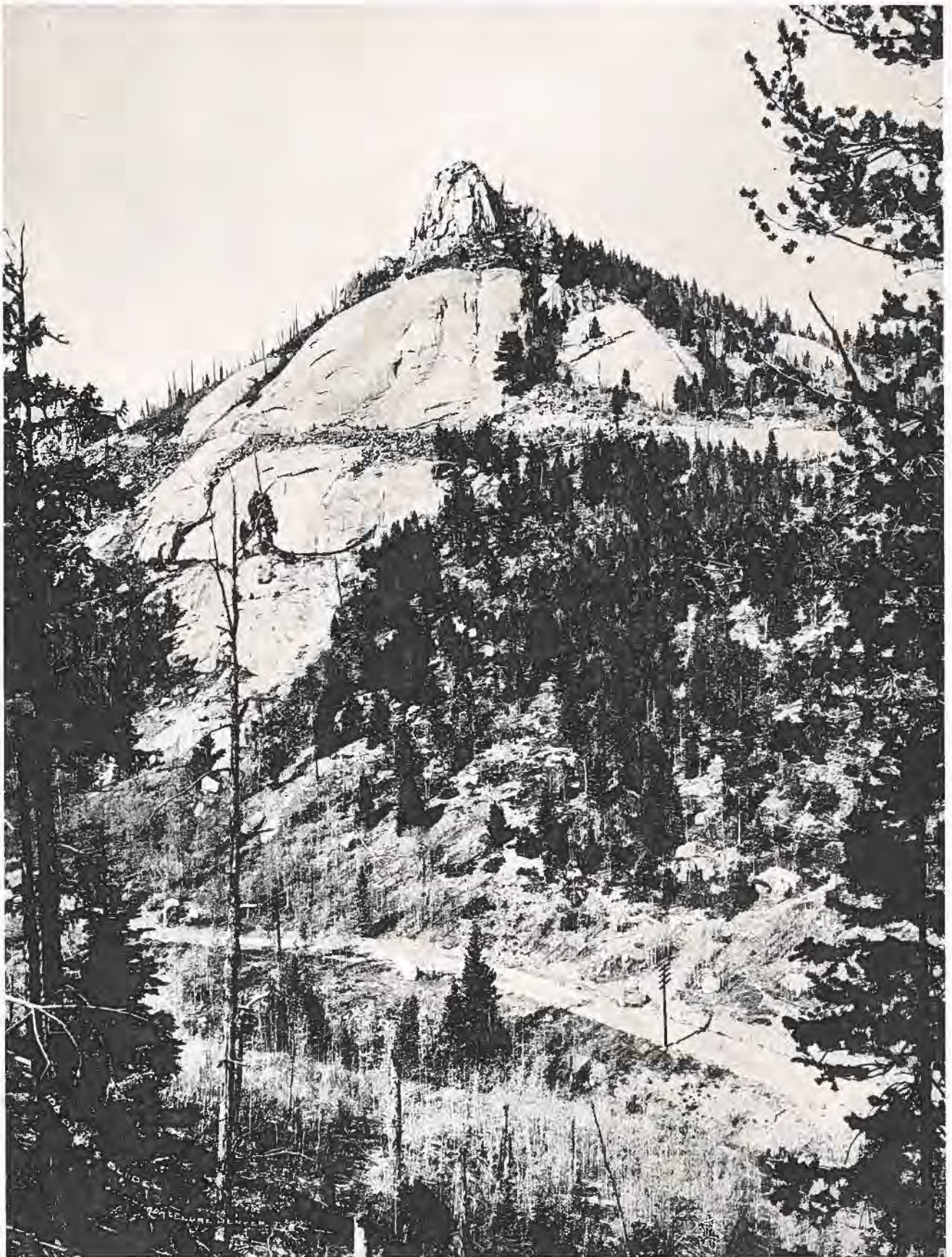
COLORADO HIGHWAY RESULTS COMPARED WITH WISCONSIN

Walter J. Kohler, governor of Wisconsin, is quoted as saying in a recent address:

"We have completed the surfacing of less than half of our through highways and during the past eight years the cost of what has been done, I am told, has been over \$70,000,000. This makes it perfectly evident that we cannot surface all of our through roads with concrete without assuming an unreasonable burden of expense, or postponing the benefit for a great many years to come."

The statement of \$70,000,000 expenditure made by Governor Kohler is interesting to Colorado people. In the last seven years the present Highway commission has spent only \$37,330,845 for 8,872 miles of improved road including 3,238 miles of Federal Aid participation and 5,634 miles of road improved only with state funds. Another example of the commission slogan "More Miles for Less Money."

Colorado road builders are wondering what they call "high roads" in Colombia. The reason is that Colombia is obtaining considerable publicity in the American press and magazines over opening of a highway in the clouds at an elevation across the Andes Mountains of 11,200 feet. That's low in Colorado. Colorado has state roads over Independence Pass, elevation 12,095 feet; Berthoud Pass, 11,315; Fall River, 11,797; Hoosier, 11,542; Loveland, 11,992; Monarch, 11,650; Fremont, 11,320 and Monarch, 11,650. Driving in the clouds is so common among motorists touring Colorado that it ceased years ago to be a novelty.



One of the beautiful drives in the Colorado Springs recreational area is shown above, giving an idea of the spectacular scenic beauty of this region, which attracts thousands of tourists each summer. This section is reached by hard-surfaced and gravel all-weather highways constructed and maintained by the State Highway Department. Photo by courtesy Colorado Association,

Highway Expenditures of States

COLORADO ranks among the states with the lowest revenue from automobile license fees and also among the average revenue paid by a car into the funds for state highways and roads. This fact is revealed in a compilation made of the 48 states for 1927, those figures being the latest to be grouped and studied.

The statistics for 1927 show that the revenue from license fees for the 48 states amounted to \$306,783,235, an average of \$13.28 per car, while the average per car in Colorado was \$5.95. The gasoline tax yielded a total of \$257,690,019 for the states, an average per car of \$13.27 while the average per car for Colorado was \$11.69.

Federal Aid funds in all the states for the year amounted to \$79,997,270, and revenue from other sources to \$140,013,003, while the total expenditures for state highways in the nation reached a total of \$636,776,616 for the year.

These figures for license fees and gasoline tax are for gross collections. States divide their funds with counties under various agreements, but the statistics show that out of the total of \$564,473,254 collected from the gasoline tax and license fees the states retained a total of \$377,504,477, leaving the counties of the nation \$186,968,777.

Some interesting figures are given in the tabulation indicating the sums that states expended in 1927 for state highways. As examples, Pennsylvania is credited with spending \$42,264,072; New York, \$45,864,301; Illinois, \$26,825,083; New Jersey, \$24,883,230; North Carolina, \$24,283,100; Ohio, \$24,469,353; Wisconsin,

\$24,741,000; Florida, \$23,488,408. Montana expended the least money of any of the states, being \$1,368,775.

Colorado and California rank with Arizona as lowest states in revenue per car from license fees, Colorado having \$5.95 and California \$5.19 with Arizona having \$5.65. Oregon tops the states with \$26.68 per car. Colorado with an average of \$11.69 per vehicle revenue from the gasoline tax is exceeded by 31 states.

In the distribution of Federal Aid funds New York headed the list in 1927 with \$4,858,693 with Texas second with \$4,129,137.

The totals for state highway expenditures are exclusive of the bond retirement and interest payments, while other sources include tax levies, legislative appropriations, county funds transferred and miscellaneous income.

The table submitted includes Colorado and those states in which COLORADO HIGHWAYS has its circulation and which, with the possible exception of Nevada, are generally classed as Denver territory. The total expenditures of these 13 states for highway purposes in 1927 totals \$84,175,969 indicating that the western states are keeping step with the rest of the nation in highway improvements.

The 1927 figures are given in this table and article as those for 1928 have not been assembled, and will not be until the present year has elapsed. This is not only because of the work entailed for compilation of these statistics, but for different fiscal years prevailing in the union.

COLORADO HIGHWAYS believes the table will prove informative to all those interested in highway work, and is as follows:

STATE	LICENSE FEES			GASOLINE TAX			
	Total Revenue	Per Car	Total Revenue	Per Car	Federal Aid Funds	Other Sources	Total Expenditures
Colorado	\$ 1,600,222	\$ 5.95	\$ 3,139,594	\$11.69	\$ 983,544	\$ 1,421,795	\$ 4,164,803
Arizona	454,429	5.65	1,388,830	17.13	667,027	901,526	2,315,783
Idaho	1,502,185	14.82	1,571,749	15.51	1,067,195	892,520	4,096,747
Kansas	6,518,622	12.09	4,594,650	9.15	3,474,083	4,880,591	14,161,327
Montana	1,136,103	10.07	1,436,398	12.74	1,332,354	258,136	1,368,775
Nebraska	3,740,553	10.02	3,664,919	9.21	2,408,280	184,939	7,771,395
Nevada	229,839	8.91	471,624	18.29	1,008,603	663,429	1,851,231
New Mexico	528,193	8.90	1,415,690	23.87	1,814,239	672,392	4,615,998
Oklahoma	5,753,912	11.43	7,197,956	14.30	1,206,556	3,199,383	12,816,236
South Dakota	2,491,981	14.63	2,393,592	14.11	717,336	1,973,602	4,011,117
Texas	15,626,531	14.06	15,650,841	14.08	4,123,137	1,914,127	21,427,654
Utah	672,403	7.15	1,461,261	15.54	1,148,589	784,682	2,974,199
Wyoming	525,807	10.10	756,049	14.55	917,875	996,138	2,590,704

GRAND SCENIC ROUTE FOR TOURISTS

The U. S. Forest Service plans a road over the Flat-tops from Meeker the coming season. The road now extends from Meeker to Trappers Lake and has been surveyed down to Williams Forks and will strike the Forks road just above the Carey ranch gate. "This will permit cars to go from Williams Forks over the Flat-tops and on to Meeker. It is proposed to extend this road on east so it will enable cars to get from the

Forks to Phippsburg and other points in eastern Routt County," the Hayden Republican announces.

Gunnison county commissioners have bought a steam shovel and the road between Somerset and Crested Butte will be widened. This is a state highway that is used by trucksters hauling Delta County produce to Crested Butte and Gunnison and one of the favorite routes of summer motorists who get a thrill over Kubler Pass. After this work is completed the shovel will be used in straightening the Gunnison-Crested Butte road.



A view of one of the splendid concrete highways leading out of Denver. This happens to be a section of the Denver-Colorado Springs road.

History and Romance Along Colorado Highways

MAJOR Stephan H. Long observed as he traversed the South Platte River with his exploration party in 1820 an unusually prominent peak. It was in view as the party followed the river, and three men started out to reach it. "The more we advanced the farther away it got" was, in substance, their report on their return to camp. This, it is presumed, was the first notation of a fact that in pioneer days gave rise to the familiar story of the eastern tourist. Everybody recalls it. The Easterner came to an irrigating ditch and stopped. To others in the party who joined him he said that the ditch only looked ten feet wide, but "it may be a half-mile!"

Long did not know that the peak would bear his name in later years. At the site of old Fort Latham, east of Greeley, the explorer turned south, following the river and the present paved highway. He then was following the Trappers Trail. This famous trail, antedating even his travels, was from Fort Laramie, in Wyoming, to Taos, New Mexico. It followed the present highway, with slight variations, to Denver, then the Cherry creek divide and south to pick up the highway again at Colorado Springs, following it through Pueblo until north of Walsenburg it veered to cross La Veta Pass, also on a state highway, and via Garland into New Mexico.

Long, however, following the highway through Denver continued on along virtually every foot of the present highway. This took him through Littleton, Sedalia, Castle Rock, Palmer Lake and on to Colorado Springs. As an aside it must be explained that paving has not been entirely along this route, though the towns mentioned are on sites that he crossed. One of the historical reminders of Long's stop in Colorado Springs is that here Dr. James ascended Pike's peak—the peak that in 1806 Pike said never would be climbed by man. Today there is not only a cogwheel railroad up the peak, but an automobile highway.

From Pueblo Long followed the Arkansas River to west of Crowley and then swung due south for New Mexico with a portion of his party, the others under

Captain Bell continuing on along the river, following the present highway.

There is no other strip of state highway in Colorado with more historical interest than that along the paved highway between Denver and Greeley with the exception of the Arkansas River route.

West of Platteville is to be seen the ruins of Fort St. Vrain, founded by the Bent brothers and Ceran St. Vrain in 1837, the first of such forts to be erected north of the Arkansas River. For many years it was the center of civilization in the Rocky Mountains. It was the point to which those who followed Long directed their steps. The adobe walls were 14 feet high and the enclosure was 100 by 125 feet, with bastions at diagonal corners. The D. A. R. in 1911 erected a granite monument to mark its site and identify the ruins. St. Vrain was known from the farthest points in the northwest territory to the Spanish possessions. St. Vrain became a prominent business man in the early days of Denver and died in Mora, New Mexico, in 1870.

Fort Lupton, known as Fort Lancaster by its founder, Lieut. Lancaster P. Lupton, a West Point graduate, was built in 1836 as a fur trading point. It was near Fort Lupton, which town takes its name from this old fur trading post. It was built of adobe, similar to St. Vrain and others of that period, but was abandoned in the early '40's. However, it was reoccupied in the late '50's and '60's and used as a stage station and as a refuge from Indians in the wars of the redskins in the latter years.

Fort Lupton figured in two unusual stories of the pioneer period. One is that reports are that Lupton first demonstrated with a garden that crops would grow in the then called "Great American Desert" by irrigation. The second deals with a desperado who escaped from Denver, seeking safety in the fort. His pursuers followed and demanded that he be turned over to them. The gates were opened and the desperado dashed out on his horse, shooting at his pursuers. They followed, firing at him. They killed the horse, but the man escaped

from them. Later he was captured and eventually was hung by order of the Denver Safety Committee.

Portions of Fort Lupton still may be seen north of the town and on the main highway.

Fort Vasquez was built by Louis Vasquez and William Sublette in 1837. In the early staging days it was a station and in the days of Indian warfare was a refuge for the settlers. It lies just off the paved road near Platteville and is the best preserved of all the old fur trading forts.

Trappers Fort has been so designated although its identity is not known. It was noted by explorers in the early '40's. It is between Lupton and Vasquez. In 1924 Dr. LeRoy R. Hafen, historian of the Colorado State Historical Society, discovered its exact site when he uncovered a corner of its foundation. History, apparently, has lost trace of its builders, the date of its construction and purpose, but it probably was a fur trading post.

Following the highway from Colorado Springs into Pueblo one traverses the old Cherokee trail which has its identification more particularly with the Arkansas river route.

Residents of Greeley have marked the site of old Fort Latham, a military post built in 1862, and the D. A. R. marked Fort St. Vrain. However, the state of Colorado never has done anything for the preservation of these other forts—centers of civilization in the period long before Denver was founded and when they truly were the outposts of civilization. California has preserved its missions, but Colorado has neglected the fur trading posts, not only north of Denver, but throughout the state.

There is the site of one of these old forts that is virtually unknown to the average citizen. It is Fort Crockett, named for "Davy" Crockett. It is on the Green River in Brown's Park, northwest Moffat County. It was presumably built about 1837. It was visited by

two men in 1839 who reported that it was built of timber and adobe and surrounded by high pickets. At that time it belonged to three trappers, Craig, Thompson and St. Clair.

Fort Crockett found its niche in history as "Fort Misery" because of its isolation and scarcity of supplies and was so named by the trappers of that part of Colorado in its heyday. The site of this post is on a state road. Following the Victory Highway and one of the main state highways west from Craig through Maybell at Sunbeam one finds the state road that passes through Greystone to Ladore and just beyond is the site. It is at the foot of the O-Wi-Yu-Kuts plateau, a wild and rugged district in the extreme northwest corner of Moffat County.

In all probability the average motorist would be speechless if \$20 was to be added to his automobile license fee or taxed as an additional payment for his gas in a year. However, this sum frequently is paid by a motorist, not without some complaint, simply because of an unimproved road.

The truth of this statement is borne out by W. E. Buck, of Georgia, in a communication to the Portland Cement Association. Buck consumed 12 hours and 45 minutes motoring 126 miles of which only 30 miles were over an unimproved road, but this is what that 30 miles cost him: Pulled out of the mud, three different times, total, \$10; rope, \$1.40; chains, \$6; washing car, \$3.50; grand total, \$20.90.

Buck, in all probability, has now become, if never before, one of the leading good roads enthusiasts in Georgia. His experience is merely one illustration of the cost of operating a car over a dirt road, and the Colorado Highway Department now is striving to eliminate this cost to motorists.



A beautiful gravel-surfaced highway, between Brookston and Milner in Routt County, constructed with Federal Aid funds.



A view of a new road constructed by the state south of Craig, showing a stretch of the Yampa River. Photo by H. L. Jenness, Division Engineer.

Highway Work to Be Done This Year

SUMMER finds highway activities by the state in full swing, with the Colorado Springs-Pueblo grading project one of the most extensive on the year's program.

This stretch of twenty-six miles is to be made ready for paving that will be started next year to be finished by August 1, 1930. The cost of the two-years' program between these two points will be approximately \$1,500,000. Several bridges are included in the construction this summer, as well as the grading of the road. The two projects now under contract include all drainage structures.

Another important project to be completed this year is the rebuilding of the highway through Sedgwick county which is the Denver and northern Colorado connection with the Lincoln highway via Julesburg. The road will be constructed on the north side of the railroad tracks and is to be graveled, with prospects of it being hard surfaced within the next two years. This new road will eliminate many curves in the present highway and also will avoid several railroad crossings.

Eastern Colorado will also witness the coming season the extension of the paving west from Fort Morgan for a fraction more than six miles giving Fort Morgan a western strip of more than 20 miles of paving.

Among the important jobs in the Arkansas valley by the Highway Department this year is paving for two miles and an underpass at Manzanola on the Santa Fe trail. The contract was let to the Driscoll Construction company of Pueblo for \$88,237.50. The contract is for the paving and the digging of the underpass.

Over in the Gunnison valley the road over Blue Mesa is to be put in shape. The road will be graded and graveled from Sapinero around Windy Point. The job when finished will eliminate some of the worst mud and snow conditions found on the western slope.

Another improvement of paramount importance to the locality will be the elimination of Dead Man's curve on the lower Poncha pass highway near Salida. The new road will be straight and do away with two dan-

gerous curves that have long been a menace to motorists.

Aside from the work mentioned there is a vast amount of road and bridge construction and improvements that will soon be under way and covering every district in the state.

The department now has thirty-two projects under construction. Eight of these have been started within the last sixty days. The total cost of these eight projects when completed will be approximately \$809,660. Of this sum, \$439,667 will cover the cost of the two grading projects now under way between Pueblo and Colorado Springs.

These two projects cover a distance of twenty-six miles, and the grading had been divided into two contracts, one of them being executed by J. L. Busselle & Co., Colorado Springs contractors, and the other was recently awarded to M. E. Carlson, Denver contractor.

Another big project under way is the paving of five miles west of Fort Morgan in the direction of Greeley. This work is being done by Contractor Edw. Selander. The total cost is estimated at \$154,000.

Two oil processing projects are now under way by the state. One of these involves the surfacing with oil of ten miles of road east of Grand Junction through the Palisade fruit belt. This work is being done by Hinman Bros. A contract is being executed by Luke Smith & Co. on 5½ miles of oil surfacing between Nunn and Dover, on the Greeley-Cheyenne road. The latter project is 33% completed. Hinman Bros. have just started work on their job.

Plans are being drafted for fifteen more projects, on which bids will be asked as quickly as possible, including six and one-half miles of concrete pavement in various parts of the state. The largest project in the list calls for forty miles of new grading work northeast of Sterling in the direction of Julesburg.

The plans for three additional miles of grading and gravel surfacing north of Kremmling has been completed and the department is asking for bids on same.

(Continued on page 20)

HOW WOMEN DEAL WITH BILLBOARDS

By a DENVER MOTORIST

AN irresistible force is a woman aroused," remarked some savant whose name I do not recall. The truth of his assertion has been found in Hawaii where a small group of indignant women started a crusade that swept billboards out of the islands. They had as their purpose the protection of scenery in Hawaii.

Here in Colorado where there has been—and is—considerable agitation against billboards and signs along highways that mar the grandeur of the scenery, interest is turning to the crusade of these women, and the manner in which they handled the problem to an entirely satisfactory end.

Colorado has a law that gives the State Highway Department the right to bar billboards and signs, other than road signs, from a state highway. However, there is no law to prevent the erection of the boards and signs on private property adjacent to the highways. This has been the nut that has not been cracked and which has caused, and is causing speculation as to how to prevent this use of private property. The women of Hawaii found the way.

Back in 1922 the Hawaiian islands were plentifully supplied with billboards. They were along the main highways and the more frequently traveled roads, placed regardless of whether they obscured an attractive view or a bog. In that year several women interested in protecting the scenery organized themselves into the Outdoor Circle and began agitation against billboards. They created a ripple. They battled harder. There was a little more attention paid to them by the press and citizens, but the boards continued to multiply. They kept up their fight and more women joined the Outdoor Circle.

Then was erected a huge billboard on one of the main highways. It occupied a marsh, but it was so flaming that it affected the surrounding country. It was in one of the most prominent places around Honolulu. It advertised a food product, and that is where the Outdoor Circle members held a pat hand!

The women notified their grocers that as long as that board stood they would refuse to buy the product advertised. Merchants had stocked their shelves with the product in anticipation of enormous sales. They soon found the goods remained on the shelves.

This was the entering wedge, and the women knew it and took advantage of it. Members of the Outdoor Circle interested others in their campaign and word was passed to merchants that they would not buy goods advertised by billboards and signs. They made good this threat. There was such a slump in the demand for these products that eventually the billposting company began losing so much money the owners were glad to sell to a group of business men who closed out the business.

Following the successful outcome of their battle the Outdoor Circle, now a powerful body of women, began planting trees, tropical fruit and flowers all over the islands and today the scenic grandeur of Hawaii is world-famous.

There is no law in the islands against billboards, but checkups of territorial legislatures for several sessions revealed that if the women wanted such a law they could have it.

It is public sentiment the women created that has brought about this change in Hawaii, and legislators, past, present and prospective realize this sentiment.

E. N. H.

EDITORIAL

(Continued from Page 3)

that it has had at its disposal, but there must be a realization on the part of the people, as in California, that funds cannot be curtailed for the highway department but must be increased.

"There are many persons who get a wrong slant on motor tourists. They get the idea that the money goes into the centers of population. As a matter of fact money is scattered, regardless of where it originates, in any state. This is particularly true of the motorist money. With good roads and enticing scenery and attractions such as can be found in Colorado motorists will not only spend more time in the state, but will naturally ramble over the state, but they want improved roads.

"The construction and extension of improved roads in Colorado mean the building up of municipalities, communities and resorts. If a fairy wand could be waved today creating a complete system of improved roads all over Colorado the result this coming season in tourist travel would be startling in numbers.

"There is no other state, and I include California, that has the possibilities to attract travel that Colorado possesses, and to obtain these visitors improved roads are as necessary as food and drink for the sustenance of man. Improved roads cost money, as California realizes, but such roads are a permanent investment and every year adds additional money expended in the state."

Another angle of the improved roads importance was cited by a farmer, who said:

"I think all of us realize that improved roads attract the tourist, as they have done in California. From a home point of view the good road means everything to a farmer in the movement of his products to market, which means a quicker turn over of money, and a saving in transportation. Good roads today in Colorado are building up villages, hamlets, towns and cities in all parts of the state, and are the means of increasing values of property in rural communities and the value of farms.

"The very nature of the topography of Colorado, the widely separated farming districts and varied character of rural activities that include livestock raising and industries call for these improved roads to facilitate business, and that means added wealth not only to the state, but to the individual."

The old Cottonwood Pass road that in the early days of mining in the Aspen region was thronged by ore wagons and other traffic may be improved during the coming season by the Pitkin county commissioners. The plans also are to extend it into Taylor Park to connect with the present road into Gunnison.

Construction of a new highway from Trinidad into the San Luis Valley is expected to start early this spring by the State Highway Department. The survey of the road on the eastern side of the divide was made last fall. This project has been agitated in the Trinidad district for a number of years.

When Colorado citizens want something they get it. The Pitkin mesa road has been graveled by residents in that district, the county commissioners furnishing the gravel.

PIONEER GRAVEL EQUIPMENT



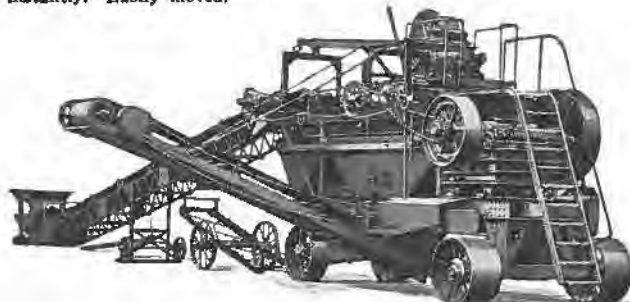
Pioneer Screening, Crushing and Loading Plant No. 10, sold to the Provincial Highway Board, Nova Scotia, Canada, by "Pioneer" Distributor, W. G. Stanfield of Sydney, N. S. Picture shows No. 10 Plant at left, with 55 ft. Steel Frame Loading Conveyor leading to 21-yard bin, at right.

Adaptable to Every Road Building Requirement

In road building the question is—What special "set-up" does your problem require? "Pioneer" Gravel Equipment offers an instant solution to the largest or smallest jobs without wait or delay. "Pioneer" engineers, trained by years of experience, are ready to aid you in selecting crushing, screening and loading machinery that will mean economy in investment, plus permanence and speed in operation.



21-yard "Pioneer" Bin made of No. 10 gauge steel, riveted and reinforced, equipped with structural steel legs with built-in lifting jacks—one man operated. Bottom opening is 19 inches square, with sliding shutters. Will fill truck almost instantly. Easily moved.



Close-up view of No. 12 Plant equipped with sand rejector. Crushes, screens and loads in one operation, one handling of pit-run gravel. Powered by 60 H. P. gasoline engine or by steam or electric motor. Capacity 350 to 500 cubic yards in 10 hours.

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HIGHWAY INCOME IN UNITED STATES

PUBLIC interest in highways in the United States is disclosed in statistics assembled for 1927. The report reveals that the total highway income of the 48 states in 1927 was \$1,465,076,214 compared with \$1,149,430,896 in 1921, an increase of \$315,645,318 in the six-year period.

The highway income is derived from bond issues, Federal Aid, motor vehicle fees, gasoline taxes, general property taxes and from miscellaneous sources. One of the revelations in these statistics is the decrease in income from bonds in the states, indicating that Colorado is not alone in voting against the issuance of bonds for improved roads.

In 1921 the bonds brought in \$438,109,273 and in 1927 only \$272,260,730, a decrease in this source of revenue of \$165,498,543.

While the bond revenue dropped, that from license fees and gasoline tax increased. From this source in 1921 was received by the states \$122,626,166 and in 1927, \$516,192,791, an increase of \$393,566,625. This fact has brought out contentions by automobilists that they are paying the bulk of highway construction costs in the United States. However, property taxes also show that in 1927 the revenue for highways amounted to \$527,122,830 from property tax comparable with \$415,681,010 in 1921.

Aside from this property tax Federal Aid in 1921 contributed \$79,333,226 and in 1927 gave \$80,459,671.

The motor vehicle contribution to highways has been a natural increase, and must continue to grow with the vastly increasing use of motor vehicles. In 1921 this income from fees amounted to \$118,942,706 and from gasoline tax to \$3,683,460. In 1927 the income was \$299,513,800 from fees and \$216,678,981 from gasoline. In these intervening years many of the states added a gasoline tax while others advanced the tax they already had. In addition there is the increase by the many thousands of motor vehicles, and this increase was marked up again in 1928 so that the 1928 statistics, when assembled for the 48 states, must necessarily show a big increase over 1927.

Advances in the gasoline tax has been noted in many of the states this winter, and including Colorado, with the realization by the members of the legislatures that the demand for improved roads is persistent in their respective states. The people have come to believe that the gasoline tax is one tax that does not come upon any of the taxpayers save those operating motor vehicles, and also that strangers within a state must contribute their share through this tax to the construction of the good roads over which they travel.

Aside from the motor vehicle revenue a recapitulation of the income for the comparable years shows revenue for 1921 to have been: Bonds, \$438,109,273; Federal Aid, \$79,333,226; property tax, \$415,681,010; miscellaneous, \$93,681,221, a total of \$1,026,804,730. In 1927 the income was: Bonds, \$272,260,730; Federal Aid, \$80,459,671; property tax, \$527,122,830; miscellaneous, \$69,040,192, a total of \$948,883,423. The addition of the motor fees

and gasoline tax gives the grand total of the highway income.

A CORRECTION

In the April issue of **COLORADO HIGHWAYS** appeared a story to the effect that the cost of maintaining paved roads in Wyoming per mile in 1927 was \$670, and that the cost per mile of medium type in Wyoming was \$700. These figures were obtained from an agency supposed to furnish reliable statistics on the various states.

Z. E. Severson, Wyoming state highway engineer, writes that the figures are far from the facts. His letter follows:

"As a matter of fact the available cost of maintaining 2,928 miles of state highways in this state for the calendar year of 1927 was \$229.69 and for the calendar year of 1928, \$250.55. This average cost includes all types of roads, the amount of pavement being only 39 miles. The maintenance cost on the 39 miles of pavement for the year 1927 was slightly below the average and for the year 1928 was slightly above the average for that year, so that if the two-year period is considered the cost of maintaining the pavement averages approximately the same as the other types."

From the figures furnished by Mr. Severson it is shown that Wyoming's maintenance cost is much lower than in a majority of states. Wyoming has a splendid maintenance force, well equipped with the latest road building and maintenance equipment, and as motorists testify her highways compare with those of richer and more densely populated states.

We apologize to Mr. Severson and the personnel of his maintenance division for printing the false information about their costs.

Another example of harmonious co-operation between a railroad company and a state highway commission to promote safety on highways is reported from California. The Santa Fe Railroad shifted its tracks and the highway commission its

roads in Orange County to properly care for the junction of two important state highways. The construction at the junction included two underpasses. The junction now, it is said, is free from danger to the motorist.

Mississippi and Montana have adopted the five-cent gas tax, making eight states now with that tax. The others are Arkansas, Florida, Kentucky, New Mexico, South Carolina and Kentucky. The adoption of five cents by Mississippi and Montana is taken as another indication of the importance of gasoline tax in raising funds for highways, and which has been successful in the other states.

T. R. Agg, professor of highway engineering in Iowa State College, says that the United States must pay twice as much money each year for road improvement as paid in 1928. The national road bill in 1928 is placed at \$1,300,000,000, exclusive of city street expenditures. Prof. Agg, therefore, figures on \$2,600,000,000 a year for this and the coming years to meet the requirements of all the states.

There are 36 states that are keeping main roads open throughout the winter, according to a statement issued by the U. S. Bureau of Public Roads. Colorado is included in the list. The government report says that studies made in these states show that the extra revenue received during the winter months more than offset the cost of keeping the roads open to traffic.

Minnesota now has 33,339 miles of surfaced roads, state and local, according to a summary of the Minnesota Highway Department's figures on trunk highway and state aid road conditions and the last available figures on county and town roads. This total is made up of 1,157 miles of paving, 631 miles of macadam bituminous treated gravel, 25,729 miles of gravel and 5,822 miles surfaced with sand clay.



A portable screening and crushing plant used in preparing material for oil processing near Dover on State Road No. 1.



A section of the concrete paved Denver-Colorado Springs Road, in Douglas County

Driving Qualities Built In

Delightful driving qualities are built into pavements of portland cement concrete. The surface smoothness remains true through every year of wear.

Surface and foundation in a concrete pavement are merely the upper and lower part of a solid slab of molded rock—there is nothing to wave or rut, even in hot weather!

Concrete pavements are restful to the nerves of driver, passenger and taxpayer alike. They are not only most enjoyable to ride over—they are safest in all weather.

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Denver National Building
DENVER, COLORADO

OFFICES IN 32 CITIES

When writing advertisers, please mention Colorado Highways.

COLORADO SCENIC POINTS TO BE LOCATED BY SIGNS

Motorists along the main traveled highways of Colorado are to locate historic and scenic attractions by signs. The Colorado State Highway Department, the Motor Club of Colorado assisted by counties and civic and commercial organizations will furnish the signs and see to their placement.

Motorists at present have no way of identifying scenery nor do they know of the historic spots they are passing. The signs will tell them. It is proposed to mark such places, for example, as the old trapper frnts along the Arkansas river and along the Greeley road; locations of Indian battles, outstanding peaks and lakes and other points of interest all over Colorado to the tourist and the citizen of Colorado.

The idea originated with John E. Loisean of the Public Service Company of Colorado and was taken up by him with the Motor Club of Colorado and Major L. D. Blauvelt, state highway engineer. It met with enthusiastic approval by them and others whom they have interested in the proposal.

Scenic Colorado signs are to be placed at points of vantage along the highways to identify for motorists this state's peaks, ranges, canyons, glaciers, rivers, mesas, historical points, etc., and to identify by name or location these points of interest, and giving additional information such as altitude and distances.

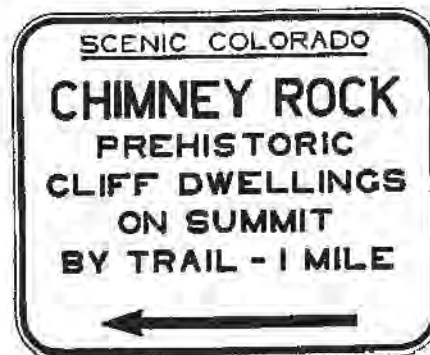
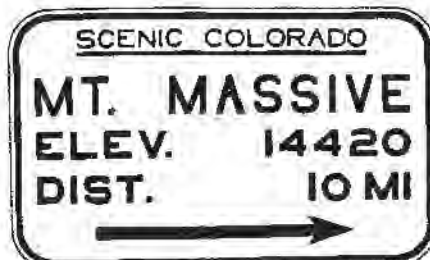
Signs are to be approved, made and installed under the supervision of the State Highway Department, and are to conform in general, to the Federal and state general marking standards. The signs are to be placed along Federal and state highways at location determined upon by the Highway Department, to conform as nearly as practicable to recommended locations.

The purpose of these signs is, first, to make a visit to Colorado more enjoyable, interesting, educational and instructive; second, to make more concrete the conception of Colorado's scenery, giving it individuality by specific designation, and third, to educate Coloradans to their own state's romance, scenery and history, that they may better entertain and inform their visitors.

One-half of the cost of the signs will be paid by the State Highway Department, and the latter agency will supervise the making and erection of the signs. The other half of the cost must be shared by municipalities, county authorities, civic organizations or similar bodies. Order blanks for the signs may be obtained from the Motor Club of Colorado, 1545 Broadway, Denver, or through the State Highway Department.

California in 1928 burned a total of 661 miles of highway right of way as an aid in preventing fires. So successful has this system proved that it will be continued in 1929, according to announcements by the state highway department. The cost to the state of this burning last year was about \$57 a mile.

The forest road program in Montana for 1929 and 1930 calls for an expenditure of about \$650,000. The work is to eliminate the barrier of bad roads that



Types of signs being erected on state roads under the supervision of the State Highway Department.

has kept motor tourist travel from traversing Montana en route to or from Yellowstone Park. Funds will be furnished by the Montana Highway Department, U. S. Forest Service and U. S. Bureau of Public Roads.

The Oregon State Highway Commission recently awarded bridge and road contracts of more than \$160,000 covering various highways in the state.

Indiana started its trunk line system of highways in 1919 and now has approximately 5,000 miles.

WHO'S WHO

Who comes with pencil sharpened keen,
With profile long and sober mien,
With transit, level, book and tape
And glittering axe to swat the stake?
The Engineer.

Who sets the level, bends his spine,
Squints through the glass along the line,
Swings both his arms at rapid gait;
Yells: "Hold that goldarned rod up
straight!"
The Engineer.

Who raves and snorts like one insane,
Jumps in the air and claws his mane
Whene'er he sees a scraper take
A whack at his most cherished stake?
The Engineer.

Whn says he'll charge an even ten
For stakes destroyed by mules or men;
While on all fours he tries in vain
To find the vanished stake again?
The Engineer.

Who saws the air with maddened rage
And turns with hate the figured page,
And then with patience out of joint
Ties in another reference point?
The Engineer.

Who calls at your unrivalled gall
Whene'er you kick for overhaul,
And gives your spine a frigid chill
Whene'er you spring an extra bill?
The Engineer.

Who deals with figures most profuse
And tells you solid rock is loose,
That hardpan is nothing more than loam,
While gumbo is lighter than seafoam?
The Engineer.

Who, after all, commands our praise,
In spite of all his peculiar ways,
While others harvest all the gain
That springs from his prolific brain?
The Engineer.

—Clemson Tiger.

The Kansas legislature has passed the bill and it has been signed by the governor raising the gasoline tax from two cents to three cents. This leaves only ten states now with a three-cent tax and a number of the latter have bills in the legislature for increases to four or five cents.

The governor of Missouri has signed the bill to issue \$75,000,000 state highway bonds voted by referendum by the people in November. A total of \$21,000,000 is made available for new construction during the current year.

W. C. Buetow, state highway engineer of Wisconsin, reports work performed in the state in 1928 as 182 miles of surfacing; 14 of grading and drainage and 203 of paving, while 1,500 miles were oil-treated. In the year 339 bridges and 18 new grade separations were constructed.

Wisconsin now has a woman road commissioner. Miss Yeone Rahr, of Oshkosh, has been named assistant highway commissioner of Winnebago County. She has been employed with a construction firm and is said to be familiar especially in cement construction.

Plowing through rocks and heavy roots to widen road. Rear wheels leaned to hold grader against the heavy cut.



Long life

-ADAMS GRADERS are built for lasting performance!

TEN, fifteen, and even twenty years is not an uncommon service record for an ADAMS GRADER because ADAMS builds for *lasting performance*. The ADAMS GRADER you buy today, given half a chance, will be doing its job well *many years from now*, and through those many years the low repair expense will surprise you.

ADAMS GRADERS outlast all others because they are *better built*—they are better designed, better balanced and use better materials . . . they are hot riveted and embody

more accurate machine work than any other grader. This machine work includes machine-cut, enclosed gears, machine-finished bearings, ball and socket joints, etc., all Alomite lubricated and adjustable for wear.

When you buy a grader, look beyond the purchase price—consider the *lifetime cost*. An ADAMS GRADER will do better work over a *longer period* of years, with *less maintenance expense* than any other grader you can buy. Send for the new ADAMS Catalog No. A-29 which fully explains why.

Elton T. Fair Company

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ADAMS

Adjustable *Leaning Wheel* Graders

The ADAMS line includes graders in 6 1-2, 7, 8, 10, 12, and 14-foot blade lengths, Motor Graders, Scarifier Graders, Road Maintainers, Patrols, Drags, Elevating Graders, Dump

New Highway Equipment and Materials



Harry P. Wilson goes "drumming" for business. Mr. Wilson is the president of the Wilson Machinery Co., dealers in all kinds of road construction and maintenance equipment. The reason for the smile was a "good order." Yes, he's the gent on the left. The youngster is H. P. Junior and the man on the right is an old friend.



J. A. HANRATTY, Vice-President
Pioneer Gravel Equipment Mfg. Co.

ADAMS BRINGS OUT NEW TRACKSON MOTOR GRADER

A new motor grader with McCormick-Deering power and Trackson Full Crawlers has been placed on the market by J. D. Adams Company under the name of Adams Motor Grader No. 12.

This new machine is similar to Adams Motor Grader No. 10 which uses the McCormick-Deering Industrial Tractor Model Twenty, except that the tractor is modified to use Trackson Full Crawlers. Also special transmission gears are used which give the tractor speeds of approximately 2, 3, and 4 miles per hour.

The McCormick-Deering Tractor and Trackson Crawlers are well known equipment which have been very successfully and very extensively used in combination for a number of years, not only in road work but in lumber camps, oil fields, etc. The McCormick-Deering provides an engine that is simple, rugged and embodies several distinctive features such as hall bearing mounted crank shaft and replaceable sleeve type cylinders which make it one of the most practical and durable power units made. At speeds of 2, 3 and 4 miles per hour the McCormick-Deering develops drawbar pull approximating that of crawler tractors rated at 20 horse power. Trackson Full Crawlers gear this power to the ground with sure-footed, ground-gripping crawler tracks, which enable the grader to work in sand, mud, loose dirt, etc. The McCormick-Deering-Trackson Crawler combination is not only very efficient but economical in investment, low cost of operation, and maintenance.

The outstanding features of the grader are an extra strong, all riveted frame braced against twist by large tubular cross members, fully machine-cut and enclosed gears, machine-finished ball and socket joints throughout, all Alemite fitted and adjustable for wear, and the Adams distinctive continuous hand wheel type of blade and scarifier control which it is claimed operates easier and faster than the ordinary type. It is also claimed that Adams Motor Graders are so designed that they have the most effective weight or cutting pressure applied to the blade, which, coupled with extreme rigidity, produces unusually smooth and steady cutting.

The crawlers do not affect the steering of Adams Motor Grader No. 12 because of the differential which is retained in the McCormick-Deering rear axle—it is not necessary to work clutches or slip the tracks in making short turns. Steering is made unusually easy and positive by use of a Ross Steering Gear such as is used on high-grade motor trucks and busses.

This new machine is furnished with or without scarifier and with 10, 12, 14, or 16-foot blade. Full particulars may be had by addressing J. D. Adams Company, represented by Elton T. Fair Co., Denver.

BUSINESS IS GOOD, SAYS MEFFLEY OF H. W. MOORE EQUIPMENT COMPANY

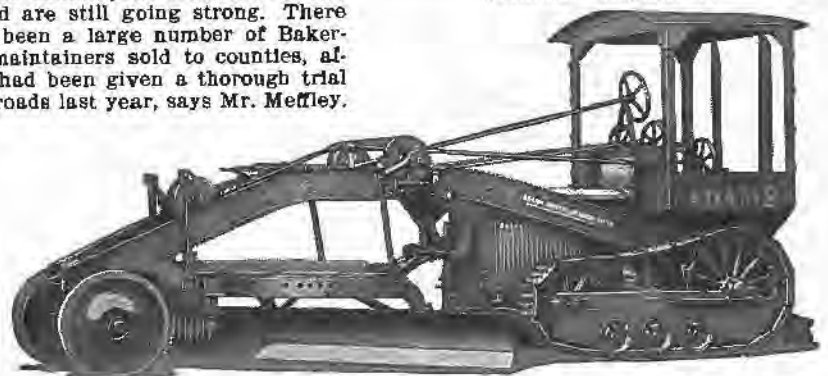
Just a whisper over the wire from George Meffley.

"Business has been better this spring than our fondest hopes," says Big Hearted George.

A flock of sales figures on the big blackboard in the office say something to that effect. Yes, he says Cedar Rapids crushing plants are still going big and Galion graders have been arriving at their destination by the carload in this territory.

The H. W. Moore Equipment Co. of Wyoming is still hitting on all six with Johnnie Wortham at the helm.

Sales on Jaeger mixers this year have been ahead of last year from the Denver office, and are still going strong. There has also been a large number of Baker-Manley maintainers sold to counties, after they had been given a thorough trial on state roads last year, says Mr. Meffley.



Adams Trackson crawler motor grader, powered with a McCormick-Deering tractor.

Here is an extraordinary picture. It is extraordinary, because it is about the only one in existence—in fact, the other one was taken when his principal clothing consisted of a safety pin and three-cornered pants.

How he came to be a gravel equipment sales engineer is more or less of a mystery, so far as his early youth is concerned. One man we know of got the gravel hobby from sating it when a mere child. They tell of another whose parents made him clean the bird cage and sprinkle fresh gravel in the bottom every day. Rumor has it that the bird kept this lad so busy that he conceived the idea of quantity production, which gave rise to the whole business of crushing, screening and loading plants. Because J. A. Hanratty's principal hobby is work and work, in his case, means gravel equipment machinery installation to fit every type of road building requirement. But, you'll find he will emphatically deny the bird cage story.

He says that Russell Grader did the pioneering in gravel machinery—that he

(Continued on page 20)

STATE HIGHWAY DEPARTMENT

Financial Statement—June 1, 1929

BALANCES DECEMBER 1, 1928

State Treasurer.....	\$ 715,660.23	
County Time Warrants.....	14,678.82	
Revolving Fund.....	9,500.00	
Total Balances.....		\$ 739,839.05

RECEIPTS

Half Mill Levy.....	\$ 406,649.29	
Internal Improvement.....	36,800.00	
Gas Tax.....	1,477,004.28	
U. S. Government.....	944,001.63	
Bus Licenses.....	21,120.88	
Highway Receipts.....	15,315.54	
Total Receipts.....		2,900,891.62
Total Balance and Receipts.....		\$3,640,730.67

DISBURSEMENTS

Federal Aid Projects.....	\$ 742,292.15	
State Projects.....	114,625.34	
Maintenance.....	397,887.78	
Maintenance, Equip. & Repairs.....	10,439.46	
Property and Equip. and Shop..	6,376.27	
Construction Equipment.....	20,369.68	
Surveys.....	5,589.77	
Traffic Signs and Census.....	380.19	
Administration.....	76,159.55	
Federal Aid Renewals.....	22,417.39	
Total Disbursements.....		\$1,398,436.58

BALANCES May 31, 1929

State Treasurer.....	\$2,218,515.27	
County Time Warrants.....	14,178.82	
Revolving Fund.....	9,500.00	
Total Balances.....		2,242,294.09
Total Disbursements and Balances.....		\$3,640,730.67

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J. A. HANRATTY, Vice-President Pioneer Gravel Equipment Manufacturing Co.

(Continued from page 18)

joined the company in 1919 and from that time on specialized in the gravel equipment line, traveling all over the United States and Canada in the course of this work.

So, when the Russell Grader Co. recently merged with Caterpillar Tractor, J. A. Hanratty, the Ellertsons, Brunsdale, Yerk and the rest of the Russell Grader enthusiasts, together with W. H. F.

Thompson, who became interested in gravel through wearing low shoes, brought out this end of the Russell Grader business and incorporated under the name of Pioneer Gravel Equipment Manufacturing Company of Minneapolis and "went to it."

Distributors and service stations have been established all over the United States and Canada and a new plant in northeast Minneapolis, with 36,000 square feet of floor space, has just been completed.

And J. A. Hanratty is traveling so

much all over the face of the earth, advising with contractors and municipalities regarding their gravel equipment needs, that his own wife says he calls his two little girls, aged 6 and 3½, "Pat" and "Jack," instead of by their right names.

But confidentially—if a serious-minded chap, who looks about ten years older than the picture we show, walks into your office, just bustle out your road building problems, because J. A. Hanratty can solve them.

IMPORTANT HIGHWAY WORK TO BE DONE THIS YEAR

(Continued from page 11)

This project connects with 23 miles of high-type gravel surfaced roadway recently completed north of Kremmling, eliminating the worst of the old slippery roadway over Muddy Pass.

In a short time the state will start oil processing of about fifteen miles of road in the San Luis valley, south and west of Alamosa. Another fourteen-mile oil project northwest of Fort Collins will be started shortly.

Plans are being drafted for a \$50,000 grading and gravel project between Deertrail and Agate on the Victory highway between Denver and Limon. This is being designed to eliminate a bad piece of roadway

in wet weather. Later the project will probably be oil processed.

The new road being graded between Pueblo and Colorado Springs will be paved next year, and when completed will give Colorado one of the longest continuous strips of concrete pavement in the world, added to the pavement already laid between Denver and Colorado Springs and Fort Collins and Greeley.

The state has contracted with the Continental Oil Co. for the purchase of 470,000 gallons of asphalt base oil for use on oil surfacing projects this summer. The contract price for this oil is \$35,268 delivered. Experiments conducted by the state highway engineers last year resulted in the development of a very durable low cost surfacing with the use of the asphalt oil, suitable for roads where the traffic is light.

PLANS BEING DRAFTED

Proj. No.	Length	Type	Location
2R No. 9	1.5 mi.	Pavement	Starkville
78-R	0.5 mi.	Overhead R. R. Crossings & Gravel Surf	South of Minturn
144-B	3.0 mi.	Gravel Surfacing	Northwest of Fort Collins
57-R	0.5 mi.	Bridge	North of Lamar
150-A	8.0 mi.	Gravel Surfacing	West of Craig
151-A	4.0 mi.	Gravel Surfacing	South of Granby
165-Reop.	3.0 mi.	Concrete Pavement	East of Canon City
175-A	40.0 mi.	Grading	Northeast of Sterling
263-D	2.5 mi.	Gravel Surfacing	Mt. Harris
263-A	4.0 mi.	Gravel Surfacing	Northeast of Ft. Garland
272-E	2.0 mi.	Concrete Pavement	West of Rocky Ford
282-G	5.0 mi.	Gravel Surfacing	South of Craig
296-E	5.0 mi.	Gravel Surfacing	South of Greenhorn
279-H	2.0 mi.	Gravel Surfacing	East of Kenosha Pass
300-B	2.0 mi.	Grading	North of Silverton

PROJECTS ADVERTISED FOR BIDS

Proj. No.	Length	Type	Location	Date Bids Opened
138-B	3.1 mi.	Gravel Surfacing	North of Kremmling	

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
2-R7	South of Agullar	1.224 mi.	Paving	H. C. Lallier Const. & Eng. Co.	\$6,990.60	86	2-R7
2-R8	Agullar, South	1.633 mi.	Paving	J. Finger & Son	66,660.00	90	2-R8
97-R1	East of Lamar	.....	Bridge	W. A. Colt & Son	24,237.50	20	97-R1
134-B1	East and West of Vona	3.352 mi.	Gravel Surfaced	W. A. Colt & Son	32,605.00	87	134-B1
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	88	138-A
144-C	Bet. Fort Collins and Laramie	2.934 mi.	Gravel Surfaced	Bedford & Woodman, Inc.	37,911.35	67	144-C
147-B	South of Cortez	4.833 mi.	Surfacing	B. J. Maloney	59,447.44	100	147-B
147-C	South of Cortez	.....	Gravel Surface	E. J. Maloney	86,182.75	?	147-C
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	58	149-A
208-AR	E. of Grand Junction	0.507 mi.	Gravel & R.R. Grade Separation	Harry A. Roush	59,568.00	59	208-AR
208AR2-CR1	East of Grand Junction	.....	Oil Processed Gravel Surface	Hinman Bros. Const. Co.	44,652.05	0	208AR2-CR1
242-C	West of Fruita	6.011 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	56,344.50	73	242-C
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	95	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	47	258-G
259-A1	Between Parlin and Sargents	2.350 mi.	Gravel Surfaced	Ed. H. Honnen	51,551.00	47	259-A1
282-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	62	282-I
286-D	South of Bondad	4.111 mi.	Gravel Surfaced	Engler, Teyssler & Co.	96,075.30	60	286-D
271-C	West of Portland	2.430 mi.	Surfacing	J. Finger & Son	54,843.40	93	271-C
272-D	East of Manzanola	1.950 mi.	Pav. & R. R. Underpass	Driacoll Construction Co.	88,237.50	32	272-D
277-D1	Between Colo. Springs & Pueblo	.....	Grading	M. E. Carlson	218,277.30	8	277-D1
277-E1	South of Colorado Springs	.....	Grading	J. L. Busselle	221,289.65	2	277-E1
279-F	North of Baileys	3.444 mi.	Graded	J. Fred Roberts & Sons	126,000.00	93	279-F
282-AR1	South of Craig	600 ft. River Protection Work		Hinman Bros. Const. Co.	11,925.00	94	282-AR1
282-E	N. of Meeker	6.421 mi.	Gravel Surfacing	Luke E. Smith & Co.	88,384.20	81	282-E
282-H	Between Rifle and Meeker	7.029 mi.	Gravel Surfaced	Winterburn & Lumsden.	82,539.74	10	282-H
286AR1-BR2	North of Nunn	.....	Oil Process Gravel Surface	L. E. Smith & Co.	20,575.25	33	286AR1-BR2
287-AR5	Between Greeley & Ft. Morgan	.....	Concrete Pavement	Fdw. Selander	154,682.85	4	287-AR5
292-B	Between Gilman and Minturn	2.640 mi.	Gravel Surfaced	O. J. Dorsey	29,146.80	13	292-B
292-C	West of Avon	.....	Gravel Surface	Fd H. Honnen	39,663.10	2	292-C
293-C	North of Ouray	3.861 mi.	Grading	C. V. Hollenbeck	62,997.80	71	293-C
296-C	N. of Greenhorn on S. H. No. 1	5.606 mi.	Surfacing	H. C. Lallier Constr. & Eng. Co.	116,466.80	93	296-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssler	38,426.00	20	298-B
299-B	Between Delta and Grand Junction	3.465 mi.	Gravel Surfaced	Gardner Bros. & Glenn	50,804.80	93	299-B

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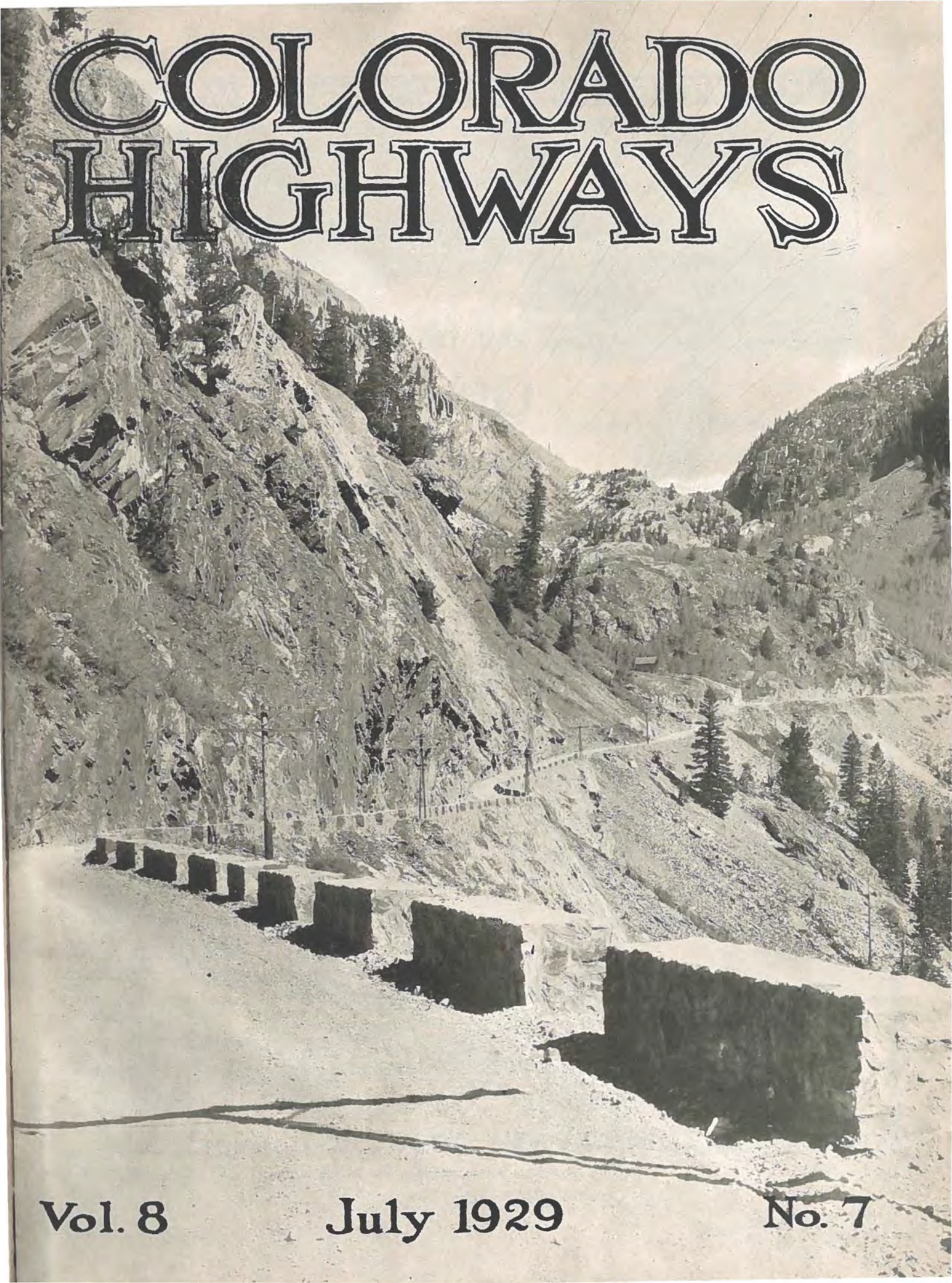
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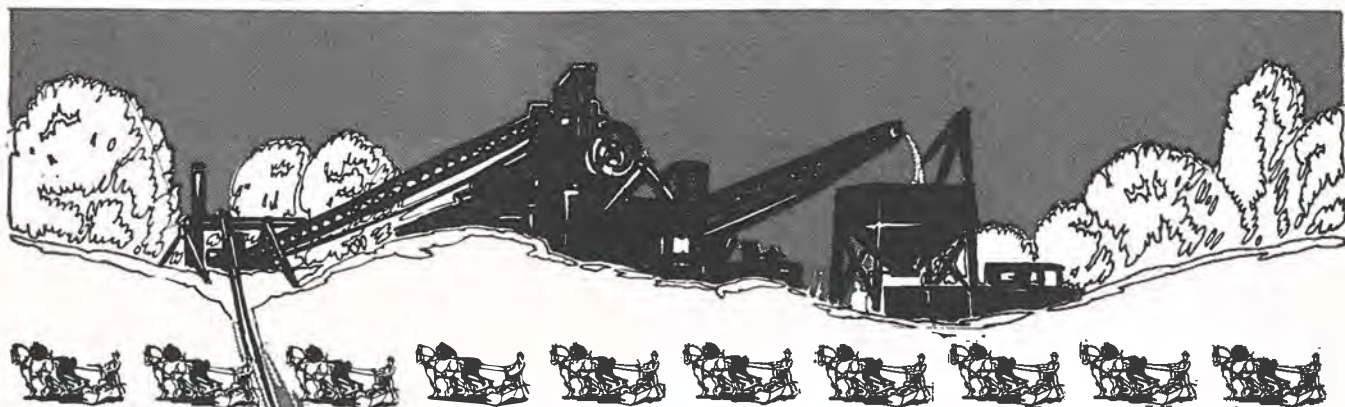


Vol. 8

July 1929

No. 7

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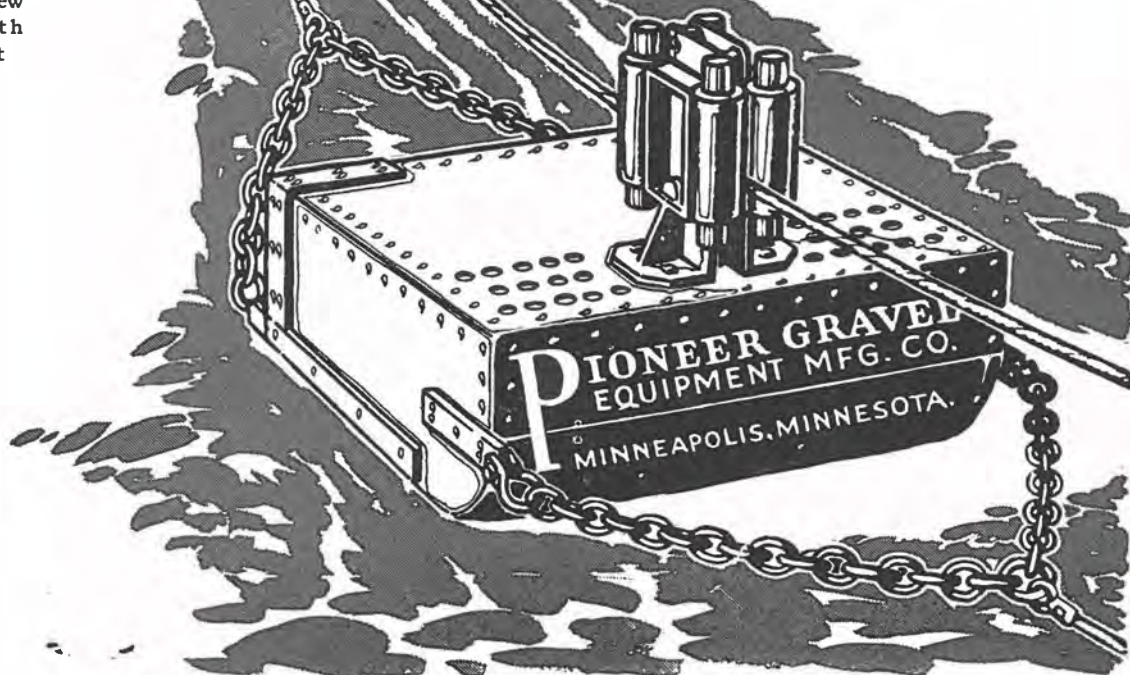


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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,
 1803 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
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Our Cover Picture

THE front page of COLORADO HIGHWAYS this month presents a view along the "Million Dollar Highway" between Ouray and Silverton. The photograph will be of especial interest to those old-timers who went over the Mears toll road, of which it is a part. In those days it was for horse drawn vehicles, with no protection walls, and was one of the "scariest" mountain highways in Colorado. Today the highway is of standard construction, with safety walls, and is one of the most scenic roads in the United States. Photo by Walker Art Studios, Paonia, Colorado.



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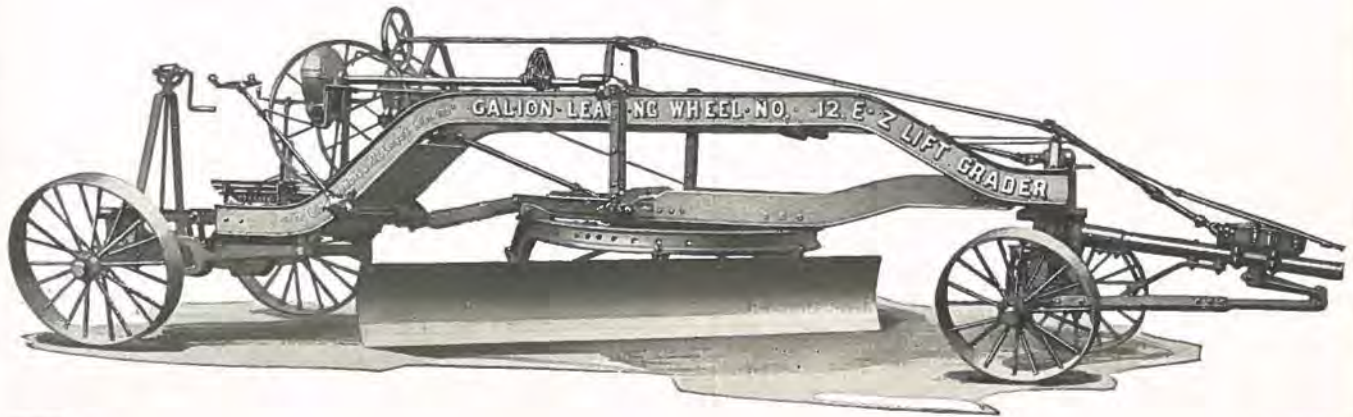
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PHONE TABOR 1361



Editorial

JULY and August are the two months of the year when the greatest congestion is found upon the highways and roads of Colorado. In addition to some 260,000 passenger cars driven by residents of the state, there are the unnumbered thousands of motor tourists who are in Colorado for pleasure. These facts must be borne in mind by the loitering motorist.

There is no room today, and no excuse, for the loitering driver on a main highway. He is not only responsible for holding up a string of automobiles on the road, but is a constant and a dangerous menace to the safety of others. Sheer selfishness is back of him. He is the man who has no care or thought of anybody else but himself. His own pleasure is paramount. One may be charitable and attribute his actions to a lack of brain, but to do so is only charity.

The automobile today has become more than a pleasure vehicle. It is a necessity. It is used by business and professional men in place of the train in traveling from one place to another. With these men time is important. That is why they use the car. They must of necessity travel fast. Every driver is aware of the fact that on a two-way road passing cars ahead is a dangerous proceeding, calling for accurate eyes and a quickened brain. Science enters into this. The experienced driver knows that if he is traveling 40 miles an hour and the approaching car is of the same speed that the two are nearing the passing point at 80 miles an hour. The loiterer may easily hold up a string of ten, a dozen or fifty cars on a heavily traveled highway.

Back of this selfish man are those who have important business engagements. They look ahead and realize that they cannot pass. The tooting of horns begins. The loitering motorist in his selfishness and conceit ignores the warning blasts. HE is content. He is doing as HE wants to do. Here is where irritation enters into the brain of those back of him. Time is passing, too. Then some man, desperate at the delay, seeks to go around. Approaching is another car. The result, possibly, is a wreck. The sole person to blame for this accident is the loiterer. Probably he smiles.

Highway motor accidents are showing a startling increase all over the United States. Checking up a considerable number of these discloses that they resulted as noted.

Careful surveys made by the American Automobile Association and Government experts have revealed there is less danger in fast driving than in slow driving. The man driving fast must necessarily be alert, his mind strictly on the road and on the car, his eyes straight ahead. The loiterer is moving along carelessly, talking to those with him, glancing at the surrounding country, the sky, or anything in Nature that would attract the attention of his passenger.

Many of the states have removed the speed limit, or have raised it. The reason for this is not only to speed up traffic and avoid congestion, but to hasten the loitering motorist along the road. Not long ago a Chicago motorist was arrested in Gary, Indiana, and fined \$5 for slow driving. He was creeping along the highway, holding up traffic. Perhaps thirty days in jail would have been a better object lesson to this man and his ilk.

In these months of July and August all the main highways of Colorado are carrying their heaviest traffic. It is plainly the duty of every driver to forget his own selfishness, his own conceit and have consideration for others, and speed up. He should be self-conscious that he is holding back a string of cars, but of more importance, that he is a menace and that his slowness may any moment result in an accident and loss of life—and he should realize in his heart that he alone must be held responsible for the accident, although he may not be held accountable under the law for the injuries or the fatalities.

There is room, of course, for the man who would drive an automobile as our parents drove the horse. There are side roads, thousands of miles of them, where traffic is not heavy and where scenery is sufficiently attractive to please any sane person. There are the main highways, heavily traveled, but here he should have thought of others and step on the gas.

A Vacation Trip at Home

BY D. B. WALKER

Photographs by Walker Studios, Paonia, Colorado

DAD'S vacation came the last two weeks of June this year, and as there was not much time and Ma said we would have to go easy on expenses cause of the new Ford this summer we decided to stay at home, that is not to go out of Colorado.

Now, Bud at the office told Dad some wonderful stories about things over on the Western Slope and said the roads were pretty good, too. So Dad and Ma got out the map and we all planned the trip.

We left pretty early in the morning. The night before none of us slept much thinking about getting started. It was pretty nice driving up to Colorado Springs so early and breathing the nice fresh air and seeing things all fresh with dew. We did not stop there, but went right on to Canon City and into Salida only stopping long enough to eat. Say boy, but that drive between Canon City and Salida was sure great and such a fine road all the way. We drove on out of Salida and decided to park for the night. It seemed as though we had seen too much for the good of our eyes and sis said she had a cramp in her neck from stretching it out of the windows to see the mountains.

We put up our tent and gathered wood for a fire and I never knew before that fried potatoes and steak seasoned with a bit of ashes and sand and plain boiled, not percolated, coffee could taste so good. Ma had made cake and brought jams and all that stuff, but it seemed to taste of the city and well we just didn't seem to care for it.

Now it's funny how a fellow wants to roll in so early when he's out camping, and never needs anybody to call him in the morning.

We started over Monarch pass the next morning, and that place certainly was well named. There is fine wide gravel road that winds around the hills and you keep going up and up and still there are mountains all around a way higher than the one you are on. When we got up to the top of the pass we all got out and looked around. Sis found a register and we all put our names in it and then we each put a stone on a pile some one had started a long time ago. I guess everybody puts a stone on that pile from the looks of it. Then we got in the car and started down the mountain. It was a nice wide road, and Dad drove slow so we



Black Canon, showing narrow gauge railroad. The canon is 2,200 feet deep.

could all see the scenery; it was easier to see going down hill. After we got off of the pass it was not so pretty, but the hills on both sides the roads were just like a garden. I never knew there were so many wild flowers.

We drove through Gunnison and headed for Sapinero. Bud at the office had told Dad that he ought to see Black Canon, and it was at Sapinero. We had to chose between going over Blue Mesa to Montrose or going over Black Mesa to Delta. Black won, and we started toward Delta. This road was not so good and Dad said he wished we had gone over Blue. But if you didn't watch the road and just left it to Dad to drive, it wasn't so bad.

There were great spaces covered with grass and flowers and then big patches of trees, both quaking aspen and evergreens. Gee, it was pretty. Soon we discovered we were on top of a mountain and there was a great deep canon between us and the next mountain. I never saw anything half so wonderful as the distance. It just faded off into blue haze and looked almost like smoke. Dad said he could not see anything beautiful about going over a road like that. All at once we came up to a construction gang and they told us that they were making a new road and



Blue Mesa road showing half-way house in the distance.



Twin Lakes, near Leadville, as seen from U. S. Highway No. 4, one of the largest and most beautiful bodies of water in Colorado.

the old one was pretty well torn up. So Dad said we would camp near there and go back across Blue Mesa the next day.

It was early, so after the tent was put up and everything fixed for the night we went to the edge of the canon. It was too much for Ma she said. She could not stand up and look over: 2,200 feet straight down. In the bottom was a great crack and there was a stream. It didn't look like much, but I guess it's pretty big. We could sure hear it and even the railroad track down there looked like it belonged to a toy train. That one sight was worth the whole trip, and when they get that new road finished we are going over it into Paonia and over Kebler Pass. They are fixing that road too. Bud at the office says that's a pretty trip; I guess he knows.

Next day we went back to Sapinero. Dad did not seem to mind the drive back so much. From Sapinero we went over a big bridge. It's the highest and widest in Colorado. We could look down in the canon and see the Gunnison River and where the old road used to go. Dad sure would have balked at driving that I'll bet. We could see where the old bridge had been, and the two railroad bridges. That made four bridges all at that one place. I guess the one we went over will last a while—it is a fine one.



The four bridges near Sapinero. The Sapinero Arch is the highest and widest bridge in Colorado.

The road over Blue Mesa was pretty good, but was mild after seeing Black Canon. We went into Montrose and camped in the prettiest municipal camp grounds we saw on all our trip.

Next day we drove to Ouray and over the Million-Dollar highway. That road really cost a million dollars, but I don't wonder, for most of it is cut out of solid rock. And you go through a tunnel and everything. There is a whole mountain up there that is all bright red. They call it Ironton. I guess it's iron that makes it red.

I could not begin to tell all we saw that day. There was Box Canon where you go in a big place that the water has cut out. You couldn't understand about it unless you saw it yourself, that was wonderful. There were a lot of gold fish and some alligators near a swimming pool. I'd like to live at Ouray all summer. We saw where there had been a snow slide and they had to blast the snow out of the road. The snow was still higher than the car on both sides of the road.

We drove back to Montrose that night and into Delta next morning. From there we went to Grand Mesa. That's the biggest flat topped mountain in the world



Monarch Pass, one of the spectacular motor highway crossings of the Rockies in Colorado. The photograph is of the western side and with a surpassing view of the surrounding mountains.

and it's just covered with lakes. There are lots of trout there too. That's what Bud at the office told Dad.

It's very pretty up there and up on that Sky Line Drive along the rim of the Mesa you can look off over the country for miles and miles. Dad said he could see the Pacific Ocean, but I couldn't see it. Guess my eyes were about all looked out.

We stayed up on Grand Mesa for two days and then went to Grand Junction. That's the place where they have the fruit, peaches and everything. We sure hit good roads then and it didn't take us long to get to Glenwood Springs. They have a big swimming pool there, about a block long and it has hot water and cold water in it—they both come out of springs there. That hot water is hot, too.

Next day we left Glenwood and drove down a pretty canon and on over the mountains until we got to Minturn. Minturn is where all the people went last year to take the pilgrimage to the Mount of the Holy Cross. You can't see the cross from there, but they say it can be seen through a notch in a mountain.

There is a big mountain called Battle Mountain where they say the Indians used to fight. This mountain has three roads, the top one is an old trail and the next one is the road they used to use, but the new one sure is a peach. We went from there over Tennessee Pass. That's not so pretty but Dad said it was easy driving.

Leadville was the next town and we nearly froze there. It's high there. We went on and camped at Twin Lakes. There is a big sandy beach there and it's nice.

The next day we drove to Buena Vista and home. I'll tell you it was sure a swell trip. And we never even had a flat tire. When it comes to pickin' a vacation trip Bud at the office sure knows his onions.



When mountain sheep are tame. A bunch of the sheep at Ouray, where they come in the winter to be fed by the people of that city. They come down early in the fall, driven out by snow, and remain in and around Ouray until the snow has gone, when they return to their lofty and almost inaccessible homes in the mountains.

THE Chief Ouray (Million Dollar) Highway, leading south from Ouray over Red Mountain Pass, to Durango and the Mesa Verde National Park, is the most scenic highway in Colorado. The point of general interest is that this million dollar road traverses a mountainous section, so rough and rugged and colorful, yet the tourist can glide along and around the hairpin turns at an easy grade of seven per cent—on a boulevard eighteen feet wide and smooth as a ribbon. It is a delight to tourists not only because of its excellent construction, but also for the magnificent scenery along the way.



The skyline drive on Grand Mesa, showing the serpentine course of the highway and glimpses of some of the several hundred lakes. The mesa is the fisherman's paradise, with some of the finest lake fishing in the West.

Passing through the tunnel and rounding a curve, four miles from Ouray, it brings the traveler in full view of Bear Creek Falls. These falls are spanned by a modern concrete bridge, about two hundred feet long, a marvel of engineering construction, as it was necessary to build it at an angle across the chasm, which is several hundred feet deep. Standing on the bridge, one has a wonderful view of a great mass of water plunging over a semi-circular apron of granite and falling two hundred and fifty-three feet into the gorge below. It is a magnificent spectacle—the water dropping away at one's very feet. The mist, rising from below the falls, catches the sunlight and forms a perfect rainbow, with all its colors, an iridescent, unforgettable picture of beauty that defies description.

Leaving Bear Creek, the road winds upward along the precipitous side of the mountain. This section of the road from all highway reports, has proved to be one of the most difficult pieces of engineering and construction work in the United States. Passing along, the road winds around the foot of old Mount Abram. It crosses many beautiful streams, whose waters tumble down into the canons, and then after making several hairpin turns, finally leads out of the canon where one may have a panoramic view of Ironton Park. Then one sees Red Mountain. No matter how wonderful the natural colorings a traveler has seen before, he will gaze at the vermilion mass of Red Mountain as something unreal when he sees it the first time.

No tourist who follows this North-South Highway from Ouray to Silverton is likely ever to forget it. He will remember it not only as a wonderful piece of engineering and highway construction, but also as one of America's most beautiful scenic roads.



At left, final smoothing operation on oiled highway near Nunn; and at right, the road as it appears under traffic.

State Completes 20-Mile Nunn Oil Project

TWENTY miles of oil type surfacing have been completed by the Colorado Highway Department between Nunn and the state line on the Greeley-Cheyenne, Wyoming, highway. It is now open to summer traffic and most satisfactory reports have been received from motorists using the new road.

The equipment used in the oil processing on the Nunn project has been moved to Ingleside, on the Fort Collins-Tie Siding, Wyoming, highway, where preparations are under way for the oil processing of sixteen miles of road which has already been graded and gravel surfaced.

With the completion of the Nunn project, there remains twenty miles of unsurfaced highway between Denver and the Wyoming state line. Work has been started by the Wyoming Highway Department to oil surface eight miles of this road between the Colorado line and the city limits of Cheyenne. This work is promised completed within 90 days. Both of these projects are processed by the "turn-over" method.

While exact figures are not yet available, the engineers estimate that the cost of the oil surfacing on the Nunn project will total about \$1,600 per mile. The gravel surfacing necessary to the laying of the oil surfacing was done under contract, while the oil process-

ing was done by "day labor" under the supervision of A. B. Collins, division engineer of the highway department.

A like procedure is being followed on the surfacing project northwest of Fort Collins. The gravel surfacing on this project was completed last year. Operations will be handled from Ingleside. It is expected that the work will be completed within sixty days, weather conditions permitting.

Much favorable comment has come to the highway department from motorists and citizens of the Nunn section on the splendid surface resulting from the use of oil between Nunn and the state line. The gravel work on the project was done by the Luke Smith Const. Co., who have a contract with the Wyoming department for furnishing the gravel for the Cheyenne project. They expect to finish the work by August 1. There will be 28,000 tons of crushed rock used in the latter project. The crushing plant will be located 5 miles south of Cheyenne. Work is to be done day and night with two 10-hour shifts on both crushing and hauling.

Altogether the highway department will oil process by the "turn-over" method about fifty miles of highway in various parts of the state this summer. One of



At left, showing tractor grader outfit turning oiled gravel; and at the right, rock crushing outfit preparing material for roadbed.

these projects is located between Alamosa and Monte Vista, while another is located near Deertrail on the Denver-Limon highway. Research by the department has shown the new oil processed road to be very satisfactory on roads where the traffic is light.

Investigation into the economics of the oil type surfaced highways by the New Mexico Highway Department has brought to light some interesting facts, advices from New Mexico assert. The oiled roads in Colorado are of the same type as those in New Mexico. It was found that the motorist on New Mexico roads pays between one-quarter and one-third of a cent per mile of car operation in taxes. In tires alone it has been found, however, that depreciation is from 20% to 30% less on oil type roads than on gravel roads. General car operation is reduced from one to three cents per mile by the higher type roads.

The oil type road does not cut tires as the gravel road does and separation is less on the former type of road. A general decrease in tire depreciation and an increase in mileage is noted on the oil type roads.

Weld county commissioners are now considering a plan whereby all state roads in that county will be oil processed.

"The commissioners are enthusiastic over the prospects of getting every mile of state highway in Weld County macadamized within the next two to four years," said Commissioner W. A. Carlson.

"We have figured that every mile of state highway in the county can be macadamized at a cost slightly less than what will be spent in the concrete paving between Greeley and Fort Morgan on the Federal Aid highway.

"Nobody could ask for a nicer riding surface than the new Nunn-state line oil processed job and the work done a year ago shows no signs of wear. It looks as though macadam was to be the solution of our ordinary road problems."

Where the traffic is light through the rural districts the oil processed job is thought to answer, but it has been found that where traffic is heavy, as between Denver and Greeley, and between Denver and Pueblo, only the heaviest type of concrete pavement will answer the purpose. The highway department engineers also have calculated that concrete will be the most economical pavement between Greeley and Fort Morgan.

The highway that is being improved between Agate and Deertrail is going to be oiled before traffic starts over the project, according to present plans. The detour will be used until this work is completed. Engineers are now running a survey for the improvement of the road east of Fitzsimons hospital. An appropriation of \$50,000 has been made for this project. If there are sufficient funds left after the stretch of road across the bottoms over Sand Creek has been brought to grade, this stretch also will be oil processed, thus extending the hard surfacing east of Denver approximately two and one-half miles.

A decided change will be made in the width as well as the surfacing of the highway between Monte Vista and Alamosa. Arrangements are being made to secure an additional ten feet for a right of way on the easterly side of the present highway for an extended distance. The surveys have been completed for this improvement. Work is expected to start within thirty days and will



A glimpse of the finished oiled road between Nunn and the Wyoming state line, State Highway No. 3. Motorists are loud in their praise of this new type of surfacing.—Photographs by Roy J. Randall.

require about 90 days to complete. The road will be oil processed. The estimated cost of this project is \$50,000.

The department also will construct an extension of the oil processed project north of Antonito at an estimated cost of \$40,000. Plans for this work are now in process of preparation.

GOVERNOR ADAMS APPOINTS TWO NEW ADVISORY BOARD MEMBERS

Jefferson Hayes Davis, of Colorado Springs, and a grandson of President Jefferson Davis of the Confederate States during the Civil War, has been appointed by Governor Adams to a six-year term on the state highway advisory board. He succeeds M. A. Ege, also of Colorado Springs, and will represent highway district No. 5, which comprises all of the counties east of the Continental Divide and south of Denver to and including El Paso County.

Davis has been prominent in Democratic circles in El Paso County for many years. He is cashier of the First National Bank of Colorado Springs, and has been active in automobile club and highway work in his district.

Governor Adams has appointed L. C. Moore of Fort Collins as member of the board to succeed William G. Duvall, Golden, representing district No. 6.

Conejos County is stepping to the front with splendid highways. Approximately \$150,000 will be spent in the county this year. The construction work includes a stretch of eight miles from Romeo to La Jara and a stretch north of Antonito, eliminating two dangerous railroad crossings. Six miles of oil and gravel surfacing west of Alamosa also is included in the state highway department plans.

The Mountain States Construction Company completed late in May the distribution of crushed rock on the main state highway from Pueblo to within two miles of Fowler. The job was begun February 16 and completed 60 days ahead of the date set by the state highway department. More than 16,000 tons of rock were placed on the road.

Vehicle Fees Show Largest Revenue

"GAS taxes build the highways" is the familiar cry one hears, but government reports indicate that this is not true, as is widely known among those who have the construction of highways in charge.

The report of the United States Department of Agriculture reveals that for the years 1923, 1924 and 1925 motor vehicle fees were first in the providing of highway funds; state bond revenues second; Federal Aid funds third; transferred funds from counties fourth, and gasoline taxes fifth.

The Government report says:

"The latest available figures of 1927 show that 12 per cent of the total state road income, \$739,765,258, or \$90,979,230, was derived from the sale of highway road and bridge bonds and from notes; 35 per cent, or \$259,854,786, was derived from motor vehicle fees, and slightly less than 23 per cent, or \$169,818,473, was derived from gasoline taxation. Federal Aid amounting to \$80,459,671 formed 10 per cent of the total.

"Of the total county and township road income for 1927 of \$840,613,923, about 21½ per cent, or \$181,080,953, was derived from the sale of bonds, which is more than double the sum received by these subdivisions from motor vehicle fees and gas taxation, amounting respectively to \$40,239,856 and \$48,860,508. Bond revenues ranked second in the counties' total income, exceeded only by the \$405,219,774 local road tax levy. Bond revenues have ranked second in the counties' annual income for several years.

"According to latest available figures, 31 states have an outstanding state road and bridge bond indebtedness of \$860,000,000. The county and township bonded indebtedness for roads in 45 states is \$386,338,600."

Bond issues by the states have been found the most acceptable method for raising the money for highways. In 25 states the interest and retirement of the bonds has been paid wholly or in part by motor vehicle fees or from gasoline tax, or both. The first issue of state road bonds was made in 1894 by Massachusetts, and

not until 1906 was this plan followed, when bonds were issued by Rhode Island and New York. In 1908 Maryland swung into line, followed in 1909 by California and New Hampshire; 1911 by Utah and Idaho; 1912, New Mexico; 1913, Maine; 1918, Louisiana; 1919 Illinois, Michigan, Nevada, Pennsylvania, South Dakota and Wyoming; and in 1920 by Colorado, Missouri, New Jersey and West Virginia.

Since 1920 other states have issued bonds, and in the elections last November Iowa voted an issue of \$100,000,000, while Missouri, West Virginia and Louisiana voted a total of \$155,000,000.

Colorado, last November, had a proposition for highway construction that would have continued over a period of many years, but it was lost at the polls.

Some of the states, notably Nebraska and Wisconsin, have laws prohibiting state bond issues. In these states motor vehicle fees, gasoline taxes, county and special taxes make up the funds for carrying on highway construction.

Colorado was not alone among the states in raising the gasoline tax in 1929. Either by act of the legislature or vote of the people a total of 18 states boosted the rate. Two states which did not have a tax now have it, New York starting with two cents and Illinois with three cents.

South Carolina is the first state to pass the five-cents mark, its tax now being six cents. Ten states have five cents and eighteen, including Colorado, collect four cents. Utah splits the penny, its rate being three and one-half cents; eleven states have three cents and only seven still have the two cents.

Among the neighbors of Colorado, South Dakota and Nebraska collect four cents and Montana five cents.

Reports received by COLORADO HIGHWAYS indicate that the tax is satisfactory in the various states, with virtually no complaint from motorists. The tax is added to the price of gasoline, yet the price of gasoline is lower in all the states today than in 1920, and of a far better quality.



Idaho Springs citizens gathered at Jackson Monument, on occasion of planting the first highway marker to sign-index Colorado's historic and scenic spots. The monument marks the first discovery of gold in Colorado mountains, 1859, by George A. Jackson.



A section of the Echo Lake-Idaho Springs highway, showing the smooth and wide gravelled surface, with the lake at the left.

Contract Awarded for Mt. Evans Project

THE most spectacular scenic highway in the United States, if not in the world, will be opened to motor parties in the completion of the Mount Evans road. A contract for this road was let by the State Highway Department in July to W. W. Giggey & Co., of Boulder, and calls for 100 working days to finish the project of 1.9 miles.

This will carry the present highway to the summit of Mount Evans, elevation 14,260 feet above the level of the sea. From it is a sweeping view of the Rockies, and the scene is spread out beneath—you will be looking down upon the greatest assembly of mountain tops, valleys and forests to be found anywhere on the continent, and in a region of perpetual snow.

Tied in with this marvelous highway is one scenic road, now open, and another projected by the State Highway Department and the United States Forest Service that will afford the choice of two scenic circle trips out of Denver that have no counterpart in all America.

The completed road is from Echo Lake to Idaho Springs. The projected road will be from Echo Lake around the base of Mount Evans and into Grant to connect there with the present state highway that is commonly known as the old Leadville road, the Platte River road or the Turkey Creek road. Each of these three designations carries an identification of the highway.

The Idaho Springs highway via Chicago Creek has been declared one of the most attractive motor highways in the United States. Today it is one of the favorite all-day tours in Colorado, and has been called by travelers one of the most interesting mountain trips in the United States.

This project is a part of Forest Highway Route No. 54, which extends from Idaho Springs via the Chicago Lakes to Echo Lake, connecting with the Mount Evans highway, and will form part of the proposed circle tour that will be a continuation of the Warren G. Harding highway from Mount Evans down Geneva Creek to Grant on the Platte River highway. It really is a link

or an extension of the circle trip in the Denver Mountain Parks area.

The Idaho Springs highway forms a figure 8 trip from Denver to Idaho Springs and return, a log of which follows:

Denver—West over the Golden pavement through Mount Vernon canon and Genesee Park to Bergen Park, this being Federal Aid Highway Route No. 2. Distance, 25 miles. Same route except over Lookout Mountain instead of through Mount Vernon canon. Distance 28 miles.

Bergen Park—West over the Mount Evans road via Squaw Pass to Echo Lake. Distance, 20 miles.

Echo Lake—Northerly over the new scenic highway via the canon of Chicago Creek to Idaho Springs. Distance, 13½ miles.

Idaho Springs—Returning to Bergen Park via Clear Creek canon and Floyd Hill to Bergen Park. Distance, 12 miles.

Bergen Park—East through Bear Creek canon and to Morrison. Distance, 16 miles.

Morrison—East over the paved highway to Denver, 16 miles.

Total of round trip, 102 or 105 miles.

The highway is primarily a scenic and tourist route, abounding in choice camping sites, and sites for summer cottages, and affording some really wonderful views of the range of mountains along the Continental Divide. It opens virtually a new territory for the motorist. While the Echo Lake motor season is approximately from June 10 to November 1, being controlled entirely by the elements, yet the Idaho Springs road, it is believed, can be kept open for a much longer period.

There are few persons following the Warren G. Harding highway, as the road is officially designated beyond Bergen Park, who realize one fact. It is that from a few miles beyond Bergen Park the motorist is looking DOWN upon the scenery, except as his eyes roam over the towering peaks and mountains of the Continental Divide.

Scenically, the Echo Lake-Idaho Springs road is unusual and is practically all within the Pike National Forest. It was approved by the Secretary of the Interior April 27, 1924, and the location survey was made in August and September of that year by S. A. Wallace, as chief of the party. There are five switchbacks on the flats and lowlands of the Chicago creeks, all located within a distance of 4,000 feet.

The construction called for some of the most difficult work that is noted in mountain roads in Colorado. The U. S. Bureau of Roads, for example, cites one section where the contractor used 12,200 pounds of dynamite in the removal of 49,405 yards of unclassified excavation during the 1926 and 1927 seasons. There was a total of 13,600 cubic yards of material classed as rock, practically all of which was boulders. Along the creeks are cement rubble masonry abutments and wing walls, and the stream beds have mortar-filled stone paving for the entire length of each structure. The system of drains for the highway entailed engineering skill, but a dry road is the result.



One of the many special culvert intakes constructed of rock and concrete on the Chicago Creek highway.

The last section of this road touching the city limits of Idaho Springs was completed in June of this year. Maintenance of the road is under supervision of the U. S. Bureau of Public Roads.

Contractors encountered, also, wet excavations, heavy downfalls of timber, ground covered with a layer of black muck which was thickly matted with old logs, brush, boulders and roots, which when opened disclosed numerous underground flows and springs. They also had frequent rains to contend with. These are but examples of the difficulties the contractors met in constructing this scenic highway and to make it standard with other highways within the parks area.

One must, of necessity, for lack of powers of description, pass over the scenic grandeur of this trip from Echo Lake to Idaho Springs. Truly it is one that must be seen—and then let the person attempt to describe it to a friend!

The proposed road from the base of Mount Evans at Echo Lake into Grant will be a continuation of the Warren G. Harding highway. From the spectacular and scenic points of view this promises to be one that will be marked as the most spectacular in the United States. For a portion of the distance it will follow an old wagon road. It swings around the base of Rosalie Peak and will open vistas of a country that very few



Looking down grade, Chicago Creek, on the way into Idaho Springs.

persons ever have seen, because of the present inaccessibility of that part of Colorado. The hiker alone can reach that country—and very few ever attempt it.

From Grant, as many motorists already know, the road into Denver via Baileys, Shaffers Crossing, Conifer and Turkey Creek is one of the most charming in the Mountain Parks area.

Reverting back to Mount Evans, the contract let in July to carry the highway to the summit of the peak is one of the most important that the State Highway Department has let. This will take the motorist to the very top of this great mountain. To those unfamiliar with the identities of peaks from Denver, Mount Evans is the one to the south with the dish face, and snow upon it can be seen the year around.



Steam shovel digging out the side of a mountain for the new highway.—Photographs furnished by U. S. Bureau of Public Roads.

From the top of Mount Evans a panorama unsurpassed in the United States is opened. Torreys and Grays peaks, landmarks of the Continental Divide, are near by; Pikes is seen in the south and in the north James Peak, the Arapahoes, Audubon and others parade before the eye to Longs Peak and on into the Medicine Bow range into Wyoming.

(Continued on page 20)

MOTORIST PAYMENTS FOR ROADS

LISTENING in on debates and conversations, the impression is gained that the motorist is really the only person who keeps up the roads in the United States. In answer to these declarations and to correct a wrong impression, statistics have been assembled from the entire country disclosing that the motorist pays only one-sixth of travel money for roads. The statistics show that motorists are paying only about one and one-half cents a mile of travel for road and street improvement.

During 1928 the motor car registration was roughly 24,000,000. These cars averaged in the neighborhood of 5,000 miles of travel. A conservative estimate of operating expenses places the 1928 automobile travel costs, which include gasoline, oil, depreciation, taxes, upkeep and so on, at 12 billion dollars.

Of this sum only two billions, or one-sixth, was expended for all road and street improvements.

Industrial economists and highway authorities point out that with both pleasure and commercial traffic increasing by leaps and bounds, the annual highway expenditure must be increased. Conservative figures show that the United States, with 78 per cent of the world's automobiles, spends altogether for new cars, repairs, fuel, truck drivers' and chauffeurs' salaries, insurance and other items, no less than 14 billion dollars yearly.

Consider with this overwhelming figure the investment to date in dealers' establishments and storage and servicing garages, gasoline filling stations, and the money invested in cars purchased prior to 1928, all of a total of about 25 billions.

Manufacturing motor cars has for some years been the nation's chief industry. In 1928 more than 4,000,000 people were engaged in one way or another in producing materials and in manufacturing 4,600,000 passenger cars, trucks and busses, worth in excess of three and one-half billion dollars.

And this tremendous motor industry, which is responsible in large measure for current prosperity, is dependent upon the highway. Investing in highway improvements is not only investing in comfort, convenience and economy for the car user, but it is also an insurance against the return of those poverty-stricken days when shirts with 20 removable bosoms were a godsend.

Larimer County gets \$85,000 of state funds for grading and surfacing Federal Aid Road No. 123 south of Virginia Dale. This is the main road out of Fort Collins for Laramie and the Lincoln highway in Wyoming. The Wyoming highway commission is completely rebuilding the Wyoming section of the Greeley-Cheyenne road. Wyoming also is planning a new road from Rawlins into northwest Colorado—items to show the interest of Wyoming in Colorado roads.

Colorado newspapers are enthusiastically approving the movement for marking historical spots, special scenery and the like in the state. This work is now going on, the state highway department placing the signs for the purchasers.



Frank H. Blair, Prominent Colorado Roadbuilder

FRANK H. BLAIR, member of the advisory board of the Colorado State Highway Department, is an example of success in many activities. He was born in South Dakota in 1870, graduated from the University of that state in 1891 and then proceeded to Sterling, where he became principal of the high school. He arose to superintendent of the Sterling schools, resigning in 1897 to become a rancher and cattle raiser.

Mr. Blair has not lost interest in Sterling schools and is president of the school board of that city. As a surprise for him and in recognition of his work for education the new auditorium-gymnasium in Sterling has been named Blair Hall.

With this brief of his life one would not expect that he would find time to look after state highways, but he has. He was appointed a member of the advisory board by Governor Shoup in 1922 and reappointed by Governor Morley and Governor Adams. The Seventh District, which he supervises, is one of the largest and most important in the state. It comprises the counties of Adams, Arapahoe, Logan, Morgan, Phillips, Sedgwick, Washington, Weld and Yuma. The district shows 128 miles of paved road, 1,097 surfaced and 278 graded and drained roads. These roads take care of possibly the heaviest traffic of any of the seven highway districts.

Mr. Blair has concentrated his efforts on the main highways in his district to accommodate the heaviest traffic. That he has succeeded in this work is shown by the improved highways now existing, and construction in the current year will add many more miles to the system.

Mr. Blair was married in 1896 and has two sons. Lieut. William P. Blair, a graduate of West Point, is with the U. S. Field Artillery in the Philippines, and Harrison D. Blair, a University of Colorado graduate and a graduate of the Harvard School of Business Administration, is with the Chemical National Bank in New York.

Cole Brothers, of Pueblo, were the successful bidders for four and one-half miles of new road on Blue Mesa, the work being west of Sapinero from Pine Grade around Windy Point. The bid was \$123,700.



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NEWS OF THE MONTH

Northwestern Colorado, familiarly known as the "Moffat Country," is well remembered in the state highway appropriations for 1929. The money is sufficient to give that part of Colorado some very important road construction and improvements. Moffat County gets \$150,000 for Federal Aid work, with \$60,000 left over from 1928. Of this amount \$125,000 is for twelve miles of gravel surfacing at the end of the gravel west of Craig; there is also \$75,000 for six miles of gravel south of Craig. Routt County gets \$150,000 for the Bear River-Mt. Harris project, which will very materially improve the canon road along the cliffs, and the county also has \$12,000 for improving the Oak Creek-Sidney road. Grand County obtains \$80,000 for continuing the gravel paving toward Rabbit Ears pass and \$60,000 for the Granby-Tabernash project. There is \$45,000 for the Meeker-Rifle highway.

The United States Forest Service will spend approximately \$288,000 on road and trail work in the forests of Colorado this year. Included in the work will be the graveling of the four-mile stretch of the Leadville highway; a two-mile stretch of the Dolores-Rico road and four miles of the Granby-Walden road from Middle Park to North Park.

The new Portland-Florence road that was under construction for several months was opened for travel June 1 and is said to be in fine condition. Guard rails and other safety necessities are being added.

The Salida Mail is urging that Solidans get busy this summer and build a road over Ute trail into South Park that will open Salida to the farmers, cattlemen and sheepmen of South Park. The Mail also is urging that a cut-off road between Salida and Bonanza be built. This latter highway has been talked of for years and the proposed road would shorten the distance from 45 miles to 21 miles.

S. A. Wallace, location engineer of the U. S. Bureau of Public Roads, is reported to have finished a survey of the Montrose-Nucla road from Ute Point between Ute and Nucla, where the present road crosses Dry Creek. The new location is said to have easy grades compared to 15 per cent grades found in the present road.

U. S. Bureau of Public Roads engineers have accepted the seven and one-half miles of new highway of the South St. Vrain road in Larimer County. This brings the new road to within six miles of Estes Park Village.

The Pine Gulch and Golden-Coal Creek roads in Jefferson County will be improved this year at an ex-

penditure of \$38,500 of the state highway funds. Of this amount \$10,000 will be for surfacing from Golden to Coal Creek, and it is believed in Golden that eventually this road will be extended to beyond Boulder. The survey for this extension is scheduled for this summer.

Fremont County obtained \$75,000 for the highway paving between Canon City and Florence in the state highway budget, and \$5,000 for improvements of the Phantom canon road.

The Monte Vista Tribune says: "Industry is attracted to localities which can offer a high class extensive road system. Agriculture is encouraged and farm values increase. Their importance in connecting distant communities cannot be estimated."

County commissioners have approved the Timberlake cut-off road from Great Divide to the Fortification highway which connects with the main Craig-Baggs road.

Agreement reached by the commissioners of Saguache, Rio Grande and Alamosa counties has resulted in work to complete the road running east from the Hooper-Mosca highway toward Mosca pass. The work was started last fall. The state highway department will contribute \$28,000 for the job.

Grand county commissioners have promised residents of Grand Lake that roads leading to the famous resort will be improved at once. Graveling of the Granby-Grand Lake road is one of the improvements.

The Cortez Herald asserts that the map of the proposed Coast-to-Coast highway known as the Midland Boulevard, to start at Newport News, Va., and end in Los Angeles is all wrong. The Herald says the map shows that the road turns south at Durango via Aztec and Farmington to Shiprock, "missing Mesa Verde entirely, while as a matter of fact it goes direct from Durango to Mancos (Mesa Verde) to Cortez, through McElmo Canon to Bluff, Utah, Mexican Hat and on to Lee's Ferry."

Eight miles of a detour road have been built near Yuma to permit the paving of six miles of the Greeley road. The detour was not only graded, but was gravelled for the accommodation of the heavy traffic on the Greeley road.

Reconstruction of all state highway curves in New Mexico has been ordered, to make them safe at 35 miles an hour. It is maintained that curves designed for slower speeds are traffic hindrances, slowing up traffic and causing congestion.

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Highway News of the United States

The people of Utah and Arizona are urging a fund of \$2,000,000 for the construction of a standard highway to the new bridge at Lee's Ferry over the Grand Canon of the Colorado River. Reports are that in all probability the funds will be made available by the two states.

The New Mexico highway commission has instructed the state highway engineer to request the United States Bureau of Roads to place the road from Carlsbad to the Carlsbad caverns on the Federal highway system. It is stressed that the caverns are attracting heavy travel and a Federal Aid road is necessary.

In 1928 a total of 390 grade crossings were eliminated from the Federal highway system in the United States. Of this number 107 were grade separations and 283 by relocation of the highway. From 1917 to the end of 1928 a total of 4,291 grade crossings had been eliminated, of which 947 were separations and 3,344 by relocation.

The Bureau of Public Roads statistics disclose that in 1928 there was a total of 10,178,344,771 gallons of gasoline taxed in the United States to the amount of \$305,233,842. Of the tax receipts it is stated that \$211,046,591 was for state highways and \$57,380,901 for local roads.

Of the 449 accidental deaths in Arizona last year, 110 are attributable to motor vehicles, according to the reports of the National Safety Council of Chicago. The council also states there were 27,000 accidents caused by motor vehicles in the United States, more than 1,000,000 persons injured and a total economic loss of \$900,000,000.

The "vacuum cleaner" of the Arizona highway commission picked up 1,150 pounds of nails and fragments of steel in one mile on the Phoenix-Yuma highway. The cleaner is attached to an ordinary truck.

"Poor roads," says Thomas H. MacDonald, chief of the United States Bureau of Public Roads, "cost more than do adequately serviceable roads. Roads built with honest administration and skilled technique have an earning capacity far beyond their cost. So the serviceable public highway has every right to be listed as an asset and not as an expense. It has already been well demonstrated that the highway can earn its upkeep, plus a very high profit on the investment."

Louisiana promises to be in the front rank of states with high class roads. In November, last, the state voted a bond issue of \$30,000,000 and the legislature raised the gasoline tax from two to four cents a gallon. Plans call for the completion of 800 miles of concrete pavement this year. The contracts probably will be let in stretches of 20 and 15 miles. Four main highways will be the first paved.

Recent statistics disclose the importance of motor trucking in the United States. In 1928 it is reported that more than 12,000,000 head of cattle, calves, hogs and sheep were shipped by truck into the seventeen leading American markets, an increase of 46 per cent over 1927. Much of this stock was trucked 200 miles and some of the shipments were 300 miles. Good roads made this possible, it is explained.

Charles M. Upham, director of the American Road Builders Association, says manufacturing good roads differs little from any private manufacturing enterprise, and adds: "It has been proven that huge sums spent for highways, under business management and without waste, has brought very satisfactory returns on the investment in decreased transportation charges and generally increased prosperity."

The end of 1928 saw 3,000,000 miles of rural highway in the United States, of which 600,000 miles were improved to some extent, though less than half of the mileage was paved. Of the 300,000 miles in state systems, 150,000 miles were improved.

The California highway commission plans striping all pavements. One stripe will be in the center and then a stripe will be marked along the edges of the pavement. The latter, it is said, will be of especial benefit to motor vehicle drivers on foggy nights, for it will plainly show the edge of the pavement.

The Nebraska highway department is obtaining a right of way for a new route for the Lincoln highway west of Grand Island. It will save approximately eight miles between Grand Island and Gibbon, and will be of standard construction. The governor signed the four-cent gas tax bill and that gives one cent to the counties and three cents to the state, assuring a large increase in funds for the department.

The new gasoline tax in Wyoming became effective April 1. The increase is from three to four cents, of which three-fourths goes to the state and one-fourth to the counties. Wyoming is planning still further improvements in its roads. Among these is the reconstruction of the highway out of Cheyenne to connect with the highway into Greeley.

Connecticut editors in their annual editorial convention passed up the extended discussion on newspapers to take up the subject of roads. Resolutions were adopted urging the state legislature to make liberal appropriations for all-weather highways throughout the state.

State bond issues are prohibited in Wisconsin, but 47 of the 71 counties in the state have issued road bonds totaling \$58,500,000. Nebraska also prohibits state bond issues for roads.



Denver and Golden are connected by a concrete paved highway—one of several radiating from Denver which have served Colorado citizens and their visitors for many years.

For Safe Highways

Concrete

Safety on the streets and highways depends upon many things—and, most of all, upon the driver's skill and judgment. But reasonable traffic speed—with safety—depends mostly upon the roadway itself—the pavement, its width, and the details of design and arrangement.

Portland Cement Concrete fits into every requirement for good design, for reasonable traffic speed, and for safety.

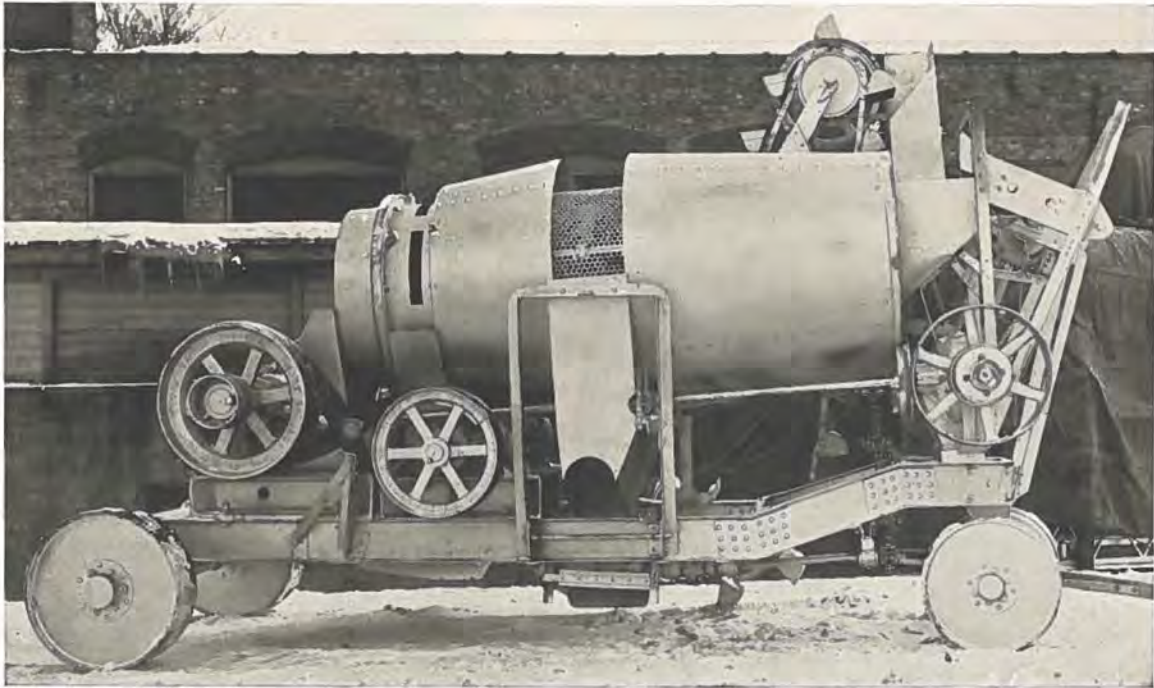
It is significant that nearly every important highway built in recent years—from the Atlantic to the Pacific—has been paved with concrete.

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THERE is but one "*REALLY PORTABLE*" crushing, screening and sizing plant built that will convey material from pit or quarry to screen—crush the oversize to desired size and deliver finished material to loading bin. Then "when moving time comes" the entire outfit can be taken down and transported six miles and assembled in two days' time. Ready to give the same satisfaction and capacity all "CEDAR RAPIDS" plants are known to give in this western country, where the crushing is usually hard.

It will pay you to investigate the entire line of "CEDAR RAPIDS" equipment—including the new "CEDAR RAPIDS" Hoists—a type and size for every job and at a price that represents real savings over the more obsolete manner of handling material. We'll test your pits or quarries and help you design, if necessary, the proper size and type for your particular job at hand.

H. W. Moore Equipment Co.

Crusher Headquarters

120 WEST 6TH AVE., DENVER

PHONE TABOR 1361

New Highway Equipment and Materials

"CATERPILLAR" PRODUCES NEW TEN AND FIFTEEN MOTOR PATROLS

The fruits of the "Caterpillar"-Russell merger are fast becoming apparent with the appearance of a power take-off elevating grader, improvements in the regular blade graders, and now the new Ten and Fifteen Motor Patrols. Building road equipment to fit definite power plants, made possible by the merger, is resulting in improved and simplified machines to fit every job, according to officials of the new corporation.

The new motor patrols are simpler in construction. Many wearing parts have been eliminated. The blade lift is more powerful. The entire mechanism is easily controlled from the driver's seat by means of four easy turning wheels. Many older models had as many as fifteen controls. Descriptive literature on the new patrol models will be furnished by addressing the Clinton & Held Company, Denver distributors.

PIONEER CRUSHER CONCERN PUTS OUT NEW 80-PAGE CATALOGUE

A new gravel equipment catalogue has been issued by the Pioneer Gravel Equipment Co. of Minneapolis, Minn. This illustrates and describes a complete line of crushing and screening plants, loading plants, storage bins, shakers, conveyors, etc. There are eleven different sizes of crushing, screening and loading plants. The Pioneer is a corporation which took over the gravel machinery end of the Russell Grader Company, when that company was recently consolidated with the Caterpillar Tractor Company. Elton T. Fair Company, Denver distributors, will be glad to furnish anyone interested with a copy of the Pioneer catalog.

FROM PROFESSIONAL TO BUSINESS STAGE

A cabaret in Paris and the offices of the Barber-Greene Company in Aurora, Ill., seem a long way apart, but in the case of Mr. Jack Turner it was just the next step. He closed a summer engagement in Paris in 1925, and September of the same year found him at work with Barber-Greene.

He worked in various departments of the shop, familiarizing himself with the details of the business, until January, 1927, when he became identified with the advertising department. He is now publicity manager. A stepper is a stepper on whatever stage he finds himself.

CRUSHERS

The Iowa Manufacturing Company of Cedar Rapids, Iowa, issue a complete catalogue treating of crushers and crushing equipment for handling rock, sand and gravel. Their one-piece outfit in one operation crushes, screens and loads. Write to Mr. John H. Jay, Iowa Manufacturing Company, at Cedar Rapids for a copy of this catalogue if interested in this type of equipment.

SHOVELS

Koehring Company, Milwaukee, Wisconsin, will be pleased to send you a copy of their Shovel Bulletin, which gives full description and illustrations of the Koehring all-service shovel. Bulletin gives sizes, capacities and specifications. Shovel quickly convertible to pull shovel, crane or dragline.

ROLLERS, GRADERS, SCRAPERS, ETC.

A broadside of mammoth proportions has been received from the Galion Iron Works & Mfg. Co., Galion, Ohio. This folder is equal to 32 pages, 7 x 10, so when spread out it presents full illustrations and descriptions of the Galion products. A page opened up to 28 x 42 contains 25 views of E-Z Lift skew axle leaning wheel graders, Premier graders, patrol graders, etc. A page half this size is devoted to rollers, Galion rollers, built with the modern equipment of the Galion shops. Another page illustrates Galion contractor's and special equipment, such as spreaders, plows, conveyors, scrapers, sprinkling wagon, and galvanized, corrugated and cast iron culvert pipe. Special bulletins may be secured on all products.

NEW AND IMPROVED STROUD ELEVATING GRADER IS ANNOUNCED

A new and improved Stroud "Heavy Duty" Elevating Grader using a 42-inch belt has just been placed on the market, according to J. D. Adams Company of Indianapolis, Ind., who are exclusive sales agents in the United States and Canada for Stroud Elevating Graders and Little Red Dump Wagons.

A number of improvements have been made throughout the machine which add to its strength, durability and general efficiency; the major improvements are a power take-off feature, a new design carrier, and a new, all-steel tongue.

In the operation of elevating graders the repair and replacement of damaged belts has always been a considerable item and any improvements which will reduce belt damage and prolong belt life will be heartily acclaimed by all elevating grader users. It is claimed by the manufacturers that in designing the new Stroud carrier absolutely nothing has been left undone to prolong belt life. The carrier construction is extremely simple and is sturdy and rigid so that the belt will always run true on the carrier. It is said that this carrier is fully 100% stronger against warping and mis-alignment than any carrier heretofore produced.

Other improvements include a wider range of adjustment for the carrier, improved plow features, more convenient operation, and greater strength throughout. The distinctive Stroud frame design, which combines flexibility with strength, is retained in the new machine.

With 3-foot carrier extension furnished as regular equipment, this new model weighs approximately 13,500 lbs. A folder describing this new machine will gladly

be mailed to those addressing E. T. Fair Co., Denver, distributors.

CLETRAC RECEIVES ORDERS

Mr. C. D. Fleming, vice-president of The Cleveland Tractor Company, reports the receipt of two large orders recently, which add very materially to an already splendid sales volume this year on their product, Cletrac Crawler Tractors. These orders for large fleets of Cletracs came from the State Highway Department of Arkansas and the Provincial Government of British Columbia, Canada. The two orders alone amount to more than \$100,000 in cash business. These sales are especially gratifying because they constitute repeat business in each case and bring, for example, the total number of Cletracs used by the Provincial Government of British Columbia up to eighty-two machines. The tractors will be, of course, used by these departments for road construction and maintenance purposes. The company has made very notable progress in the sale of large fleets of their tractors to state highway departments all over the country, with individual purchases amounting in some instances to more than a hundred tractors.

The Cletrac Company also recently received a large repeat order of 34 tractors of the Model "30" size from the Colorado Highway Department. This brings the total of these tractors used by the Colorado department to eighty. The order was placed through the Liberty Trucks & Parts Co., Denver distributors.

NEW LINE OF HEAVY DUTY INTERNATIONAL TRUCKS DEVELOPED

A new line of heavy duty International Harvester motor trucks with respective ratings of 2½, 3½ and 5 tons has recently been developed. The new trucks are being made in both the chain-drive and double-reduction types with the exception of the 5-ton size, which is of chain drive type only.

Several important new features are incorporated in the design of these new Internationals, some of which are: new and more powerful engines, four-wheel brakes, single dry-plate clutches with vibration dampers, and transmissions with five forward and two reverse speeds.

The engines of the new Internationals consist of five independently maintained sub-assemblies, which greatly simplify servicing and thus help to keep the truck on the job. The entire engine unit of each truck is clean-cut and compact, and all parts are easily accessible, making possible a quick check-over. It has an overhead valve and camshaft arrangement which is designed so that valve grinding is a simple bench job, and also made so that lubrication is carried to every moving part. Another important feature of the engine is its aluminum pistons, which are of a patented split-skirt type. Six piston rings are used, three of which are compression rings and the other three of which are oil wipers.

Contract Awarded for Mt. Evans Project

(Continued from page 11)

Aside from these lofty peaks there are hundreds and hundreds of lesser mountains rolling out before the eyes, and from here, too, one can look over into South Park and into hundreds of valleys and canons and over the Pike National Forest.

Engineers of the State Highway Department who have tramped over Colorado, and United States Forest Service men who have done the same, have united in the belief that for inspiring views that from the top of Mount Evans is not equalled elsewhere on this continent.

Historically, the motorist may be interested in knowing that Bergen Park, then known as Elk Park, was where George Jackson went with his two companions to hunt in the winter of 1858-59, and from where he started on his prospecting trip that resulted in the discovery of gold on Chicago Creek at Idaho Springs. This was the discovery, followed by that of Gregory, at present Central City, that caused the great gold rush of 1859. In the pioneer days Bergen Park was an important stage station.

The road between the Santa Fe Trail and the Kansas-Colorado Boulevard that connects Vineland and Devine is being improved by cutting down the sharp turns on the hill south of the Arkansas River. The rock and gravel removed will be used for surfacing the Kansas-Colorado Boulevard toward Pueblo.

Grading on the rebuilt Fort Lupton-Dacona road has been completed by the state highway department and Weld county commissioners. With some \$20,000 left over, it is proposed to improve the state highway from Greeley through Milliken to Johnstown. W. A. Carlson, chairman of the commissioners, expects to have every mile of road in Weld County a hard road within two years.

Construction is being pushed on the bridge to span the Royal Gorge, according to the Florence Citizen. The building of the road is virtually completed, and foundations for the towers to support the bridge are said to be nearly finished. Towers of 190 feet and 125 feet, resting on granite, will support the bridge.

PLANS BEING DRAFTED

Proj. No.	Length	Type	Location
2-R No. 9	1.5 mi.	Pavement	Starkville
68-R	1.9 mi.	Gravel Surfacing	North of Monte Vista
78-R	0.5 mi.	Overhead R.R. Crossings & Gravel Surf.	South of Minturn
144-D	3.0 mi.	Gravel Surfacing	Northwest of Fort Collins
57-R	0.5 mi.	Bridge	North of Lamar
150-A	8.0 mi.	Gravel Surfacing	West of Craig
151-A	4.0 mi.	Gravel Surfacing	South of Granby
165-Reop.	3.0 mi.	Concrete Pavement	East of Canon City
175-A	40.0 mi.	Grading	Northeast of Sterling
253-D	2.5 mi.	Gravel Surfacing	Mt. Harris
263-A	4.0 mi.	Gravel Surfacing	Northeast of Fort Garland
267-C	3.0 mi.	Grading	Near Model
272-E	2.0 mi.	Concrete Pavement	West of Rocky Ford
282-G	5.0 mi.	Gravel Surfacing	South of Craig
296-F	5.0 mi.	Gravel Surfacing	South of Greenhorn
279-H	2.0 mi.	Gravel Surfacing	East of Kenosha Pass
300-B	2.0 mi.	Grading	North of Silverton

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
2-R7	South of Aguilar	1.224 mi.	Paving	H. C. Lallier Const. & Eng. Co.	\$ 66,990.60	100	2-R7
2-R8	Aguilar, South	1.633 mi.	Paving	J. Finger & Son	66,660.00	100	2-R8
97-R1	East of Lamar	.....	Bridge	W. A. Colt & Son	24,237.50	50	97-R1
134-B1	East and West of Vona	3.352 mi.	Gravel Surfaced	W. A. Colt & Son	32,605.00	100	134-B1
138-A	North of Kremmling	10,916 mi.	Grading	F. L. Hoffman	201,262.80	98	138-A
144-C	Bet. Fort Collins and Laramie	2,934 mi.	Gravel Surfaced	Bedford & Woodman, Inc.	37,911.35	88	144-C
147-C	South of Cortez	.....	Gravel Surfaced	E. J. Maloney	86,182.75	39	147-C
149-A1	Between Deertrail and Agate	4,716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	71	149-A
208-AR	East of Grand Junction	0.507 mi.	Gravel & R. R. Grade Separation	Harry A. Roush	59,568.00	97	208-AR
208AR2-CR1	East of Grand Junction	.....	Oil Processed Gravel Surface	Hinman Bros. Const. Co.	44,652.05	7	208AR2-CR1
242-C	West of Fruita	6,011 mi.	Gravel Surfacing	Hinman Bros. Const. Co.	56,344.50	91	242-C
258-F	Gunnison-Sapinero	5,689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	95	258-F
258-G	West Side of Cerro Summit	2,885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	62	258-G
258-H	West of Sapinero	4,921 mi.	Gravel Surfaced	Cole Brothers	123,700.60	0	258-H
259-A1	Between Parlin and Sargents	3,350 mi.	Gravel Surfaced	Ed. H. Honnen	51,551.00	62	259-A1
262-I	South of Russell	4,034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	77	262-I
266-D	South of Bondad	4,111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	96,075.30	63	266-D
270-C	Betw. Alamosa and Monte Vista	5.0 mi.	Oil Pro. Gravel Surf.	Mountain States Const. Co.	38,485.50	5	270-C
271-C	West of Portland	2,430 mi.	Surfacing	J. Finger & Son	54,843.40	93	271-C
272-D	East of Manzanola	1,950 mi.	Pav. & R. R. Underpass	Driscoll Construction Co.	88,237.50	39	272-D
277-D1	Betw. Colo. Springs & Pueblo	.....	Grading	M. E. Carlson	218,277.80	26	277-D1
277-E1	South of Colorado Springs	.....	Grading	J. L. Busselle	221,389.65	6	277-E1
279-F	North of Baileys	3,444 mi.	Graded	J. Fred Roberts & Sons	126,000.00	99	279-F
282-AR1	South of Craig	600 ft.	River Protection Work	Hinman Bros. Const. Co.	11,925.00	100	282-AR1
282-E	North of Meeker	6,421 mi.	Gravel Surfaced	Luke E. Smith & Co.	88,384.20	82	282-E
282-H	Between Rifle and Meeker	7,029 mi.	Gravel Surfaced	Winterburn & Lumsden	82,589.74	16	282-H
286AR1-BR2	North of Nunn	.....	Oil Process Gravel Surface	L. E. Smith & Co.	20,575.25	96	286AR1-BR2
287-AR5	Between Greeley & Ft. Morgan	.....	Concrete Pavement	Edw. Selander	154,632.85	32	287-AR5
292-B	Between Gilman and Minturn	2,640 mi.	Gravel Surfaced	O. J. Dorsey	29,146.80	30	292-B
292-C	West of Avon	.....	Gravel Surfaced	Ed. H. Honnen	39,663.10	28	292-C
293-C	North of Ouray	3,561 mi.	Grading	C. V. Hollenbeck	62,997.80	77	293-C
295-BR1	South of La Jara	6,622 mi.	Oil Pro. Gravel Surf.	People Bros. Const. Co.	14,226.50	12	295-BR1
295-D	North of Antonito	2,460 mi.	Oil Pro. Gravel Surf.	Levy Const. Co.	72,676.75	0	295-D
296-C	N. of Greenhorn on S. H. No.1	6,706 mi.	Surfacing	H.C.Lallier Constr. & Eng. Co.	115,466.80	100	296-C
297-C	Southwest of De Beque	9,953 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	312,453.50	0	297-C
298-B	North of Pagosa Springs	2,414 mi.	Surfacing	Engler & Teyssier	38,426.00	23	298-B
299-B	Btw. Delta and Grand Junction	3,465 mi.	Gravel Surfaced	Gardner Bros. & Glenn	60,804.80	98	299-B



Adams Motor Graders

with Crawler or Wheel Type Power



No. 10 is furnished with 6-inch wheel extensions as extra equipment to increase tire width to 16 inches if desired.



No. 12 has Trackson Full Crawlers to meet the requirements of exceptionally soft going on dirt roads.

ADAMS Motor Graders are recognized by highway officials and contractors the country over as the most rigid, most durable, and smoothest cutting motor graders ever built . . . They are powered by McCormick-Deering Model 20 Tractors, the most dependable and most economical tractors you can buy. ADAMS Motor Graders are available in two types to meet every traction requirement . . . No. 10 with wheel-type power . . . and No. 12 with Trackson Full Crawlers.

A rigid frame construction which does not permit the frame to twist or weave, or the blade to rock sidewise . . . more effective weight on the blade and scarifier than any other machine . . . a blade control that is easier working and 50% faster . . . these are features which distinguish ADAMS Motor Graders from all others. Furnished with 10, 12, 14, or 16-ft. blades. With or without scarifier and cab. Write today for special descriptive folder.

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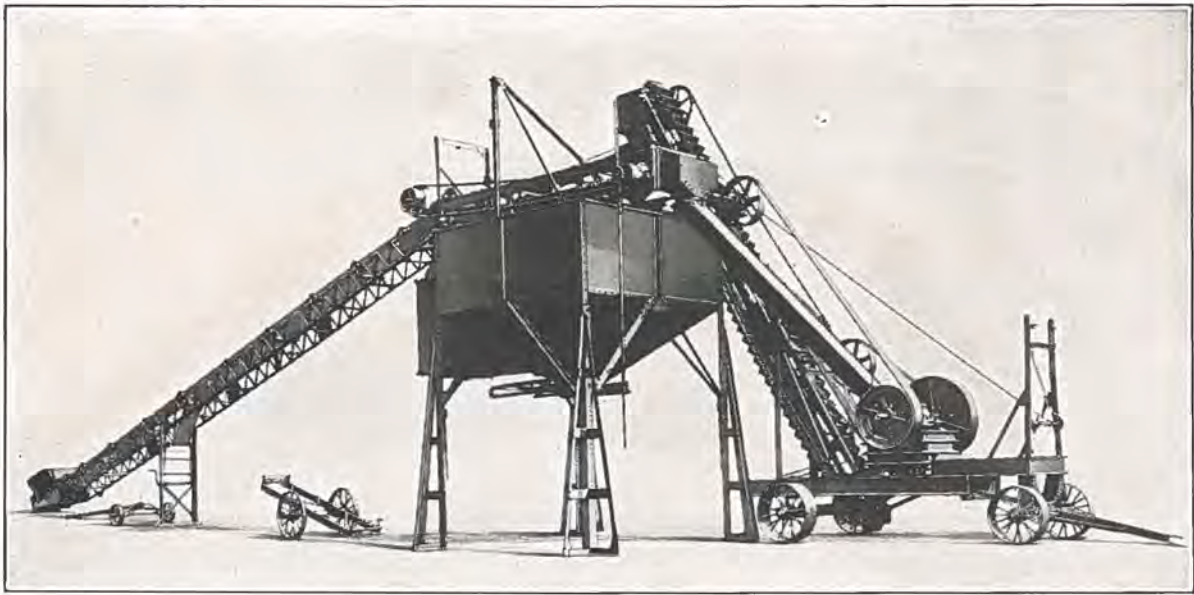
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COLORADO HIGHWAYS



PIONEER GRAVEL EQUIPMENT



Pioneer Plant No. 44

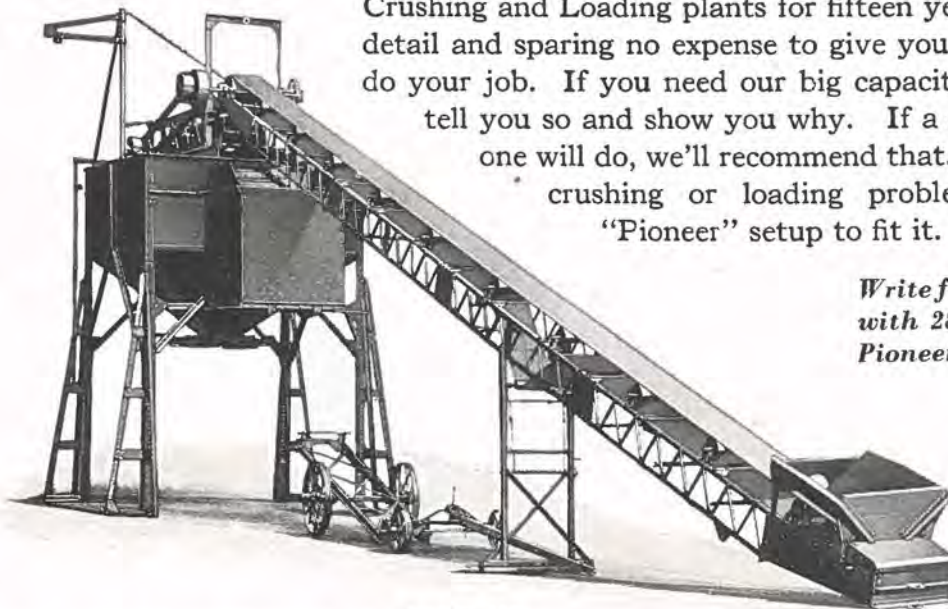
Crushes, screens and loads all in one operation. Capacity up to 300 cubic yards per day, based on one-inch reduction and 25% oversize. This plant rejects sand, crushes oversize and separates the crushed gravel into two divisions, coarse and fine. 21-yard bin—55-foot conveyor with 18-inch, 5-ply belt. Alemite equipped. Plant is powered by 45 H. P. gasoline engine and is readily portable. Weight, 33,000 pounds. Codeword: Fahez.

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*Write for new 80 page catalog
with 28 blue print setups of
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Plant No. 41S

Screens and loads large daily yardage. 21-yard bin, same as Plant 44, with same conveyor and belt. Has sand rejection feature. Easily moved. Bin has lifting jacks on steel legs—can be raised or lowered and moved on gravel truck—Alemite equipped.

We manufacture a complete line of 11 different sizes of Crushing and Screening Plants, also Loading Plants, Drag Lines, Storage B'ns, Conveyors, Shakers, Revolving Screens, etc.

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Denver, Colorado

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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,
1803 1/2 Broadway, Denver, Colo.
Phone Main 4962

M. W. BENNETT, Editor

Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
10 CENTS A COPY. \$1.00 A YEAR.

Our Cover Picture

A VIEW of the world-famous Mount of the Holy Cross, located in Eagle county, is printed on this month's cover of COLORADO HIGHWAYS. During the present summer many hundreds of tourists from all parts of the globe have visited this shrine. It is reached from Red Cliff on U. S. Highway No. 40. The state highway department is now constructing a new road over Loveland Pass which will reduce the distance from Denver to the shrine by 25 miles.—Photo by Colorado Association.



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WHETHER you want your specification material delivered to railroad cars, bins, trucks, or stock piles, it's all the same to the Cedar Rapids One Piece Outfit. Its quick adaptability enables you to get material delivery where and how you want it.

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Editorial

COLORADO HIGHWAYS presents this month two interesting articles that, it believes, will be of unusual interest to readers. One is on the summer motor tourist and his relation to the people and the importance of improved highways, and the other is by a contributor signing himself "Motor Gypsy," on the relation of improved roads as public service by the State Highway Department.

Neither of these correspondents is connected with the State Highway Department, hence has no other interest than that of their own in the construction of improved roads in Colorado. They also each have a very decided love for Colorado.

Motor tourists, as those who travel Colorado know, are attracted by improved roads, and this fact is brought out in one of these articles. Some additional light is shed on this phase of summer visitors, and the importance of this traffic in Colorado. This year will establish a new high record for motor tourists, the writer says, and he points out that official figures of 1927 disclosed that this class of visitors expended \$45,000,000 in the state. What will they leave in 1929?

The second article takes up the question of improved roads as relating to the State Highway Department in that this construction is public service. He points out what is public service as connected with the modern highways and scores, we believe, heavily in his argument.

COLORADO HIGHWAYS believes the presentation of two such articles from correspondents who are in no way connected with the State Highway Department, but actuated in their writings only by their supreme interest in the state, is illuminating. They show that there is among motorists and others in this state an intense interest in the improved road program, and that the building of good roads reaches to every citizen. The ramifications of these benefits is stressed in both of these articles.

COLORADO HIGHWAYS believes that the people of the state have become more familiar with highway construction in the last two or three years than they had in the prior twenty years. We believe the realization of the importance of these roads to every community, rural and urban, is impressed upon the mind of every adult individual and upon every school child. Results are what is wanted today in every line of human endeavor. Not prospective results, but actual results. These have been realized.

We believe, also, that today the people realize that construction of modern roads is a tremendous job. There are some of us who have reached the age where we can look back and know that in road building of a comparatively short time ago the road was scraped, the dirt piled up in the center and left for vehicular travel to beat into a really travelable highway. We may recall the spring thaws and the condition of the roads. This has not, necessarily, reference to Colorado, but conditions that prevailed all over the United States.

We of Colorado can remember these roads in localities; we can recall the snow-blocked mountain roads, that for months various localities of the state were cut off from the rest of the state by snow. We recall the roads, narrow, rough and dangerous even for the team we drove to negotiate. In the early automobile days many of the roads that we considered as good called for a snail-like speed.

Today we witness more than 8,000 miles of improved highways in the state. The two articles that are referred to have covered these points as to the present day highways and their influence, nationally and within the State of Colorado.

Construction of modern highways is going steadily forward. The year 1929 will witness the completion of a large number of projects—and one may in truth say that it will be many years before the present program is completed. It costs money to build a modern highway in Colorado. We have not the mud to combat, as in Iowa, but we have even greater obstacles in the Rocky Mountains, in the vast plains area, in the valleys, for there are counties in Colorado larger than some eastern states. The original program of the State Highway Department was the construction of a paved highway in the more densely populated district of the state, and where, naturally, the traffic was the heaviest. This program has been completed from Fort Collins, Greeley and Boulder through Denver to Colorado Springs and beyond. The Pueblo pavement will be finished next year, with extensions to follow.

Splendid highways have been built over a dozen mountain passes and these roads have been extended the breadth and length of this state—and the work still is going on. And it will be going on, with all the engineering skill and with all the power of machinery until Colorado will be noted for its marvelous system of improved highways.

The Footprints of the Engineer

BY JAMES B. WEAVER, Des Moines, Iowa

THERE have been but two notable periods of road building in the last 2,500 years. And the vitality and achievement of every civilization that has flourished in that period are reflected in its attention to its public highways, to its system of human communication. Regarding these roads it is an illustration of the irony of fate that while the rulers and politicians of every period have added greatly to their fame by inscribing their names upon a multitude of pillars and milestones, the men who actually planned and supervised the construction of the great highways of the ages have had to be content with some obscure line in a musty payroll, consigned on completion to some dingy vault or wayside bonfire. In some cases the road itself, redolent of antiquity, has survived even the name of the ruler and politician, and stands today proof of a civilization that has otherwise largely vanished. Note the case of the Incas. Now sweeping across the great plateaus, now bordering the ocean, or again hanging suspended at an elevation of 12,000 feet along the shoulders of the Andes, that mighty road, 20 feet wide, of cut stone, runs from 100 miles north of Quito to Cusco, thence on for 1,500 to 2,000 miles toward Chile. With deep foundations and surfaced with cut porphyritic stone, it challenges us to visualize in imagination a people whose footfalls are hushed and whose civilization vanished, leaving this proof of an astounding progress.

The spectacular success of Alexander was only possible by reason of the great Persian highways trod by his legions. He achieved with his army the then unheard-of speed of 20 miles per day. There was the so-called "Royal Road," that ran from Ephesus on the Aegean to Susa on the Tigris; another connected Mesopotamia with Egypt, and others of lesser note. Certain it is that shattered dynasties and transformed civilizations were the result in no small part of the work of the men who before the Christian era built the main roads of the Orient.

The magnificent roads of Rome were commensurate with her proud place in history. They shaped her destiny, first making possible her far-flung empire; and then in the closing days opening the way for the barbarians who stormed at the gates of the Imperial City. Their location determined by geography, these roads ran from the capital to the far corners of the empire. The Appian Way ran southeast, first to Capua, thence to Brindisi on the Adriatic; the Flaminian Way northeast to Rimini on the Adriatic; the Via Ednatia, from Durazzo to Constantinople, thence to Alesandria; the Via Aurelia, from Rome to Gaul, thence to Cadiz; another from Milan to Boulogne, and many more, splendid arteries for the circulation of her legions and for the commerce of a world empire.

And they were indeed magnificent roads, many constructed of four layers—first large stones, next rubble, then smaller stones and concrete, and finally, as in the

Via Appia, surfaced with cut polygonal stones. Many sections survive, and for thousands of miles the work of Roman engineers is today the foundation of existing roads in Italy, France, Switzerland, Spain, and even Egypt.

Hannibal's army traversed these roads at a speed of 24 miles per day. Caesar narates a journey of 800 miles in 8 days. Aristides, the rhetorician, in the winter of 155-6 A. D., in a journey of 100 days from Asia Minor to Rome, tells of making 50 miles per day—"as fast as the couriers." A notable section of these roads centered at Lyons, then the capital of Gaul, and the identical highways along which Roman chariots rattled in the first century today resound to the honk of the motor car.

COLORADO HIGHWAYS this month presents the following address, delivered by James B. Weaver, of Des Moines, Iowa, to a convention of highway engineers, not only as an historical recital of road construction, but as a graphic portrayal of the necessity of modern highways, and a deserved tribute to the highway engineer. We believe it will be read with interest, and give to the reader a greater conception of what highways mean to the nation and to the people.

Though military considerations were the original incentive in building of Roman roads, their influence, as is always true, stretched far beyond things military. Italian culture permeated the provinces. Christianity radiated from Rome in all directions. The colonies contributed to the Empire both men and ideas. Seneca, the naturalist and philosopher, was born at Cordova, his mother a native Spaniard. The Emperor Trajan was the son of an Iberian officer from along the Pyrenees. Pliny's mother was a Spaniard, and there are many more examples. These splendid roads gave cohesion to the Empire.

Traveling in Europe in Roman days was easier and safer than at any time since until the nineteenth century, and in Asia Minor was safer in Paul's day than it is in our own time. The work of the highway engineer as the servant of the state was the fundamental fact at the root of "the grandeur that was Rome," gave wings to her dominion, sent her legions to the margins of the known world, and brought to the arena of her public life talent from all the races within her boundaries.

With the passing of the Roman Empire notable road building ceased until the nineteenth century. The long lethargy and chaos of the Dark Ages were illuminated by no outstanding improvement in facilities for communication. In 1339 and again in 1668 the British Parliament was prevented from meeting by the state of the highways. At the beginning of the nineteenth century travel from London to Dover was still dangerous. In 1635 it took two months to get an answer in London to a letter to Scotland or Ireland. Old Dr. Johnson thus taunted Boswell: "The noblest outlook that a Scotchman ever sees is the highroad to London," and that great highroad did in fact transform the Scotch from enemies into allies.

It is only within a century that England has established anything like a system of improved highways. In that century she has become an industrial hive, with splendid roads reaching every corner of the island and to the remote corners of Scotland. With an area for England and Scotland only one-tenth larger than Minne-

sota, the home population of 45,000,000, freely circulating over a network of fine roads, maintains its prestige as the center of a world empire.

In the Far East she built the Grand Trunk Road. Stretching across India for 1,600 miles, from Calcutta at the mouth of the Ganges to Peshawar on the borders of Afghanistan, the imagination is stirred by Kipling's familiar words from the mouth of Tommy Atkins:

"We're marchin' on relief over India's sunny plains,
A little front o' Christmas-time an' just be'ind the Rains;
Ho! get away you bullock-man, you've 'eard the bugle blowed,
There's a regiment a-comin' down the Grand Trunk Road;

With its best foot first
And the road a-sliding past,
An' every blooming campin'-ground exactly like the last
While the Big Drum says,
With 'is 'rowdy-dowdy-dow!—
'Kiko kissywarsti don't you hamsher argy jow!"
(Which is native for "Why don't you get on?")

Penetrating the gloom that had shrouded Europe for a thousand years, in the fifteenth and sixteenth centuries came that marvelous awakening termed the Renaissance—literally the rebirth of the Greek passion "to know." First taking the form chiefly of art and literature in Italy; free thought in Germany; colonization, commercial expansion and sea dominance in England and Spain, the spirit of the Renaissance has refashioned the world. The discovery of America and the spread of the ideal of democracy were its direct product. Out of it our modern scientific era was born with every phase of man's amazing mastery of the forces of nature, which is the mark of our own time. The first years under the American Constitution, the closing of the French Revolution, the Napoleonic era and Stephenson's locomotive were essentially contemporaneous. It was the opening of an age of daring initiative.

Here in America this era found us intent also upon the mastery of a primitive continent, the richest prize that ever fired the imagination of a great people. The country was too new and accumulations of capital too meager for serious attention to scientific road building. The railroads made a frenzied effort to keep pace with the movement of the pioneers in their race for homes and for the exploitation of the riches of a continent:

"Something hidden, go and find it.
Go and look beyond the ranges,
Something lost beyond the ranges,
Lost and waiting for you. Go!"



Showing a picturesque section of the Big Thompson canon highway which leads to the Estes Park recreational area.

As for the roads, there were few that deserved the name. Water and rail transportation held the attention of the nation. Highway building was scattered, mainly ineffective, with little coordination and without scientific guidance. There were a few notable exceptions, but anyone of us who, even in the seventies, took his turn at "working the roads," as I did, has a vivid recollection of how futile was the effort, and a realization today of the untold millions of public moneys squandered by the primitive methods in vogue.

But while indifferent to highway construction, we shared in all the magic of an astounding period. For America, as well as for Europe, the close of our own Civil War opened an era that reads like a page of romance. Eighteen hundred and sixty-nine had seen the Atlantic and Pacific linked by the first transcontinental railway, and the first ocean cable had just brought the news of the world to the breakfast tables of two continents. Eighteen hundred and seventy-three sent the cable cars climbing the hills of our cities, while in 1875 the genius of Bell annihilated distance in the transmission of the human voice. The next few years mankind, emerging from the gloom of the candle, touched a button and said, "Let there be light," and lo, the lightning leaped to pillar and tower and from cellar to garret and stood poised, the instant servant of humanity. In 1877 Holland's submarine nosed its way through the harbor's



Type of maintenance outfit being used by the highway department to keep Colorado state roads smooth.



A section of the Hoosier Pass highway in Summit county improved with state funds.

slime, puny but unquestioned parent of the modern U-boat, 300 feet in length, with its cruising radius of 8,000 miles. In 1880 the electric railway made possible the far-flung confines of the modern city.

There quickly followed the linotype, the guilty parent of the penny extra, and the internal combustion engine, the latter probably the most revolutionary triumph in all the realm of mechanics. It made possible the automobile, and by the genius of Wright and his dauntless followers has taught this age to "hitch its wagon to a star," or at least to launch it in the path of the storm, and has given to man a fourth dimension peopled equally with terrors and delights. Eighteen hundred and ninety-six brought Marconi's wireless, and the cries of "those in peril on the deep" were heard across a thousand miles of storm-swept sea; and 1906 saw those frowning citadels of Mars, the dreadnaughts, steaming out of the harbors of the world, grim floating fortresses built to express a nation's will in the thunder of their mighty guns.

Isolation has been the target for nearly all these triumphs of man's inventive genius. Charles Dudley Warner truly said that "isolation breeds conceit," and conceit is everywhere the foe of progress. The trans-Atlantic cable, the cable and electric car, electricity, the telephone, the linotype, the internal-combustion engine, through its children, aviation and the automobile, wireless, the radio, are all aimed squarely at the effacement of isolation. Beside the great men who have made these possible, and though less spectacular, their equal in dignity as an agency in the world's struggle for that understanding that is the basis of brotherhood, I place the road builder. It is he who across state and national boundaries brings face to face the great masses of mankind. He thus renders an immeasurable service in the cause of understanding and racial amity.

The day is coming rapidly when America's 20,000,000 motor cars may explore the hills and valleys of every state in the Union upon a first-class, modern highway. The people are ready, the motors purring, eager to be off, and, thanks to the engineer, great stretches of im-

proved roads are unfolding like ribbons strung along the face of the continent. I am inclined to share the faith of an old fundamentalist friend of mine, who offers this in proof of the Prophet Nahum's clear vision of the twentieth century auto, when he wrote, 700 years B. C.: "The chariots rage in the streets. They rush to and fro in the broad ways. The appearance of them is like torches. They run like the lightning." And, too, you may well claim Isaiah to be one with you in the spirit where he sings: "The crooked ways shall become straight and the rough places smooth."

Yes, indeed, the crooked misunderstandings, born of isolation and the rough judgments of sectionalism, shall be straightened out and smoothed away when the many millions under the American flag may come, thanks to your task well done, to know each other in an intimacy never before approached since creation.

But what does the limelight really matter, after all? The great thing is to keep faith with the nation by efficient service. As you make your locations, fix your grades, drain your marshes, lay your surfaces, fashion your curves, try to visualize, if you can, just how vital your place is in the building of a nation. How down the years you are sending your hundreds of thousands safely on their way upon endless errands of business, of mercy, of pleasure. How you are an agent in that wholesome decentralization of homes so desirable in an industrialized age. How suburban homes will stream along your highways with their blessings of sunshine and pure air, where children may bask in "the good, gigantic smile of the brown old earth." How little, bereft country school houses will be swallowed up in great consolidated schools, as is rapidly occurring in my own state. How you will facilitate a nation's outing as your highways ramify through our national forests and penetrate the splendid park areas of the republic. How you have effaced consciousness of that thing so vital to my boyhood, namely, "the city limits." How you are bringing to the farmers of the nation the cultural advantages of the city and making it possible to deposit on his doorstep daily the news of the world. How, as notably in Con-

(Continued on page 20.)



Another maintenance outfit employed by the state highway department on federal aid roads.



Showing a stretch of gravel surfaced highway on Willow Creek Pass recently completed by the U. S. Bureau of Public Roads. It is located in the Arapahoe National Forest and the new road eliminates the worst stretch between Granby and Walden.

Improved Highways and Prosperity

BY A MOTOR GYPSY

I HAVE returned home from a swing over Colorado in my car. I am more than ever impressed with the realization that improved highways mean prosperity and happiness to the state. In the construction of these highways I also realize more fully than ever that the State Highway Department is a public service for Colorado.

Public service in highway construction is bringing communities into closer bonds of personal and commercial friendships; is opening the state to motorists that they may travel the length and breadth of the commonwealth on splendid roads, and reach a personal appreciation and understanding of the greatness and the resources of Colorado.

I have lived in Denver a sufficient number of years to remember the old wagon roads, the almost impassable roads in the mountains, the burro trails and even the trails beaten by the tramping feet of miners. I remember that to reach the far-flung parts of Colorado one traveled only by train.

In that period it was natural that there could not be a close communion of communities. The result was that each locality was isolated. Its interest was naturally centered within its own borders. What was taking place in the surrounding localities was virtually unknown, and such knowledge came through the weekly newspapers, commercial travelers or occasional local visitors.

All this I have deeply realized in this recent motor trip over Colorado—a rambling trip of two weeks with no especial fixed destination. I have found that this is the way to see Colorado—and to KNOW Colorado.

Improved highways have made possible this intercommunication of all the communities in Colorado, and all localities. The automobile, of course, is the means of travel—but of what avail would the car be without the improved roads?

Prosperity has moved in the path of the engineer who has put through these highways in Colorado.

I have wondered as I drove over the state how many people realize that the construction of improved highways is a public service, and the results. Presumably the number is small. We have become accustomed to rolling along over the highways with no thought as to the why and the wherefore of the construction, nor of the public service that is being rendered the state by the building of the roads.

I believe that most of us realize that good roads in Colorado are wholly responsible for the heavy motor tourist traffic. I believe we realize that without these roads there would be no tourists in cars rambling all over the state. We must also realize that these motorists leave money in their wake.

What has interested me particularly is that the highways have been of vast help to the farmer. They have enabled him to transport his products to market in time to hit the higher prices; have enabled him to get in and out of town with speed. In addition to this the improved road, if passing his farm, has cost him nothing, but has added very materially to the value of his land. If upon a main traveled highway he has found a ready sale for his minor products—melons, vegetables, eggs, poultry, honey and the like that otherwise would never have left the place.

Aside from the standard highways there are other roads, highly improved, direct results of and contributory to the main highway. Farmers along these roads also reap the benefits of the road.

There is no question that every community has been benefited by the improved roads. That is acknowledged, and I know that, for I have asked in many of them if the improved road was a benefit, and the answer has been

most emphatic in the affirmative, with considerable elaboration of the results of the improved highway.

Is the construction of these improved roads not a public service?

I have frequently wondered to myself as I have driven over Colorado where the basis of complaint was about the roads. I have found the answer.

Checking up on my recent trip I heard that all adverse comments about the highways of Colorado came from those who were not upon an improved road.

The great trouble has been to make the people realize that the State Highway Department cannot build all the roads in a year, or two years, or twenty years. In fact, when babies of today are grandparents construction of highways in Colorado will be carrying on. That fact was impressed upon me as I realized the enormous job ahead; of the far-flung localities of Colorado, and the Rockies cutting through the state. The cost of road construction in Colorado, in some places, has been staggering.

We know of the plans of the State Highway Department for the future, entailing vast sums, but every projected road is for a purpose, either scenic or commercial.

One touring Colorado by motor should do so with open eyes and an open mind. It would be well for him to familiarize himself with past history of the roads he will travel and trace it from the wagon road to the present day. Let his eyes tell him the story as he rolls along and views the old road, winding and twisting below or above him, as his car races over a broad highway, and on high and an easy grade.

Perhaps he will cross Berthoud or some other pass and realize what it meant in labor, skill and money to open the road after the winter ended—drifts 15 and 20 feet high, perhaps, that had to be moved or dug through. Here is public service.

It is possible that the inquiring motorist may encounter one of the maintenance crews and gain some idea of

the cost of keeping up the highways for his pleasure and for the business interests and other interests directly concerned in that particular road. More public service.

There is the patrol system along the thousands of miles of improved roads in Colorado, and the motorist should stop one of these men and have a talk with him. The multitudinous duties of these men would surprise the inquirer. Repair of road and bridge, directing strangers, aiding motorists in trouble, and almost countless other helpful acts would be related. Here, too, is public service.

If one motoring extensively in Colorado will take the trouble to inquire he will learn of values of farm and town property that have been increased by the construction of improved roads; of growth in population; of strangers who have bought farms and ranches as a result of a motor trip in the state. He will learn that these highways have made the farmer, the rancher and the miner really a resident of his nearest town—resident in the fact that with his car he and his family can go into town and back in a space of time never dreamed of before the improved road came—though he then had his automobile. All this is what I term public service.

I may add here that I am not in any way whatsoever connected with the State Highway Department, but I do have an interest in good roads, for I know what they mean to the state, and what has been done, and is being done, and I am an enthusiastic motorist and an enthusiastic champion of everything that is Colorado.

I trust that such men as Charles R. McLain of Canon City, Dr. F. L. Bartlett of Denver, and others who championed good roads twenty and thirty years ago, and later, can see from their places beyond the tomb what has been accomplished, and as a result of their pioneering—and there is work today, I believe, for every champion of good roads and Colorado to take up their enthusiasm. That is all I am trying to do.



A stretch of concrete pavement on the Colorado Springs-Denver concrete boulevard, showing one of the many underpasses eliminating railroad grade crossings.

Network of Perfect Highways at the Motorists' Service

BY WESLEY SPARLING

ANOTHER great link in Colorado's system of fine roads is being forged in the Pikes Peak region this year with the adoption by the State Highway Department of the program to continue the major improvements completed last year on the Denver highway to the south of Colorado Springs between this city and Pueblo.

In another year the great army of gasoline tourists from the southland will travel on concrete from a point fifty miles south of Colorado Springs to 150 miles to the north, over one of the finest paved highway systems in the world, which is remarkable for the absence of death-dealing grade crossings, abrupt turns or long hills.

To realize this objective, the state this year is expending \$450,000 to grade the new permanent south road for the unpaved stretch between Colorado Springs and Pueblo, a distance of 26 miles. An army of workmen are now engaged on the work. Contracts call for the completion of the job by December 1. Paving operations will start next spring, the entire distance to be paved—then another ceremony will be held at which the effigy of "Dusty Roads" will be hanged.

Great progress has been made in the past three years in bringing the state's system of good roads up to the standard fixed by the more thickly populated eastern states. For several years representatives from the fifth highway district on the state advisory board have followed the policy of concentrating their allotted funds on such major projects as the north and south highway, with the result that Denver and Colorado Springs are linked by a concrete boulevard—one of the finest in the world—and the last preliminary step is under way for the merging of two more of Colorado's principal cities by a paved road. Support for this policy has been given by Gov. W. H. Adams, who hopes to see the entire length of the state from the north to the south drawn closer by the strip of concrete on which commerce and farming can realize quicker, cheaper means of bringing products to consumer, and by which the cool breezes of Colorado are brought to the back door of Kansas, Oklahoma and Texas. Governor Adams hopes to see this cherished project realized before the expiration of his present term of office.

In other words, Colorado, which has depended too much on its naturally fine gravel roads, is forging to the front in giant strides and creating boulevards of gravel roads which have been found inadequate for the great volume of traffic brought upon them.

Accessible from the south over naturally good gravel roads and pavement, which are now maintained by the State Highway Department, and from the north by the paved Denver boulevard, the Pikes Peak region still lays claim to being the premier motorists' paradise of the nation. Here scenic highways, public and privately owned, open the vistas of the mountains to the visitor and make accessible every point of scenic interest, even to the white-capped summit of famous Pikes Peak. Pri-

vate enterprise has left no scenic treasure unavailable to the motorists of the nation. Marvelous engineering feats have been accomplished to carve wide, safe highways up easy grades to the tip-top of the highest mountains in the Rocky Mountain range.

Colorado Springs years ago adopted a progressive program for its highway development. Private capital has been lavishly spent to develop an unsurpassed system of scenic highways, most of which are now state or city maintained public roads, and the city also has believed in developing its natural resources to the utmost of its ability. Hence the mountain scenic routes are a never-ending source of wonderment to tourists, but also probably the safest roads on which to drive. Safety factors have been emphasized and, paradoxically as it may seem, there has not been a serious accident on any of the region's mountain highways in years.

All sections of the Pikes Peak region are closely knitted together by a modern road system. The county appropriates a large sum each year to a systematic program of betterments until today the motorist can choose any route he desires and find a fine, gravel highway on which to travel.

Narrow, shaky wooden bridges are now almost a thing of the past in the Pikes Peak region, so rapidly have the state, county and city replaced them with wide, concrete-and-steel spans. By the same token the roads have been elevated, equipped with guard rails and snow fences on the exposed sides, and adequate drainage structures installed at low places. The rare snowstorms of any sever-



A section of spectacular mountain highway in the Colorado Springs recreational area.

ity in this region never block the roads for more than a few hours, so well have the road-building agencies gone about their task of elevating, protecting and draining the highways. State and county crews are constantly on the job to clear the roads of snow or to repair damage from rains.

Colorado's new highways are built along the specifications of the United States bureau of public roads which call for direct routes between cities, absolutely no grade crossings, the leveling of hills likely to inconvenience the motorist, and the ironing out of sharp turns likely to cause collision or other accident. Such a highway is the new Denver-Colorado Springs boulevard, and such will be the new Pueblo-Colorado Springs highway.

Scenic routes, while not paved, are hewn out of mountain sandstone or granite and offer a natural roadbed which cannot be equalled. Each year considerable work is done to bring the roads a little closer to the highest possible point of efficiency. Curves are constantly being widened, hills reduced and the entire roadway broadened to standard. Motorists, while seeking to "rough it" in the mountains, do not like their automobiles to do it, and there is no need for it in the Pikes Peak region. Motorists can "rough it" in extreme comfort as long as they are at the wheel of their machines.

Especially active in this form of improvement work is the park department of the city of Colorado Springs, a bureau which has the job of maintaining one of the largest systems of park roads in the country. During the winter months a crew is constantly at work on road improvement projects undertaken during the slack months of the year to provide employment for regular employes. Last year this park department completely rebuilt one scenic highway leading into the mountains, and this year has transformed a little-used by-road, tortuous and difficult to negotiate, into a fine highway which has opened up new scenic attractions to visitors and residents alike.

Perhaps the only highway reaching to 10,000 feet above sea level which is kept open the year around is near Colorado Springs—the scenic Broadmoor-Cheyenne Mountain highway. This is the newest marvel of road building feats in the Pikes Peak region, having been constructed less than four years ago, and has not been closed down for 24 hours since. With its swinging curves, protected switchbacks and relatively easy grades, the highway is one of the most outstanding examples of mountain road building in the world.

The world's highest road at the present time, which leads from Colorado Springs to the summit of Pikes Peak, has long been fully developed to a safe, wide roadway. Constant improvements are made each year, however, and so painstakingly has the work been done that automobile races are held over it each year.

The twenty-six miles of highway between Pueblo and Colorado Springs are being graded without necessitating detours. More than half of the new road will exactly parallel the present one, from the limits of existing pavement north of Pueblo to the station of Buttes, and from the limits of existing pavement south of Colorado Springs on south almost to the town limits of Fountain.

Between Fountain and Buttes the new road will be west of the old route, placed there to avoid the need of crossing and re-crossing the Santa Fe and Rio Grande



A glimpse of the picturesque Phantom canon highway.

road is finished. Re-routing will eliminate four of them, and the fifth, at Bragdon, just north of Pueblo, will be eliminated with an underpass. The latter is now under construction.

By the end of this summer all grading and drainage for the new road will be finished. This means that all bridges will be built, culverts placed, side ditches dug and the roadbed brought to grade. Everything will be done except the laying of the pavement. The road then will be allowed to settle throughout the fall and winter, so that pavement laid next year will not crack or need unusual repairs.

When completed next year the new road will give unbroken concrete pavement from Denver to Pueblo, without a single railroad grade crossing, a distance of 118 miles.

Work on the project of grading the Pueblo-Colorado Springs highway for the pouring of concrete next summer is rapidly being pushed forward, with nearly half of the job completed, according to P. C. Thurmond, engineer in charge of the two grading projects. Grading on the underpass at Bragdon is about 50 per cent complete. Unpaved road from Pueblo to Colorado Springs amounts to about twenty-six miles. Eighty per cent of the culverts on the stretch are finished and detours on the road are in good condition. Piling for the bridges over the dry creeks has been driven and

Highways and Summer Travel

INDICATIONS are that the 1929 season will set a new high record in Colorado for motor tourists, according to those affiliated with the travel industry. This points out the importance of improved highways in the state as a lure to motorists.

Official reports disclose that in 1915 there were two auto camps in Colorado with registration of 4,500 campers, and in 1927 there were 350 auto camps with 825,000 campers. These figures, of course, include duplicate registrations, but show how the motorist moves over the state.

In 1915 the total rail and motor travelers in the state were 300,000 and in 1927 were 700,000. The total expenditures by these tourists in 1915 is placed by official reports at \$8,000,000 and in 1927 at \$45,000,000. Of these expenditures the report credits \$25,000,000 to rail travelers and \$20,000,000 to auto tourists.

These statistics are of interest as comparable with the prospects for 1929, and the amount of money that the auto tourists will leave in the state. As an index to the wide spread of travel this season of motor tourists COLORADO HIGHWAYS is informed by one man that standing on a downtown corner in Denver for twenty minutes he counted eleven cars from outside the state. These were from Iowa, Minnesota, Maryland, Missouri, Kansas, New York, California, Texas, South Dakota, Oklahoma and Illinois. Parked in three blocks in the business district he noted cars from Oregon, Nebraska, Kentucky, Wyoming, New Mexico and Michigan. In one parking place he counted seven out-of-state cars.

Inquiries at the office of Rocky Mountain Motorists, Inc., A. A. A. member, come from motorists from every state in the Union, with indications that the final report will show a vastly increased number of motor tourists in the state this year over any previous season.

In connection with this another informant reports that in an extensive motor tour of Colorado recently he noted cars from 32 of the 48 states, showing once more how motor tourists roam over the state.

These authoritative statements prove the wide extent of summer tourist travel in Colorado by motorists. It is brought to mind that the motor tourist, no matter how economical he may be, will average \$5 a day current expenses during his stay in the state. This sum, of course, is increased for two or more persons in the car. One Denver man with his wife and son motored to Mesa Verde recently. He said that he watched his expense account to see how much it cost him. He stopped in cottage camps and in hotels, but did not stop in expensive places. His average was \$10 a day for the two weeks he was gone.

These figures are submitted to counteract an expression that comes from those who are speaking without any personal knowledge or investigation of the facts that the motor tourist does not leave any money in the state.

"One has to drive over the state to get a full realization of what the motor tourist means to Colorado," said the motorist who made an extensive trip that carried him into practically every district. "He must realize that the motorist must have gas and oil, must



Showing a stretch of concrete pavement north of Greeley on the Denver-Cheyenne highway, forming a part of Colorado's splendid paved highway system.



This view shows how the state highway department builds safety devices to protect motorists on main roads. Picture was taken on Denver-Fort Collins highway.

have food and must have a place to sleep. This latter statement reminds me that while you note campers, yet it must be borne in mind that the camper, too, must have oil and gas for his car, and must have food.

"The expenses of a motor tourist are not only for the bare necessities. I noticed that they bought souvenirs, purchased presents to take back home, and that they bought a variety of things. Their money went into a dozen or more avenues.

"The tourist money is new money. I mean that it is additional money brought into Colorado and which goes to Colorado citizens, to remain in the state, and it requires no mathematician to realize the vast sum left by the motor gypsy. The personal wants of the man, woman and child are varied, and it is absolutely impossible to find any commodity that is not salable to the visitor, young or old.

"The impressive thing to me on my travels over Colorado was this spending by the tourist—and I noted it especially in my own case, and being a motorist I was to all intents and purposes a tourist. Farm products are bought directly from the producers, which accounts for the many stands one finds along the road, including those announcing butter, eggs, vegetables, fruit and the like. Here is additional money for the farmer."

Back of this statement by this man is a check-up made by COLORADO HIGHWAYS that discloses the importance of modern highways. Only a few years ago the motor highway we know of today was a wagon road, some of them across the mountains, mere trails for burros. If such roads prevailed today there would not be the motor travel noted this season. The fame of Colorado roads has spread over the Nation, and coupled with the scenic attractions of the Rocky Moun-

tains, and accommodations that will fit any purse, the state is reaching the point where it will increase its popularity for the summer motorist.

Improved highways have had a more far-reaching effect than was anticipated by the people. Aside from drawing tourists to Colorado, the highways have affected localities and they have created a civic pride that was unknown and undreamed of before the advent of the roads. One of the marvels to eastern tourists is the smaller cities with their business districts paved, and often some of the residence streets. They have commented upon this fact and upon the class of commercial buildings and private homes seen even in hamlets. The cleanliness of municipalities is another favorable comment one hears from the strangers.

Colorado is not alone in this bid for tourist travel, and with improved highways as the lure for the motorist. It has spread to every state in the Union and up into Canada. Canada, as an aside, has taken its tip from the United States and the construction of highly improved highways connecting the centers of population of Canada with those in the United States has gone forward with amazing progress in the last few years. Alberta, for example, has made especial bid for American tourist travel in the construction of roads and auto camps, and has gone a step farther in construction of highways as the best known method for increasing the efficiency of the farming communities.

A. B. Mackay, president of the Alberta Motor Association, speaking of the importance of the motor tourist, said:

"Another interesting feature is that any individual to derive benefit or profit from a tourist does not need to have a direct transaction with him. Those who have a direct dealing with the tourist get the money, which

includes a profit. They in turn have many wants and requirements in the community which cause them to buy from others in the community and they use the tourists' money to pay for what they buy. In this way the tourists' cash passes from hand to hand in the community in which it has been left and all directly or indirectly benefit."

Possibly this may be taken as a selfish point of view, but it discloses how the money left by the tourist is circulated eventually through many hands in every community. This is as true in Colorado or any other state as in Alberta.

That improved highways attract motor tourists is demonstrated by statistics. This includes, of course, the marvelous progress made in the building of automobiles. It goes without saying that a few years ago cars were not made whereby transcontinental journeys could be taken with assurance of reaching the destination and returning without numerous troubles with the car. This season has witnessed cars in Colorado from all the forty-eight states, and improved highways have resulted, too, from the progress made in the building of cars. The two go hand in hand.

The Colorado State Highway Department officially reports that as of December 31, 1928, there were 343 miles of paving, 3,797 miles of surfacing and 4,732 miles of graded and drained roads in the state-operated

highway system. It is noted, also, that of the total of 8,872 miles, 8,100 miles have been improved in the last seven years. With this record what can be expected of another seven years, ten years or twenty years?

Statistics also reveal that where improved highways have been built one finds the motor tourist. California is a striking example of this fact; so is New Mexico, Arizona and many other states. Improved highways and improved automobiles have caused the creation of new tourist places in a score or more states, with Missouri creating state parks in the Ozarks as a lure for the motor sightseer and pleasure seeker.

Colorado has extended the improved highways over the Rockies, surmounting apparently insurmountable difficulties, to the two national parks and the four national monuments and to places that only a few years ago were inaccessible except to one on horseback. Scores of remote districts have been opened to the tourist, and the extension of the system each year opens additional scenic and recreational districts. As these places and these highways become known throughout the Nation there will naturally follow an increase in motor travel. The coming years will see additional districts opened by improved roads, affording thereby additional places of interest to the motorist, be he a simple rambler over the state or a permanent home seeker.



In COLORADO HIGHWAYS for April was a story by Thomas H. Tully detailing a trip made in 1910 when the highway commissioners were planning a state highway system. This photograph is of historical interest as an addition to Mr. Tully's story, and was furnished COLORADO HIGHWAYS by J. A. Clay, former member of the advisory board of the State Highway Department, and a pioneer in road advancement in Colorado.

The photograph was taken July 9, 1910, members of the party being as follows: Back row, left to right: C. F. Allen, member of the State Highway Commission; J. E. Maloney, then state highway engineer, and now assistant engineer. Front row, left to right: Thomas H. Tully, member of the State Highway Commission; Otto Mears, "Pathfinder of the San Juan" and famous builder of toll roads; J. A. Clay, of Durango, and Louis

Wyman, Durango. Mr. Wyman was prior to this time state superintendent of highway construction, but had retired.

Added historical interest attaches to this photograph as the party was out to ascertain the possibility and practicability of a highway between Durango and Silverton. Today that road is one of the finest motor highways in the mountains of Colorado and is a part of the famous "Million Dollar" highway between Silverton and Ouray. It is of interest also to note that the "Million Dollar" highway when this photograph was taken was the old Mears toll road.

In transmitting the photograph Mr. Clay says that "the party went from Durango to Cascade creek by horse and buggy, camping over night at Cascade, and then on horseback to Silverton the next day," a trip by automobile today of about five hours.

NEWS OF THE MONTH

On August 12th the highway department received a bid from the Steamboat Transportation & Storage Co., of Steamboat Springs, for the gravel surfacing of nineteen miles of roadway between Rifle and Meeker. The bid of the Steamboat contractors was \$47,125. The type of improvement will be crushed rock and will be used to renew the surface of a road which was improved several years ago south of Meeker.

The department also received a bid on August 12th from Bailey & Edwards, Manassa, Colo., contractors, for the grading of twelve and a quarter miles of new roadway east of Mosca, on the newly declared state highway No. 150. This project marks the start of the Mosca Pass highway from the San Luis Valley. The work will include 78,000 cubic yards of excavation. The contractor also will furnish 115,000 lineal feet of barbed wire fencing. He agrees to finish the work in 100 working days.

Hamilton & Gleason Co., of Denver, has been awarded a contract for the construction of two and one-half miles of new gravel surfaced highway near Mt. Harris in Routt county. The contract price was \$161,911. The work includes some extra heavy excavation, including 135,000 cubic yards of various types of material to be moved. There is 107,000 yards of overhaul on the project. There were five bidders for the job. The contractors require 200 working days to complete the project. Completion of this work will mark the elimination of the worst stretch of roadway between Steamboat Springs and Craig located on the Victory highway.

Another improvement on the Victory highway west of Craig was started with the opening of bids on eight and a quarter miles of new gravel surfaced roadway on August 12th. Lowest bidder on this work was Gardner Bros. & Glenn Const. Co., of Silt, Colo. Their bid for the completed work was \$102,825. Like the Mt. Harris project, the U. S. Bureau of Public Roads will share in the cost of this work. The contractors agree to complete the work in 200 working days. The project is an extension of the improved highway west of Craig toward Maybell.

The highway department is co-operating with Washington county in the improvement of State Road No. 54 between Akron and Otis. This is located on the main road between Akron and Wray. The road will be raised and gravel surfaced. Commissioner Arthur Mitchell will have supervision of the work.

State Road No. 54 also is being gravel surfaced south of Brush. A large fleet of county trucks is at work. Farmer teams also are being employed. The state also is co-operating in this work. The road was graded last spring.

Bids will be received by the highway department August 19th for the construction of forty-two miles of grading between Sterling and Ovid in Sedgwick and

Logan counties. This is the longest single job to be undertaken on one contract in Colorado for a number of years. The new road calls for the elimination of several railroad crossings by relocation. It is estimated the work will cost \$250,000.

Frank L. Hoffman, Denver contractor, has finished eleven miles of grading and gravel surfacing west of Kremmling on U. S. Highway 40. He is now grading and graveling four additional miles connecting with the completed project on the west which will take the new road to the foot of Rabbit Ears Pass. When finished it will give a splendid gravel road from Kremmling to Steamboat Springs. Commenting upon the completion of the new road, the "Steamboat Pilot" says:

"Everyone who travels the Victory highway will give a few cheers when the newest government aid project on Muddy Pass is finished and the new road put into use. The Muddy has caused more delay, more expense and more bad advertising for Colorado than any other stretch of road within its borders. In a short time the last link will be completed and the new gravelled highway put into use."

The contractor is rushing the work at top speed in order to finish before snow flies.

"Keep the traffic moving at all odds." That's the slogan of the maintenance division. And that's exactly what it has been doing for several weeks of heavy rains in various parts of the state. J. P. Donovan, assistant superintendent of maintenance, traveled over 2,000 miles the first two weeks of August keeping in contact with work in southern and southwestern Colorado. Three days in succession floods washed out the road at Ouray and three days in succession road crews put it into condition again. Motorists were delayed a couple of days because of washouts on the Million Dollar highway between Ouray and Silverton.

W. A. Colt & Son, of Las Animas, have moved a big dirt moving outfit into Bearcreek, located in the Montezuma national forest. They will eliminate the Bear Creek grade, said to be one of the most dangerous stretches between Dolores and Rico. The road is being constructed entirely with forest service funds.

Recent heavy rains in various parts of the state damaged main highways to the extent of \$200,000, according to an estimate made by Robt. H. Higgins, state maintenance head. The damage consisted of washed out culverts and bridges, and removal of surfacing by the unusual rainfalls.

The new pavement being laid between Fort Morgan and the Weld county line on U. S. Highway No. 38 will be ready for traffic by September 1st, according to a report received from Edward Selander, contractor. Workers on the job have been handicapped by the hot weather, but work has progressed in a very satisfactory fashion, according to the engineers.

The new highway over Fool's Hill, between Grand Junction and Delta, eliminating a dangerous stretch of road, has been completed by Gardner Bros. & Glenn. The project consisted of four miles of grading and gravel surfacing, costing \$60,800.

A state highway crew has renewed construction of the famous Loveland Pass road, expecting to near the summit before cold weather. The crew started one and one-half miles from the summit.

The joint resolution now before Congress to create a United States Motorways Commission is hailed as an effective ally by the American Road Builders' Association in its fight for betterment of traffic conditions throughout the nation.

The commission would first consider the question of a national system of express motorways. These would take care of high speed, through traffic. Proponents of the express highways would have lanes for fast traffic in the center, slower traffic on the outside, and have traffic on all intersecting roads separated into different levels.

Senator Lawrence C. Phipps, of Colorado, chairman of the senate roads committee, has asked Congress to authorize a nonsalaried commission composed of two senators, two representatives, an official of each of the six government departments of labor, agriculture, post-office, commerce, war and treasury and a civilian who is experienced in industrial, military, aviation and traffic problems. This group would study the many suggestions which have been made to relieve traffic congestion and then furnish a comprehensive report with recommendations to Congress and the president.

Representative John M. Robison, of Kentucky, sponsored the resolution in the lower house of Congress. Both he and Senator Phipps have long been champions of federal aid roads.

"Such research," Senator Phipps declares, "might save years of haphazard investigation as well as hundreds of millions of dollars to the nation's taxpayers." It is believed that the study should be nationwide in scope, although initial projects would be put into operation where traffic conditions most demand. The senator believes the proposed commission would find great need of "feeder highways" to augment the federal system. He urges that these be built as rapidly as possible.

According to Charles M. Upham, secretary-director of the American Road Builders' Association, much good can be accomplished by a motorways commission, and he has offered the research facilities of the Road Builders' to aid in the investigation.

"Highway planning of today must be with traffic requirements of the future in mind," Upham declares. "We will need broader and safer highways as motor vehicle registration advances toward the fifty-million mark in the United States. Our state systems of gas, taxation and registration fees make increased road building activity possible. Every cent of such funds collected must be returned to the highways in fairness to the motorist. Additional finances must be obtained by issuance of highway bonds in many cities and counties.

"Not only must we consider the expensive express motorways and the low cost rural roads, but the secondary routes must be given due attention, and all road building co-ordinated into one great national plan."

A Successful Motor Trip to the Far West

INDICATING that the tourist information service of the Atlanta Motor Club and the kindly assistance of the AAA clubs in many states were responsible largely for a perfect motor trip of five thousand miles, A. W. Malone, of 544 Trust Company of Georgia Building, writes most interestingly of his recent journey by motor to Colorado. He says:

"We have just returned from a five thousand mile motor trip to Denver and the Rocky Mountains. We left Atlanta June 2d and traveled via Chattanooga, Nashville, Evansville, Vincennes, St. Louis, Kansas City, Salina to Denver, 1,663 miles. The roads were splendid with the exception of Georgia and about one hundred miles in Kansas. We returned over the same route to Vincennes, then through Louisville, Lexington, Asheville, Franklin to Atlanta, 1,871 miles, arriving June 30th. We spent seven days each way in making the trip, which allowed time enough for us to enjoy the beautiful scenery and visit the interesting places along the route.

"Denver is the cleanest city I ever saw and her marvelous chain of public parks, both in the city and in the mountains, together with the Rocky Mountain national park near at hand, offer the tourist and camper an ideal spot for a vacation.

"There are sixty-one mountain peaks in the United States higher than 14,000 feet, and forty-seven of these are in Colorado. We were constantly making one-, two- and three-day trips into these mountains, crossing the Great Divide twice and were above timber line several times. On June 15th, the first day that Milner and Fall River passes were open to the public, we drove through numerous cuts in the snow twenty to twenty-five feet deep, where the contractors had just succeeded in clearing the road.

"We visited Echo Lake, Grand Lake, Berthoud, Milner, Fall River and Ute passes, Big Thompson, Boulder, Saint Vrain and Phantom canons, Royal Gorge, Pikes Peak, Colorado Springs, Manitou Springs, the Garden of the Gods, Cliff Dwellers, Cave of the Winds.

"A most interesting trip was to Cripple Creek, from Colorado Springs over the Corley Mountain Highway through nine tunnels. President Roosevelt is quoted as saying that the scenery along this route 'bankrupts the English language.'

"The entire trip, with the one exception of the climb to the top of Pikes Peak, was made with my wife and daughter in our 1929 Buick sedan. My daughter and I usually alternated at the wheel every fifty miles.

"I was surprised at the ease with which the trip was made and was delighted with the openhearted, cordial co-operation I received on every hand in the West. My membership in the Atlanta Motor Club opened the door for me to every motor club along the route and the Rocky Mountain Motorists, Inc., in Denver, planned each of my mountain trips. I realize that the success of the most enjoyable vacation I ever had is due in a very large measure to you, and I wish to thank both you and the Rocky Mountain Motorists for your kindly assistance and your splendid advice and invaluable maps, all of which were furnished without cost.

"I have gathered a considerable amount of data regarding Colorado and will be pleased to give any information I can to any member who contemplates a trip to the Rockies."

Highway News of the United States

ROADSIDE ADVERTISING BATTLE SETTLED

Anti-sign legislation passed by the recent New Mexico legislature threatened for a time to involve the state's highway department, who were charged with enforcing the law, into a fight with sign owners.

The futility and probable waste to both parties appealed strongly to signboard owners and highway officials alike with the result that a meeting was arranged in which both sides presented their cases. When the problem had been fully discussed the signboard owners decided to co-operate with the highway department and immediately remove such of their signs which were in conflict with the law, while the state officials promised that the law would not be fanatically enforced but would be interpreted in a light which would do the greatest good to the traveling public.

Rhode Island—During 1928, forty-six miles of pavement from twenty to forty feet wide was completed, 31.7 miles being new construction and 14.3 miles reconstruction.

Florida—More than two hundred fifty miles of sand-clay base topped with asphalt and slag chips is in service. The base averaged \$2,500 a mile and the top \$2,200. This low-cost type, designed to expedite farm marketing, has served 1,000 vehicles daily or more with economy.

Minnesota—Oiling and tarring on state routes this year is to total one hundred and twenty-five miles, bringing the mileage of this class of surface up to six hundred and forty-six miles. About three hundred and sixty miles of retreatment is also in progress. New treatment costs \$2,500 for tar and \$2,000 for oil, while retreatment costs \$1,200 and \$800 per mile.

Ohio—The sheriff of Franklin county has equipped all county-owned cars with brooms and has ordered his deputies to keep the highways cleared of glass broken in accidents.

Michigan—The feasibility of working toward a forty-foot shore line highway circling the state is being studied by the state highway department. The highway would cost about thirty million dollars. Widening highway No. 31 to forty feet from the Indiana line north, and relocation along the Lake Michigan shore between Grand Haven and Manistee are among the first steps contemplated.

South Dakota—A new state law provides that the county highway superintendent shall maintain township roads on mail routes, in case of their neglect.

New Mexico—Oiled gravel roads cost approximately half as much to maintain as untreated gravel. Figures for ordinary gravel average \$250 a mile yearly, or \$200 not counting equipment depreciation and repair, while oiled sections have averaged only about \$125 a mile per year.

LOUISIANA TO SET NEW PAVING RECORD

Louisiana, whose voters last fall approved a highway bond issue of \$30,000,000 and raised the gas tax from two to four cents a gallon, will shortly embark on the state's greatest road building season.

Plans call for the completion this year of some eight hundred miles of concrete pavement. This is considered a rather ambitious undertaking, but Leslie R. Ames, state highway engineer, is hopeful that this will be accomplished, provided a sufficient number of well-equipped and responsible contractors can be obtained. Most contracts will be for fifteen or twenty miles.

Immediate paving in Louisiana will be greatly facilitated by the good road beds now existing on state highways. Nearly all of the state highway system is either graded or gravel surfaced. Four main highways will be paved first. These include the Jefferson highway and another north and south route, and two east and west roads, one of which is the Old Spanish Trail.

Plenty of aggregate is available for the construction work. There are now enough pits and quarries to supply materials for hard surfacing and a much greater annual mileage than is anticipated by the present extensive program.

By reason of Mr. Ames' wide highway building experience, particularly as chief highway engineer of North Carolina for several years, Louisiana will be enabled to start on a larger immediate program than would otherwise have been possible. Mr. Ames won nationwide recognition for large-scale pavement laying while in North Carolina. There he superintended the construction of several hundred miles of concrete yearly.

A "highway clinic," a gathering probably unique in highway annals, was recently held in Nashville, Tennessee. It was attended by some six hundred and fifty state legislators, county officials (fifty-seven of the state's ninety-five county judges being present in person), automobile club officials, and other civic leaders interested in highway development. No other matter of public interest would have resulted in such an attendance from these men, who came in the interest of developing the highways, and therefore the state.

The meeting was opened by a speech from Governor Henry H. Horton, who gave his approval to a road plan submitted to the meeting.

The two-fold purpose of calling the gathering was to review highway progress of the past year and discuss recommendations and a plan which the state department of highways proposed to lay before the legislature. The material for discussion was embodied in the department's annual report, copies of which were distributed at the meeting.

Colonel Harry S. Berry, commissioner of highways, who called the meeting, reviewed the road facts and outlined the recommendations, stressing the need for additional funds to complete new roads required by Tennessee's growing motor vehicle traffic.



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New Highway Equipment and Materials

LIBERTY TRUCK CONCERN MOVES INTO NEW MODERN BUILDING

The Liberty Truck and Parts Co. are now located in their new building at West Sixth Avenue and Bannock Street. This concern is Colorado distributor of Cletrac tractors, F. W. D. and Indiana trucks, Wood hoists, etc. They also carry the largest stock of parts for all makes of trucks in the Rocky Mountain territory.

They are now housed in a new, modern brick and steel building, 50x125 feet, with

Ray Corson, sales manager of the firm, has spent a month's vacation in Virginia. During his absence William Boese took over city sales while John B. Burke assumed the duties of order clerk.

Harry P. Wilson is now on an extended vacation trip with his family. He was entitled to it—business has been good all spring and summer, says H. P. This includes all the lines handled by the Wilson firm, namely: Koehring draglines, shovels, mixers, etc.; Austin-Western graders, Monarch tractors, and Insley concrete chuting equipment, etc.

For leveling dirt and rock dumped from trucks, pushing dirt and rock over fills, backfilling trenches, building airport fields and other similar work, bulldozers mounted on tractors have come into universal use. On this page we illustrate an "Ateco" hydraulic bulldozer mounted on "Caterpillar" tractor.

The "Ateco" hydraulic bulldozer is constructed of steel throughout, being electrically welded and sturdy enough in all parts to withstand without damage the full pushing power of the tractor.

The "Ateco" hydraulic bulldozers are manufactured by the American Tractor Equipment Company, of Oakland, California, recently organized to build bulldozers and dirt movers manufactured under the McMillan patents, over 150 of which are now in use. "Ateco" hydraulic bulldozers are sold through tractor dealers throughout the United States and foreign countries.

The "new baby" at Cheyenne, namely, the H. W. Moore Equipment Co. of Wyoming, is surely stepping out of its swaddling clothes and hanging up some record sales. John R. Wortham, general manager at Cheyenne, reports sales of eight Jaeger mixers, one Galion one-man maintainer, a McCormick-Deering Bay City shovel, a ½-yard General, a Cedar Rapids hoist and dragline outfit, a Galion grader and Perry Fresno—and a lot of miscellaneous stuff.

ZONING LAWS TO PROTECT HIGHWAYS

Zoning laws to protect the state highways may become general in the future, according to legislation under consideration in various states. A bill before the Massachusetts legislature which has been referred to the next session will zone 1,600 miles of state highway. The principal object of such legislation is to abolish the so-called automobile slums which now disfigure the principal roads of Massachusetts, as well as other New England states.

The proposed law lays down definite regulations for control of the use of the land for a distance 500 feet back of the roadway and to require permits for erection of buildings for any use other than in connection with the growing and sale of the natural products of the land.



Showing McCormick-Deering crawler tractor recently developed by the International Harvester Co.

a demonstration field for their equipment. Two new pieces of road building equipment are being shown in their spacious showroom. These include the new, improved Model 30 Cletrac, and a new automatic two-ton dump Indiana truck. The latter is one of the best looking "dirt moving jobs" seen in these parts for some time.

Richard Carlson, general manager of the concern, has issued a general invitation to all contractors and road officials to visit their new quarters.

Hinman Brothers Const. Co. have purchased a new Lorain 75 1½-yard shovel for use on their state highway contract located between DeBeque and Palisade. This is one of the longest and heaviest rock excavation jobs let by the highway department in several years.

Elton T. Fair Company have a "set-up" of one of the latest model Pioneer portable gravel crushing and screening plants on their demonstration field located on Wazee Street in Denver. Two of these plants were delivered to Colorado contractors during the past month.

The Fair firm also are Colorado agents for Adams graders, Stroud elevating graders and D. A. lubricants. Mr. Fair reports the largest volume of business in the history of the concern this year.

All deliveries on a large order for Monarch tractors received from the state highway department have been made by the Wilson Machinery Co., Colorado distributors of the Allis-Chalmers product.

Louis L. Clinton reports for the Clinton-Held Company, Colorado agents for the Caterpillar line of tractors, Russell graders and Holt combines, the largest business on record. This concern recently sold Weld county ten Caterpillar tractors. This county now has forty-two "cats" in service. More than fifty tractors of varied sizes have been sold to wheat and corn farmers in eastern Colorado this season.

John Jay, president of the Iowa Mfg. Co., of Cedar Rapids, was a Denver visitor the second week in August. He landed in the company's plane, the Cedar Rapids. He recently completed a sixteen-day tour of the eastern half of the United States via airplane. While in Denver he was the guest of George Meffley, general sales manager of H. W. Moore Equipment Co., local sales agents for the Cedar Rapids one-piece crushing plants.

A crawler dump wagon recently placed on the market by the Caterpillar Tractor Co.



The Footprints of the Engineer

(Continued from page 6.)

necticut, you are relegating the passenger train to districts of dense traffic, eliminating warehouses, preventing terminal congestion, providing delivery from zoning stations and in less than car lots, saving insurance, increasing speed of service, and saving enough in gas alone in twenty years to pave the road. These ends being achieved by motor traffic are only possible by reason of your service.

In the system of state and national road programs now under way literally billions of dollars are by the American people intrusted to your care and dependent upon the fidelity of your service. It is for you, as the trusted agent of the common people, who pay the taxes, to stand firmly against the greed of selfish interests on the one hand and the shifty machinations of the politician on the other. Let your service be commensurate with the importance of your task to the welfare of the nation, and that cannot be exaggerated.

Rockwell Kent, in one of his most effective pictures, has drawn "The Star-Lighter"—a tall, powerful and graceful figure, his torch held aloft, striding from constellation to constellation, setting alight the stars as "Night lets her sable curtain down." May we not picture in imagination something tintured with the same

symbolism—the figure of the highway engineer traversing the continent, trailing in his wake the silvery pathways that shall indeed make our nation one. Today he is penetrating crowded cities and remote and lonely places, touching with his magic wand the pulse of 115,000,000 free citizens of the great republic, bringing delights, service, economies, unity that the world has never known. And not only within our borders, but the day is approaching when, thanks to you, I may travel with my auto on an international trunk highway from Winnipeg to Cape Horn, and from Cairo to Cape Town. I can follow the route of Alexander, fill my radiator within the sacred precincts of the Garden of Eden, and touring leisurely under the shadow of Everest, pick up the historic trail of the Grand Trunk and follow on to the Indian Ocean—following always "the footprints of the engineer." Making always for unity, acquaintance, understanding. Such are the possibilities of your service, such the dignity of your achievement.

So I come to you today with the old appeal to catch the significance of your relation to the work of building a nation, your unequalled chance to cement the unity of American life, and that as the century goes on from one victory to another, as it will, in the footprints of the engineer, you may rightly feel that your footprints have helped to guide the nation to that destiny which is the goal of all our prayers.

PLANS BEING DRAFTED

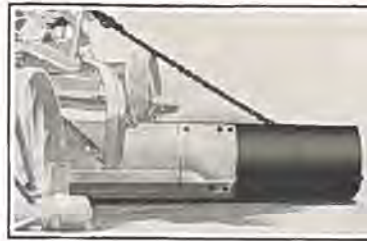
Proj. No.	Length	Type	Location
2-R No. 9	1.5 mi.	Pavement	Starkville
68-R	1.9 mi.	Gravel Surfacing	North of Monte Vista
78-R	0.5 mi.	Overhead R.R. Crossings & Gravel Surf.	South of Minturn
144-D	3.0 mi.	Gravel Surfacing	Northwest of Fort Collins
57-R	0.5 mi.	Bridge	North of Lamar
150-A	8.0 mi.	Gravel Surfacing	West of Craig
151-A	4.0 mi.	Gravel Surfacing	South of Granby
165-Reop.	3.0 mi.	Concrete Pavement	East of Canon City
175-A	40.0 mi.	Grading	Northeast of Sterling
253-D	2.5 mi.	Gravel Surfacing	Mt. Harris
263-A	4.0 mi.	Gravel Surfacing	Northeast of Fort Garland
267-C	3.0 mi.	Grading	Near Model
272-E	2.0 mi.	Concrete Pavement	West of Rocky Ford
282-G	5.0 mi.	Gravel Surfacing	South of Craig
296-E	5.0 mi.	Gravel Surfacing	South of Greenhorn
279-H	2.0 mi.	Gravel Surfacing	East of Kenosha Pass
300-B	2.0 mi.	Grading	North of Silverton

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
2-R7	South of Aguilar	1.224 mi.	Paving	H. C. Lallier Const. & Eng. Co.	\$ 66,990.60	100	2-R7
2-R8	Aguilar, South	1.633 mi.	Paving	J. Finger & Son	66,660.00	100	2-R8
97-R1	East of Lamar	.....	Bridge	W. A. Colt & Son	24,237.50	50	97-R1
134-B1	East and West of Vona	3.352 mi.	Gravel Surfaced	W. A. Colt & Son	32,605.00	100	134-B1
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	98	138-A
144-C	Bet. Fort Collins and Laramie	2.934 mi.	Gravel Surfaced	Bedford & Woodman, Inc.	37,911.35	88	144-C
147-C	South of Cortez	.....	Gravel Surfaced	E. J. Maloney	86,182.75	39	147-C
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	71	149-A
208-AR	East of Grand Junction	0.507 mi.	Gravel & R. R. Grade Separation	Harry A. Roush	59,568.00	97	208-AR
208AR2-CR1	East of Grand Junction	.....	Oil Processed Gravel Surface	Hinman Bros. Const. Co.	44,652.05	7	208AR2-CR1
242-C	West of Fruita	6.011 mi.	Gravel Surfacing	Hinman Bros. Const. Co.	56,344.50	91	242-C
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	95	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	62	258-G
258-H	West of Sapinero	4.921 mi.	Gravel Surfaced	Cole Brothers	123,700.60	0	258-H
259-A1	Between Parlin and Sargents	3.350 mi.	Gravel Surfaced	Ed. H. Honnen	51,551.00	62	259-A1
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	77	262-I
266-D	South of Bondad	4.111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	96,075.30	63	266-D
270-C	Betw. Alamosa and Monte Vista	5.	Oil Pro. Gravel Surf.	Mountain States Const. Co.	38,485.50	5	270-C
271-C	West of Portland	2.430 mi.	Surfacing	J. Finger & Son	54,843.40	93	271-C
272-D	East of Manzanola	1.950 mi.	Pav. & R. R. Underpass	Driscoll Construction Co.	88,237.50	39	272-D
277-D1	Betw. Colo. Springs & Pueblo	.....	Grading	M. E. Carlson	218,277.80	26	277-D1
277-E1	South of Colorado Springs	.....	Grading	J. L. Busselle	221,389.65	6	277-E1
279-F	North of Baileys	3.444 mi.	Graded	J. Fred Roberts & Sons	126,000.00	99	279-F
282-AR1	South of Craig	600 ft.	River Protection Work	Hinman Bros. Const. Co.	11,925.00	100	282-AR1
282-E	North of Meeker	6.421 mi.	Gravel Surfaced	Luke E. Smith & Co.	88,384.20	82	282-E
282-H	Between Rifle and Meeker	7.029 mi.	Gravel Surfaced	Winterburn & Lumsden	82,589.74	16	282-H
286AR1-BR2	North of Nunn	.....	Oil Process Gravel Surface	L. E. Smith & Co.	20,575.25	96	286AR1-BR2
287-AR5	Between Greeley & Ft. Morgan	.....	Concrete Pavement	Edw. Selander	154,682.85	32	287-AR5
292-B	Between Gilman and Minturn	2.640 mi.	Gravel Surfaced	O. J. Dorsey	29,146.80	30	292-B
292-C	West of Avon	.....	Gravel Surfaced	Ed. H. Honnen	39,663.10	28	292-C
293-C	North of Ouray	3.661 mi.	Grading	C. V. Hollenbeck	62,997.80	77	293-C
295-BR1	South of La Jara	6.622 mi.	Oil Pro. Gravel Surf.	Pope Bros. Const. Co.	14,226.50	12	295-BR1
295-D	North of Antonito	2.460 mi.	Oil Pro. Gravel Surf.	Levy Const. Co.	72,676.75	0	295-D
296-C	N. of Greenhorn on S. H. No.1	6.706 mi.	Surfacing	H. C. Lallier Constr. & Eng. Co.	115,466.80	100	296-C
297-C	Southwest of De Beque	9.953 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	312,453.50	0	297-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssier	38,426.00	23	298-B
299-B	Btw. Delta and Grand Junction	3.465 mi.	Gravel Surfaced	Gardner Bros. & Glenn	60,804.80	98	299-B

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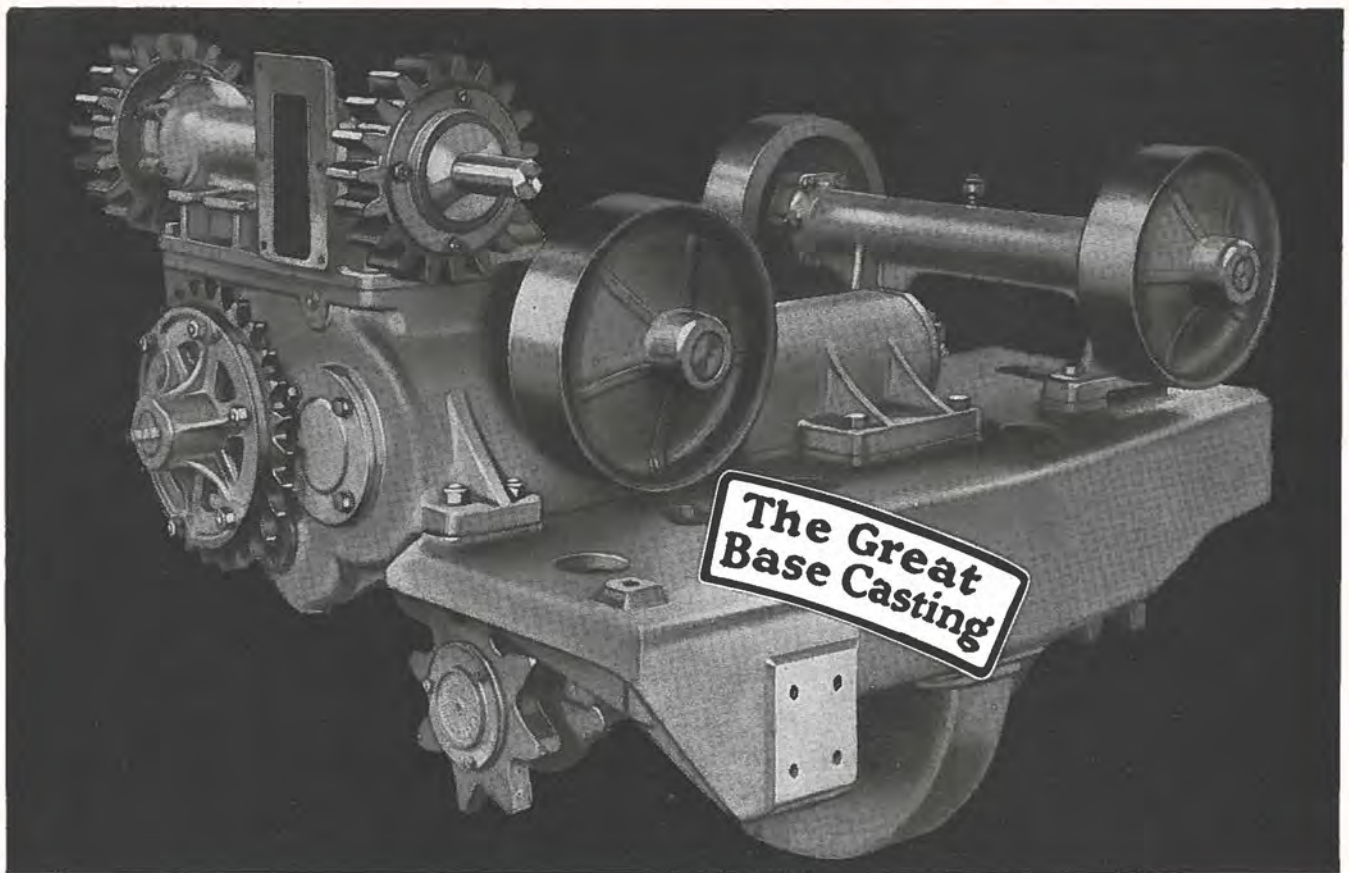


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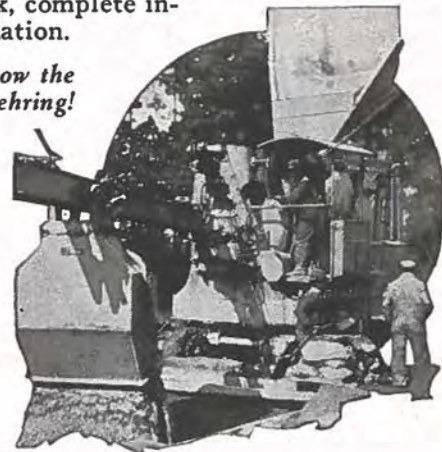
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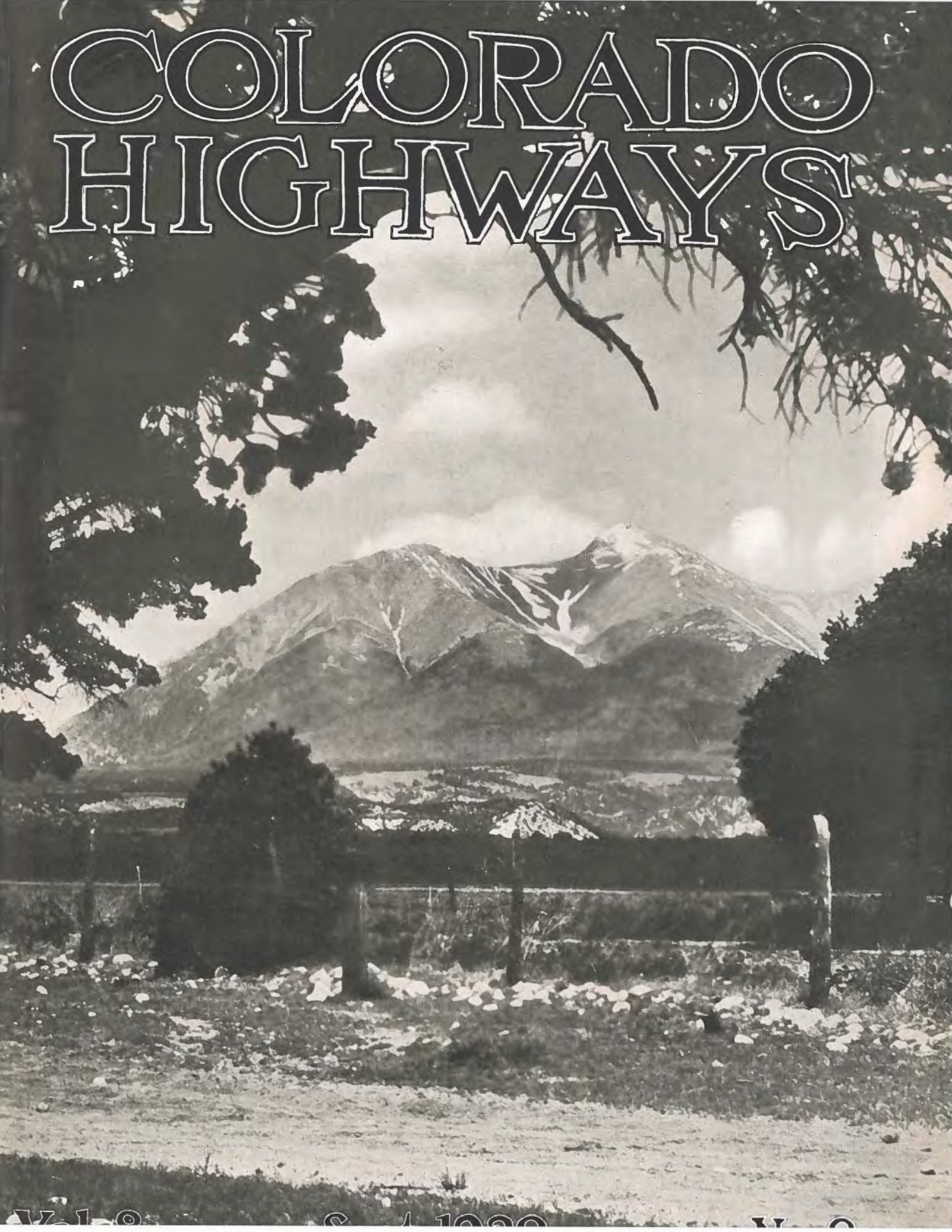
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Official Publication of the
COLORADO STATE HIGHWAY DEPARTMENT
 Denver, Colorado

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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,

1803½ Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
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Our Cover Picture

ON this month's cover of COLORADO HIGHWAYS we print a splendid picture of "The Angel of Shavano," as seen from U. S. Highway No. 50, near Salida, in Chaffee County. Like the Mount of the Holy Cross, the Angel of Shavano is visible the year 'round, and is a big attraction to tourists from all parts of the world.

—Photo by courtesy Colorado Association.



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Highway Legislation by the States

Legislatures of Over Forty States Enact Laws to Carry on the Highway Work for the Next Biennium

OVER forty legislatures met in the first three months of this year and enacted legislation covering the work of the states and the counties as affecting the development of the highway transportation system. In some states there was no particular legislation enacted in view of the fact that a general policy had been previously adopted and the sources of revenue were fixed.

It is interesting to observe that 21 legislatures increased the gasoline tax as a means of securing additional funds for road improvement. However, it is also of importance to note that in the distribution of the increased gasoline tax 17 out of the 21 states give all of the increase, or virtually so, to improvement of county roads as distinguished from the state system. In a few instances gasoline tax funds are given to cities.

With the favorable action of the legislatures of Illinois, Massachusetts and New York, all of the states now use the gasoline tax as a means of securing funds for road work. Without doubt, this action is permanent. While there is a limit to the amount of gasoline tax that should be levied as far as a reasonable expectation of return is concerned, there seems to be a tendency to increase the tax for this purpose. Two legislatures made an increased gasoline levy for a limited period of time only, but past history indicates that that action will not be conclusive.

In the matter of safety on the highways, several legislatures have enacted laws very similar to what has been known as the "Hoover Code." The speed limit has been increased, and in a few cases eliminated entirely. State traffic patrol has been organized in a few states and the number increased in others. Drivers' licenses as a measure of safety have been required by many legislatures, and we predict that in a few years it will be universal throughout the country.

ARKANSAS

The legislature of Arkansas changed the organization of the Highway Department and created a fully appointive board and the chairman to be chosen from this board (instead of being the land commissioner, as heretofore, elected by the people).

Funds for state roads out of bond issues were increased \$5,000,000 for 1929, and the same amount for 1930.

The possibility of privately owned toll bridges was legislated out of existence and a law passed which makes it possible for the State Highway Commission to condemn, for the purpose of purchasing, any toll bridge now located on the state highway system, which is privately owned.

Approximately 300 miles of new roads were added to the state system.

COLORADO

The legislature of Colorado increased the gasoline tax from 3 to 4 cents, effective May 1. This gasoline tax is divided, 70 per cent to the State Highway Department, 3 per cent to

the State Highway Department for a special fund to be expended in cities of more than 2,500 population in accordance with the motor vehicle registration, 27 per cent to counties "to be expended for improvement of public highways." The $\frac{1}{2}$ mill levy heretofore made for road purposes has been taken away from the Highway Department and allocated to the general fund of the state. While the change in gasoline tax will increase the gross revenue by \$1,300,000, the removal of the $\frac{1}{2}$ mill tax, however, will leave the State Highway Department with no more funds than heretofore.

A uniform traffic code bill passed the house, but failed to receive the sanction of the senate.

CONNECTICUT

The state legislature of Connecticut passed a very few laws affecting the Highway Department or the work. There were no increases in funds made, but a transfer was made for administrative expenses from the civil list fund to the gasoline tax and motor vehicle registrations, thereby for the first period cutting down the amount that will be expended for road work.

An increased weight equal to a total gross weight of 30,000 pounds was made for pneumatic tires and the fees were reduced above four tons about 25 per cent.

About 50 miles of new trunk line highway was added to the state system.

DELAWARE

The Delaware legislature passed a new motor vehicle act very close to what is known as the Hoover Code. The maximum truck and bus load was increased from 22,000 to 24,000 pounds for pneumatic tires, and a six-wheel law was passed allowing a gross load of 36,000 pounds.

A bill to regulate advertising signs was defeated.

IDAHO

Few measures of importance affecting highway administration and financing were acted upon during the recent session of the Idaho legislature, although considerable interest was shown in highway affairs.

An increase in the gasoline tax from 4 to 5 cents per gallon had been proposed, mainly for the purpose of extending the state system to include market roads, but was never reported out of committee. Some increases were made in license and registration fees for trucks and stages, but not to the direct benefit of the highway fund. The entire proceeds of the gasoline tax, except for collections on fuel for aeroplanes, which will be paid into the newly created aeronautics fund, are still available for state highway purposes, and no material change was made in the division of the motor vehicle license fees. No new sources of revenue were provided, and funds for the use of the department for the next two years will be approximately the same as during the past biennium. Limited issues of treasury notes in anticipation of gasoline



Fine stretch of gravel-surfaced highway on Santa Fe Trail, located east of Pueblo.

tax receipts were authorized for the purpose of increasing the flexibility of the state highway fund.

The most important enactment from an administrative standpoint was a railroad crossing bill, authorizing the highway department and local officials to negotiate with railroad companies for the elimination or alteration of crossings, providing for appeal to the Public Utilities Commission in case of disagreement. Provision was also made for the designation of arterial highways, for stricter control of signs and markers on state highways, and for co-operation on maintenance and construction of state highways within certain classes of incorporated municipalities.

Of laws affecting the use of highways, the most noteworthy are a revision of load limits as applying to heavy vehicles, and a provision for operation of stages under permits issued by the Public Utilities Commission. The drivers' license law, proposed for the dual purpose of traffic regulation and of providing funds for enforcing traffic laws, failed to obtain approval, but a motor vehicle fund for the latter purpose, expendable by the department of law enforcement, was created by increases and diversions of license fees. Efforts to control advertising signs within view of highways on a permit and license basis met with legal difficulties and were abandoned for the present.

INDIANA

The legislature of Indiana increased the gasoline tax, effective April 1, from 3 to 4 cents, making the entire increased amount available for use by the State Highway Commission.

The speed limit on rural highways was removed, subject to certain regulations.

Drivers' licenses were also ordered to be required, effective July 1.

IOWA

A brief summary of the legislation affecting highways in Iowa passed this spring is as follows:

Submission of an amendment to the constitution permitting the general assembly to issue bonds to the extent of \$100,000,000 for highway purposes (this in lieu of a like measure passed last year and declared unconstitutional on technical grounds).

The State Highway Commission is given authority to determine location of all primary road extensions.

Iowa for many years has had a provision which prevented the condemnation of rights of way of roads through orchards. This has been amended by the legislature so that the state has that authority.

Control of traffic on public roads is placed in the hands of the State Highway Commission. The commission is given power to establish rules and regulations for control of traffic on primary roads. Also the commission is authorized to establish seasonal load limits.

Extension of primary roads within cities and towns as arterial highways and requiring traffic approaching such highways to come to a stop is placed under control of the State Highway Commission.

Speed limit of motor vehicles weighing less than three

tons has been removed when driven outside of cities and towns.

Another important measure passed by the Iowa legislature was a complete revision in the administrative machinery with reference to secondary roads. Township trustees are eliminated from the administration of highway affairs. All county and township road work is placed under the county boards. The State Highway Commission will establish standard plans and specifications, approve contracts and advise with the county board of supervisors concerning road matters.

A bill was passed increasing the limit of county indebtedness in order that counties might assist in speeding up road construction on the state system until such time as the bond issue can again be approved by a vote of the people.

KANSAS

The recent Kansas legislature remodeled the highway law so that for the first time in the history of the state the entire control of a state system of highways was placed in the hands of a State Highway Commission. The funds for building this system are to be raised from automobile license fees and gasoline taxes.

The present gasoline tax of 2 cents was increased to 3 cents, to continue for a period of two years, ending July, 1931; after which, without additional legislation, the gas tax will revert to 2 cents. The entire automobile license fees and gas tax are placed in the hands of the state treasurer, but the legislature provided a sum of \$3,200,000 to be returned to the counties and townships for construction of county and township roads. The increase of the gasoline tax, together with a slight change in distribution, will increase the state system construction fund about \$2,000,000 a year.

The county officials are given authority to take over all of the roads in their respective counties not on the state system.

A law was also enacted which removes the speed limit entirely from the state system and requires the State Highway Department to erect "stop" signs at all roads entering state highways. This very definitely gives the state highway system the right of way.

Another law, placed for the first time in the hands of the state, regulations concerning the size and weight of vehicles upon the highways. It provides that vehicles shall not exceed 96 inches in width or be greater than 13 feet in length; also that a combination of vehicles shall not exceed 60 feet in length. The gross weight permitted on a single unit on four wheels shall be 24,000 pounds and the gross weight on any one axle shall not exceed 16,000 pounds; also vehicles having three axles shall be permitted to carry a maximum load of 34,000 pounds.

LOUISIANA

Up until the last session of the Louisiana legislature the gasoline tax was 2 cents, all of which went to the state maintenance fund. Since then 2 cents additional have been added, 1 cent going to the general maintenance fund and 1 cent pledged toward a \$30,000,000 bond issue for hard-surfaced roads.

The motor license fees on farm trucks were changed to not exceed \$15 per vehicle.

In view of the authorization of \$30,000,000 bond issue, the funds for the next two years for road construction will be greatly increased. In addition to the above, a special bond issue of \$2,000,000 was authorized for the New Orleans district.

The speed limit was changed from 30 to 45 miles on state highways. All signs on state highways must be authorized by the State Highway Commission. One thousand miles of roads were added to the state highway system. Of this 1,000 miles, almost 800 miles have already been improved by the parishes, and now the state takes over these roads for maintenance.

MAINE

The legislature of Maine passed a law creating a new commission of three members. The law is very similar to the one heretofore in operation, except that instead of an annual salary of \$1,000 for each commissioner, they will be paid \$3,500.

The legislature referred to a vote of the people a constitutional amendment which would authorize the issuance of \$15,000,000 in bonds, \$10,000,000 for roads and \$5,000,000 for bridges.

Also the people will vote upon the question of whether to increase the gasoline tax from the present rate of 4 cents to 5 cents. The 4-cent tax is divided $1\frac{3}{4}$ cents to construction and reconstruction of the state highways, 1 cent to state aid or second class construction, $\frac{3}{4}$ cent to maintenance, and $\frac{1}{2}$ to third class highways. Under the 5-cent tax the distribution would be $1\frac{1}{2}$ cents for maintenance, $\frac{1}{2}$ cent for third class highways, 1 cent for state aid and 2 cents for construction of state highways. The funds for state highways may be transferred to maintenance if necessity arises.

Two toll bridges were authorized.

The method of licensing motor vehicles was changed to a graduated scale, based upon the makers' list price.

Another law of special interest passed by the legislature provides that it is to be unlawful for any person, while upon any public highway, to endeavor by words, gestures, or any other way to beg invitation or secure transportation in any motor vehicle not engaged in passenger carrying for hire, and providing a penalty of a fine or imprisonment, or both.

The present laws of the state were changed so that state funds may be used in building roads in towns of less than 5,000 inhabitants.

MASSACHUSETTS

The Massachusetts legislature has joined the majority and passed a 2-cent gas tax. This bill was really passed last year, but was submitted to the people on a referendum and became effective January 1st of this year.

MICHIGAN

In Michigan the state legislature enlarged the powers of the State Highway Commission so that on the approval of the state administrative board it will be possible for the location of trunk line highways to be changed, altered or abandoned even though these routes had been laid out by legislative enactments.

Five hundred miles were added to the state highway system.

The state has been authorized to construct bridges and grade separations in cities of less than 16,000 population. Heretofore the law limited state work to cities of less than 6,000.

MINNESOTA

The state legislature of Minnesota increased the gasoline tax from 2 to 3 cents, 1 cent of which goes to the county-aid roads. Funds for state roads will be increased approximately \$1,000,000 per year.

The commissioner of highways is empowered to employ traffic officers.

County highway officials were given jurisdiction over township county-aid roads.

The speed limit on the highways was increased from 35 to 45 miles per hour.

The most noteworthy legislation undoubtedly is the act permitting the commissioner of highways to employ a traffic police force of 35 men to enforce the traffic act and other regulations on the state highway system.

MISSISSIPPI

The Mississippi legislature increased the gasoline tax from 4 to 5 cents, 3 of the 5 go to the counties. There will, therefore, be no increase in the fund for state highways during the next two years.

Traffic regulations were changed so that speed limit in towns is 15 miles, and 40 miles in the country.

The legislature increased the state highway mileage from 6,500 to approximately 10,000 miles.

MISSOURI

The Missouri legislature at the opening of its session passed such enabling acts as were necessary to authorize the expenditure of the \$75,000,000 bond issue which had been voted on favorably by the people last November.

In addition to this very important legislation empowering the highway commission to acquire lands for the location of state highways and bridges, changing channels of streams and disposal of excavated materials, was passed.

The highway commission was given authority to relocate highways inundated because of the construction of hydro-electric power projects and to settle for damages caused by such projects.



Section of concrete pavement east of Grand Junction, leading into the Palisade fruit section.

Enabling act was also passed permitting political subdivisions of the state to aid in the purchase of rights of way.

Provision was made for the refund by the state to civil subdivisions for the construction of highways and bridges now on the state system. This will be done either by cash or additional roads.

A bill was passed limiting the power of the commission in the payment of salaries. The chief engineer's salary may not exceed \$10,000 per year, the assistant chief engineer not to exceed \$7,500, and the various bureau chiefs and the attorney \$6,000 per year and the secretary not to exceed \$5,000.

MONTANA

Effective April 1 and continuing for four years, the legislature of Montana increased the gasoline tax from 3 to 5 cents. The gross returns from the 5-cent gasoline tax was split 75 per cent to the state highway fund and 25 per cent to the gasoline tax draw back fund. The legislature estimated that it would take 25 per cent of the gasoline tax to pay refunds for gasoline used for other purposes than motor vehicles. The final result of this will be that the state highway fund will receive all of the net gasoline taxes.

Effective January 1, 1930, the motor license fees were changed from a horsepower basis to a weight basis. The minimum license fee was increased from \$7.50 to \$10, and the maximum from \$22.50 to \$25.

The total funds for the state roads, by the increase of the gasoline tax, will be increased about 65 per cent.

NEBRASKA

The Nebraska legislature increased the gasoline tax from 2 to 4 cents; 1 cent of the additional tax was given to the counties and 1 cent to the state, with the provision that one-half of the increase must be used for paving. The registration fees were rearranged so that the final effect is to cause a slight decrease in revenue.

A bill was passed requiring drivers' license for all drivers of automobiles. This law went into effect September 1.

The laws heretofore on the statute books intended to control traffic on the highways were strengthened by adding a penalty and placing the enforcement under the department of public works.

About 1,250 miles were added to the state highway system, but provision was made that this mileage shall not be added until certain roads already designated have been improved.

NEVADA

The last legislature of Nevada enacted a law giving the Department of Highways the entire 4-cent gasoline tax, which is to be used to match federal aid for construction, and also to establish sufficient funds for the proper maintenance of the federal aid constructed roads. This law arbitrarily will do away with the county-state highway fund for construction purposes.

Money derived from the motor license fees is placed in the state highway fund, to be used for the payment of accrued



Newly completed gravel road and concrete bridge near Bondad in La Plata county.

interest and the redemption of state highway bonds as they become due. Any money remaining from these fees is used for the purchase of new equipment and maintenance of roads constructed with federal aid.

Any increase in the state road fund during the next two years will be due to the probable increase of gasoline sales and also to the placing of the fees derived from motor busses and trucks in the state highway fund, through recent legislation.

No changes in the duties and powers of state highway officials were effected by the legislature—with the exception of centralizing the method of financing construction—and this change practically eliminated what little authority county officials have previously had.

Nevada has drastic laws regarding advertising signs in so far as the state highways are concerned; no signs, other than direction signs, are allowed within the right of way.

The licensing of chauffeurs and all motor vehicle drivers has been attempted in Nevada, but laws requiring this have always failed to pass the legislature.

Fifty-five miles of new roads were added to the state highway system this year.

The giving of the entire gasoline tax, together with the motor bus and truck fees, to the state highway fund, and the changing of the state highway laws as affected by this action, received the hearty support of the legislature.

Several attempts were made to authorize bond issues for the construction of roads not on the federal aid system. While all were anxious to improve the state highway system, the idea prevailed that Nevada should be careful in keeping within its means; practice economy even if it would require several years to give all of the people in the state that service for which they are now clamoring through the construction of highways.

NEW HAMPSHIRE

The New Hampshire legislature passed a bill providing for the construction and reconstruction of trunk line highways, carrying a bond issue of \$8,000,000, of which \$1,500,000 is available for each of the years 1929 and 1930. The remainder is to be distributed \$1,000,000 a year until the entire amount of the bond issue has been expended. It is planned under this bill to construct not less than 50 miles a year of cement concrete highways.

A bill was also passed authorizing a loan to cities and towns of \$750,000 to connect up with the trunk line highways.

Another bill provided for state assistance in maintenance of classes 1 and 2 highways through the towns.

A bill was passed regulating the marking of main highways through towns and cities. The highway commissioner was given authority to designate the proper signs for this purpose.

The carrying capacity for bridges on state aid bridges was increased from 10 to a minimum of 15 tons.

NEW MEXICO

The New Mexico legislature amended the present law so that all exemptions from the gasoline tax are eliminated. This makes the proceeds from the 5-cent gasoline tax a net income.

Motor license fees were raised so that the minimum license fee is increased from \$7 to \$18 for the first three annual registrations and abolishes personal property tax on automobiles. After three annual registrations the minimum fee drops to \$10. The distribution of motor license fees is 37 per cent to the state, 17 per cent to the counties, 21 per cent to the state general tax, 25 per cent to the several tax districts of the state in proportion to taxable valuation.

The 1½ mills state property levy for roads was repealed, which offsets to some extent the increase in motor licenses fees.

The legislature authorized the State Highway Commission to sell \$5,600,000 worth of debentures for 1929 and an equal amount for 1930, the proceeds from these debentures federal aid roads already constructed, and to construct state will be used to meet federal aid, to oil some 1,000 miles of roads outside of the federal aid system.

The State Highway Commission was given authority to close highway railroad grade crossings upon relocation or grade separation; to pay rewards for conviction of persons defacing or destroying road signs or markers, lights, etc.; prescribe regulations for the placing of pipe lines, telephone, telegraph and transmission lines, as well as ditches along the highways.

The Hoover Uniform Traffic Code was approved by the legislature. As a companion measure, a comprehensive law was passed, known as the "Uniform Motor Vehicle Anti-Theft Act," requiring certificate of title, license of dealers in each vehicle, etc.

Speed limit was raised from 35 to 45 miles an hour.

A law was passed making it illegal to erect any advertising signs within the limits of highway rights of way. No signs can be placed on land adjacent to a public highway which will obstruct the view at corners, curves, angles or intersections with highways or railroads within 500 feet. No advertising signs can be placed within 100 feet of any state highway without a permit from the State Highway Commission, written consent of the owner and paying a fee of \$5. All signs erected previous to the passage of this act must be removed within 60 days.

A comprehensive law was enacted for the regulation of busses and trucks or motor vehicles used as common carriers. The operation of this law is placed in the hands of the state corporation commission. Fees derived from this source are in addition to the regular motor vehicle license fees and the funds are converted into the state road fund.

Another bill of value to road work in New Mexico is one providing for the construction of necessary highway railroad grade crossings and grade separation. The cost is distributed equally between the railroad and the state. Heretofore, by mutual agreement, the railroads paid 25 per cent and the state 75 per cent.

NEW YORK

Hitherto New York has built two types of highways, one known as a state highway, the state paying the entire cost, except bridges, and the county highway, the state paying 65 per cent and the county 35 per cent. This year the New York legislature passed a law so that hereafter the state pays 100 per cent of the cost of both state and county highways. The bridges will remain as heretofore; namely, the state paying 65 per cent and the county 35 per cent.

The financing of highways in New York is by direct appropriations, although the revenue from motor license fees goes into the general treasury and furnishes a principal source of income.

The legislature passed a 2-cent gasoline tax, 75 per cent of the proceeds of which are to be used in the construction and reconstruction of state and county highways and bridges; of the other 25 per cent the City of New York gets one-fifth, and the remaining four-fifths goes to the "Up-State" counties, to be expended on a county road system under the supervision of the county superintendent. Under the new system a county must adopt a county road map, and all money contributed by the state, as well as by the counties or townships, must be expended upon the approval of the state superintendent of public works. Provision is also made for the maintenance of

these highways as they are built, by requiring that the state superintendent of public works withhold money from the counties that do not properly maintain their roads.

There is no change in the distribution of the motor license fees. The 25 per cent which is now returned to the counties is returned on the basis of the number of cars licensed in each county to the total number of cars licensed in the state. This means that poor rural counties get very little, while rich metropolitan counties get a great deal. The gas tax is returned to the counties on the basis of public highways within the counties, which means that the rural counties having a greater mileage of public highways than the smaller metropolitan counties get a greater proportion of the tax.

Advertising signs which purport to give directional or danger information are illegal if erected within 1,500 feet of any public highway.

NORTH CAROLINA

The recent session of the North Carolina general assembly increased the gasoline tax from 4 to 5 cents. The 1-cent additional tax, however, is to be used exclusively on a system of county roads, selected by the State Highway Commission. In addition to the 1-cent gasoline tax, which will raise funds for this purpose, the law also provides that from the general highway fund there shall be appropriated \$500,000. On this account the funds for state roads for the next two years will be slightly decreased.

The legislature created a state highway patrol, consisting of 37 men. This patrol began operations on July 1.

A 20 per cent increase in the mileage of the present state highway system was authorized by the legislature.

NORTH DAKOTA

The state legislature of North Dakota amended the gasoline tax law, increasing from 2 to 3 cents this tax. The extra cent tax is to be prorated back to the counties in proportion to the amount of license fees contributed by the counties. All of the funds thus derived are to be used to build roads leading into the state highways.

OHIO

The legislature of the state of Ohio increased the gasoline tax 1 cent, making the total 4 cents. The funds for state roads are to be increased for the next two years approximately \$7,000,000.

The speed limit on the highway was increased from 35 to 45 miles an hour.

The state highway mileage was increased to not exceed 200 miles in any one year.

OKLAHOMA

The recent session of the legislature in Oklahoma passed a law which repeals the old law creating a five-member State Highway Commission and creates one of a membership of three. The members of the commission are to serve for a period of six years. Each member of the commission draws a salary of \$6,000.

Another bill passed by the legislature limits the speed of driving on the highway to 45 miles an hour.

There will be a special session of the Oklahoma legislature soon to take up other road matters.

OREGON

In the state of Oregon the recent session of the legislature increased the gasoline tax again, to be effective January 1, 1930, which will make the total 4 cents. To offset this, however, the motor license fees were reduced approximately 25 per cent.

A bill was passed making it unlawful to use the words "stop," "go slow," "caution," "danger," "warning" or any other word, sign, symbol or character commonly known or understood to be a caution or warning to traffic on the public highways in connection with advertising signs.

PENNSYLVANIA

The 1929 session of the Pennsylvania legislature added 1 cent to the gasoline tax effective July of this year. This makes a total gasoline tax of 4 cents.

Provision was made by the legislature for the common-



A state maintenance crew filling expansion joints on concrete pavement.

wealth to take over the maintenance of all state aid roads in townships heretofore constructed by township reward funds.

Authority is given the secretary of highways to relocate and change widths of state highways in boroughs.

Authority is given the secretary of highways, upon approval of the governor, to establish, construct and maintain roads parallel to existing state highways in order to relieve traffic congestion.

An appropriation of \$2,000,000 from motor license fees was made to be distributed to cities of the second class, second class A and third class and construction and maintenance of state highways through said cities.

Provision was made that county bridges over streams on state routes in boroughs, townships and towns shall be taken over by the Department of Highways.

Authority was given the secretary of highways to relocate state aid roads in townships. Another act provides for the construction of unimproved state highways and allocates to each county a certain amount of money for this purpose based upon the ratio of unimproved mileage to the total unimproved mileage on the system, with a further provision that the share of the counties shall be limited to not less than \$200,000 nor more than \$600,000 and appropriated from the motor license fees a total amount of \$23,500,000 for this purpose.

Hereafter the maintenance of all state highways in boroughs shall be done at the entire expense of the state instead of on a 90-10 basis as heretofore provided.

RHODE ISLAND

The Rhode Island legislature changed the law concerning the collection of the gasoline tax, as it was generally known that there was considerable evasion. The fees for motor licenses were changed to weight only, instead of weight and horsepower. The effect of this readjustment will be to reduce fees on passenger cars practically 20 per cent without any change on trucks.

SOUTH CAROLINA

The legislature of South Carolina increased the gasoline tax from 5 to 6 cents, 5 cents going to the Highway Department and 1 cent distributed among the counties on the basis of motor vehicle registration. The distribution of the gasoline tax was changed, the amount going to the State Highway Department being increased from 3 to 5 cents and the additional 1 cent going to the counties. The funds for state roads are increased by the amount of 2 cents gasoline tax transferred from the counties. This will make an average of about \$2,250,000 per year for the next two years.

A state bond issue of \$65,000,000 was authorized for the state highway system.

Motor busses and trucks engaged in interstate traffic must be licensed in the state of South Carolina.

One hundred sixty miles was added to the state highway system.

The legislature passed a law making the minimum widths of rights of way for state highways at 66 feet and delegated to the State Highway Commission authority to remove buildings and other obstructions regardless of how far back from the road they may now be located.

The governor is authorized to name a list of eligibles to act as jurors on condemnation proceedings.

SOUTH DAKOTA

Although 43 bills dealing with highway legislation were introduced in the legislation of South Dakota, no radical changes were made in either the amount of funds provided or the general operation of the Highway Department. Only nine bills received the governor's signature.

State highway markers and signs will hereafter be manufactured by the South Dakota state penitentiary.

Authority was granted the State Highway Commission, as well as county commissioners, to acquire as much as 160 acres in one location for the purpose of securing gravel, stone or other building materials; heretofore the law was limited to 10 acres.

A bill was passed to the effect that a car five years old or more which has been registered in South Dakota for five consecutive years will thereafter be registered at one-half the original fee.

A bill was passed which requires the county highway superintendent to maintain and repair roads used as U. S. mail routes in case of failure or neglect of proper township boards.

A new uniform motor vehicle act was passed having many items similar to the Hoover Code.

TENNESSEE

The tax on gasoline in Tennessee was increased by the last session of the legislature from 3 to 5 cents per gallon. Of this increase a sum equivalent from a 1-cent levy was appropriated and set aside as a special fund to be used exclusively as "state-aid" funds. These funds must be allotted by the commission to the counties, 50 per cent on the basis of area and 50 per cent on the basis of the federal population census. One additional cent of the increased gasoline tax was also set aside as a reimbursement fund to pay the counties for certain funds advanced to the State Highway Department for the construction of roads on the state system.

The legislature also authorized the Highway Department to borrow on short-term notes the sum of \$25,000,000 for construction on the state highway system. This is in addition to the regular funds derived from the gasoline tax and motor license fees.

Two years ago the legislature authorized the construction of 17 major bridges, funds to be derived from notes or bonds and retirement of these notes or bonds to be made from funds secured by tolls. The last session increased this number to 21 bridges.

The speed limit on highways was removed. The present law prohibits the placing of any advertising signs on the highways.

The total mileage of the state system is left in the hands of the highway commissioner. The legislature also placed in the hands of the public utilities commission the management and control of all vehicles used for transportation of persons or property for compensation.

The Highway Department is now given authority to construct highways through corporated cities and towns.

TEXAS

The recent session of the Texas legislature did not pass any laws affecting the finance or organization of the state work of the Highway Department.

Authority was given to the State Highway Department to take over county roads and maintain them as detour roads during the construction of the roads on the state system.

A bill was passed which authorized the State Highway Department to co-operate with any adjoining state, if necessary, in the construction of state or interstate bridges as toll bridges, operating under the federal law, approved in 1927, which approved the use of federal funds for toll bridges when constructed by a state or states.

The State Highway Department was authorized to secure rights of way sufficient to make the right of way of state roads 100 feet.

The legislature passed a general enabling act providing for the regulation of the common-carrier service on the highways.

VERMONT

The Vermont legislature increased the gasoline tax from 3 to 4 cents. The funds for road construction for 1929 and



A stretch of newly completed gravel road located west of Steamboat Springs on Victory highway.

1930 will be at least 50 per cent greater than for the past two years.

The minimum license fee for the motor vehicle was increased from \$10 to \$16.

Motor truck weight is limited to 20,000 pounds, including load.

Persons engaged in outdoor advertising for direct profit shall secure from the secretary of state a license, for which the fee is \$25 annually. Each designed device must receive the approval of the secretary of state, and also the written consent of the owner of the property on which such structure is to be erected. No sign shall contain more than 600 square feet. A graduated scale of fees for these large signs is provided. Advertising signs shall not be placed within 50 feet of any public park, playground or cemetery, or within 35 feet of the center of the traveled part of any highway outside of the thickly settled business part of a city. The secretary of state may order the removal of an advertisement if, in his judgment, it obstructs a clear view along the highway.

WASHINGTON

The recent session of the legislature in Washington passed but two laws that affect highway financing and organization of that state. The first of these was a law which creates the director of highways and provides that this director shall assume all responsibility and perform all the duties that formerly were vested in the state highway committee and the state highway engineer.

The other law was an increase of the gasoline tax of 1 cent per gallon. The entire increased revenue is to be spent by the counties on lateral highways under the supervision of the director of highways.

WEST VIRGINIA

At the general election in November the people of West Virginia ratified a constitutional amendment authorizing an additional \$35,000,000 for road purposes. The legislature authorized the issuance of \$10,000,000 for 1929 and \$10,000,000 for 1930. In addition to previous legislative enactments, it will make the total funds available about \$9,000,000 a year.

An act was passed providing for the creation of a state bridge commission to build or acquire by purchase, toll bridges. Such construction or purchase to be financed by bridge bonds, these bonds to be retired by the revenue obtained from tolls, after which the bridges are to be free.

An act was passed to permit the state board of control to hire to the state road commission, the county court of any county, or to contractors engaged in the construction of roads in the state, the labor of any and all convicts confined in the state penitentiary.

An act was passed, prohibiting the picking of flowers or the molesting of flowers, trees or shrubs within 100 yards of a public highway.

WYOMING

The Wyoming legislature increased the gasoline tax from 3 to 4 cents. The original 3 cents to continue to go to the State Highway Department fund for maintenance, and the additional 1 cent is to be distributed to the counties for county work. The motor license fees remain the same, except that, effective December 1, a county registration fee will become effective in lieu of a property tax. These county registration fees go to the counties.

Funds for the next two years in Wyoming will be practically the same as for the past two years.

A Study on Highway Finance

By CHARLES M. UPHAM, Secretary-Manager
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IN CONNECTION with the early history of highway finance in this country, it is perhaps fitting to go back to the stage coach period. At this time highway construction was mostly local in character and often the construction was carried on by residents of communities furnishing labor, and the work financed by such funds as were considered necessary secured from local treasuries. Toll road companies were formed at this time and the toll road had its greatest popularity during this period. At first it was thought that the toll road would be the universal means of transportation but it was soon learned that the steel rail was more economical, especially for long distances.

The irritation caused by private toll roads, the failure of their promoters to keep them in repairs, and the growing recognition that the interest of the entire public was bound up in the transportation which the vehicle provided, forced a relinquishment of these toll-road franchises and today there are virtually no toll roads in the United States.

The stage-coach or toll-road period was followed by the development of the steam engine which may be termed the next period, and an extensive development of the country took place at this time. The first real inspiration for an extensive program of improved highways occurred with the advent of the bicycle and it is an interesting reflection that the papers of the day commented at length upon the costly folly of constructing roads which cost \$1,000 a mile.

Perhaps the impelling motive for highway improvement even in the early stages was the fact, quickly recognized, that road development immediately reacted to the benefit of the community possessing them. As good roads were extended from town or city, the transportation and commerce centering there showed a marked increase. The farm, hitherto outside the economic zone of production was made available, property values were enhanced and as a result a spirited rivalry of road building ensued between centers of population all over the country, and general prosperity followed.

HISTORY OF HIGHWAY FINANCE

Highway finance, which should be treated as an investment, is a problem of taxation, and the direct or "pay-as-you-go" policy of expending funds was the first method used for financing highway improvement. The motor registration increased with great rapidity and demanded many miles of improved highway. Difficulties developed in securing sufficient funds from current income to provide for the necessary construction, without increasing tax rates to undesirable or unbearable proportions. Since sufficient mileage of modern roads could not be built rapidly enough from current funds without a heavy tax burden, and keeping in mind, the economic necessity for this mileage, the practice was resorted to of authorizing highway bonds to be paid for, over a period of years from the taxes on land. And these in turn, have in recent years been largely supplanted, as far as state highways are concerned, by the automobile, gas and registration taxes.

Massachusetts, New Jersey and New York took the lead in providing for the issuance of highway bonds; Massachusetts approving the law relating to bond issues in 1894, quickly followed by the other two states. The local units in these localities made their initial venture in bonding at about this time. This method of financing rapidly gained popularity and up to 1928, 25 states had resorted to state highway bond issues and 47 of them have resorted to county bond issues, North Dakota being the only exception.

BONDING VERSUS "PAY-AS-YOU-GO"

In considering these two methods of financing certain principles have been set forth which are the result of the experience in highway financing which this country as a whole has passed through, and which should afford some assistance in making a choice.

The bonding plan requires a definite program in advance, a legislative enactment which places the responsibility of the

construction program in the hands of a reliable and competent commission and which governs mileage in system and specifies location of highways as to origin and destination. Large sums of money spent without restrictions by law may not be expended where they will benefit the greatest economic needs. Therefore, the necessity of preliminary road-laws covering bond expenditures is strongly recommended as a safeguard for public funds.

The bonding plan is recommended when the program is just beginning and before any great part of the system has been completed. It furnishes a means of more rapidly meeting the popular and economic demand for roads, and its great advantage lies in the early availability of the highways. This response through a rapid construction program to popular requirements for better and more lines of communication always starts a series of reactions that result so favorably on the industrial and economic life of the country. It permits quick construction of programs large enough to secure the advantage of big contracts and low prices. It makes the building program more rigid and tends to remove it from the easy manipulation of local politicians.

The "pay-as-you-go" plan should be used when the construction of the highway system is more advanced and should be used when the road program is nearing completion. It may be successfully used if annual revenues are plentiful and should be used in any case where the present bonded indebtedness is so heavy as to have affected adversely the public credit of the state or county.

In making a choice of financing, an essential detail is pointed out. If \$100,000 is to be spent by the "pay-as-you-go" plan on 10 miles of construction and the annual highway fund is \$10,000, the cost is \$10,000 per mile and it will take 10 years to build. With a \$100,000 bond issue, serial type, 4 per cent maturing in a 20-year period, the cost of the bond issue will add \$42,000 to the cost of the highway, so there must be added \$4,200 to the cost of each mile of roadway but the entire 10 miles of newly constructed highway would be immediately available.

If this immediate construction of the entire mileage accommodates enough traffic to save or earn the difference in cost, the bond issue is always justified.

Considering the problem from a viewpoint of possible mileage and highway use with a given income and taking for an example a county with an annual construction fund of \$14,000, a program extending over a 20-year period and operating on current funds would construct 28 miles of roadway at \$10,000 a mile and would finance the construction of 1.4 miles of roadway per year. The highway mileage available over a period of 19 years would be 14 miles and equal in terms of road usage 266 year miles.

Using bonding plan, choosing 20 year, 4 per cent serial method, and annual construction fund of \$14,000, it is found that this figure would pay interest and principal on a \$200,000 bond issue. This would construct at \$10,000 a mile, 20 miles of roadway in one year and the total mileage would be immediately available, this considered over a period of 20 years or the life of the bonds would total in terms of road usage 330 year miles. The difference between this figure and 266 which is the total under the pay-as-you-go method equals 114 year miles. This difference represents 43 per cent greater use of the highway under the bonding plan over the same period of years and if this improvement of transportation facilities accommodates sufficient traffic to justify its immediate construction, then this difference may be considered the measure of advantage for the bonding method of financing.

In summary, the pay-as-you-go policy in this case would finance the construction of 40 per cent greater mileage from the same annual income, but would take 19 years longer to build and would provide 43 per cent less mileage for use over a 19-year period. Under these conditions, unless the economic condition of the locality is unusual, the advantage of the earlier use of the small mileage would justify bonding.



Showing completed concrete pavement between Sterling and Fort Morgan.

BONDS

In considering the issuance of bonds, the three forms in general use are, term, serial and annuity. Term bonds mature after definite periods and require a sinking fund. Serial bonds are retired annually or at other periods, a fixed portion of the issue being retired at each maturity date. The annuity is similar to the serial, but the retirement plus interest is maintained at a constant figure. The serial bond is the cheapest and is the most popular for highway financing. This type is particularly adapted for financing operations which by their very nature involve a depreciation of property. A highway is in part a depreciating property. If the retirement of bonds is faster than the depreciation of the highway, then the difference between outstanding bonds in any one year and the value of the highway may be termed the margin of safety.

Instances are not lacking where errors in expenditure of bond issue funds for highway purposes have occurred. These instances are invariably due to mismanagement of the construction program rather than to defective principles of bonding and some of the more common errors will be cited later.

In states and counties where road financing by bonds has been pushed forward on a comparatively large scale and the funds expended judiciously, there has been a notable increase in the use of motor vehicles and growth of prosperity. Inasmuch as the gas tax and registration fee are among the most satisfactory methods of highway financing, the reaction of the improved highway on automobile registration is one of the most important developments of capitalization of funds for the purpose of bond issue financing.

A comparison of states having highway bond issues with those which have used other methods of financing indicates a marked advantage in automobile registration for the bonded states for the year 1927. Using figures compiled by the Bureau of Public Roads the total increase in automobile registration in 1927 over the preceding year amounts to 1,131,848 motor cars and trucks. The 25 states having bond issues show a total increase of 716,931 vehicles, or an average of 20,677, which is about 6.5 per cent. The unbonded 23 states and District of Columbia show an increase of 414,918 vehicles, an average of 17,288, which is about 4.3 per cent.

North Carolina leads the entire country with an increase of 11.8 per cent. This state is an outstanding example of

highway financing by the bond method and it is perhaps advisable to note its procedure and resultant development.

In 1921, the North Carolina general assembly passed the "Road Law" which authorized a \$50,000,000 bond issue for the construction of a highway system connecting county seats and principal towns. This has since been increased to a total of \$115,000,000, which is the total authorization to date and is nearly all outstanding. In addition the State Highway Commission has spent on road construction about \$35,000,000 in federal aid, automobile and participation funds bringing the total expenditure to about \$150,000,000. As a result of this expenditure North Carolina has about 5,000 miles of completed surfaced highways; about 3,500 miles of which is cement concrete or asphalt on a concrete base.

North Carolina has exhausted the funds received from the sale of its bonds, and the program started in 1921 is very nearly complete. It has a "system of highways running to all county seats and principal towns."

The ultimate cost of retirement of this large bond issue should now be given consideration. The serial bond plan has been utilized here, the first maturity taking place in 1929 and the last one in 1964. The interest rate on the total averaging 4.25 per cent. The ultimate cost of this financing, assuming that the bonds are not retired earlier than planned, will amount to about \$70,000,000 in interest and amortization charges, which is a total cost of \$185,000,000 in principal and interest but according to actuarial computations the sinking fund requirement for the longer term serials will be sufficient to retire \$65,000,000 about 10 years before the last bonds mature. This will materially decrease the carrying charges and discharge the total debt about 1953. The maximum life of the bond issue under these conditions would be less than 30 years. The entire expense attached to bond retirement is taken care of by revenues received from gasoline tax and registration fees, but the full faith, credit and taxing power of the state has been placed behind every bond and note issued.

That this method of financing in this instance is self-sustaining with sufficient surplus for further construction operation is evident from publication of recent figures. For the year ending June 30, 1927, the receipts of the gasoline tax and registration fees were sufficient so that the State Highway Commission has a surplus of approximately \$6,000,000 for road construction purposes after all annual charges had been made, including interest, sinking fund and maintenance of highway system. This figure is estimated to be about \$8,000,000 for 1928.

The highway system as an investment or producer of wealth and figured from a standpoint of economic saving shows some astonishing results in North Carolina. Using figures computed from the traffic census and the saving in operating costs demonstrated at the experimental station of Iowa State College, the economic saving in operating costs alone would amount to \$60,000,000 annually. This is computed from mileage figured from automobile consumption of gas which is 3,000,000,000 car miles for current years and a saving of 2 cents per mile by the use of improved roads. Even if this total was reduced one-half to allow for any possible adjustment of operation of the surfaced highways it would still show a saving according to the experimental station ratios, of about twice the total license fees and gasoline taxes paid by the motorists in the whole state for the year just ended. Other savings through good roads in this instance are numerous but somewhat difficult to translate into figures. The



A section of the pavement on U. S. Highway No. 40 in town of Manitou.

operating savings, alone, however, would justify the \$115,000,000 bond issue that the state is requiring automobile owners to liquidate with taxes from savings they effect through good highways. It is safe to estimate that the saving to motorists, on account of the highway system may amount to between five and six times the total motor taxes paid in a year.

Had North Carolina attempted its program of highway construction through use of current funds, it is evident that its present system of completed connecting highways would have taken years to construct and the resulting moderate increase in automobile revenues would necessitate augmenting this form of taxation by others more burdensome.

The proceeds from bond issues should be used for permanent improvements where possible; that is, grading and drainage structures and any part of the surface that may have a salvage value; these are estimated to be 40 per cent to 60 per cent of the investment and are permanent. Funds from bonds should never be expended for temporary road surfaces on unimproved grades. One southern county issued bonds to the amount of \$300,000 and spent it for light grading on an excessive mileage of roads. The improvements contemplated should outlast the bond issue. Bond money should never be spent on maintenance. Lack of engineering supervision, necessary economic surveys, and poor highway administration have accounted for wasted funds in many instances.

There are instances where state bonding has been pushed ahead too rapidly without sufficient planning as to classification and location of highways. One state committed errors in her building program due possibly to hurried planning or possibly to the fact that the first bonds were issued in 1910 and errors were made in planning for future traffic requirements. In this state the bonds issued to date amount to \$73,000,000 and will ultimately cost in principal and interest \$132,000,000. The payment period will extend to 1965. This is evidently expensive financing, the carrying charges amount to about 80 per cent of the principal. The life of the bonds are from 40 to 45 years, which is too long and should have been issued from 25 to 30 years only.

The possibility of wasting funds may be minimized by taking into consideration the following principles:

(a) State highway bonds should be serial in form and should mature over a period not exceeding 30 years. The annual charge decreases very slowly from this point, whereas the total cost increases rapidly.

(b) County bond issues should be serial in form and should mature over a period not exceeding 20 years. Interest rates on county bonds are as a rule higher than those on state issues. The use of the serial bond eliminates the hazard of a large sinking fund which is in constant danger of violation.

(c) Maturities should be arranged so that the annual requirements of principal and interest will be as nearly uniform as practicable. This also avoids the danger of accumulation of large sinking funds and a fluctuating tax rate.

"PAY-AS-YOU-GO" PLAN

Virginia is a very good example of a state carrying on its highway program by the pay-as-you-go method. It commenced its major operations in highway construction in 1919



A stretch of gravel-surfaced highway on Hoosier Pass, constructed with state funds.



Scene on State Road No. 82, north of Carbondale, improved with state funds.

and has regulated the extent of its improvements by the amount of annual income. Virginia receives its highway revenue from a 5-cent gas tax, license tax, state convict force, federal aid and mill tax, the total amount for construction purposes during 1928 total about \$8,000,000. The State Highway Commission borrowed about \$9,000,000 of county bond issue funds some years ago and have since refunded the money and assumed the amortization of the bonds. The counties are now receiving a 1½ cent share of the gas tax pro-rated according to their respective real estate valuations.

Virginia has spent on construction since 1918 about \$60,000,000 and has graded and surfaced approximately 3,300 miles of highways, including about 1,600 miles of hard surface, bituminous, macadam predominating. The state policy of financing is a typical example of the "pay-as-you-go" plan, and with the cessation of use of county funds for state highway improvement, the objectionable feature has been removed.

Georgia receives its funds for roads from federal aid, a 4-cent gas tax, registration fees and county aid. It is now financing with current funds, but the method differs from Virginia through source of income and method of distribution of funds. It has a county debt of about \$23,000,000 which represents money that has been received from county and district bond issues. This revenue represents a large percentage of the state highway total income. This policy of county-aid financing necessitates the expenditure of funds in the counties from which the funds are received, and it follows that the richer counties are supplied with roads, whereas the poorer counties are lacking. In many instances this affects and delays the completion of the state system and results in lack of co-ordination, curtailing the development of through highways and causing impassability.

Georgia has spent since 1918 about \$65,000,000 on highway construction and has graded and surfaced about 2,500 miles, 900 miles of which is hard surfaced, concrete predominating. Georgia had for construction funds in 1928 about \$8,000,000.

RESULTS OF DIFFERENT METHODS OF FINANCE

Now to observe the effects of these methods of financing on the automobile registration which is an indication of prosperity and progress. In 1910 there were less than 5,000 automobiles in any of the three states. In 1919, about the time the road program started, Georgia led with 125,000 registrations, Virginia was second with 105,000 and North Carolina was third with 65,000. Virginia's registration was greater than that of Georgia in 1922. North Carolina's increase was sufficient to pass Georgia in 1923 and led Virginia in 1924. According to figures recorded in October, 1928, Virginia had 50,000 more registrations than Georgia, and North Carolina had 100,000 more than Virginia.

The trend of motor vehicle registration per capita in the three states is as follows:

	Georgia	North Carolina	Virginia
1910	145	1,350	760
1920	20	31.5	17
1923	17.2	13.1	9.3
1925	13	8.3	7.3
1928	10.5	6.4	7.1

It is undoubtedly true that automobile registration is limited only by population and the ability of the purchasing public to buy. The rate of increase of registration is a function of highway improvement, each one reacting directly on the other and the common cause is the demand for easier and cheaper communication. North Carolina is an excellent example of resultant large increase in the use of motor vehicles from the very rapid completion of a well planned connecting mileage of roads.

The present system of financing in Virginia is sound and is a good example of financing from current income. It would seem, however, from comparisons drawn herein, that Virginia could have profited by a speedier program and inasmuch as it has some distance to go with its construction, a bond issue of suitable proportions would evidently react to its advantage.

The best results in highway financing have evidently been obtained under strict business management and efficient engineering. A very sound principle of administration and finance might read somewhat as follows: "Funds for state highway construction purposes should be state funds and expended under the direction of the state highway commission, to secure the best results."

That there has been and still is violation of this principle in some states is evident. The use of county funds for the purpose of state highway construction not only exhausts the credit of the counties but seriously curtails the development of local highways. States should assume the responsibility of financing state systems, thus eliminating this undesirable distribution of highway funds.

The advent of gasoline tax and registration taxes has solved the problems of state highway taxation to a large extent. Inasmuch as 75 per cent of the total expenditures on state systems is derived from gas tax and license fees, at the present time, it would seem a possibility that these might become the absolute source of revenue in due time.

The gas tax made its initial appearance in 1919 in Oregon and has since been adopted in all but two states with rates ranging from one to five cents per gallon. The total revenue received from this tax in 1926 was \$188,000,000 and amounted to nearly \$257,000,000 in 1927, making an increase of \$69,000,000. With the advent of this means of highway income, state tax levies on real estate are diminishing, thus improving the situation in the local communities. Local highways in most instances should be financed through local taxes, and with the abolishment of the state road tax on real estate, the counties are free to utilize their entire taxing power toward the development of their respective systems. This change in taxation has given great relief in certain states through the south, where an extensive school program is in effect and a

great many counties are laboring under a heavy tax burden. Financial distress in county highway development, however, can quite generally be traced to mismanagement in the administration of their road funds, and a good many of them are rather heavily in debt with very little permanent mileage to show for their expenditures.

Highway financing, by the two methods now in use, has been quite generally standardized. From errors made in the past, valuable lessons have been learned and by utilizing the information gleaned from successful operations and profiting by the mistakes of less fortunate, a method of financing highway construction should be possible for either state or county system which would include a maximum of efficiency and a minimum of waste.

With any method of financing, the value of detailed study of the economic condition of the state or county or city, as well as the traffic conditions cannot be overestimated. No road should be improved by expenditure of public funds in excess of its earning capacity. The return to the public in the form of economic transportation is the sole measure of the justification for the degree of improvement.

CONCLUSION

In considering methods of financing, it is necessary to first determine the degree of indebtedness, extent of highway income and degree of completion of system. Classification according to degree of completion is recommended. The fact that much of the improvement of highways is lasting, and may be in use from 20 to 50 years, would justify a distribution of costs to cover several years, thus causing the user to pay. This is evidently fair distribution and so with states or counties which are in the preliminary stages of highway construction and where it has become necessary to proceed with construction so rapidly that the expenditures would cause excessive tax rates, then the costs should be deferred and financing by bond issue is justified and recommended.

This reasoning would not apply to states or counties where highway construction is well on the way to completion and the bond issue method should never apply where states or counties have indebtedness which affects the public credit.

Current funds should furnish sufficient revenue for normal financing in states where the road program is well under way to completion. Bonding is not recommended where states are in this condition. Maintenance and reconstruction are the factors under consideration in this instance and should be paid for by current revenues. Bonding, however, may be used for special projects or extensions to the system.

It is well to keep in mind that sound planning and good management of the loan in bonding operations is of greatest importance. The question of the debt itself is relatively of less consequence, for it is a well-established business principle that extension of credit within safe limits is necessary for maximum results.

In the final analysis the question is not merely whether a community shall incur a debt, but whether the maximum economic efficiency and the full development of the public wealth will be best promoted by using public credit.



Bridge over the Eagle River at Wolcott, connecting State Road No. 11 with U. S. Highway No. 40.

U. S. Highway No. 138 east of Julesburg, is being improved by the state of Nebraska. This work extends from North Platte thru Big Springs to the Colorado line. Motorists are inconvenienced by several detours. Work has been started on the 42-mile project between Julesburg and Sterling by the Colorado department.

The state in co-operation with Fremont county has resurfaced with gravel three miles of the Devil's Gap road west of Canon City. This is located on federal highway No. 50. Work of resurfacing a 10-mile stretch west of Devil's Gap has been started by the state. This work will be under the direction of Commissioner D. N. Cooper.

NEWS OF THE MONTH

The contract for nineteen miles of graveling on the Rifle-Meeker state highway, on which the lowest bidder was the Steamboat Transfer & Storage Company, has been taken over by Hamilton & Gleason company, railroad contractors, of Denver. Charlie Berry, representing Hamilton & Gleason, is in charge of operations, which have been started. The work will be rushed to completion. The Steamboat Springs company, it is said, was unable to establish its qualifications for the work.

Three new bridges are to be constructed on State Road No. 4, near Ramah. Expense of construction will be shared equally by the state and El Paso county. One of these bridges, 35 feet long, will be at the edge of the town of Ramah. The other two bridges, 20 feet and 35 feet in length, will be built west of Ramah.

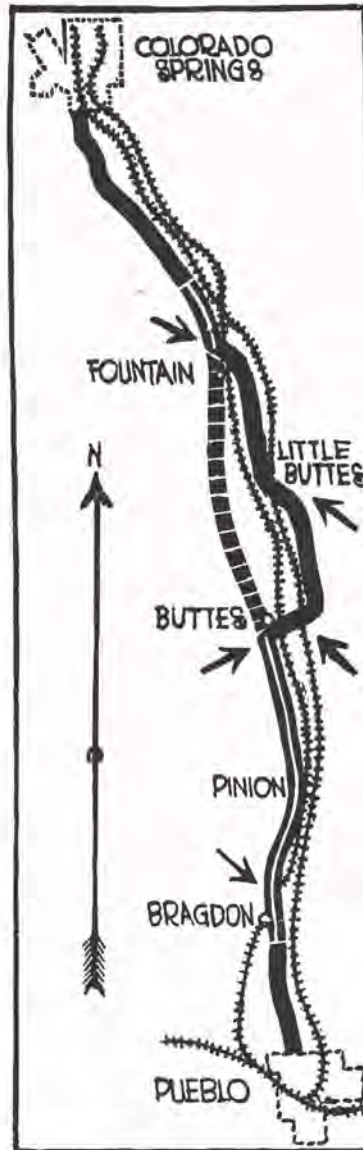
Six miles of new graveled highway between Loma and Mack, on U. S. Highway No. 50, has been completed by Hinman Bros. Const. Co. Several curves were eliminated and the road which formerly was one of the worst stretches of highway on the western slope is now one of the best.

On August 28, a new strip of highway on the west side of Cerro Summit was opened to the public. The new strip is three miles in length and was constructed by the Mtn. States Const. Co. The cost was \$68,000. The work was started last fall. The new road eliminates a very bad stretch which formerly was a bugaboo of motorists, especially in wet weather. It can now be traveled in any kind of weather in safety.

The new oiled roads in the San Luis valley are proving a success according to D. Kirk Shaw, supervisor of maintenance in district No. 3. Several stretches of this type of surfacing have been laid in the valley during the past two years.

With only a half-mile of light rock work needed to carry the road to the summit, the contractor on the last stretch of the Mt. Evans highway was forced to quit work because of a heavy snow fall on the mountain on Sept. 1. There was an unusually short construction season on Mt. Evans this year, the contractor having only approximately a month on the job, but enough was accomplished to insure the completion of the road next season. W. W. Giggey, of Boulder, has the contract for the work.

Plans for the construction of an underpass crossing of the Colorado & Southern railroad tracks east of Boulder have been completed by state highway engineers. This project will probably be included in the 1930 budget of the state highway department. When finished the underpass will complete the paving between Denver and Boulder.



Map showing new stretch of road now under construction by the State between Colorado Springs and Pueblo. Old road is shown by heavy black line. Arrows point to dangerous railroad crossings which will be eliminated on the new route.

The National Park service has ordered the Bear Lake scenic road in Estes Park to be oiled. One-half of the road will be oiled at a time. The work should be finished by Oct. 1.

A foot of snow fell on Cameron Pass on Sept. 7. This is the heaviest snow in recent years in that area. Maintenance crews aided a number of motorists over the pass, following the storm. The highway was cleared of snow in less than 24 hours.

The Victory Highway improvement association, formed to promote the improvement of the Victory highway in northwestern Colorado, was organized in Steamboat Springs on Sept. 5 by representatives of Moffat, Routt and Grand counties. The new association will seek the active support of Denver and counties along the route in eastern Colorado, Utah, Kansas and California in obtaining enough state and federal funds to bring about the graveling of the road. Eighty miles of the road in western Moffat county lies wholly in government land and an attempt will be made to have the road improved with federal funds alone. R. I. Gwillim of Oak Creek was named president of the new organization and F. A. Metcalf, Jr., of Steamboat Springs, secretary.

To raise funds to start construction on the Fishers Peak scenic road, the Trinidad Business and Professional Women's club, plan a home-talent vaudeville show and dance to be held in October. Mrs. Anna Humble is in charge of the arrangements. Members of the Rotary, Lions, Kiwanis, Chamber of Commerce and Knights of Columbus are co-operating.

The Cortez Herald prints the following in regard to the work on Federal Aid project No. 147-C, located south of Cortez: "Cars are now traveling over the new stretch of highway from McElmo to Casey's on the Cortez-Shilprock highway, and as soon as some minor work is finished and the new bridge across McElmo is completed the Maloney Construction people will leave for other contracts. These people are first-class road builders and deserve much credit for the work they have done in this section."

Contract for the construction of the Rocky Mountain Trail ridge highway from Estes Park toward Grand Lake, including 17.2 miles has been awarded to W. A. Colt & Sons of Las Animas, Colo., for \$393,674. The contract was let by the U. S. Bureau of Roads. The new construction is all in the Rocky Mountain National park. It will eliminate a dangerous section of the Fall River road to the top of Milner Pass. It was one of the projects that was held up until the Colorado legislature ceded jurisdiction in the park to the United States.

A meeting of the County Commissioners Association of the Third District, comprising fourteen counties of the San Juan and San Luis valley, was held in Lake City on Sept. 12. The state highway department was represented at the meeting by B. B. Allen, chairman of the state highway advisory board, and Robt. H. Higgins, state superintendent of maintenance. A resolution requesting the highway department to appropriate \$25,000 for the improvement of the highway between Creede and Lake City was adopted.

Total Number Motor Vehicles, License and Gas Revenue Per Vehicle, 1928.

State	Number of Automobiles and Trucks	Rank	Gross Receipts from Auto License Fees	Rank	Average Motor License Per Vehicle	Rank	Revenue from Gas Tax	Rank	Average Gas Receipts Per Motor Vehicle	Rank	Tax Per Gal.	Average Motor and Gas Receipts Per Motor Vehicle	Rank
Alabama	269,519	28	\$3,474,065	30	\$12.88	27	\$6,614,297	17	\$24.54	5	4	\$37.42	8
Arizona	94,372	43	565,806	47	5.88	47	2,018,238	34	21.38	10	4	27.26	30
Arkansas	214,931	34	3,786,004	29	17.61	9	5,382,782	23	25.04	4	5	42.65	3
California	1,799,890	2	9,292,301	12	5.16	48	29,566,769	1	16.42	21	3	21.58	40
Colorado	284,867	27	1,790,183	39	6.28	46	3,921,224	29	13.76	29	3	20.04	44
Connecticut	309,792	24	7,373,589	14	23.79	3	3,511,675	30	11.33	36	2	35.12	12
Delaware	51,210	47	928,916	43	18.13	6	800,349	44	15.62	24	3	33.75	16
Florida	352,961	21	4,935,995	22	13.98	25	11,257,617	6	31.89	1	5	45.87	1
Georgia	318,856	23	4,041,767	27	12.67	28	8,245,486	12	23.00	8	4	35.67	11
Idaho	108,154	40	1,626,949	41	15.04	20	1,884,023	36	17.41	16	4	32.45	18
Illinois	1,504,359	5	15,521,530	5	10.31	35	(a) 836,826	...	None	...	0	(b) 10.31	48
Indiana	823,806	8	5,751,781	19	6.98	45	11,177,549	7	13.56	30	3	20.54	41
Iowa	733,466	11	10,692,767	10	14.57	22	8,535,628	10	11.63	35	3	26.20	33
Kansas	533,799	15	5,394,448	21	10.10	39	5,394,841	22	10.10	39	2	20.20	42
Kentucky	304,231	25	4,725,258	23	15.53	17	6,743,224	16	22.16	9	5	37.69	7
Louisiana	264,293	29	4,383,634	24	16.57	11	3,380,931	31	12.75	34	2	29.32	24
Maine	172,638	37	2,763,598	34	16.00	16	3,192,384	32	18.49	14	4	34.49	14
Maryland	285,311	26	3,034,621	31	10.64	34	5,425,873	21	19.01	13	4	29.65	22
Massachusetts	726,295	12	13,919,618	6	19.16	5	...	...	None	...	0	(b) 19.16	45
Michigan	1,249,221	6	20,056,848	3	16.05	15	18,334,840	4	14.67	28	3	30.72	20
Minnesota	673,573	14	10,101,785	11	14.99	21	5,768,100	18	8.56	44	2	23.55	37
Mississippi	246,242	32	2,814,150	33	11.42	32	5,696,553	14	23.13	7	5	34.55	13
Missouri	712,965	13	8,765,609	13	12.29	30	6,948,229	19	9.74	41	2	22.03	39
Montana	126,035	38	1,298,828	42	10.30	36	1,683,404	38	13.35	32	3	23.65	36
Nebraska	391,355	19	3,950,788	28	10.09	40	3,941,164	28	10.09	40	2	20.18	43
Nevada	27,376	48	249,111	48	9.09	42	531,186	45	19.40	12	4	28.49	27
New Hampshire	102,644	41	2,070,957	38	20.17	4	1,884,175	35	18.35	15	4	38.52	5
New Jersey	758,340	9	13,569,029	7	17.89	8	8,470,336	11	11.16	37	2	29.05	25
New Mexico	65,737	45	627,751	45	9.55	41	1,852,037	37	28.27	2	5	37.72	6
New York	2,083,942	1	34,306,706	1	16.46	14	...	...	None	...	0	(b) 16.46	47
North Carolina	464,376	17	6,088,140	18	13.11	26	9,787,011	8	21.07	11	4	34.18	15
North Dakota	173,525	36	1,775,145	40	10.22	37	1,479,469	40	8.52	45	2	18.74	46
Ohio	1,649,699	3	11,840,258	8	7.17	44	24,885,699	2	15.08	26	3	22.25	38
Oklahoma	529,843	16	6,258,610	17	11.81	31	8,147,901	13	15.37	25	3	27.18	31
Oregon	248,118	31	6,969,221	16	28.08	1	4,008,259	27	16.15	22	3	44.23	2
Pennsylvania	1,642,207	4	27,113,777	2	16.51	12	21,998,064	3	13.39	31	3	29.90	21
Rhode Island	125,698	39	2,273,819	36	18.08	7	1,182,328	41	9.40	43	2	27.48	29
South Carolina	216,805	33	2,440,539	35	11.25	33	5,518,240	20	25.45	3	5	36.70	10
South Dakota	191,371	35	2,901,905	32	15.16	19	3,158,873	33	16.50	20	4	31.66	19
Tennessee	322,137	22	4,066,478	26	12.62	29	5,134,600	24	15.93	23	3	28.55	26
Texas	1,214,297	7	17,701,251	4	14.57	23	17,945,037	5	14.77	27	2	29.34	23
Utah	98,541	42	731,340	44	7.21	43	1,664,652	39	16.89	19	3½	24.10	34
Vermont	86,231	44	2,090,960	37	24.24	2	1,118,882	42	12.97	33	3	37.21	9
Virginia	360,545	20	5,572,046	20	15.45	18	8,616,239	9	23.89	6	5	39.34	4
Washington	402,875	18	7,028,291	15	17.44	10	4,206,515	26	10.44	38	2	27.88	28
West Virginia	251,556	30	4,142,595	25	16.46	13	4,308,109	25	17.12	17	4	33.58	17
Wisconsin	742,135	10	10,774,707	9	14.51	24	6,856,759	15	9.50	42	2	24.01	35
Wyoming	56,336	46	572,570	46	10.16	38	954,317	43	16.93	18	3	27.09	32
Totals and Averages	24,493,124	...	\$322,156,044	...	\$13.82	...	\$303,970,694	...	(c) \$16.53	...	...	\$29.32	...
Total 1927	23,015,635	...	\$306,783,235	...	\$13.28	...	\$257,690,019	...	\$13.27	...	...	\$26.55	...
Increase	1,477,489	...	\$15,372,809	...	...	...	\$46,280,675	...	...	...	...	...	...

a = Unconstitutional, funds returned to State Treasury; b = no gas tax; c = this average secured by omitting motor vehicles registered in states not having a gas tax.

Distribution of Automobile License Fees and Gas Tax, 1928.

State	Automobile License Fees					Gasoline Tax					
	Total Gross Receipts	Collection and Administration	For Highway Purposes			Rate—Cents Per Gal.	Total Receipts	Construction & Maintenance on Rural Roads		State and County Road Bond Payment	For miscellaneous Purposes
			State Highways	Local Roads	State & County Road Bonds			State Highway	Local Roads		
Alabama	\$3,474,065	\$151,721	\$1,075,501	\$677,443	\$1,569,400	4	\$6,614,297	\$2,725,893	\$3,296,387	\$556,538	
Arizona	565,806		565,806			4	2,018,238	1,261,412	756,826		
Arkansas	3,786,004	75,720	832,921	567,901	2,309,462	5	5,382,732	1,184,212	807,417	3,283,497	
California	9,292,301	1,426,542	3,910,311	3,910,311		3	29,566,760	19,680,687	9,840,343		
Colorado	1,790,193	166,313	811,935	811,935		3	3,921,224	2,702,191	1,158,092		14,451
Connecticut	7,373,589		7,373,589			2	3,511,675	3,511,675			
Delaware	928,916		928,916			3	800,349	800,349			
Florida	4,935,995	521,968	3,201,150	1,165,449		5	11,257,617	6,741,135	2,247,045		2,254,096
Georgia	4,041,767	143,088	3,898,679			4	8,245,486	5,150,804	2,060,321		1,030,161
Idaho	1,626,949		166,549	1,460,400		4	1,884,023	1,870,573			
Illinois	15,521,530		9,337,237		6,149,010	0	936,826				836,826
Indiana	5,751,781	249,233	5,502,548			3	11,177,549	7,438,938	2,789,602		929,867
Iowa	10,692,767	203,982	10,068,490	367,712		3	8,535,628	3,446,331	5,066,000		
Kansas	5,394,448	286,846	3,213,511	1,894,091		2	5,394,841	4,517,041	877,800		
Kentucky	4,725,258	195,198	4,041,685	488,375		5	6,743,224	6,719,946			
Louisiana	4,333,631		4,333,631			2	3,380,931	3,380,931			
Maine	2,763,598	220,513	1,364,283		1,038,802	4	3,192,384	3,174,819			
Maryland	3,031,621	303,462	2,124,231			4	5,425,873	4,338,698			1,084,675
Massachusetts	13,919,618	1,352,012	11,643,077		924,529	0					
Michigan	20,056,848	729,063	12,245,725	6,000,000	1,082,060	3	18,334,840	9,499,452	5,399,874	3,000,000	345,392
Minnesota	10,101,785		6,507,230		3,594,555	2	5,768,100	5,768,100			
Mississippi	2,814,150	140,707	194,162	2,479,281		5	5,696,553	2,590,891	2,884,805		215,257
Missouri	8,765,609	370,000	5,283,109		3,112,500	2	6,948,229	6,890,783			
Montana	1,298,828	75,919		1,189,596		3	1,683,404	1,673,124			
Nebraska	3,950,788	118,131	1,149,797	2,682,860		2	3,941,164	3,934,403			
Nevada	249,111	11,485	109,790		127,836	4	531,186	265,593	265,593		
New Hampshire	2,070,957	151,790	1,906,428			4	1,884,175	1,412,501			470,834
New Jersey	13,569,029	849,699	7,882,354	4,536,976		2	8,470,336	8,368,341			90,000
New Mexico	627,751	70,406	371,633	185,712		5	1,852,037	1,414,496		400,500	
New York	31,306,706	1,785,572	23,999,877	5,196,770		0					
North Carolina	6,088,140	300,000	3,975,334		1,812,806	4	9,787,011	6,869,282		2,908,042	
North Dakota	1,775,145	170,000	867,573	737,572		2	1,479,469	1,454,469			
Ohio	11,840,258	386,503	5,969,831	5,483,924		3	24,885,699	15,760,943	4,147,616		4,977,140
Oklahoma	6,258,610		2,503,444	3,755,166		3	8,147,901	5,431,934	2,715,967		
Oregon	6,969,221	300,000	1,665,855	1,667,305	3,336,061	3	4,008,259	3,999,466			
Pennsylvania	27,113,777	1,783,898	20,509,755		3,870,914	3	21,999,064	14,123,214	4,707,738	3,167,112	
Rhode Island	2,273,819	211,905	2,031,516	30,398		2	1,182,328	886,746		295,582	
South Carolina	2,440,539	25,398	2,415,141			5	5,518,240	3,310,944	1,655,472	551,824	
South Dakota	2,901,905	59,901	1,450,002	1,392,002		4	3,158,873	2,210,215		940,970	
Tennessee	4,066,478	109,014	3,957,464			3	5,134,600	5,083,254			
Texas	17,701,251	500,519	10,011,767	7,188,965		2	17,945,037	13,458,778			4,486,250
Utah	731,310	130,000	313,370		257,970	3½	1,664,652	1,143,222		515,930	
Vermont	2,090,960		2,090,960			3	1,118,882	1,118,882			
Virginia	5,572,046	260,000	5,312,046			5	8,616,239	5,744,159	2,872,080		
Washington	7,028,291	285,454	4,201,591	2,038,965		2	4,206,515	4,206,515			
West Virginia	4,142,595	239,913	1,262,682		2,640,000	4	4,308,109	2,308,109		2,000,000	
Wisconsin	10,774,707	639,497	5,645,210	4,490,000		2	6,856,759	2,521,196	3,831,933		493,645
Wyoming	572,570		572,570			3	954,317	951,944			
Total	\$322,156,044	\$15,001,372	\$208,880,272	\$60,399,109	\$31,825,911	Av. 3.00	\$303,970,694	\$211,906,591	\$57,380,901	\$17,619,995	\$18,228,606

District of Columbia motor license fees totaled \$473,981 and gas tax \$1,263,148; Disposition of motor fees for miscellaneous purposes involved 12 states totaling \$6,390,734 but \$3,334,487 was for N. Y. City general fund, \$606,925 for the streets of Baltimore, \$949,210 for highway motor patrol in Pennsylvania and \$502,281 for a like purpose in the State of Washington.

Highway News of the United States

STATES GET LARGE SUMS FROM NATIONAL FORESTS

More than \$1,600,000 is due thirty states from the Federal government as their share of receipts of national forests lying within their borders for the fiscal year ending June 30, 1929, according to a statement just sent by the United States Department of Agriculture to the Comptroller General of the United States. This sum represents more than 25 per cent of the gross receipts of the national forests for the year, and the great bulk of it is owing to western states, in which the principal areas of national forest and other public lands lie.

The state shares of national forest receipts represent a Federal payment in lieu of taxes which the states would receive if the national forests were in private ownership, and under the Federal statute providing for the apportionment the money must be used by the states for schools and roads.

"That the Federal government allots the states such a generous portion of national forest receipts is not generally recognized by the public," says Acting Secretary Renick W. Dunlap, of the Department of Agriculture. "Moreover, the states do not have to bear a penny of the burden of national forest protection, administration, and development. In the fiscal year ending June 30, 1928, the Federal government spent more than \$20,000,000 on the national forests, including \$10,020,835.29 for roads and trails, and more than \$2,000,000 for purchase of additional forest land. The great bulk of this expenditure went for development activities, such as protection against fire, roads, trails, planting, etc., which will ultimately greatly increase the productivity of the forests and consequently increase their revenues.

"Most of the receipts came from timber sales and grazing. No effort is now being made to push national forest timber sales because of chronic overproduction in the lumber business. Ultimately, however, when overproduction is cured, either by some form of control or by the great inroads made on private timber, there will be heavier demands for national forest timber, and consequently greater national forest revenues and larger sums to the states.

"These national forest revenues are perpetual. National forest timber will never decrease in amount; it is a permanent asset handled by 'sustained yield,' so that when an area is cut over it grows up again to timber. Thus, cutting and re-growth go in an endless cycle. Likewise, the industries based on the national forests are perpetual and a permanent asset to the community. Contrast this with forest lands that have been completely denuded and left unproductive, a burden on the community. Many such lands, in course of time, revert to the states for delinquent taxes. All in all, both in direct revenue and in permanent industrial development and watershed protection,

the national forests are contributing very largely to the western states."

Following is a list of the states which have national forests within their borders, and the shares of the receipts from those forests for the fiscal year 1929 which they will receive:

Alabama	\$ 188.94
Alaska	20,628.89
Arizona	133,049.37
Arkansas	18,908.37
California	356,606.10
Colorado	124,715.29
Florida	7,889.75
Georgia	3,351.38
Idaho	156,928.12
Maine	1,416.10
Michigan	1,685.38
Minnesota	7,125.07
Montana	65,968.89
Nebraska	2,396.21
Nevada	23,130.77
New Hampshire.....	19,532.11
New Mexico.....	35,718.97
North Carolina.....	7,654.80
Oklahoma	1,142.24
Oregon	285,025.97
Pennsylvania	1,012.22
Porto Rico.....	62.48
South Carolina	1,266.88
South Dakota	42,988.27
Tennessee	2,980.78
Utah	51,287.05
Virginia	9,238.26
Washington	167,779.28
West Virginia.....	1,745.31
Wyoming	74,459.40

FORTY-TWO STATES TO CONSTRUCT 21,644 MILES OF ROAD IN 1929

One question upon which cities and villages, mountain and plains, truck farmers of the East and ranchers of the West, all sections of the United States agree is the building of good roads.

A census of state highway departments just completed by the American Road Builders' Association shows an estimated 21,644 miles of roads to be constructed this year in 42 states.

A questionnaire was sent to all states and figures received from all except Connecticut and Nebraska indicate \$744,266,000 available for maintenance and construction this year. This sum includes highway funds apportioned by the Federal government to the states, and funds raised by gasoline taxes, motor vehicle registration and various other methods.

The estimated county expenditures for 1929 are shown to be \$405,150,000 in 40 states. This added to the state funds shows a grand total of \$1,149,416,000, which is a conservative figure of the total money that will go into good roads during 1929 or the fiscal year 1929-30. The Bureau of Public Roads' estimate is \$1,315,000,000.

In hard surface building Iowa, which now has 1,900 miles, heads the list of states in mileage to be constructed and will pave 750 miles each year in 1929-30-

31, making a total of 4,150 miles of paved road.

Kansas has a 1929 construction program with a total of 1,875 miles, which includes 800 miles of grading, 1,000 miles sand and gravel and 75 miles hard surface.

New York, with 10,840 miles of all types of road, will add 700 miles this year and "700 plus" in 1930.

Ohio, with 6,660 hard surfaced and 3,837 miles of gravel roads, will add 300 miles this year.

Pennsylvania, with 7,485 miles hard surfaced in her total mileage of 12,756, will add 500 miles in 1929.

Texas, with 18,000 miles of all types, will add 800 miles this year and "probably the same" in 1930 and 1931.

Colorado will add 200 miles of gravel, oil and hard-surfaced highways to her state system in 1929.

West Virginia will add 360 miles of hard surface each year over the three-year period. Wyoming will add to her present 39 miles of hard-surfaced roads 390 miles, of all types, in 1929 and 375 miles each in 1930-31.

Michigan, with 3,452 miles of all types will build 560 miles this year and 500 each in 1930-31, making a total of 5,012 miles.

Alabama expects to build 1,100 miles of road in 1929. Illinois this year will add 600 miles of hard surface to her present 7,525.

Kentucky will hard surface 382 miles of road this year and expects to exceed this program in both 1930 and 1931.

North Dakota, which now has only 15 miles of hard-surfaced roads, will build 1,000 miles of all types annually in 1929-30-31.

Missouri will build 1,291, all types, this year and follow next year with 917 miles more, giving that state a total of 2,876 miles hard surfaced.

Mississippi is the only state which has no funds nor estimate for construction this year. The state has matched Federal aid with county bond issues in past years, but several proposed bills this year have failed, according to the state highway department.

The census further shows that in 22 states all construction is by contract, 23 states employ some day labor, when bids are too high, in emergencies, and on small projects, and convict labor is used on roads in Florida, Michigan and Virginia.

At least six states divide gas tax between the state and counties, Florida giving the counties four cents of her six-cent tax and Mississippi giving the counties three cents out of five. In the others, the states take the larger proportion.

Eight states hope to secure funds for road construction by bond issues in the near future. New Mexico and Maine expect to complete bond issues this year; Mississippi anticipates an issue in 1930; Maryland and Iowa in 1931, the latter for \$100,000,000; Alabama and Georgia are desirous of issuing bonds, with the latter state seeking \$100,000,000.

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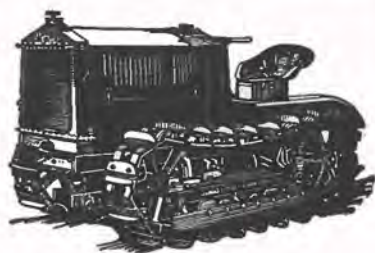
Denver National Building, Denver, Colorado

STATE HIGHWAY DEPARTMENT
Financial Statement, September 1, 1929

BALANCES	
State Treasurer.....	\$ 715,660.23
County Time Warrants.....	14,678.82
Revolving Fund.....	9,500.00
Total Balances.....	\$ 739,839.05
RECEIPTS	
½ Mill Levy.....	\$ 432,872.22
Internal Improvement.....	44,400.00
Gas Tax.....	2,464,004.28
U. S. Government.....	1,354,578.74
Bus Licenses.....	35,533.98
Highway Receipts.....	28,084.78
Total Receipts.....	\$4,359,474.00
Total Receipts and Balances.....	5,099,313.05

DISBURSEMENTS	
Federal Aid Projects.....	\$1,778,076.33
State Projects.....	266,082.76
Maintenance	712,121.14
Maint. Equip. and Repairs.....	225,064.95
Property and Equipment.....	27,476.13
Construction Equipment.....	33,428.76
Surveys	10,979.16
Traffic Signs and Census.....	10,373.82
Administration	117,955.29
Federal Aid Renewals.....	37,849.05
Total Disbursements.....	\$3,219,407.39
BALANCES 8-31-29	
State Treasurer.....	\$1,856,791.51
County Time Warrants.....	13,614.15
Revolving Fund.....	9,500.00
Total Balances.....	\$1,879,905.66
Total Disbursements and Balances	\$5,099,313.05

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PAVING CONFERENCE IN NOVEMBER

The eighth annual asphalt paving conference will be held October 28-November 1, 1929, at West Baden, Indiana, under the auspices of the Asphalt Association, New York. Special attention is to be paid to the improvement of farm-to-market roads, and airport paving, as well as city street construction and trunk-line highway improvement. The dominant feature will be the discussion of the latest and most economical methods for the construction with asphalt of low-cost surfaces of secondary and tributary highways. Salvaging of existing gravel and macadam roads and their utilization as bases for low-cost asphalt surfaces will be given serious consideration.

The Association of Asphalt Paving Technologists will also hold its annual meeting at this time, in connection with the conference.

Within ten years after its origin as a means of financing highway construction, the gasoline tax has spread to every state in the union. Re-enactment by Illinois of a gas tax law brings this tax plan into universal use in the United States. Massachusetts and New York were without gasoline tax laws until January 1st last and May 1st, respectively. The first states to adopt this plan of taxation were Oregon and Colorado.

The Colorado Springs chamber of commerce in a recent meeting opposed the plan for extending Highway No. 36, maintaining that it would be detrimental to the Springs and the Pikes Peak district. The chamber decided to go back of Highway No. 40, the present route west from Norton, Kansas.

John D. Painter, of Roggen, the largest individual landowner and the largest individual taxpayer in Weld County, in an interview in the Greeley Tribune asserts that the county commissioners should give the southeastern corner of the county more attention. He asserts that his activities for roads is not a criticism on Greeley and that corner of the county has no intention of deflecting business from Greeley, "but we people living 30 miles south of Greeley feel we have a right to a safe road into Denver without being forced through Greeley," he is quoted as saying.

Col. A. S. Peck, district forester of the U. S. Forest Service, is quoted in Estes Park as saying the forest service will construct a modern mountain highway from that village to Colorado Springs as rapidly as funds will permit. The road, it is said, will allow motor tourists to drive into the state through Denver, over the Denver mountain parks to the proposed forest highway.

PLANS FINISHED BUT PROJECT NOT ADVERTISED

Proj. No.	Length	Type	Location	Waiting for
57-Reop.	0.5 mi.	Bridge	North of Lamar	B. P. R. Approval
68-Reop.	1.9 mi.	Grading	North of Monte Vista	B. P. R. Approval
263-A	3.404 mi.	Gravel Surfacing	Northeast of Ft. Garland	B. P. R. Approval
282-G	5.0 mi.	Gravel Surfacing	South of Craig	B. P. R. Approval
300-B	2.828 mi.	Grading	North of Silverton	B. P. R. Approval

PLANS BEING DRAFTED

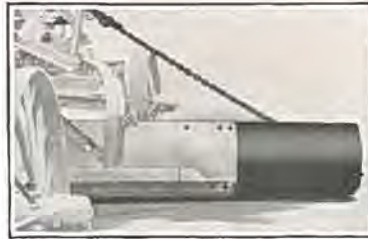
Proj. No.	Length	Type	Location
2-R No. 9	1.5 mi.	Pavement	Starkville
151-A	4.0 mi.	Gravel Surfacing	South of Granby
165-Reop.	3.0 mi.	Concrete Pavement	East of Canon City
267-C	3.0 mi.	Grading	Near Model
272-E	2.0 mi.	Concrete Pavement	West of Rocky Ford
296-E	5.0 mi.	Gravel Surfacing	South of Greenhorn
279-H	2.0 mi.	Gravel Surfacing	East of Kenosha Pass

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
97-R1	East of Lamar	0.275 mi.	Bridge	W. A. Colt & Son	\$ 24,237.50	80	97-R1
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	99	138-A
138-B	North of Kremmling	3.133 mi.	Gravel Surfaced	F. L. Hoffman	76,363.35	28	138-B
144-C	Bet. Fort Collins and Laramie	2.934 mi.	Gravel Surfaced	Bedford & Woodman, Inc.	37,911.35	100	144-C
147-C	South of Cortez	3.428 mi.	Gravel Surfaced	E. J. Maloney	86,182.75	76	147-C
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	94	149-A
150-A	West of Craig	8.227 mi.	Gravel Surfaced	Gardner Bros. & Glenn	93,477.35	0	150-A
175-A	Between Sterling and Ovid	41.979 mi.	Graded	Cole Bros.	193,055.75	0	175-A
208-AR	East of Grand Junction	0.507 mi.	Gravel & R. R. Grade Separation	Harry A. Roush	59,568.00	100	208-AR
208AR2-CR1	East of Grand Junction	9.254 mi.	Oil Processed Gravel Surface	Hinman Bros. Const. Co.	44,652.05	77	208AR2-CR1
242-C	West of Fruita	6.011 mi.	Gravel Surfacing	Hinman Bros. Const. Co.	56,344.50	98	242-C
253-D	West of Milner	2.547 mi.	Gravel Surfaced	Hamilton & Gleason Co.	147,192.00	0	253-D
258-F	Gunnison-Sapinero	5.659 mi.	Surfacing	Hinman Bros. Const. Co.	68,640.60	89	258-G
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	123,700.60	23	258-H
258-H	West of Sapinero	4.921 mi.	Gravel Surfaced	Cole Brothers	51,551.00	78	259-A1
259-A1	Between Parlin and Sargents	3.350 mi.	Gravel Surfaced	Ed. H. Honnen	37,933.50	94	262-I
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	96,075.30	78	266-D
266-D	South of Bondad	4.111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	38,485.50	86	270-C
270-C	Betw. Alamosa and Monte Vista	5. mi.	Oil Pro. Gravel Surf.	Mountain States Const. Co.	54,843.40	100	271-C
271-C	West of Portland	2.430 mi.	Surfacing	J. Finger & Son	88,237.50	83	272-D
272-D	East of Manzanola	1.950 mi.	Pav. & R. R. Underpass	Driscoll Construction Co.	218,277.80	66	277-D1
277-D1	Betw. Colo. Springs & Pueblo	15.566 mi.	Grading	M. E. Carlson	221,389.65	33	277-E1
277-E1	South of Colorado Springs	10.2 mi.	Grading	J. L. Busselle	126,000.00	100	279-F
279-F	North of Baileys	3.444 mi.	Graded	J. Fred Roberts & Sons	88,384.20	89	282-E
282-E	North of Meeker	6.421 mi.	Gravel Surfaced	Luke E. Smith & Co.	82,589.74	34	282-H
282-H	Between Rifle and Meeker	7.029 mi.	Gravel Surfaced	Winterburn & Lumsden			
286AR1-BR2	North of Nunn	5.267 mi.	Oil Process Gravel Surface	L. E. Smith & Co.	20,575.25	100	286AR1-BR2
287-AR5	Between Greeley & Ft. Morgan	6.590 mi.	Concrete Pavement	Edw. Selander	154,682.85	86	287-AR5
292-B	Between Gilman and Minturn	2.640 mi.	Gravel Surfaced	O. J. Dorsey	29,146.80	71	292-B
292-C	West of Avon	1.646 mi.	Gravel Surfaced	Ed. H. Honnen	39,663.10	71	292-C
293-C	North of Ouray	3.661 mi.	Grading	C. V. Hollenbeck	62,997.80	97	293-C
295-BR1	South of La Jara	6.622 mi.	Oil Pro. Gravel Surf.	Poble Bros. Const. Co.	14,226.50	98	295-BR1
295-D	North of Antonito	2.460 mi.	Oil Pro. Gravel Surf.	Levy Const. Co.	72,676.75	21	295-D
297-C	Southwest of De Beque	9.953 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	312,453.50	13	297-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssier	38,426.00	33	298-B
299-B	Btw. Delta and Grand Junction	3.465 mi.	Gravel Surfaced	Gardner Bros. & Glenn	60,804.80	99	299-B

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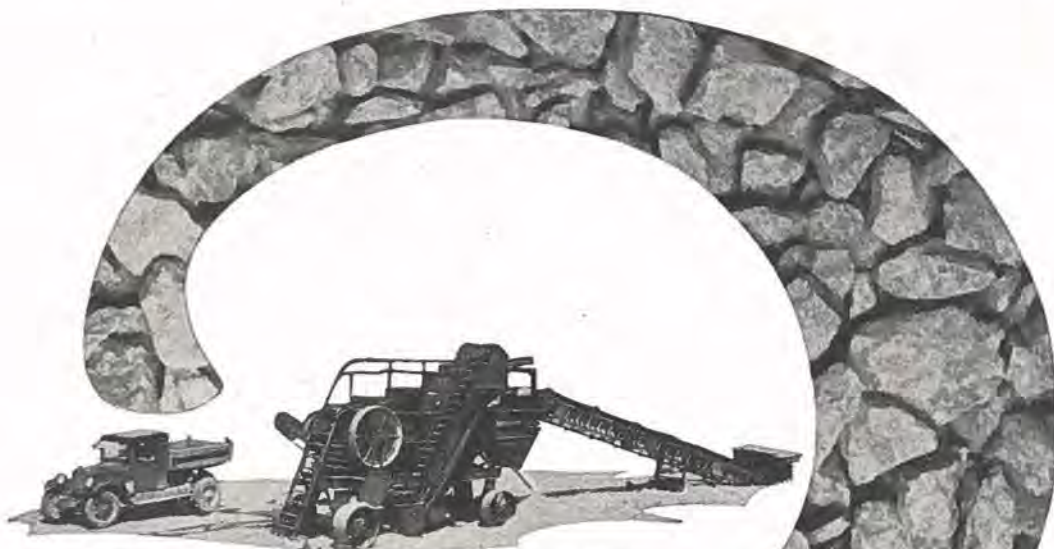
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Vol. 8

Oct. 1929

No. 10



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Published Monthly by the
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 1803 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

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Our Cover Picture

LOVELY mountain lakes—forests reaching up to the timber line—majestic peaks, snow-clad until late summer—the grandeur of the Mount Evans region of the Denver Mountain Parks system lures the traveler back year after year. On the cover of this month's COLORADO HIGHWAYS we print a view of the new Mt. Evans highway, as it crosses the Summit Lake "flat." On the left is Summit Lake, a beautiful body of water which nestles among mighty rocks at an elevation of 13,500 feet, far above timberline. Paved highways and splendid mountain roads bring this scenic wonderland within a few hours' drive of Denver. The Colorado Highway Department is now engaged in the construction of the last link of the highway to the summit of Mount Evans. Photo by Colorado Association.



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Editorial

By E. E. DUFFY

MIRACLE men is the term that can well be applied to modern highway builders. South Carolina, which recently approved a highway bond issue of \$65,000,000, expects to complete her state highway system within the next three and a half or four years. This means that in that time some 2,000 miles of hard-surfaced roads will have been built and that 1,500 miles will be otherwise improved.

This amazing aspiration is held forth by C. E. Jones, chairman of the state highway commission. The bond issue is now before the state supreme court for official sanction.

The South Carolina bond issue, which in effect marshals a small part of that state's actual and potential resources for immediate use, will enable the state to introduce mass production into roads. Obviously roads can be purchased cheaper in large quantities. South Carolina expects to let contracts for lengthy mileages to builders equipped with the most efficient machinery.

To travelers who have found themselves in South Carolina during the wet months, the statement that South Carolina's state highway system will be so improved within a short period may seem a bit enthusiastic. However, in this day and age, mass production of roads may be accomplished as easily as the making of enormous quantities of rubber tires.

Modern highway builders, with their gigantic paving mixers and motorized equipment, now lay pavements with the ease of laying carpets. One paving outfit may place as much as a thousand feet of pavement in a day without anyone getting unduly excited. Yet it is this knack of getting the pavement down quickly that foretells the eventual smooth paving of all well traveled routes.

Illinois, North Carolina and other states have built their roads very rapidly under the bond issue method. Last year Illinois set a new high record for highway construction through the completion of 1,340 miles of concrete, most of which was laid through bond issue financing. A little reflection on that construction achievement brings the realization that highway builders are in step with modern private business.

The early usage of the "backbone" highways in South Carolina will bring returns that will far more

than offset the interest on the bonds. That state's chief method of obtaining highway income is the gas tax, which was recently raised to 6 cents a gallon. According to Mr. Jones, the mud roads prevalent in South Carolina during several months of the year collect a much greater tax than 6 cents a gallon. He asserts that when the new paved highways are opened to travel, the increased business and pleasure utility of the highways and the lessened car operating costs and maintenance costs of the roads will show a decided profit for the state.

An argument against a bond issue for highways that looks very fine on the face of it is that the interest on a \$20,000,000 bond issue would pave 667 miles. But it neglects to state that the failure to float bonds, or to raise the same amount in some other way would mean that a good proportion of the \$20,000,000 would be eaten up in maintenance costs on heavy traffic roads, and folks in the country would constantly get less, both in maintenance and construction. On roads costing over \$1,000 a mile in maintenance, paving will pay for itself, both interest and principal. When we refuse to take care of those roads in a permanent way we are not practicing economy but extravagance. It means no increase in real estate taxes, remember that, for the bonds would be retired from the gas and vehicle taxes. The longer we put it off the less money we will get on the light traffic roads. Refusing to pave may be economy, but if it can go by that name, then the farmer who refuses to build a barn to shelter his stock is also an economist, and the merchant who refuses any increase in trade because he doesn't want to hire an extra clerk.

Among the prohibitions of advertising signs and sign boards along the state highways issued by the Arizona commission are these: if sign will permit snow or sand to drift over highway; if placed to throw a shadow on the road; if placed above the highway so it could be blown into the road; if it is similar to standard road signs; if it in any way resembles a railroad crossing sign; if placed in any stream or arroyo where it might cause a stoppage of water and flood the highway. It is stated that under no conditions will permits be issued for such signs.



Another spot where the State Highway Department put an end to "Dusty Roads"—A view of the new oil surfaced highway near La Jara.

Officials Study Colorado Road Problem

HOW to spend \$3,500,000 in the construction of new highways in Colorado during 1930, in the best interest of everybody!

That's the problem that will face the governor, members of the state highway advisory board and the state highway engineer, when they sit down at the annual meeting of the advisory board to be held in November.

With every section of the state clamoring for more and better highways, the problem confronting the board members is no easy one, to say the least. A third of the money which will be available for new construction next year will be contributed by the Federal government. And that means that two-thirds of the total must be expended on Federal Aid roads, which include the main arteries of travel in the state.

In northeastern Colorado they would like to see the completion of the pavement between Greeley and Dearfield, thus completing the paved link between Sterling and Greeley.

In Denver there is a demand for the improvement of the Denver-Limon road, which has been a source of criticism during the past summer.

Completion of the pavement between Pueblo and Colorado Springs is desired by the citizens of these two cities. And undoubtedly the 1930 budget will carry an appropriation for this purpose.

Citizens of the Arkansas Valley will ask for further improvements on the Santa Fe Trail, while Trinidad undoubtedly will seek additional funds for an extension of the Stonewall-San Luis road, as well as improvements on the main highway north to Walsenburg.

Additional funds for the new Mosca Pass highway, and extensions to the oiled road program from Alamosa and Monte Vista will be sought by the San Luis Valley.

Extensions to the gravel surfacing program inaugu-

rated several years ago in the Durango district, more particularly between Durango and Pagosa Springs, will be requested of the board.

On the Western Slope there will be advocates of improvements on the highway between Montrose and Grand Junction. Also, it will be necessary to provide funds for the completion of the new highway now under construction between Palisade and DeBeque.

In northwestern Colorado there is a demand for further improvement of the Victory highway, more particularly west of Craig, to connect with a new stretch of road which Utah is constructing to the state line.

And, of course, there will be numerous other requests for funds made of the board. How to satisfy everybody is the big problem. It will probably be unable to please all because of the limited funds available. Never before has there been so insistent a demand for improved highways as there comes from all parts of the state today.

At a recent meeting of the Colorado Association the present highway situation was the principal subject of debate.

"We build a little patch here and a little patch there. Then while we are building in between them, the patches are worn out," declared President Wilbur F. Denious at the organization's general membership meeting, held October 3.

There were many others, all of the same way of thinking, representative of all parts of the state. That evening, after the day's discussion, the State Association of Commercial Organizations, holding its own meeting, put the whole thing on record in resolutions, saying:

"The highways and highway system of Colorado in their present condition are inadequate, deplorable, dangerous, and hurtful to the best interests of our state. * * * The entrance of Colorado upon an extensive road

improvement program will mark a forward step in line with the national activity. * * * It is essential to reduce transportation costs, to increase comfort, convenience and pleasure to our citizens, to insure the high standing of Colorado as a tourist state, and to absolutely avoid retrogression.

"Therefore, the State Association of Commercial Organizations hereby goes on record favoring the road-building program of the Colorado Association as outlined by its executive vice president, Dr. B. M. Rastall; it further favors a long-time program as submitted by the Rocky Mountain Motorists, Inc.; and it further takes the firm position that nothing will satisfy short of adequate funds to complete at least two arteries of traffic across the state."

The Colorado Association issued the following statement in regard to the highway situation at the close of the meeting:

"What's going to be done about it?"

"Everybody wants an answer to that question.

"Well, it's a big problem that must be carefully approached and it will take time. All important interests of the state must be considered in its solution. That is why the Colorado Association is forming a Statewide Highway Committee that will include in its membership many of the ablest and most experienced men in all sections of Colorado. Upon that committee will depend the future action. Nothing has yet been decided on road financing or anything else in connection with roads. The committee will determine what shall be done after it organizes and goes over the situation and needs. It will be earnest, constructive work carried out in cooperation with the State Highway Commission to accomplish the most effective results possible.

"Every Chamber of Commerce in the state has been asked to appoint a representative on the committee. Many have sent in the names of their men; others have not. If yours has not, get your community represented! A meeting will be called in the next two weeks.

"In the meantime, plans and suggestions are being received for presentation to the committee. Dr. Rastall's suggestion was one of these. Oiling, in his opinion, will be the solution of many road-surfacing problems. A study of the State Highway Commission's finances has convinced him that, despite the small fund, an impressive demonstration of the benefits of oiling roads on some of the main highways of the state can be made within two years. Then the people will see for themselves, and perhaps an extensive program can be begun.

"But there are many other suggestions. All will be gone over and threshed out by the Statewide Highway Committee. One thing is certain—through this committee the Colorado Association will get action on roads for advancement of all Colorado."

A long term plan for the construction of Colorado's highways was the keynote of a program submitted at the membership meeting of the Colorado Association by Clarence Werthan, executive secretary of the Rocky Mountain Motorists, Inc.

The adoption of the plan, some agreed, would produce the best results with the present resources until the people of the state or the Legislature adopt a new adequate financing plan.

The principal points of the Werthan program follow:



U. S. Highway 40S along the Colorado River in Glenwood Canon.

1. Concentration on the completion of our trunk system in an orderly way, according to a long term plan. No investment to be tied up in any project which cannot be put to use within a reasonable time.

2. Adoption of improved oil process construction where engineers determine it to be economical.

3. No money to be spent on roads which are built purely for scenic purposes and which do not have commercial value.

4. No more mountain passes to be constructed until all present projects are completed or eliminated as state highways.

5. Economy and efficiency rather than increased taxation through a constant effort to obtain the maximum return for each highway dollar spent.

6. Readjustment of automobile personal taxation and license fees through constitutional amendment, thus reducing cost of collection, increasing revenue and dividing the burden equally among all.

7. All taxes collected from the motorists to be returned to the motorists through improved roads.

8. Centralized highway control through the adoption of the Uniform Highway Motor Vehicle Code. Elimination of the dishonorable "fee system" and "speed traps."

9. Use of every feasible method within our resources to keep motor transportation moving between the western and eastern slope in the winter.

At about the same time the members of the Colorado Association were discussing the highway situation in this state, the Western Motor Clubs' Conference, held in Seattle, passed resolutions favoring increased Federal Aid and forest highway appropriations.

The conference, in resolutions which will be transmitted to state officials, auto clubs in all parts of the country and to national representatives, pointed out the necessity for immediate congressional action on these matters and asked for the support of all motordom.

Requested increase in Federal Aid funds would provide \$100,000,000 annually, instead of the present allotment of \$75,000,000, while the forest highway appropriation would be raised to \$12,500,000 from \$7,500,000 a year.

Colorado's allotment from the \$75,000,000 Federal road fund at present is \$1,230,000.



A section of completed road near Milner, west of Steamboat Springs on the Victory Highway—another State Highway Department achievement.

Gas Tax Is Investment, Declares Road Builders' Official

NOW that New Yorkers and Illinoisans are paying taxes on gasoline in their home states, gasoline for car operation can't be bought in this country without some little contribution to highway funds.

Getting money for road purposes used to be more painful—recall those days when most all states were empowered to collect road taxes from able-bodied males, who had the choice of paying with either cash or muscle. Down in Peru, S. A., they're still doing it, with men between the ages of 21 and 50 required to work on the roads for 12 days each year, or to hire someone to do it.

This old-fashioned method of garnering road funds, although obviously inefficient, was nevertheless based on the sound principle that everyone benefited from road improvement. If one was a road user then the benefit was direct; if one had no occasion to drive a horse or mule to town, the benefit was still there, but indirectly, for the material and intangible things that made for earthly progress and happiness then, as now, came through transportation. Even in this day of the airplane, the road goes on strengthening its claim as a most important transportation factor.

Aside from the reasonable vehicle license fees collected in every state, the gasoline tax has been selected as the most equitable and desirable method for obtain-

ing funds wherewith to extend pavement systems. No state collects less than two cents a gallon for motoring gas, while two states now receive six cents a gallon—Florida and South Carolina. Road conditions in those states, so say highway authorities, really warrant this tax rate. It has been definitely proven that poor roads, and roads that cannot be used the year round, exact a levy on the motorist's pocketbook far beyond the gasoline and other taxes for highway income.

Critics have complained that gas taxes are unduly large. The reasons for such an attitude are obscure; certainly, the facts do not bear out this view. A few states may be misusing gas tax funds for other than road work, but that is a matter for those states themselves to correct. Motorists may read that the total gas tax collection for 1928 was some three hundred million dollars and that additional millions will be collected in 1929. True, these are big figures, but the motorist may get the clear picture of the situation by analyzing his own expenditures.

The average motorist uses no more than 400 gallons of gasoline in a year's time. Can the gas tax charge of from eight to twelve or twenty-four dollars be called excessive? Particularly when the savings permitted in driving over the paved roads built by the gas tax money amount to far more than the gas tax charges?

AUTOMOBILE owners should regard gas taxes, costing at most five cents for every 15 to 20 miles traveled, as an investment rather than an expenditure, declares Frederic A. Reimer, president of the American Road Builders' Association. He declares that some motorists want to take all they can get out of highways, and put nothing in.

"You cannot ignore the old principles, dating back to Bible times, that you have to give in order to receive," he declared. "The nation's highway program, financed in part by automobile registration fees and gasoline taxes, benefits all citizens. The highway industry is a great factor in fostering our national prosperity, touching as it does the great interests of materials, equipment, labor and transportation. In its results, it provides for continuance and expansion of the motor vehicle trade, and brings better living conditions to all.

"Its direct benefits come at once to every automobile owner, giving him new outlets for pleasure and commercial traffic and saving him actual dollars in the lengthened life of his car. For this he should be willing to pay.

"It is evident," says Reimer, "that highway construction in most instances is not keeping pace with transportation demands. The full development of public wealth in many states is retarded by lack of transportation facilities.

"With automobile registration figures showing a rapid increase, difficult problems must be met by highway engineers.

"That highway transportation and automobile distribution has been retarded by congestion and lack of adequate highways in large cities is evident from an analysis of traffic.

"Based on the car ownership in Detroit, which has 3.5 persons per automobile and whose highway facilities are excellent, the ownership of cars in New York City, Chicago, Philadelphia and Boston is evidently held back by reason of lack of exits, high speed arteries and regional highways. Boston has seven persons to each automobile; Philadelphia and Chicago have nine;



Apishapa River bridge near Fowler on Santa Fe Trail, constructed with state funds.



Showing stretch of new pavement entering Boulder, a Federal Aid project.

New York has ten. Wayne County, Michigan, in which Detroit is located, has 400 miles of good 40-foot pavement, giving a good outlet for city traffic. Los Angeles, which has good pavements within and without the city, has an automobile to each two and one-quarter persons.

"Where highway construction has been wisely planned and carried out, automobile registration has shown a rapid increase. Inasmuch as vehicle taxes used for highway construction and maintenance in 1928 amounted to \$620,000,000, which is 40% of the total expenditure of \$1,560,000,000, the necessity of meeting the demands for motor vehicle transportation is plainly evident in order to continue this cycle of activity.

"Quoting data of the Bureau of Public Roads, the proceeds from gasoline taxes have increased from zero in 1918 to \$305,000,000 in 1928. Yet the motorist today is paying less for fuel than he did nine years ago. Then, when he purchased gasoline, he got gasoline only; now he secures gasoline in full measure and good roads thrown in to the extent made possible by gas taxes. The proceeds from automobile registration have increased from \$51,000,000 in 1918 to \$322,000,000 in 1928.

"Increase in highway expenditure is dependent on increase in motor vehicle registration, not only for current funds, but for bonding operations. Twenty-nine states have resorted to bonding for highway purposes up to the present time, and even though some have undoubtedly violated good financing principles, there is no instance where the extension of credit has not reacted advantageously to the state and no instance where state credit has been adversely affected."

USE of the motor vehicle in the United States is every year increasing faster than mileage of improved roads. The country as a whole is spending \$1,500,000,000 a year on its roads, but only a fraction of the highways has been brought to engineering standards. Two-track thinking in highway construction must be changed to four-track thinking in all phases of public roads improvements—financing and administration as well as engineering design and construction.

(Continued on page 20)

How Improved Highways are Promoting Rural Education

By KATHERINE M. COOK

Chief, Division of Rural Education, U. S. Bureau of Education, Washington, D. C.

In this article, appearing in the United States Daily, road builders are given a fresh realization of the new educational opportunities following improvement of side roads.

BIGGER and better rural schoolhouses replacing the little old red schoolhouse of traditional reverence are of growing importance as measures of educational progress in modern rural communities. More and more miles of better and better highways have preceded, accompanied and followed the building of such schoolhouses in thousands of rural communities during the past decade.

Past Decade a Consolidation Era

Ohio offers one example. In the past 10 years, 4,000 consolidated schools have been built there, an average of one a day, replacing thousands of schools of the one and two-teacher variety. In 1927 Ohio led the states in local disbursements and was among the first 14 in state disbursements for improved roadways. There are in round numbers 44,000 miles of surfaced roads within her borders.

A number of other states which are outstanding in respect to recent school consolidation are equally outstanding in road building, with programs apparently paralleling each other in time as well as territory involved. North Carolina is another excellent example.

Hence, if experience is any criterion for judgment, it may be assumed that the two programs (improved roads and improved schools) are closely related.

In a progressive county in a southwestern state in which consolidated schools had all but completely replaced those of the one-teacher variety, the county superintendent was invited by the chamber of commerce in the county seat to speak at the weekly luncheon of that body on "How Good Roads Have Helped Secure Consolidated Schools in ——— County." The superintendent replied that she would gladly accept the invitation to speak if the topic were changed to read, "How Consolidated Schools Have Helped Secure Good Roads in ——— County."

Another county superintendent, addressing an educational meeting recently, was asked if the consolidation of schools, which had reached practically 100 per cent in that county, came as the result of improved roads. Her reply was, "No; we decided to consolidate the schools, select the site, proceed with our building and in the meantime petition the county commissioners to improve the road leading to the schools. In our case, good roads follow as well as precede school consolidation."

Barring for the moment the more or less exceptional cases, improved highways are as apt to be a result of school consolidation as is consolidation to be the result



Soldiers Memorial gateway constructed at junction of U. S. Road 285 by patriotic citizens of Boulder.



A fine stretch of Federal Aid highway looking east from Fraser, in Grand County, with James Peak in the distance.

of improved highways. Much of the same spirit necessary to promote the one, promotes also the other.

That improved educational facilities for thousands of farm children, through centralization, wait on improved road conditions is a fact not to be overlooked. Isolated homes and communities where the poor quality of the soil, difficult topography, lack of funds for drainage and other fundamental road improvements combine to eliminate the possibility of long distance travel, are still with us in large numbers and particularly prevalent in some of our states.

Consolidation Not Only Benefit

But the significance of improved roads to the education of children in these situations is not confined to the extension of the consolidation movement. Difficulty of walking to and from school, increased by necessity of the children to struggle over muddy, undrained roads, often in deep snow or through inclement weather, has been found in several studies of the question to be the most significant cause of irregular school attendance of country children.

Even if children must walk to the school—be the school large or small—good roads increase educational opportunities to a considerable degree.

Co-operation in school and road programs of improvement is, of course, the satisfactory plan. Schools can and should be located not only centrally in relation to the children served, but centrally in relation to the system of improved highways. Accessibility is far from being in 1929 the question it was in 1910 or even in 1920. Ten miles to school over a good road in a modern transportation vehicle is a short trip. It may and often does involve less danger to health as well as less time than a walk of a mile in cold or wet weather over muddy or otherwise unimproved roads.

Good local roads and school consolidation are bringing education home to the farm—education for the parents as well as for the children. They are bringing opportunities for high school education within easy access of country children, permitting them to spend the night under the home roof and in the family circle.

Good roads combined with the innate faith of every American parent in the efficiency of education as a means of making for his children a better world than the one he himself has lived in, are changing the social order in farm communities.

In the better organized and more progressive communities, school centralization is proceeding on a larger scale than ever before. Whole counties are now being surveyed and schools located with a view to the best interests of all the children in the county.

Last year there was spent \$40,000,000 for transporting children to school—probably most of them over improved highways. Nearly 15,000 motor buses served 14,695 schools. For approximately four to five million children enrolled in the elementary and secondary grades of our consolidated schools, now totaling 17,000, this expenditure represents an investment in ultimate values difficult to estimate educationally and is a “noble experiment” in offering wider social opportunities.

Whether good roads promote and precede consolidation, or consolidation promotes and precedes good roads may be considered as in that interesting class of questions sometimes labeled “academic.”

Larger enrollments mean better trained teachers, richer curriculum offerings, and enlarged social opportunities. Good side or local roads are helping to make all this possible. That the generation represented by the youth now in school—reared with an appreciation of the relationship between highway improvements and education in its broadest sense—will continue the program on an increasingly larger scale, seems a foregone conclusion.

IN ANOTHER article in “The United States Daily,” Timon Covert, assistant specialist in rural education, U. S. Bureau of Education, presents these significant facts bearing on both sides of this subject:

Since 1918 more than 35,000 small, inefficient rural schools have been closed, approximately 10,000 consolidated schools established, and an average of about \$24,000,000 expended annually in transporting pupils to

school. These figures indicate how it has been possible, in part as a result of improved roads, for three important movements in education to help bring about fewer and better schools for country boys and girls.

That these modern rural schools are proving satisfactory is evidenced by the fact that the movement toward consolidation is rather constant; that they are better schools than the small ones supplanted is rather conclusively shown by many studies of instructional results in the two types of schools.

On the other hand, the following situation, typical of many, exists in a midwestern state. Three one-teacher schools, one enrolling fewer than 10 pupils, and one two-teacher school, all within a radius of four miles, are practically isolated from one another because connecting roads are impassable much of the time. The absence of one bridge over a small creek which runs through the territory effectively obstructs all transportation across the stream. There is an abundance of gravel excellent for road surfacing in two of the four school districts, but little use has ever been made of it.

Commerce, social activities, and educational facilities alike are retarded a quarter of a century in this community because roads have not been improved. Each district is obliged to maintain a school, under present conditions, although all the elementary pupils of the three one-room schools could easily be transported over good roads in one large motor bus to the larger school.

In another state there is this situation: Four small villages are located at intervals of five miles along a well kept highway. Each village maintains an elementary school, and in addition each village, with its adjacent territory, attempts to maintain a four-year high school. The combined enrollment of these four high schools is less than 200 and the number of teachers employed in them is 15.

Within a radius of a few miles of each village are many one-teacher schools. Many of these have small enrollments. The topography of the entire territory is



View in Eleven Mile Canon, located between Florissant and Divide, forming a link in U. S. Road 40S, improved by state forces.

favorable for good roads and gravel is plentiful, but little side road surfacing has been done. Seasonal changes render many roads unfit for regular use.

The new oil pavement through the town of Palisades, constructed by the State Highway Department, has been thrown open to full traffic. Much favorable comment has been expressed of this new oiled highway, according to the Palisades Tribune. This work was put down under contract by Hinman Bros. Const. Co.

The Russell project of the La Veta Pass highway has been completed. The project consisted of a four and one-half mile strip between Russell and Mortimer, which has been widened and gravel surfaced. Work on another six-mile strip between Mortimer and Fort Garland will be started by the highway department within a few weeks. It is estimated that this work will cost \$50,000.

After completing the pavement project west of Wiggins, on the Greeley-Sterling concrete ribbon, Edward Selander, contractor, has turned his attention to the loading of sugar beets for the Great Western Sugar Co. He has four steam shovels on this work. Selander also has a dragline working on the Cole Brothers job, between Ovid and Julesburg. Selander is one of those contractors who always keeps his equipment busy,



Showing splendid concrete pavement near Fort Morgan, recently completed by State Highway Department.



State maintenance tractor-grader outfit, equipped with snowplow, clearing snow from Tennessee Pass—to keep traffic moving throughout the winter months at 10,000 feet altitude.

Travel in Parks Breaks All Records

A NORMAL increase in travel to the national parks and monuments administered by the Department of the Interior is reported for the 1929 travel year, which closed September 30. The total of 3,248,264 is 223,420 above the 1928 figures, and is the highest yet recorded.

Visitors to the national parks alone during 1929 totaled 2,680,597, as against 2,522,188 in 1928. The travel to the national monuments totaled 567,667 in 1929, and 502,656 in 1928.

Eleven, or more than half of the national parks, passed the hundred thousand mark this year, Hawaii Park for the first time. Substantial increases in travel also were shown in Yellowstone, Sequoia, Crater Lake, Glacier, Rocky Mountain, and Grand Canyon National Parks. The new national parks, Bryce Canyon and Grand Teton, had, respectively, 21,997 and 51,500 visitors. The principal increases in national monument travel were at Carlsbad Cave, Capulin Mountain, Casa Grande, Devils Tower, Papago Saguaro, Pipe Springs, and Scotts Bluff.

Comparative tables, giving the park and monument travel for 1928 and 1929, follow:

The number of visitors to the various national parks and monuments, a few of which are estimations, with 1928 figures for comparison, is given in the following tables:

NATIONAL PARKS

NAME OF PARK	1928	1929
Yellowstone (Wyoming)	230,984	260,697
Sequoia (California)	98,035	111,385
Yosemite (California)	460,619	461,257
General Grant (California)	51,988	44,783
Mount Rainier (Washington)	219,531	217,783
Crater Lake (Oregon)	113,323	128,435
Platt (Oklahoma)	280,638	204,598
Wind Cave (South Dakota)	100,309	108,943
Sullys Hill (North Dakota)	24,979	21,004
Mesa Verde (Colorado)	16,760	14,517

NAME OF PARK	1928	1929
Glacier (Montana)	53,454	70,742
Rocky Mountain (Colorado)	235,057	274,408
Hawaii (Territory of Hawaii)	78,414	109,857
Lassen Volcanic (California)	26,057	26,106
Mount McKinley (Alaska)	802	1,038
Grand Canyon (Arizona)	167,226	184,093
Acadia (Maine)	134,897	149,554
Hot Springs (Arkansas)	199,099	184,517
Zion (Utah)	30,016	33,383
Bryce Canyon (Utah)	.....	21,997
Grand Teton (Wyoming)	.....	51,500
Total	2,522,188	2,680,597

NATIONAL MONUMENTS

NAME OF MONUMENT	1928	1929
Arches (Utah)	.....	500
Aztec Ruins (New Mexico)	18,359	18,193
Capulin Mountain (New Mexico)	7,600	12,000
Carlsbad Cave (New Mexico)	46,335	76,822
Casa Grande (Arizona)	28,274	37,244
Chaco Canyon (New Mexico)	1,425	2,750
Colorado (Colorado)	10,000	12,000
Craters of the Moon (Idaho)	7,768	7,730
Devils Tower (Wyoming)	8,000	12,000
El Morro (New Mexico)	5,356	2,625
Gran Quivira (New Mexico)	2,779	3,357
Hovenweep (Utah-Colorado)	240	450
Montezuma Castle (Arizona)	16,232	17,824
Muir Woods (California)	103,571	93,358
Natural Bridges (Utah)	175	260
Navajo (Arizona)	315	965
Papago Saguaro (Arizona)	66,450	87,600
Petrified Forest (Arizona)	75,225	69,350
Pinnacles (California)	13,216	10,756
Pipe Spring (Arizona)	17,321	24,883
Rainbow Bridge (Utah)	200	450
Scotts Bluff (Nebraska)	37,500	42,500
Shoshone Cavern (Wyoming)	300	.....
Sitka (Alaska)	3,000	3,500
Tumacacori (Arizona)	17,341	18,250
Verendrye (North Dakota)	15,000	11,500
Wupatki (Arizona)	500	550
Yucca House (Colorado)	174	250
Total	502,656	567,667

Auto Deaths Show Big Increase

THE possibilities of getting killed by an automobile, at the present time, is 10 per cent greater than a year ago.

This is the assertion of the Safety Committee of the American Motorists' Association, which it declares is substantiated by figures of the United States Census Bureau. The figures, just revised, show that the death rate by automobiles, for the year ending August 10, 1929, was 24.3 persons per 100,000 population, compared with 22.1 per 100,000 population for the previous corresponding year, or an increase of approximately 10 per cent for the 12 months period.

The figures are compiled from mortality statistics of the 78 largest cities of the country, showing that for the year ending August 10 last, the total killed in these 78 cities was 7,986 persons. The total death toll, by automobiles, for the calendar year of 1928, according to the revised figures for the entire country, was 24,932, bringing the grand total killed in this manner during the past 12 years up to 188,313.

An analysis of the number of automobile fatalities per 100,000 automobile registrations shows a steady decrease during the ten-year period from 1917 to 1926, but that beginning with 1926 there has been an increase despite the highway safety work of Federal, state and municipal governments in conjunction with automobile associations. Figures of the U. S. Census Bureau, covering not only the 78 cities but the entire United States since 1917, show the following comparisons:

Year	Automobile Fatalities	Fatalities per 100,000 Auto Registrations
1917.....	9,097	178
1918.....	9,457	154
1919.....	9,825	130
1920.....	11,074	119
1921.....	12,370	118
1922.....	13,676	112
1923.....	16,452	109
1924.....	17,566	100
1925.....	19,828	99
1926.....	20,819	95
1927.....	23,217	97
1928.....	24,932	102

"The revised figures for last year show that there were 102 persons killed for each 100,000 of motor vehicle registrations. Considering the concerted effort to curb automobile fatalities during the past five years, the figures are a bit disappointing in that the deaths last year show an increase not only as to totals, but also as to the numbers killed per 100,000 automobile registrations," J. Borton Weeks, president of the association declares. "The conclusion is that even greater efforts must be made if this death toll increase is to be checked."

One of the most effective ways in which this can be done, the association believes, is to give greater study to highway engineering and make the streets and highways as safe as possible. "The saving of human life and the prevention of injury, through the adoption of highway safety methods, is of the greatest importance," President Weeks declares. "Governmental and

semi-governmental agencies that have undertaken serious study of these problems should speed up their work in order that the increasing automobile fatality rate may be curbed.

"Methods which are receiving consideration by these bodies include a uniform system of traffic control, compulsory periodic mechanical inspection of motor vehicles, widening and straightening of highways and grade crossings and dangerous highway intersection eliminations. Imposition of rigid requirements for motor vehicle operators and increased penalties for violators of traffic laws and regulations are other subjects now receiving study.

"Undoubtedly, many constructive recommendations will ensue from these studies and states and their subdivisions, charged with highway construction, maintenance and traffic control, must promptly adopt these safety measures if the mounting loss of life from automobile accidents is to be curbed," the association's president declares.

The U. S. Forest Service will complete a two-mile section of the Rico-Dolores road the coming season. The work will cost about \$35,000 a mile and will eliminate the Bear creek grade. The service has expended approximately \$130,000 on the highway, and the present construction is for elimination of grade which will entail heavy excavation at Bear Creek.



A fast stretch of gravel surfaced state road in Yuma County.

NEWS OF THE MONTH

The Pikes Peak Region "played" to the largest tourist crowds on record during the past summer, according to reports of the operators of scenic attractions. On August 10th more than 2,000 persons made the Pikes Peak trip by automobile. Most of them drove their own cars. F. C. Matthew, traffic manager of the highway and railroad, said it was the heaviest day's business in history.

"The Million Dollar Highway from Durango to Ouray convincingly illustrates the wisdom of the government's road policy. This 78 miles of Federal Aid road is not only a marvelous scenic route and a favorite with auto tourists, but is a commercial traffic highway that is serving thousands of people, trucks plying the 54 miles from Durango to Silverton and from Ouray to Silverton loaded with all kinds of freight. For the past several weeks mining machinery has been trucked for enlarged operations. The farmers in the valleys south and west of Durango and those in productive regions beyond Ouray and as far distant as Delta and Grand Junction utilize the same route in trucking vegetables and fruits to mining camps adjacent to Silverton. Briefly, the Million Dollar Highway is a double service road of outstanding importance."—Silverton Standard.

A comprehensive study of traffic on all Federal highways in Colorado will be made during the coming year. This work will be carried out through a co-operative agreement between the Colorado Highway Department and the U. S. Bureau of Public Roads. Traffic census reports will be gathered from all states west of the Mississippi River.

During recent weeks considerable complaint has been heard from various sources regarding the condition of the highway from Denver to Limon. To see for himself, a certain motorist left Denver at 4 a. m., drove to Limon, thence to Colorado Springs, and returned to Denver over the paved highway. His speedometer registered 294 miles for the round trip, which was made in seven and one-half hours actual driving time.

"You could make that time only on a good road," he declared. "And I remember not a few years ago starting out on the same trip, when we were on the road two days, and finally had to leave our car stranded on the plains and come home on the train.

"The road isn't paved, that's true. But it's not as bad as a lot of folks would have one believe. However, I think the road should be paved as soon as funds will permit."

The editor will be glad to furnish the name and address of the motorist in question to anyone interested.

Paving of the new gravel roadbed from a point 2½ miles north of Fountain to five miles north of Pueblo, completing the pavement between Colorado Springs and

Pueblo, will be one of the major highway projects during 1930. The unpaved portion of this stretch totals 26 miles. When the Pueblo paving is completed, Colorado will offer pavement to motorists traveling on the main north-south road from a point 18 miles south of Pueblo on the Santa Fe Trail to Fort Collins, a distance of approximately 214 miles.

According to figures compiled by the U. S. Bureau of Roads, Colorado has a total of 4,155 miles of surfaced roads of the 9,120 miles on the state highway system. Colorado has 3,730 miles of gravel surfaced roads, and leads other states in the Rocky Mountain area in pavement, with 343 miles. Utah has 279 miles of pavement, Arizona 203, Nebraska 111, New Mexico 74 and Wyoming 34.



Bear Creek Falls, above Ouray on Million Dollar Highway.

The last five-mile stretch of the highway between Ouray and Silverton will be improved and ready for traffic next spring, according to highway officials. The new improvement will conform to the excellent condition of the remaining 19 miles between these two points. Curves will be eliminated, grades reduced and new drainage structures erected.

W. A. Colt & Son have started work on their contract in Estes Park, which marks the initial step to the construction of a new highway over Milner Pass.

Official figures from the national parks show that Colorado had from 25 to 50 per cent more registrations this year than last, according to a statement issued by the Colorado Association.

"Colorado has almost doubled her tourist travel as compared with last year," said Dr. B. M. Rastall, executive manager of the association, "while California and other western states have had decreases rather than increases. This can be accounted for only by the national advertising our association carried in May and June."

Two road crews from Fremont and Teller counties are busy repairing washouts on the Phantom Canon highway from Victor to Florence. This road has been closed for several weeks because of washouts and faulty bridges.

A survey party has been working on a line for a proposed new road between La Junta and Hadley. As yet no decision has been reached by state highway officials. The new road would run east from La Junta on the south side of the river, thus eliminating two river and two railroad crossings between these two points.

The Minneapolis Steel & Machinery Co., Denver, was awarded the contract for furnishing steel and timber for three bridges, to be constructed by county forces on State Roads No. 4 and No. 94 in El Paso County, near Ramah. W. W. Giggey of Denver was given a contract for the construction of a small concrete bridge over Russell Gulch in Gilpin County, located on State Road No. 54.

Hamilton & Gleason, Denver contractors, were low bidders on three miles of grading on State Road No. 19, located north of Silverton in San Juan County. This project forms a link in the famous "Million Dollar" Ouray-Silverton highway. Hamilton & Gleason's bid for the work was \$39,212. The new road is to be constructed under Federal Aid specifications with the government participating in the cost of construction.

The highway department also awarded a contract for the construction of two miles of gravel surfaced highway north of Monte Vista in Rio Grande County. J. Finger & Son were the successful bidders. Their price was \$24,303. There were five other bidders.

The Mountain States Const. Co. of Pueblo submitted the low bid on three and one-half miles of gravel surfacing in Costilla County, located between Mortimer and Fort Garland. This concern bid \$52,260 for the work. Five other contractors bid on the work. The contractors agree to complete the project in 160 working days.

The Gardner-Denver Co. manufactures slush pumps, air compressors, high pressure drill steel forges, rock drills and drill steel sharpeners. It also has a plant at LaGrange, Mo.



Preparations are being made by the State Highway Department to oil surface six miles of the Denver-Limon road between Deertrail and Agate.

Work of constructing a new highway over Loveland Pass has progressed to the summit of the pass. It is estimated that \$100,000 will be required to complete this new road to Dillon, on the west side of the pass. A survey for the road has already been made. At present the road extends from Georgetown to the summit of the pass. With the completion of this road a short route from Denver to Leadville and the Western Slope will be made available to motorists.

The commissioners of Pueblo County have purchased the buildings and surrounding ground formerly occupied by the Baker Oil Burner Company, on the outskirts of Pueblo. There are nearly 30,000 square feet of space in the main building and the shop. Floors are of concrete and ample room is provided for storing and repairing trucks, graders, tractors and other bulky road equipment. Pueblo County has 23 trucks, eight maintainers, six tractors, one rock crusher, one loader, a complete camp outfit for 30 men and miscellaneous equipment. There are more than 2,200 miles of highways in Pueblo County, of which about 2,000 miles are maintained by the county. The county expends about \$1,000,000 each year on its roads. The commissioners are: W. L. Rees, chairman; P. G. Kay and Hurb H. Wilson. Walter N. Leslie is superintendent of roads, and is assisted by Samuel E. Thomas. The centralized shop plan now in effect is said to be saving the county considerable expense on repairs.

Grading and graveling of a new road down Leopard Creek in San Miguel is rapidly nearing completion. This work is being done by the State Highway Department in co-operation with San Miguel County. A steam shovel is being used in the grading and trucks for the hauling of gravel surfacing. The section being improved was very difficult for motorists to negotiate in wet weather.

A detour north of Fitzsimons Hospital has been staked out for use during the construction of the new oil surfaced project, which will be started in a few weeks by the State Highway Department. This will be an extension of the paving east of Aurora, and will eliminate a bad stretch of "bottom" road east of the government hospital on the Denver-Limon highway. An appropriation of \$50,000 has been made for the project.



COLORADO CONCERN DEVELOPS NEW GUARD FENCE FOR ROADS

The above photographs show an installation of a new type of guard fence recently developed by the Colorado Fuel & Iron Co. at its Minnequa plant in Pueblo. The fence shown was erected by the State Highway Department in co-operation with the C. F. & I. on a dangerous curve located south of Littleton on the main North-South highway.

Thousands of dollars have been spent in several states to develop a safety highway guard fence that would absorb the impact of cars striking it. In some of the eastern states very elaborate and expensive types of highway guard have been put into use, with favorable results, the cost, however, in some instances being as high as \$10.00 a running foot.

The Minnequa Safety Net Highway Guard Fence was designed to eliminate the hazard of cars striking the posts of a highway guard which, in a good many cases, has proven fatal to the occupants of a car as well as wrecking the car and destroying the fence. While the cost of the Minnequa Safety Net highway guard is more than that of the ordinary types of highway guard fences generally erected on state highways, it does not nearly equal the cost of the expensive types mentioned above.

If a car strikes the Minnequa Safety Net Highway Guard, due to the resilience of the steel posts, and the manner in which the fence is suspended from the posts, the car will rebound because the fence absorbs the force of the impact.

This fence is designed so that it may be constructed in three different ways.

Ten states have furnished most of the motor visitors to the Rocky Mountain region this summer, according to a check of tourist registrations at the offices of Rocky Mountain Motorists, Inc., the local A. A. Club. This check reveals that Illinois leads in the number of visitors, with California second.

The other states in the order named are Missouri, Ohio, Texas, Nebraska, Iowa, Oklahoma, New York and Pennsylvania. In addition every state in the Union has furnished visitors to Colorado and Wyoming.

The automobile club also reports that motor visitors are staying longer in the Rockies this year than formerly. Circle trips containing the maximum amount of scenic and recreational facilities are decidedly popular this summer.

Great progress in the development of highway construction and maintenance machinery is evidenced by the increased number of applications for exhibition space that are being made for the next convention and road show of the American Road Builders' Association, which will be held in Atlantic City in January, 1930. To date 14% more applications have been received for space than at this time last year, this in spite of several mergers in the exhibitors' field. Many of the applicants have not heretofore exhibited at this exposition and some are new companies that are just entering into the highway industry.

Almost every exhibitor is bringing forth some new idea or feature and the year will mark great strides in the showing of new labor-saving equipment.

Within the new auditorium and its exhibition hall, the largest in the world, the exhibitors for the first time will be able to assemble and completely demonstrate their road building products in one building.

Manufacturers of road building equipment and materials will display over 500 carloads of their products. This will be the largest exposition of this nature that ever has been held. It will be so arranged and coordinated with the convention that delegates may attend all sessions and yet have sufficient time to see and compare all the different makes of machinery and materials. Several machines never before shown will be on display. Practically all of the standard and patented pavements will be represented.

Hibbard S. Greene has been appointed assistant to the president of the Chain Belt Company, according to word received during the month by the Wilson Machinery Co., Colorado agents for the Chain Belt line. Mr. Greene was formerly vice-president and director of the Barber-Greene Company, of Aurora, Illinois. The Chain Belt Company manufactures a complete line of construction machinery, including concrete mixers, pavers, pumps, saw rigs, as well as conveying systems. The products of the concern are all trademarked under the name "Rex." Mr. Greene is well known to the industrial world. He was one of the organizers of the Barber-Greene Company, which for a number of years has been manufacturing the Barber-Greene line of trenching machines.

It's A Fact

Repeat Business does pay—



IN AUGUST, 1927, Luke E. Smith & Co. purchased the first General Excavator sold in this territory for work on Loveland Pass.

IN SEPTEMBER, 1928, Luke E. Smith & Co. purchased their second General Excavator for a road job between Rifle and Meeker, Colorado.



The new Generals come equipped with 6 cylinder motors (for extra power and faster operation) at the same price as the 4 cylinder motor equipped General. One-third of orders received for new Generals come from "General" owners.

IN OCTOBER, 1929 (October 3rd, to be exact) Luke E. Smith & Co. purchased SIX General Excavators for shipment October 15, 1929, and they're on their way to Colorado now. "Generals" just had to "make good." They aren't built to do otherwise. "Generals" out-perform, out-sell any other half-yard shovel sold in this territory.

WE HAVE A GENERAL IN STOCK FOR IMMEDIATE DELIVERY

H. W. Moore Equipment Co.

Colorado's Oldest and Largest
DENVER

Paving Officials Consider Farm Roads

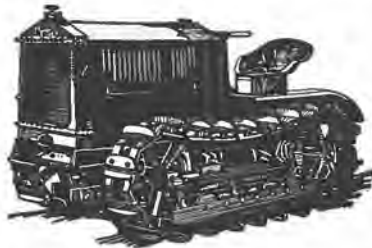
PROGRAM announcements for the Eighth Annual Asphalt Paving Conference, to be held at West Baden Springs, Indiana, October 28th to November 1st, next, are indicative of a very interesting and instructive meeting, with numerous highway officials and engineers of national reputation presenting papers on timely and pertinent subjects and participating in the oral discussions which will follow each paper presented. The conference, as usual, will be under the auspices of The Asphalt Association, New York, Leroy M. Law, of St. Louis, president, and J. E. Pennybacker, of New York, secretary and general manager, respectively; and The American Association of Asphalt Paving Technologists, W. J. Emmons, Ann Arbor, Mich., president, and C. A. Mullen, of Montreal, secretary. For the first time in the history of the conference farm organization officials and others nationally prominent in advancing program of farm relief, as well as officials speaking for the motoring public, will meet with the road-building officials, engineers, contractors and others to devise plans for speeding up the improvement of the nation's highway system as a measure of farm relief and the alleviation of traffic congestion on the trunk-line highways near the great centers of population. Paving of the farm-to-market roads with low-cost surfaces will be the keynote of the conference.

Farm organization officials declare that the deplorable condition of the farm-service roads, which the ma-

ajority of farmers must use in getting to and from their farms to the paved highways, has become a serious matter. Without discounting the value of the highways connecting the cities, farm organizations feel that it is high time an effective movement were started for paving these roads. While the farmers of the United States are paying 7 per cent of the taxes for state and local highways, less than 3 per cent of the farms are reached by paved roads. Today, approximately 5,000,000 farmers are still living on muddy, rutty, dusty roads, and there are still in the United States 2,484,822 miles of unimproved highways. Of the 3,050,000 miles of highways in the country, only 187,000 miles have high-type surfaces such as asphalt, brick and other types. Automobile men declare that if all the 24,000,000 automobiles in service today were placed on the paved roads at one time, each car would have only 13.7 yards in which to operate. The 40,000 miles of new roads annually constructed are not much more than sufficient to provide parking space for the annual increase in new motor cars and trucks.

The state has taken over the maintenance of six miles of forest highway, located between West Portal and Fraser. This new stretch of road will be under the supervision of John Stamm, district maintenance superintendent. This gives the state supervision of maintenance on Berthoud Pass from Empire to Fraser.

PRICE
REDUCED
\$200.00
ON
MODEL "20"



CLETRAC TRACTOR

The new price F. O. B. Denver on this popular model is \$1,653.

This reduction has been made possible by greatly increased production and an assurance of increased future sales.

Write for literature

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Denver

IDEAL CEMENTS:

**in quality they are "there,"
in delivery they are here!**

YOU don't have to hunt around for Ideal cements, with construction schedules going to pot and every hour a costly delay. Ask your building materials dealer for an Ideal Cement — 14 out of 15 times he'll say, "Right here, Mister; order it today and pour it tomorrow."

Ideal Cements blanket this market. Ideal Cements also *cover the entire range of cement requirements*. Check your next job's requirements against this list, and get a cement which is 100% right for that particular job!



Ideal Portland Cement

"Standard of the West for Over 25 Years"

Ideal Oil Well Special Cement

"A Special Purpose Cement"

Ideal Quixtrench Cement

"28-Day Strength in 24 Hours"

Ideal Hydro-Plastic Waterproof Cement

"For Waterproofing and Stucco"

Colorado Portland Cement Company
Denver National Bldg. Denver, Colo.

New Highway Equipment and Materials

On September 17th, twenty Coloradans made a trip to Cedar Rapids, Iowa, to inspect the new Pre-Mix Oil plant which the Iowa Mfg. Co. recently placed on the market. The party consisted of members of the State Highway Department, county commissioners and contractors. They were the guests of the H. W. Moore Equipment Co., with George Meffley in charge of the entertainment features. They were in Cedar Rapids two days and were shown the Pre-Mix Oil plant in full operation turning out material for various types of oil pavements. While there they were entertained by John Jay, Howard Hall and Guy Frazee, officials of the Iowa Mfg. Company. Among those who made the trip were: Capt. John P. Donovan, H. L. Jenness, Roy Randall, Sanford Buster, Wm. Hamilton, Andy Opople, Clarence Lee, James Ogilvie, Howard Pigg, Charles Draney, E. B. Hill, Craig Bradford, Samuel Clark, Wm. Carlson, Ernest Montgomery and A. B. Collins. Reports would indicate that all were well impressed with the working of the new Cedar Rapids Oil plant. For full details of the trip and its results, see the forthcoming issue of George Meffley's "Look Around."

Mr. Meffley reported the sale of six ½-yard General shovels to Luke E. Smith during the past month. These machines are being used in loading sugar beets for the Great Western Sugar Company in various parts of the state. Also, he reported the sale of a Galion-Cletrac one-man maintainer to Teller County. It will be used in snow removal work and maintenance. A Colorado Special Cedar Rapids one-piece crushing unit and a No. 78 Leaning Wheel Galion grader were sold to Garfield County, to be used in graveling school bus routes.

Sales of the Moore concern to date have broken all records, according to Mr. Meffley. He reported that the Wyoming branch, under the management of John Wertham, sold 16 F. W. D. trucks to the Wyoming highway department, totaling \$87,520.

"Pavegard" is the trade name of a new steel armoring produced by Blaw-Knox, used for obtaining a long wear surface on roads, streets, alleys, courtyards, bridges, bridge approaches and other parts of pavement which are ordinarily subjected to extremely heavy wear. Wilson Machin-



Cedar Rapids portable crusher outfit being used by Hamilton & Gleason on a state highway project near Lamar.

ery Company of Denver are showing samples of this new type of reinforcing mesh.

This concern is distributing a bulletin illustrating the new Smith Weigh-Mix, manufactured by the T. L. Smith Company. The Weigh-Mix is a proportioning and mixing unit, which weighs stone, sand and cement, water, and then mixes to a uniform concrete.

A score of automatic devices are a part of the new 27-E Koehring Paver, which reduces the mixing cycle, according to Harry P. Wilson, head of the Wilson equipment concern. These automatic operations are said to have brought the complete mixing cycle, including charging and discharging down to 69 seconds, with one-minute period allowed for mixing. The duties of the operator on the new Koehring paver consist only of lowering the skip and operating the bucket control lever. The height of the paver is 11 ft. 3 in. and its weight 22 tons.

Arthur & Allen, Pueblo contractors, have purchased their third Koehring shovel from the Wilson firm.

The Allis-Chalmers Company of Milwaukee issues a monthly house magazine called "Monarch Track-Type," edited by H. G. Hoffman, which contains a mass of data interesting to road builders. You may receive copies of this periodical monthly by writing the Wilson Machinery Co., Denver sales agents for Monarch tractors.

Various types of snow-fighting equipment built for "Caterpillar" tractors are

pictured in relief and in action in "Snow Removal Equipment," a colorful booklet just off the press of the Caterpillar Tractor Co. Copies of the booklet may be obtained from the Clinton & Held Co., Denver distributors of Caterpillar Tractors and Russell Road Machinery.

A new motor grader with McCormick-Deering power and Trackson Full Crawlers has been placed on the market by J. D. Adams Company under the name of Adams Motor Grader No. 12. This new machine is similar to the Adams Motor Grader No. 10, which has been a big seller in the Rocky Mountain territory.

"The McCormick-Deering Tractor and the Trackson Crawlers are well-known equipment which have been very successfully and very extensively used in combination for a number of years, not only in road work, but in lumber camps and oil fields," says Elton T. Fair, Denver sales representative. "Trackson Full Crawlers gear the McCormick-Deering power to the ground, enabling the grader to work in sand, mud, loose dirt, etc."

Eddie Nicholson, who handles the Denver and Colorado contractors' accounts for the Mack Trucks, Inc., from the Denver branch, is singing the praise of a new line of standard dump bodies recently put on the market by his concern.

"Can't beat 'em," says Eddie. "Our new line covers the major portion of dump truck requirements, and meets the exacting demands of the field for ruggedness of construction. These bodies were designed by the Mack engineers after years of experience building heavy duty motor trucks, and watching the performance of various types of bodies manufactured by other concerns."

A letter to the Denver branch of the Mack concern will bring you full details and specifications of the various truck bodies they manufacture.

Sales of the Gardner-Denver Co. for the month of September have exceeded those of last year by a fair margin, according to announcement of Ralph G. Gardner, vice-president, and production of the Quincy, Ill., and Denver, Colo., plants is being increased to take care of the large volume of unfilled orders. Part of this additional output is being effected through the employment of a night force in the Quincy plant.



A Monarch tractor pulling a new type Western Crawler wagon, loaded to the "gun-wales"—another modern road construction unit.

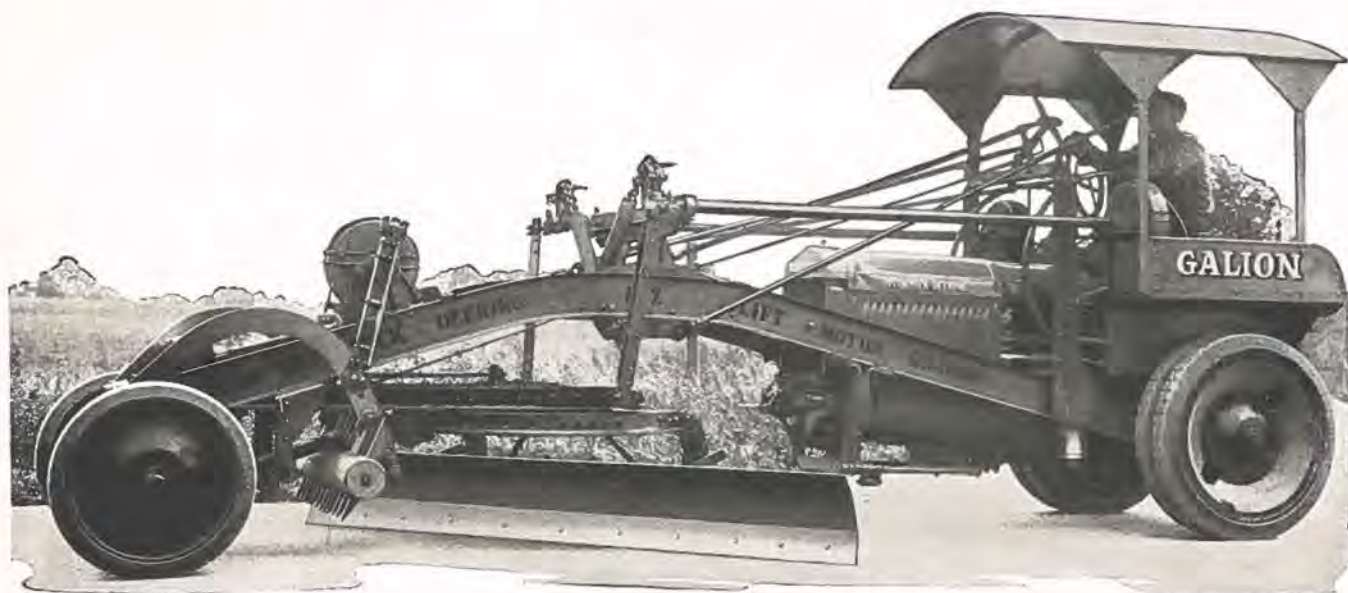
GALION ROAD MACHINERY

WILL SERVE YOU BEST



Galion

MCCORMICK-DEERING ONE MAN MOTOR PATROLS are built with the same care and precision that all Galion and International products are built—same E-Z Lift, E-Z Steer, E-Z Shift features on the grader, plus unusual, easy starting, long wearing McCormick-Deering motors make an ideal maintenance unit.



Galion

E-Z Lift, E-Z Steer, E-Z Shift Leaning Wheel Graders plus the Skew Axle principle insure the user the greatest value in road grader construction. We will any time, any place, demonstrate Galion Graders to the entire satisfaction of the purchaser — satisfaction or your money back.



H. W. MOORE EQUIPMENT CO.

Colorado's Oldest and Largest

DENVER

Gas Tax Is Investment, Declares Road Builders' Official

(Continued from page 7)

struction—according to "Engineering News-Record" in a symposium on developments in that field.

Total road mileage of the country early in 1928 was placed at 3,013,584. Of this total only 589,000 miles consisted of improved roads. Improved highway classified according to surfaces, shows 15 per cent is surfaced with sand or clay, 73 per cent with treated and untreated gravel, chert, crushed stone, and waterbound macadam, and the remaining 12 per cent with hard surface of higher type.

Mileage of improved roads increased 55 per cent since 1921. Early records show that in 1904 the year's total in highway expenditures was only \$79,623,617. In 1914 expenditures on roads approximated \$250,000,000, while in 1927 close to a billion and a half dollars went into the highways.

In 1928 motor car registration in this country was roughly estimated at 24,000,000. These cars averaged in the neighborhood of 5,000 miles of travel. A conservative estimate of operating expenses places the 1928 automobile travel costs, which included gasoline, oil, depreciation, taxes, and upkeep, at \$12,000,000,000.

Of this sum, just two billions, or one-sixth, was expended for road and street improvements. Industrial economists and highway authorities point out that with both pleasure and commercial traffic increasing by leaps and bounds, the annual highway expenditure must be increased.

PRACTICAL ROADSIDE DEVELOPMENT

When there is more written about everything than even the specialist in the particular subject can read, a book which boasts that it is the first book of its kind ever published ought to be very worthwhile. That is the claim made for "Roadside Development," Mr. J. M. Bennett's attractive new volume devoted exclusively to the subject indicated. His experience of ten years in supervision of projects running into millions of dollars is evidenced in the confident way in which he handles a problem which has but recently become general and acute. Mr. Bennett presents clearly, accurately the information necessary and practical for economically improving the appearance and utility of the roadsides for the community, the property owner and the traveling public generally. He tells where one roadside development project increased the value of the abutting property ten times while the tax rate remained the same, and insists that the best methods yet discovered should be applied and that a roadside development, in one or more phases, should start whenever and wherever the traffic count reaches five hundred vehicles a day.

The book is published by MacMillan Company of New York, for five dollars a volume, and COLORADO HIGHWAYS has agreed to transmit any subscriptions that its readers care to send in through this office.

PLANS FINISHED BUT PROJECT NOT ADVERTISED

Proj. No.	Length	Type	Location	Waiting for
2-R No. 9	1.135 mi.	Concrete Pavement	Starkville	B. P. R. Approval
165-R	2.545 mi.	Concrete Pavement	East of Canon City	B. P. R. Approval
265-C	2.5 mi.	Gravel Surfacing	West of Bayfield	B. P. R. Approval
296-E	5.467 mi.	Gravel Surfacing	South of Greenhorn	B. P. R. Approval

PLANS BEING DRAFTED

Proj. No.	Length	Type	Location
151-A	8 mi.	Gravel Surface	South of Granby
243-C	6 mi.	Gravel Surface	West of Dyke
267-C	4.5 mi.	Gravel Surface	Northeast of Model
272-E	3 mi.	Concrete Pavement	East of Rocky Ford
279-H	3 mi.	Grading	North of Kenosha Pass

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
68-R1	North of Monte Vista	1.900 mi.	Gravel Surfaced	J. Finger & Son	\$ 24,124.00	0	68-R1
78-R	Near Minturn	0.709 mi.	Gravel Surfaced	J. Fred Roberts & Sons	96,342.90	0	78-R
97-R1	East of Lamar	0.275	Bridge	W. A. Colt & Son	24,237.50	80	97-R1
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	99	138-A
138-B	North of Kremmling	3.133 mi.	Gravel Surfaced	F. L. Hoffman	76,363.35	57	138-B
144-D	Northwest of Ft. Collins	2.834 mi.	Gravel Surfaced	J. Fred Roberts & Sons	66,430.10	0	144-D
147-C	South of Cortez	3.428 mi.	Gravel Surfaced	E. J. Maloney	86,182.75	79	147-C
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	94	149-A1
150-A	West of Craig	8.227 mi.	Gravel Surfaced	Gardner Bros. & Glenn	93,477.35	0	150-A
175-A	Between Sterling and Ovid	41.979 mi.	Graded	Cole Bros.	193,055.75	3	175-A
208AR2-CR1	East of Grand Junction	9.254 mi.	Oil Processed Gravel Surface	Hinman Bros. Const. Co.	44,652.05	98	208AR2-CR1
242-C	West of Fruita	6.011 mi.	Gravel Surfacing	Hinman Bros. Const. Co.	56,344.50	100	242-C
253-D	West of Milner	2.547 mi.	Gravel Surfaced	Hamilton & Gleason Co.	147,192.00	4	253-D
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	95	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	94	258-G
258-H	West of Sapinero	4.921 mi.	Gravel Surfaced	Cole Brothers	123,700.60	30	258-H
259-A1	Between Parlin and Sargents	3.350 mi.	Gravel Surfaced	Ed. H. Honnen	51,551.00	100	259-A1
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	94	262-I
263-A	Betw. Mortimer & Ft. Garland	3.404 mi.	Gravel Surfaced	Mtn. States Constr. Co.	47,509.20	0	263-A
266-D	South of Bondad	4.111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	96,075.30	83	266-D
271-C	West of Portland	2.430 mi.	Surfacing	J. Finger & Son	54,843.40	100	271-C
272-D	East of Manzanola	1.950 mi.	Pav. & R. R. Underpass	Driscoll Construction Co.	88,237.50	98	272-D
277-D1	Betw. Colo. Springs & Pueblo	15.566 mi.	Grading	M. E. Carlson	218,277.80	79	277-D1
277-E1	South of Colorado Springs	10.2 mi.	Grading	J. L. Busselle	221,389.65	40	277-E1
282-E	South of Meeker	6.421 mi.	Gravel Surfaced	Luke E. Smith & Co.	88,384.20	100	282-E
282-G	South of Craig	5.147 mi.	Gravel Surfaced	Chas. B. Owen	61,645.22	0	282-G
282-H	Between Rifle and Meeker	7.023 mi.	Gravel Surfaced	Winterburn & Lumsden	82,539.74	43	282-H
287-AR5	Between Greeley & Ft. Morgan	6.590 mi.	Concrete Pavement	Edw. Selander	154,682.85	86	287-AR5
292-B	Between Gilman and Minturn	2.640 mi.	Gravel Surfaced	O. J. Dorsey	29,146.80	83	292-B
292-C	West of Avon	1.646 mi.	Gravel Surfaced	Ed. H. Honnen	39,663.10	80	292-C
293-C	North of Ouray	3.661 mi.	Grading	C. V. Hollenbeck	62,997.80	98	293-C
295-BR1	South of La Jara	6.622 mi.	Oil Pro. Gravel Surf.	Peple Bros. Const. Co.	14,226.50	98	295-BR1
295-D	North of Antonito	2.460 mi.	Oil Pro. Gravel Surf.	Levy Const. Co.	72,676.75	37	295-D
297-C	Southwest of De Beque	9.953 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	312,453.50	21	297-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssier	38,426.00	40	298-B
299-B	Btw. Delta and Grand Junction	3.465 mi.	Gravel Surfaced	Gardner Bros. & Glenn	60,804.80	100	299-B
300-B	North of Silverton	2.828 mi.	Graded	Hamilton & Gleason Co.	35,647.80	0	300-B

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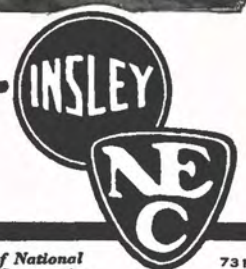
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Published Monthly by the
COLORADO HIGHWAYS PUBLISHING COMPANY,
 1803 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.

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Our Cover Picture

On the cover of this month's COLORADO HIGHWAYS we show a view of the new Bear Lake road in Estes Park, constructed by the National Park Service. This is said to be one of the finest pieces of highway found in any of the national parks. It was recently given an oil process surfacing similar to that now being laid by the State Highway Department in various sections of Colorado. Photo by Colorado Association.



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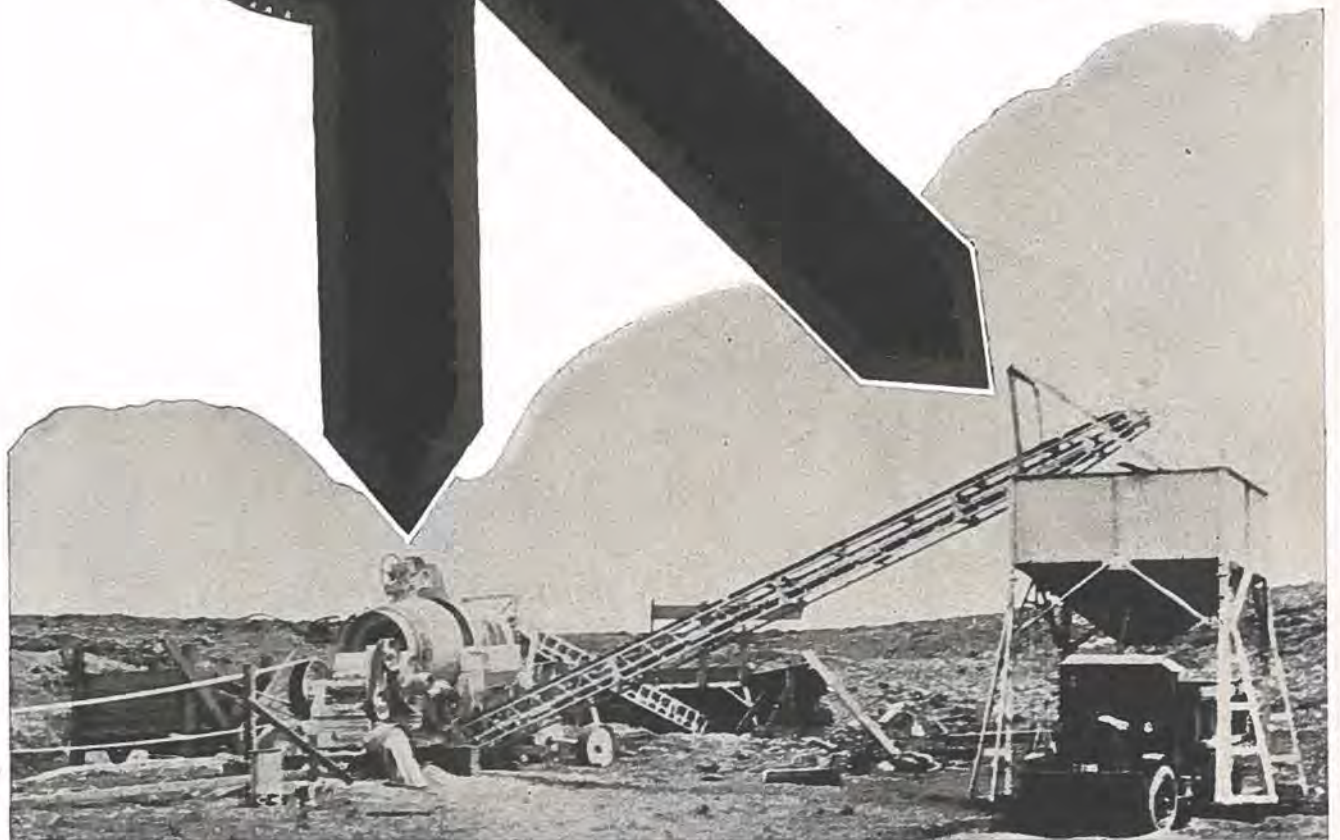


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Colorado Highways

"BETTER ROADS"

VOLUME VIII.

NOVEMBER, 1929

NUMBER 11

High Lights in Highway Progress

By JAMES W. BROOKS

THE growing need for a greater mileage of low-cost roads as a means of spreading the benefits of highway improvement over the entire country is being given intensive study and application by state and Federal highway authorities.

This need is recognized as a most essential part of the country's highway program. It has at no time been overlooked, notwithstanding the immediate necessity for high type construction around heavy traffic centers to prevent the absolute wrecking of the whole program by excessive road repair costs. As a matter of fact, road replacement on many of the original projects is already coming up, with road widening hardly begun, and there is no prospect of the nation's road-building enterprise ever reaching anything like an easy stage. There can be no let-up except at the risk of heavy loss to the public.

In the matter of low-cost road, it may be set down as a truth that its ultimate goal is toward one of the higher types as it advances in social and economic service to the public. In the meantime it is needed as an adjunct to the heavy traffic lanes, functioning somewhat in the capacity of a branch line railway and over which traffic requirements may be met with less expensive roadbed.

The claim is made that farms are not being motorized as rapidly as they should be, and that to achieve this result more highway capital should be spent in that di-

rection. Perhaps, but it must be remembered that highways are being built from motor-vehicle revenue, and that of the approximate 25,000,000 cars now in use, only about 5,500,000 were owned at the farm end of the road as late as last year. Original sources of highway income indicate, however, where motor traffic is heaviest and where the most money should be spent, but notwithstanding this guide, the farm end of the road is already getting a much larger percentage of highway construction capital than it is paying in, when studied from the standpoint of car ownership.

Concerning the task which confronts highway officials and engineers in adjusting the various types of construction to fit traffic demands, it should be remembered that since the first step in Federal Aid road building was taken in 1916, the power equivalent of more than one billion horses has been thrown upon the highways of this country. This new power appeared in the form of gasoline engines, approximately 21,000,000 in number, between 1916 and 1928, according to motor vehicle registration figures for that period, and allowing an average of fifty horsepower to each engine. The amount of increased tonnage moved by this new power is utterly beyond calculation. Never before in the history of transportation have engineers had to cope with the difficulty



Gravel surfaced state highway located north of Salida in Chaffee County.



Showing a section of the La Veta Pass highway, maintained by state forces.

of providing adequate and economic trackage for such an amazing volume of traffic already in motion.

In looking back over the achievements of the past few years and noting the mileage of new highway, both low-cost and high-cost, that has been constructed under such heavy demand from both ends of the road, the discovery is made that commendation rather than criticism is due the officials and engineers who are striving to keep new trackage apace with increasing highway motive power. It is a very difficult task, and one that is being made increasingly difficult by the fact that the Federal government is running far behind in financing its share of that cost.

A survey of mileage completed on each state system and the work which remains to be done discloses the fact that if the public demand for more roads is to be met at a more rapid rate than is now possible, two steps are necessary.

The first need is to increase the annual Federal Aid appropriation to 125 million dollars in order that the Federal government may keep pace with its part of the work according to the original 50-50 program.

The next important step is to continue to hold Federal Aid inflexibly to state and interstate systems, since these main routes carry from 75 to 85 per cent of the country's traffic and are at the present time but little more than 26 per cent actually finished. This point has been made before. It will bear continued repeating, however, until it is thoroughly understood by the motorists who are paying the lion's share of road-building costs, that any attempt to extend Federal Aid to back roads before the main systems are much farther advanced will tend to weaken if not actually endanger the whole road-building program.

Colorado has about 9,000 miles of highway in the state system. Reports show that out of this amount about 6,700 miles are improved, and that Federal Aid was used on only about 1,200 miles as against approximately 5,500 miles built by the state alone. The total of all roads in Colorado, outside of the state system, is approximately 59,000 miles.

The state system in New Mexico also covers about 9,000 miles. Of this amount, approximately 5,400 miles are reported improved. Federal Aid was used on about 1,800 miles and the state built slightly over 3,500 miles on its own account.

Arizona state mileage approximates 2,000. Of this amount, about 1,700 miles are reported improved, approximately 900 with Federal Aid and about 800 miles without aid.

Nevada reports show that on a state system of approximately 3,500 miles, slightly over 1,500 miles have been improved. Federal Aid was used on about 1,300 miles and about 250 miles were built without Federal aid.

The total mileage of roads built with Federal Aid in this group of states is but little over 5,300 miles, while roads built without Federal Aid approximate 10,000 miles.

The term "improved" embraces work done from grading and drainage on up to hard surfacing. While grading and drainage, where it has been well done, may be classed in the main as finished work, the top or wearing surface of a road, where traffic exceeds 500 cars a day, cannot be called finished work unless it has been hard-surfaced. It is here at this point where the truth is discovered that the main state road-building project, taking the country as a whole, is but little more than 26 per cent actually finished.

Big Highway Program Started in Rocky Mt. National Park

A GENERAL program of road extension in the Rocky Mountain national park was outlined in Denver recently by Horace M. Albright, director of all the national parks.

This development work was started this fall with the letting of a contract for the construction of the first link of the \$1,000,000 Trail Ridge highway, which when completed will be the highest continuous automobile road in the world. The road will be open to traffic by the 1932 season, under present plans.

Mr. Albright expressed great enthusiasm over the tourist possibilities of the Rocky Mountain national park, following a four-day tour of the mountain playground west of Denver. He was accompanied by Edmund B. Rogers, superintendent of the park. Inspection was made of the newly completed Bear Lake road in the park, and final plans for the oil surfacing of this beautiful stretch of road were approved.

Registration in the Rocky Mountain National Park during 1929 was the second largest of any park in the country. The total registration was 274,408 visitors, as compared with 235,057 in 1928. Yosemite National park in California showed the largest registration of any of the parks, with 461,257 persons.

"Great care is being exercised in all road construction in the national parks," Albright said. "Our engineers are instructed to build them with a view of preserving the landscape as much as possible, saving trees and cutting vistas.

"The new \$1,000,000 Trail Ridge Highway to the top of the continental divide and over into Grand Lake will rise to an elevation of 12,200 feet at the highest point. It will be a marvel of engineering skill and a sensation to the traveling public. Some of the finest mountain scenery in the park will be traversed by the new road, with towering peaks on each side and views far down into the valley."

This new road will replace the present Fall River road, which was constructed several years ago by the State of Colorado. Expenditures by the government at present follow the ceding of the park to the national park service by the last Colorado legislature.

Funds for the construction of the Trail Ridge road are now available, and the work will be rushed to completion as fast as possible. The general project probably will be broken up into several individual contracts, in order to complete the entire road by 1932.

Officials of the national park department are said also to be considering the construction of a new road from Longs Peak Inn to Estes Park. This will be an extension of the new highway already completed up the South St. Vrain from Lyons to Longs Peak Inn.

In line with the general expansion program, the parks department has employed a fish expert who will work on the problem of restocking the fishing streams in the

mountain parks in an effort to make them the finest fishing streams to be found anywhere, Albright said.

Albright declared that the wild game conservation program is advancing so rapidly that the abundance of wild animals has become a problem in many of the parks. One of the hotel proprietors in Estes Park asked him how to keep bears away from the hotel food, he said.

"There are several herds of deer and sheep in the Rocky Mountain national park and one herd of more than 100 elk can be seen almost daily in Moraine Park," he said.

Between \$15,000 and \$20,000 is to be spent yearly in improving the trails and building new ones in Colorado. Encouragement of tourists to get off the traveled roads onto the trails has greatly increased their popularity. In the Rocky Mountain national park there are more than 1,500 horses used daily by tourists. Glacier National, with its 800 horses, held the record.

Albright's trip was the first he has made through the Rocky Mountain national park during the summer for 10 years. He expressed amazement at the development of the country.

"With the question of jurisdiction over the Rocky Mountain national park settled satisfactorily, the government will aid the Colorado playground in every way possible. We are now getting \$5,000,000 a year for the parks and the Rocky Mountain will get its share," Albright declared.

For ten years Albright was director of the Yellowstone national park, before his appointment as director of all the national parks.

Three miles of the new highway that will connect Estes Park and Grand Lake have already been completed and work is being rushed to continue throughout the winter until stopped by heavy snows.

The new construction, let under a contract for \$393,674.80 to W. A. Colt and Sons, of Las Animas, Colo., by the U. S. Bureau of Public Roads, the first week in September, starts from Deer Ridge on the top of the High Drive above Estes Park. It goes through Hidden Valley and follows the ridge over a distance of 17.2 miles.

By building the road over this route it is expected the road can be kept open most of the winter, as it will be practically free from the drifts which early obstruct the present Fall River road.

Colt and Sons at present have one steam shovel working on the project, and as the work progresses three other shovels will be employed. Only heavy snow will interfere with the work. It is expected that the road will be completed for use next summer.

Automobile accident fatalities reported in 1928 reached an estimated grand total of 27,500. Figures from forty-five states indicate an increase of 7.36 per cent over 1927. Increases were recorded in twenty-one states, the highest being 85.33 per cent. The greatest decrease was 16.32 per cent.

Old Fort Bent on the Arkansas

By WALDEN SWEET

A CENTURY ago on the rolling prairie land where the Arkansas River cuts its way through southeastern Colorado a group of hardy Yankees and two Frenchmen began the construction of a fortress. For two decades and more thereafter this fort was the one spot of civilization in hundreds of square miles of what was then known as the Great American Desert. It became a celebrated place before the name Colorado was ever imagined and before the thriving towns which now spread along the valley of the Arkansas were ever dreamed of.

The builders were the business men of the wilderness—the fur traders—vanguards of the wave of white emigration from the east which in a later day was to sweep the Indians out of the vast territory of the west, subjugate the land and create new commonwealths.

The men who began this enterprise were the Bent brothers and Ceran and Marcelin St. Vrain. There were three of the Bents, William, George and Charles, who later became the first governor of the territory of New Mexico when it came under the American flag. It was Charles Bent who perished on that bloody January day in 1847 when the Indians and Mexicans went stark mad in Taos. They scalped him alive and left him to crawl away feebly, his bloody head between his two hands, only to be recaptured, to suffer further torture and then be killed.

The Bents and the St. Vrains first began their operations on the Arkansas in 1826. That year they built a small stockade along the river banks and began their trading ventures with the wild tribes, which controlled the country. Their ventures prospered and it was soon agreed that a larger and more substantial fort was needed as the base for their operations.

So in the year 1829 they began the erection of the bigger fort. The spot they chose was on the north bank of the river, across the stream from the present town of Hadley, where to this day traces of the ruins of the old fortress may be seen if one will take the trouble to travel only the short 100 miles or so down from Pueblo.

This fort they named Fort William after the elder Bent, which was fitting, for that hardy individual was the genius of their fur trading activities. Somehow the name did not stick however. Throughout the broad land of the fur traders it became known as Fort Bent, or more affectionately, Old Fort Bent.

It was a strong fort, proudly and honestly built, reflecting some of the sturdy, independent courage of its owners. Eighteen feet above the ground they reared the walls of sun-baked adobe bricks, thick and staunch. The walls were six feet through at the base, tapering

toward the top, where they were two feet in breadth. It cost nearly four years of arduous labor to see the completed structure. The walls made a rectangular enclosure, approximately 100 by 150 feet in dimension. Towers, or bastions were raised at two of the corners, 30 feet high and 10 feet in diameter. These projected from the walls, so that the defenders might rake the sides of the building with an enfilading rifle fire, calculated to disperse the most savage attack.

The main entrance was a 30-foot gateway, which looked down the river valley to the east. Tremendous plank gates of extraordinary thickness made this portal safe.

Mounted atop the walls was one six-pound brass cannon and several smaller pieces of ordnance.

Completed, the fort was a safe retreat from all the hordes of countless savages who occupied the surrounding country for a hundred miles or more in any direction. With a small but determined band of defenders it was regarded as impregnable from Indian attack.

This impregnability was a necessity for the plains and mountain Indians were far more numerous even at that time than they were in the days of the Colorado gold rush. There were numerous times when travelers recorded that they saw as many as 20,000 Cheyennes, Arapahoes, Comanches and Utes gathered in the vicinity, come to barter and trade, but those familiar with the Indian nature knew that they would be as ready to pillage as to bargain, if the opportunity came. There was, of course, another factor which contributed somewhat to the safety of the handful of

white men who peopled the fort. There was always hostility among their tribes and there was little likelihood of a general alliance against the traders. Still the utter isolation of the fort made its strong walls most comforting.

Atop the gate was a sentry-box, always manned to scan approaching parties and determine the friendliness of their purpose. Above the sentry-box, whipping gallantly in the prairie breezes there was always the American flag, year after year proclaiming to the wilderness a distant sovereignty.

The flag was a courageous symbol in those years of the '30s and the '40s for it waved over the sole American outpost of any permanency in all the vast territory of the trader and trapper in the west from the Spanish colonies on the south to the British possessions on the north and to the Spanish colony of California on the west. Although Bent's Fort was a private and commercial venture none the less it was the only real evidence of the claim on this vast hinterland made by the youthful Republic which possessed it in name only.



WILLIAM BENT

Founder of Old Fort Bent, headquarters of the fur traders along the Arkansas River in 1829.

The post was the center of the colorful melange of the fur trade. Through its massive gateway came and went at one time or another the bearded mountain men. Noted trappers—Bridger, Sublette, Carson, Bill Williams—made it a stopping place and a refuge on their trips north and south. Adventurous overland travelers were enlivened by the hospitality which abounded there.

Marcus Whitman, pious father of Oregon, paused for rest and refreshment there on his famous ride from the west coast to the east.

And always the Indians came and went, bringing bales of beaver skins and buffalo hides and their handiwork to exchange for the knives, cloth, guns, and it is to be supposed, whiskey, which the white man was willing to exchange with them.

The location of the post was in lonely and monotonous country. The mountains were 135 miles to the west. The fort itself was on the only real eminence in the country. For miles in all directions stretched the treeless prairies, their unbroken contours usually brown and sear except for the brief time in the spring when the melted snows brought green to their verdure.

The business of Bent, St. Vrain and Co. prospered and thrived. Out of the fort and down the river valleys to the east rolled train after train of creaking, mule-drawn wagons, heavy laden. Piled high, they were, with bales of beaver skin and buffalo hide, each bale branded with the famous "Quarter-Circle B" brand, insignia of the company.

After these wagon trains had dragged across the weary, dust-choked miles to St. Louis, the fur capital of the country, those bales brought top prices for the brand of the Bents' and St. Vrain's was a guarantee of honest excellence.

Inside the fort there was much activity. The volume of business transacted by the company needed constant attention. But there was always an atmosphere of well being, almost gaiety, despite the fact that strict business principles prevailed there. It was a harbor and a haven for the travel-stained traveler and the mountain men in from the fastnesses of the wilderness where they carried on their activities. It was the one bright spot of civilization in a savage land. Visitors fared well under the rude but ready hospitality.

There was for instance a billiard table, pride of the fort, which had been dragged overland from Independence, an unbelievable piece of furniture which delighted the heart of the trappers and later the army officers who came to use the fort as a base in their forays into Indian territory.

But beyond and above

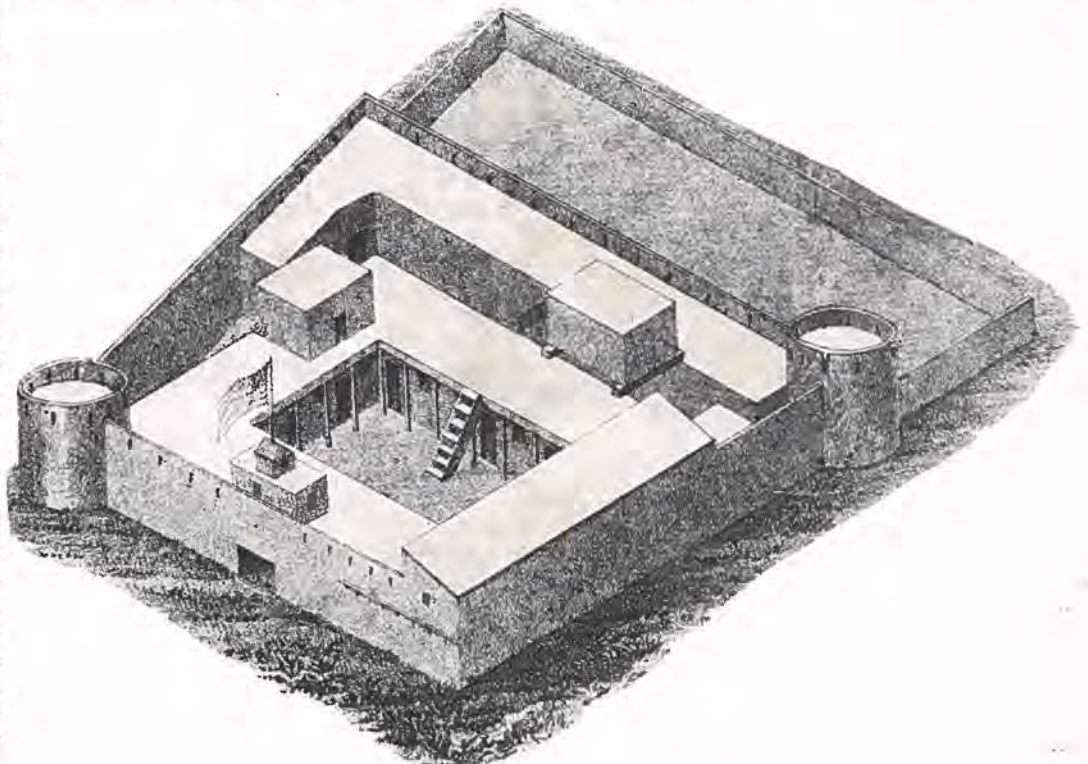
everything there was Charlotte, a black mammy, transplanted from Missouri into this strange setting, who was the gem and chief jewel of the establishment. Charlotte presided over the kitchen and despite the rather rudimentary list of victuals with which the fort's larder could be stored, managed to produce, by some sort of magic, meals which the mountain men, after a season on jerked venison, or quite as likely horse "beef" were willing to travel hundreds of miles to reach. Biscuits and pies and like delicacies made Charlotte almost as famous in her day as the fort.

The ramifications of the trade were far-flung when the fur business was at its peak. As an outpost the St. Vrain established a branch on the Platte River near where the St. Vrain River flows in.

During one period Kit Carson, the greatest of all the mountain men and the trappers, was a familiar figure around the post. He took a contract as hunter with a commission to supply all the meat needed for the post, no inconsiderable task, as the business was of such proportions that a large number of employes was needed.

Carson hunted for the fort for eight years, and during this time, he conducted huge buffalo hunts and built up around him that celebrated company which later became so famous as Carson's Men in their battles with the Indians.

Eventually Col. William Bent became the sole proprietor of the fort but its glory waned. The great animal life of the west with its huge fur possibilities had been despoiled. No longer were prime furs so easily obtained, and then the fops of the east dealt a heavy blow to the fur trade. They discarded their time-honored beaver headgear for the newly fashioned silk hat. Thus a vagary of fashion put an end to the romantic period of the fur trapper and trader.



Showing the construction of Bent's Fort, which was the center of the colorful melange of the fur trade on the Arkansas. It was located across the Arkansas River from the present town of Hadley.

The post was used at one time by General Kearney as a headquarters for one of his expeditions into New Mexico and the government, having decided that it had best establish a firmer hold on this vast western territory, and so was desirous of buying the establishment as a military base. Bent was ready to sell. The place was no more the busy center of western life that it had been and no longer poured forth the rich profits of the earlier day.

Col. William Bent was no weakling. Instead he was a strong, high-headed man of a stubborn and determined mettle. He was not for nothing the grandson of that fiery Capt. Silas Bent who commanded at the Boston Tea Party. He was a vigorous man who had married five times during the course of his life—three of his brides being squaws.

Old prints reveal determination and a certain grim obstinacy and pride written on the lean jaws and high-bridged nose which won for him the title "Roman Nose." For years he had been a sort of a patriarch and had ruled over the fort and the business with an iron hand. Undoubtedly he was something of an autocrat.

The government which ruled the eastern part of the United States must have seemed a shadowy and fleshless thing to him. He had been a government of his own, the only regime the traders country had known had been his. This government had not protected him when he and his associates had set up their business in the west. They had to see to their own protection of their goods and chattels and lives in a country where any man's safety was likely to be precarious.

Now the government wanted to buy his fort and he, as has been said, was ready to sell, but it is not surprising that he felt he was the man to set the price. He did set the price of \$16,000 for the fort as it stood.

The government was disposed to haggle. It offered \$12,000, but Colonel Bent was not a man to haggle with. He was a fair and honest trader, asking a fair and honest price and so the petty tactics of the government incensed and outraged him.

So it was that in the summer of 1852 the old man, his face set in lines of grim anger, stalked about the post giving crisp orders to his men.

Inside the courtyard of the fort there was ceaseless activity. The men were busy loading the wagons with everything movable in the place. That is, everything except some kegs of gunpowder in the magazine. These they left untouched by strict order.

Then with everything loaded Colonel Bent gave the order to move out and away. He sent the wagons out through the portal and down the hill toward the river bottoms.

As he stood there watching the train as it rolled away there must have been a tearing at the heart-strings of the old man. This place, it must be realized, had been his. The pride of possession in him must have been stronger and the feeling of ownership greater due to the



A sketch showing one of the wagon trains moving furs to the Missouri River.

fact that it was not his by grant or deed or written instrument but his because of strong arm and will, by the right of courage. The very fibers of the man must have been rooted deep within the place where he had lived and worked for so many years.

Any regrets he may have had, however, had no force in blunting his determination. As the wagons drew away he turned back into the fort and fired it with his own hands. Then he rode away down the hill without looking back.

As the wagons creaked and rumbled down the river road, the drivers, heads turned backward over their shoulders, could see the flames boiling higher and higher within the old fort. And then followed a heavy, rumbling explosion which left the storied fortress a mass of smouldering ruins.

Bent moved down the river 30 miles to a place known as Big Timbers. There he set himself up another post, built another but smaller fort planned along the same lines as the old one. This he occupied until 1859, selling it to the government in that year and retiring from the fur business.

Colonel Bent was the first Yankee fur trader to operate within the confines of the state of Colorado. His few predecessors had been Spanish or English, and he was the last trader of any magnitude to conduct business in the state. The history of his fort encompasses the history of the fur trade in the state and it is the central and dominate figure in the picture of one of the most glamorous periods of Colorado history.

The careless travelers pass the crumbled ruins of his fort now without knowing it. These ruins are back considerably from the road and therefore attract no attention. They are marked, however, with a State Historical Society marker and trees have been planted around the ruins, but these have not yet grown to sufficient height to catch many eyes even in a treeless country. However, they should hold as much interest to the west as any historical shrine of the east.



A sketch of one of the early-day adventurers who met with misfortune on the trek to Colorado.

Old Loveland Pass Stage Road Now Transformed Into Auto Highway

By C. W. LERCHEN

THE trip from Denver to Graymont, a good many years ago, over the famous "Loop" between Georgetown and Silver Plume, was a treat for the traveler, now known as the tourist, over the narrow gauge railroad, the real terminus for the tourist being Silver Plume, after the abandonment of the four miles of track and roadbed between Silver Plume and Graymont. This scenic trip over the Colorado & Southern is just as fine as it ever was, and as grand, but as the years have rolled on, this beautiful trip has been increased by the advent of good roads and the automobile, so if all goes well next season we are promised the completion of the automobile road over "Loveland Pass" and on down the western slope to the Snake river, Summit county, to Dillon.

After the Loveland Pass road is finished the people of this state can with a great deal of pride invite the world to take advantage of a trip unsurpassed, every minute a revelation, full of grandeur and wonder. Leaving Denver the motorist travels west over a good paved road to the boundary of the Denver Mountain Parks, and well-kept highways to Bergen Park, thence to Idaho Springs, the Gem City of the Rockies, a beautiful city of modern conveniences and improvements, actively and prosperously engaged in metal mining for the ores of gold, silver, lead, zinc, copper and other metals, and is also known as the home of the "Jackson Monument," erected in memory of the first discovery of gold in Colorado, enjoying an ideal climate, the hot springs, of radium waters, and hotels to accommodate those wishing to enjoy the pleasures and many advantages afforded.

Leaving Idaho Springs we still travel west up Clear Creek canon through the mining camps of Dumont and Lawson, to Empire Station on the C. & S. railway. At this point, leaving the Victory highway (which has been the one used from Denver), we travel over a fine highway southwest to Georgetown, another of the historical mining camps with millions of dollars to its credit for the production from its mines, besides being an ideal place to live.

Leaving Georgetown, going west again, we travel over a fine road to Silver Plume, looking down from this road upon the "Loop" known the world over. At Silver Plume one realizes the magnitude of early day mining activity and operations, in evidence when one looks up the sides of the high mountains north of town, especially Brown and Sherman mountains, whose sides are honeycombed by shaft and tunnel operations and covered by immense dumps, demonstrating that great wealth was extracted in metals from the surface down, and is still being produced from these workings.

Leaving Silver Plume, going west again, it is four miles to the summer camp of the Boy Scouts, known as Camp Lemen; then, still going west from Camp

Lemen, it is about ten miles to the top of the main range, this being Loveland Pass, where one should stop long enough to enjoy the magnificent views east, west, north and south, looking down into the valleys of Clear Creek, Snake River and the Blue River, being also able to locate the mining camps of Montezuma, Chihuahua, Decatur and St. John, in the valleys of the streams, and the mines by the large and small dumps scattered over the sides of the nearly perpendicular mountains, most of whose tops are above timber line. After viewing from Loveland Pass the magnitude of this territory, practically unexplored, especially that portion going down to the Snake River valley, for mineral wealth, the great importance is vividly brought forth that the Loveland Pass road should be a completed thoroughfare without delays of any kind, enabling the counties through which it passes and people of the state at large, to derive the benefits of the mineral wealth, scenic and other advantages made possible by auto and truck transportation through this territory, the shortest east-west highway from Denver to Leadville and other points beyond.

From Loveland Pass on down this side of the mountain it is probably seven miles to the Snake River in a south-southwest direction, thence down the stream west three miles to Keystone, the terminus of the railroad from Breckenridge to Dillon, and four miles west from Keystone to Dillon, on the Blue River. From this point trips can be planned south into South Park, north into Middle Park, and west into Leadville and other points, all over improved auto roads.

After passing over Loveland Pass the fact and realization is brought forth of the division of the stream flow of the creeks and rivers, those on the east side of the main range flowing to the Atlantic ocean and those on the west side flowing to the Pacific ocean.

The importance and grandeur of the Loveland Pass east-west highway cannot be realized by anyone not familiar with the territory involved and the route traversed, requiring a trip of the federal and state highway officials to expedite matters toward necessary appropriations to complete construction work started many years ago by the citizens, men and women, of the counties of Clear Creek and Summit. — Reprinted from Idaho Springs Gazette.

On October 10 a party of six men from Silver Plume drove the first auto over the Loveland Pass road from Silver Plume to Dillon. The men were William, Ed and Bob Buckley, Wm. Taylor, Donald Marshall and William Buxton. The trip was made to Dillon in three hours, waiting about an hour for the steam shovel to make clearance on top of the pass. The return trip was made by way of Kremmling and Berthoud Pass.

The trip was made to gain additional publicity for
(Continued on page 16)

Colorado Joins U. S. in Traffic Study

ON SEPTEMBER 1, the state-wide cooperative traffic survey, initiated by the U. S. Bureau of Public Roads and joined by the Colorado Highway Department began. This work is to last one year, covering about forty localities in the state. The purpose of the Bureau of Public Roads in initiating this survey is to obtain authentic information as to the density of traffic throughout the six western states. Nebraska is included in the survey for comparison with the central states condition.

In the scattered districts, twelve 8-hour counts during day period and one night count will be taken. In the Denver territory twenty-four 8-hour counts and one night count will be taken. This includes the six Federal Aid roads entering Denver.

Observations will be taken at Greeley, Fort Collins, Wiggins, Brush, Sterling, Burlington, Wray, Julesburg, Holly, La Junta, Pueblo, Colorado Springs, Trinidad, Walsenburg, Limon, Alamosa, Salida, Canon City, Leadville, Kremmling, Craig, Rife, Grand Junction, Fruita, Montrose, Durango and Cortez.

The study has been undertaken in order that the federal government and the western states may know what the flow of traffic is throughout the year on the main transcontinental highways and on other roads in the federal-aid highway system in the west. In addition to Colorado the highway departments of California, Washington, Oregon, Idaho, Nevada, Wyoming, Utah, Arizona, New Mexico and Nebraska will join in the traffic survey which will extend over a period of one year.

Among the routes on which traffic will be measured are the historic Oregon Trail, over its entire length from Omaha to Portland, parts of the Santa Fe and Overland Trails, and the long-distance motorbus routes from Omaha to Denver, Salt Lake City and San Francisco, and from Denver to Los Angeles by way of Santa Fe, and from Seattle to Los Angeles.

The transcontinental highways which give easy access to national parks and monuments and to national forests in the west carry great and increasing traffic from the east and middle west and they pass through public land states which have large percentages of unappropriated and unreserved public land, relatively low densities of population, and comparatively small revenues for road construction, and in these states federal aid has been of material assistance in closing gaps in the through routes.

In these western states traffic has reached the point where it is necessary for the states to know the flow of traffic density, and composition on their roads, so that they can plan their highway systems on a good economic basis and plan for the removal of snow in winter.

The survey will show the number of vehicles using each of the main highways throughout the year, by days of the week and hours of the day, and the number of vehicles passing a given point at certain times of the day. It will classify the traffic according to types of vehicles, whether passenger cars, motor trucks, or motor busses, and the number of passengers in passenger cars. The importance of cities, towns and sections of the state as the source and destination of traffic will be ascertained, and the number of vehicles from other states using the highways, and other information re-

quired by state and federal highway officials, will be obtained.

The data will show population trends and will be useful in solving traffic regulation and safety problems. Surveys will be conducted simultaneously in each of the states.

As a result of the survey, the Colorado Highway Department will obtain complete information with regard to the use of the Federal Aid highways in the state, which will be useful as a basis for construction and maintenance programs and policies of snow removal, and which will also answer questions in regard to the amount of tourist traffic on the Federal Aid roads in the state.

A variety of facts concerning the traffic are needed for the solution of many of the problems arising in highway administration. For some, the data required are those which will furnish an accurate idea of the flow of traffic throughout the year; others require a knowledge of winter traffic; others the peak of density; others of some fraction of the total traffic, such as motor trucks, or foreign vehicles, etc.

For instance a count this past summer revealed that nearly fifty per cent of the cars traveling between Pueblo and Colorado Springs were from other states. Several counts between these two points during August showed over 3,000 cars in eight hours.

The cooperation of the motoring public is vitally necessary to the success of the survey. Much of the information will be secured from the answers of the motorists upon cards which are being distributed by the traffic recorders at strategic points throughout the state. These cards require less than one minute to fill out completely; yet from them may be gotten the essential facts concerning highway traffic of the state.

All that is needed is that the motorist write in a very few figures and a couple of state names. No one need disclose his identity as the cards are not to be signed. Practically one hundred per cent cooperation from the motorists is expected since the benefits of the survey are realized entirely by the traveling public in the form of better transportation facilities and in the extension of existing facilities.

As the local requirement of the people can be made known to the Federal government through the filling out and mailing in of all cards received in each community, it is felt each citizen should stop and accept the card handed him, as by doing so he is adding volume, hence importance to the highway problems of his community.

The California highway commission has this letter of inquiry from Koenigsberg, Prussia: "I should be very much obliged to you for communicating me the experiences you made in your state about this matter, namely: American motor highways were they built to open regions of great picturesque beauty and to be visited by tourists? did their construction cause the foundation of new settlements (towns, villages, hotels) still in prosperity? what is the sort of construction which gave the best effects and how elevated were the costs? and finally: who gave the money to construct them and what may be considered as the principal advantage they gave to the country?"

Auto Death Rate Shows Big Increase

Nineteen of the nation's largest cities will lose from 20 to 40 citizens for every 100,000 population this year from motor vehicle fatalities.

These figures were cited in the highway safety campaign of the American Road Builders Association as indicative of the great need for courtesy and caution on the part of every driver and pedestrian, for all are potential victims of this great evil of modern transportation.

The total of traffic deaths for the first eight months of 1929, which was 8.5% higher than for the same period of 1928, forecasts at least 30,000 deaths and possibly more by the end of the year. The worst months of previous years have been the autumn and early winter months and it is assumed that this year will not be an exception.

Several cities had traffic death increases of 100% or more, comparing the August figures with those of August, 1928. An average of 91 persons were killed each day in August, according to figures of the National Safety Council, which has reports from about one-half the country showing that more people were killed by motor vehicle accidents in the United States in August than in any previous month in our history.

If the proportionate increase by months follows the trend of former years, December, 1929, will see 3,300 deaths—nearly 110 persons daily.

The proportion of pedestrian deaths, which continues to rise, in August was 56%. The opening of school always has brought a higher total figure of pedestrian deaths, as from 40 to 60 per cent are of children under 15 years of age.

The child driver, so commonly blamed for a large share of motor accidents, had a very small part in the accidents reported in August, as, out of 13,000 drivers involved, all but 150 were 18 years of age or over.

Pittsburgh, Pa., led the list of larger cities, those over a half-million population, which reported in August. Its death rate was 24.8, or approximately 25 persons killed for each 100,000, if the average monthly deaths continue the same for the final four months of 1929. Cleveland, Ohio, was second with a rate of 22.7. Boston is lowest in this group, with a probable rate of 14.

In the list of cities between 300,000 and 500,000 population, Cincinnati's approximated death rate is highest, 24.6, and New Orleans is close behind with 23.8. Rochester, N. Y., with a possible 10.4 death rate, is lowest in this group.

Among the cities between 100,000 and 300,000 population, San Diego, Calif., has an approximated rate of 42, and Dayton, Ohio, is next with 32.6. Wilmington, Del., which went on the August honor roll for completing the month without a motor-vehicle death, has only had three deaths in the first eight months this year and bids fair to end the year with a death rate of 2.4.

The highest rating in the entire list of reporting cities comes in the class under 100,000 population, which is contrary to the general idea that the greatest traffic danger is in the largest cities.

Atlantic City, N. J., with a death rate that may average 46.2 persons of each 100,000 population this year, heads this group. Chicopee, Mass., is second with 19.3. Low honors of this class go to Shreveport, La., which has

had only one traffic death this year, none in August and has an average rate of 1.4, giving it the distinction of being the safest city in the country in which to drive or walk about the streets.

The American Road Builders Association has consistently fought for wider and safer streets and highways, sane traffic legislation and its strict enforcement, elimination of grade crossings, dangerous curves and other hazards, uniformity of traffic control. It is believed that in addition to all these efforts, the driver and pedestrian must contribute courtesy and caution to the great cause of highway safety.

Chief Reed, of the Denver police department, asserts that a motorist could not travel a block downtown or five blocks in any of the thickly settled districts of the city without his license plate and not be notified by a policeman.

In all probability there is not a driver in Denver who is sufficiently curious to try the experiment to satisfy his own curiosity.

All this has to do with two Montana women. They left home and without a tag on their machine. They motored through to Massachusetts before they were stopped and told the license plate was not on their machine.

Here is an opportunity for somebody to figure out how it was done. As a hint, Charles M. Armstrong, secretary of state, says the two girls had IT. Now it is passed up to Chief Reed with the query: Has any woman sufficient IT to get by the police without a license tag?

To the uninitiated in the latest byword in America, IT means the possession of so much personal charm that the bearer could get way with murder!



Stretch of concrete pavement south of Colorado Springs, recently completed with Federal Aid.

NEWS OF THE MONTH

J. O. Francisco, assistant superintendent of maintenance, with headquarters at Steamboat Springs, will have fifteen snow plows in his division for the work of snow removal during the winter. The plows will be distributed as follows: Elk Springs, Maybell, Hayden, Kremmling, Granby, State Bridge, Hamilton, Nine Mile hill, between Craig and Meeker, Rio Blanco, Craig, Rifle and Meeker.

Plans are under way by the state highway department looking to placing oil surfacing on a six-mile stretch of road between Agate and Deertrail. When the contract was let the department planned only to grade and gravel this piece of road. A supplemental contract was let calling for oil treatment.

Luke E. Smith & Co., contractors, have completed six and one-half miles of grading and gravel surfacing north of Meeker, on the Craig route. The cost of this work was \$88,000 and was a Federal Aid project. Gardner Bros. & Glenn, contractors, have completed three and one-half miles of gravel surfacing between Delta and Grand Junction. This also was a Federal Aid project. Ed. Honnen, contractor, finished a three and one-half mile Federal Aid gravel surfacing project between Parlin and Sargents during October.

Two and one-half miles of Federal Aid gravel surfacing west of Portland were completed during the month by J. Finger & Son. The cost of the work was \$54,843.

Frank H. Hoffman, Denver contractor, also came through during the month with eleven miles of finished grading and gravel surfacing north of Kremmling. This work eliminates the old bad stretch of highway across Muddy Pass. The new work reaches to the good road on Rabbit Ears Pass. The cost of this Federal Aid project was \$201,262. This was one of the largest contracts let by the highway department during the 1929 construction season.

The department has had three projects, consisting of grading and gravel surfacing, on the Blue Mesa route between Gunnison and Montrose during the past summer. These Federal Aid contracts totalled \$303,309. One of the projects was located between Gunnison and Sapinero; the second located west of Sapinero, and the third west of Cerro Summit. There were eleven miles in the three projects. The contractors were Hinman Bros., Mountain States Const. Co. and Cole Brothers. The first-named contractors are practically through with their jobs, while Cole Brothers have their project west of Sapinero 30 per cent completed.

The month of October saw the completion of the Kansas City-Denver Airline highway from Byers, its western terminus, to the Washington county line. A crew of men working under the direction of the Arapahoe county commissioners finished up the work the first of Novem-

ber, east of Byers. Adams county last month also finished the work on twelve miles of the highway extending west from the Washington county line. The work was done with state and county funds. The Airline extends from Byers to the Kansas line and there connects with an excellent highway constructed by Kansas.

Four construction crews are now engaged in the work of constructing a new roadbed for state highway No. 2, between Iliff and Ovid in northeast Colorado. The work is under the direction of W. A. Lewis, resident engineer of the highway department. This is a Federal Aid project 42 miles in length, contracted by Cole Brothers, Pueblo contractors. The total cost of the project will be \$191,055. Three draglines will be used in the work.

Surfacing of a grade between Wiggins and Roggen, constructed last year, is now under way by the highway department. Much of this nineteen-mile stretch of road has a heavy sand fill. Clay is being placed on the fills and gravel will be spread. About five miles of the surfacing remains to be finished. The road provides a cut-off from Wiggins to Hudson and Fort Lupton. A large bed of mussel shells was encountered in the clay formation which is being used.

Fremont County has a large crew of men engaged in gravel surfacing the western half of the Colorado Springs-Canon City highway. This road has been a source of inconvenience to motorists this past summer, through the surfacing having worn out.

H. T. Reno, resident engineer of the department at Gunnison, has started surveys on two new proposed Federal Aid projects, from the foot of Monarch Pass to Cochetopa creek. Both are extensions of completed Federal Aid projects on the same road.

More than 43 miles of county roads have been graded in eastern Bent County during 1929, according to Commissioner Frank A. Froman. Twenty-five miles of this work was done with a new elevating grader purchased early in the spring. In addition to the work done with this grader, 13½ miles have been put in shape with a blade grader since January 1.

September collections of the 4-cent tax on each gallon of gasoline sold at retail in Colorado were the greatest in the history of the state, a total of \$711,000, which was nearly \$100,000 greater than collections in August, the previous highest month, with \$620,000.

With the construction of the new Federal Aid project south of Greenhorn, between Pueblo and Walsenburg, the highway department will eliminate two of the most dangerous curves on the North-South highway, located at what is known as the Apache schoolhouse. Construction

on this project is expected to start before the first of the year. It will be known as F. A. P. 296-E, and will be five and one-half miles in length. It will connect with the project recently completed north of Greenhorn on the same road. Both projects are designed for paving at a later date.

The entire South St. Vrain canon road is being surfaced from Lyons to the Raymonds resort, according to County Commissioner S. D. Buster, of Boulder County. J. H. Loew is in charge of the work for the county, which is paying the cost.

State road crews have completed the five-mile stretch of new oil-process roadway leading out of Alamosa toward Monte Vista, according to William Walsh, resident engineer. This crew also put in shape another mile which was improperly laid a year ago. The oiling required 20 days.

Present indications are that refunds from the state gasoline tax in 1929 will total \$540,000. These refunds have been claimed by farmers and contractors consuming gasoline for other than use of machines on state highways.

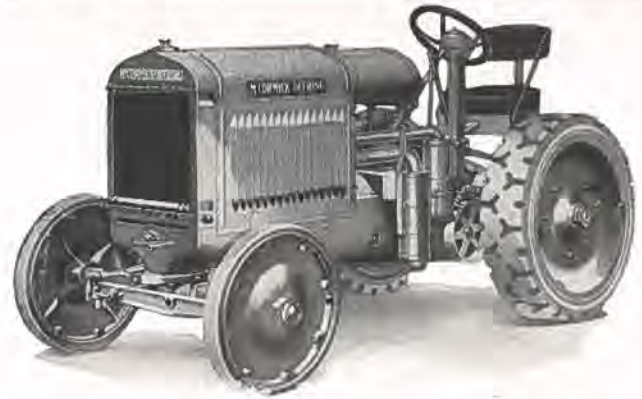
The total receipts from the 4-cent tax are expected to reach \$6,000,000 this year, of which the net share of the highway department, after deductions are made, will total about \$3,780,000. This is just about the sum which the department will have available for new construction of roads during 1930.

The Cheyenne-Greeley road and the Cheyenne-Fort Collins road are to be merged for a distance of several miles out of Cheyenne, according to surveys made by the Wyoming highway department. The Greeley route will be used for traffic to Fort Collins and Greeley from Cheyenne to a point near the state line, where the two roads are about four miles apart, according to reports. This change in route will eliminate several railroad crossing hazards.

We made a mistake last month in stating that the Chain Belt Company was represented in the Denver territory by the Wilson Machinery Co. The Chain Belt company is represented here by the Burnite Machinery Co., of which the genial Tom Burnite is the manager. The Chain Belt line includes the well-known Rex concrete pavers and mixers. They also manufacture various types of material conveyors.—The Editor.

The new route of the Black Mesa road, which has been under construction all summer, was opened to traffic on October 17th, and immediately received its share of the travel between these towns, according to the Crawford Chronicle. This is but another step toward the completion of the Black Mesa highway.

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Old Loveland Pass Stage Road

(Continued from page 9)

the Loveland Pass project, and volunteer workers from Summit and Clear Creek counties have joined forces in repairing the bad places in the old stage road in Summit County, making it a passable one-way road.

The distance between Silver Plume and Dillon by the new route is twenty-eight miles. At present, traveling via Kremmling and Berthoud Pass, the distance is 120 miles.

At the recent meeting of the highway advisory board citizens of Clear Creek and Summit counties made a request for additional state funds to complete the highway into Dillon. While no definite statement was made, it is likely that additional funds will be allotted to the road during 1930. The road at present is completed to the summit of the pass.

It is estimated that \$150,000 will be required to finish the new road into Keystone, a distance of about ten miles from the summit of Loveland Pass.

Urges Early Planning for Roadbuilding

Improved highways are so badly needed that every possible expedient should be taken to keep road graders and concrete mixers in action.

One of the leading difficulties encountered in the war on mud, dust and friction is nothing more than that human quality which inspired Benjamin Franklin to urge, "Never put off until tomorrow what you can do today."

Plans for highway betterments in themselves do not save the motorist gas, or wear and tear on his car. No comfort is brought to the motorist at least until he hears that the contract for the contemplated project has been let. In a day's ride one may pass through dozens of communities, each with a long planned pet project for which finances are available, and yet no constructive action taken.

It is with pleasure that the action of the Minnesota state highway department is viewed. Bids for contracts on 136 miles of pavement are now being received. This pavement is not to be built until 1930, but the contracts are being placed now—and just so much routine work is out of the way.

Early letting of road contracts brings with it manifold benefits: the contractor has ample time to make his plans; road machinery can be placed in operation at the crack of dawn on the first suitable day; costly delays are eliminated and full advantage can be taken of the all too short roadbuilding season; and the citizen feels his tax money will soon be at work for him.

Eight inches of crushed rock is being used in surfacing of the new road west of Leadville on Tennessee Pass. It is expected that the Pass can be kept in condition for all-winter travel. The construction work now in progress from the Leadville city limits will facilitate snow removal activities. The state highway department will assist in keeping this mountain pass open through the snow months.

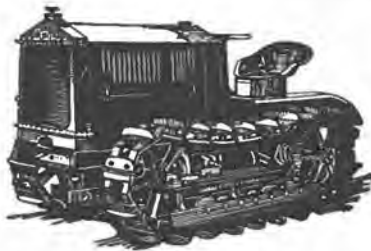
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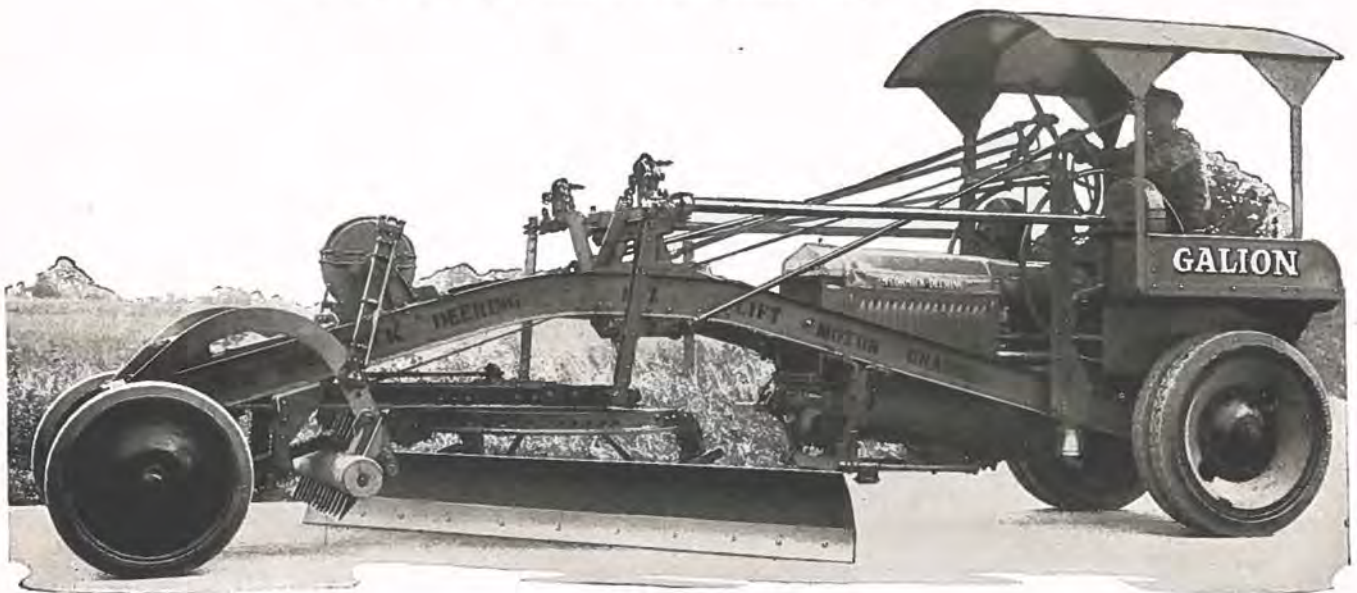
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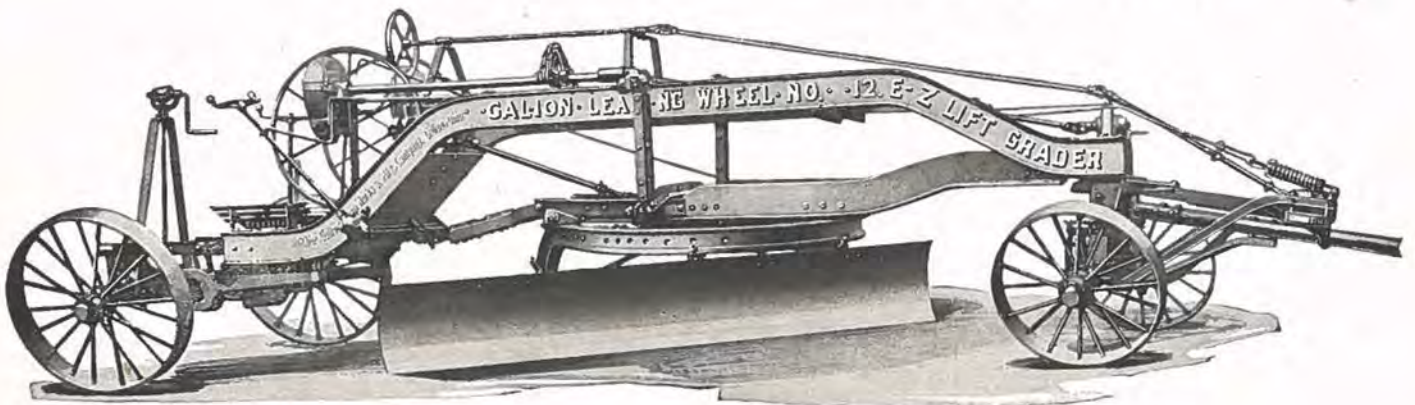
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Biblical Parable Fits Some Drivers

Most people are familiar with the parable of the foolish virgins who forgot to put oil in their lamps. But people who drive on highways at night in 1929 with poor headlights are taking greater risks, says a state highway bulletin.

It was once thought that people who drive with glaring lights were selfish and discourteous, endangering others for their own benefit. But experience has shown that those who drive with glaring lights are endangering themselves as much as others. They are not selfish; they are just foolish, more foolish than the virgins who went without oil in their lamps.

Glaring lights are seldom due to high candlepower, but to lamps which are not properly focused or adjusted. Glare is due to the main beam being pointed upward so it strikes the eyes of approaching drivers. Such lamps do not illuminate the road. It is as dangerous to drive with glaring lamps as it is to meet them.

With shorter days and more night driving, it is advisable to have your auto lamps put in good shape. The best way is to have them tested at one of the official light adjusting stations. Even if the lamps were O. K. when new, they may have gotten out of focus. A slight bump on the fenders will often spoil the adjustment. Properly adjusted lights will make night driving more pleasant and safer for yourself and the people you meet.

Driving with one headlight out, or driving any kind of a vehicle without a rear light or reflector—"foolish" is too mild a word. It is just plain suicide.

Wants Special Road for Reckless Drivers

Every time we pick up our Monday paper we are reminded of news from the front during the late war. In big headlines the dead and wounded are told of as a result of the Sunday auto accidents, and the stories are sometimes more sanguinary than the war reports, which, added to the killings and maimings during the week, make a record unparalleled in peace-time pleasures. It does not seem to make any difference how carefully one drives, there is always a number of wild drivers who know no rules and who spread death and destruction along their trail. In view of this condition, we would respectfully suggest to the highway commissions that they maintain two lines of traffic—an elevated one for careful drivers and a lower one for the wild birds, lined on each side with deep ditches so that when they go off the trail it will be a "finish job" so far as they are concerned, and any killings they inflict on others on that trail would not be a loss, the dead being of the same irresponsible stripe as the killers.—Beach, N. D., Advance.

PLANS FINISHED BUT PROJECT NOT ADVERTISED

Proj. No.	Length	Type	Location	Waiting for
243-C	3.837 mi.	Gravel Surfacing	West of Dike	B. P. R. Approval
267-C	4.491 mi.	Gravel Surfacing	Northeast of Model	B. P. R. Approval
272-E	2.562 mi.	Concrete Pavement	West of Rocky Ford	B. P. R. Approval
296-E	5.467 mi.	Gravel Surfacing	South of Greenhorn	B. P. R. Approval

PLANS BEING DRAFTED

Proj. No.	Length	Type	Location
151-A	7 mi.	Gravel Surfacing	South of Granby
165-Reop.	9 mi.	Oiled Gravel Surfacing	East of Canon City
149-B	5 mi.	Gravel Surfacing	East of Aurora
279-H	3 mi.	Grading	North of Kenosha Pass

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
57-R2	North of Lamar	0.502 mi.	Bridge	J. Fred Roberts & Sons	\$140,102.96	0	57-R2
68-R1	North of Monte Vista	1.900 mi.	Gravel Surfaced	J. Finger & Son	24,124.00	4	68-R1
78-R	Near Minturn	0.709 mi.	Gravel Surfaced	J. Fred Roberts & Sons	96,342.90	4	78-R
97-R1	East of Lamar	0.275	Bridge	W. A. Colt & Son	24,237.50	100	97-R1
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	99	138-A
138-B	North of Kremmling	3.133 mi.	Gravel Surfaced	F. L. Hoffman	76,363.35	66	138-B
144-D	Northwest of Ft. Collins	2.834 mi.	Gravel Surfaced	J. Fred Roberts & Sons	66,430.10	3	144-D
147-C	South of Cortez	3.428 mi.	Gravel Surfaced	E. J. Maloney	86,182.75	82	147-C
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	100	149-A1
150-A	West of Craig	8.227 mi.	Gravel Surfaced	Gardner Bros. & Glenn	93,477.35	7	150-A
175-A	Between Sterling and Ovid	41.979 mi.	Graded	Cole Bros.	193,055.75	17	175-A
208AR2-CR1	East of Grand Junction	9.254 mi.	Oil Processed Gravel Surface	Hinman Bros. Const. Co.	44,652.05	99	208AR2-CR1
253-D	West of Milner	2.547 mi.	Gravel Surfaced	Hamilton & Gleason Co.	147,192.00	16	253-D
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	100	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	94	258-G
258-H	West of Sapinero	4.921 mi.	Gravel Surfaced	Cole Brothers	123,700.60	54	258-H
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	100	262-I
263-A	Retw. Mortimer & Ft. Garland	3.404 mi.	Gravel Surfaced	Mtn. States Constr. Co.	47,509.20	15	263-A
266-D	South of Bondad	4.111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	96,075.30	86	266-D
270-C	Betw. Alamosa & Monte Vista	5.000 mi.	Oil Pro. Gravel Surf.	Mountain States Constr. Co.	38,485.50	96	270-C
272-D	East of Manzanola	1.950 mi.	Pav. & R. R. Underpass	Driscoll Construction Co.	88,237.50	98	272-D
277-D1	Betw. Colo. Springs & Pueblo	15.566 mi.	Grading	M. E. Carlson	218,277.80	92	277-D1
277-E1	South of Colorado Springs	10.2	mi. Grading	J. L. Busselle	221,389.65	60	277-E1
282-G	South of Craig	5.147 mi.	Gravel Surfaced	Chas. B. Owen	61,645.22	0	282-G
282-H	Between Rife and Meeker	7.029 mi.	Gravel Surfaced	Winterburn & Lumsden	82,589.74	51	282-H
287-A5	Between Greeley & Ft. Morgan	6.590 mi.	Concrete Pavement	Edw. Selander	154,682.85	100	287-A5
292-B	Between Gilman and Minturn	2.640 mi.	Gravel Surfaced	O. J. Dorsey	29,146.80	86	292-B
292-C	West of Avon	1.646 mi.	Gravel Surfaced	Ed. H. Honnen	39,663.10	87	292-C
293-C	North of Ouray	3.661 mi.	Grading	C. V. Hollenbeck	62,997.80	99	293-C
295-BR1	South of La Jara	6.622 mi.	Oil Pro. Gravel Surf.	Pople Bros. Const. Co.	14,226.50	100	295-BR1
295-D	North of Antonito	2.460 mi.	Oil Pro. Gravel Surf.	Levy Const. Co.	72,676.75	54	295-D
297-C	Southwest of De Beque	9.953 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	312,453.50	33	297-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssier	38,426.00	48	298-B
300-B	North of Silverton	2.828 mi.	Graded	Hamilton & Gleason Co.	35,647.80	7	300-B

It's A Fact

Repeat Business does pay—



IN AUGUST, 1927, Luke E. Smith & Co. purchased the first General Excavator sold in this territory for work on Loveland Pass.

IN SEPTEMBER, 1928, Luke E. Smith & Co. purchased their second General Excavator for a road job between Rifle and Meeker, Colorado.

IN OCTOBER, 1929 (October 3rd, to be exact) Luke E. Smith & Co. purchased SIX General Excavators for shipment October 15, 1929, and they're on their way to Colorado now. "Generals" just had to "make good." They aren't built to do otherwise. "Generals" out-perform, out-sell any other half-yard shovel sold in this territory.

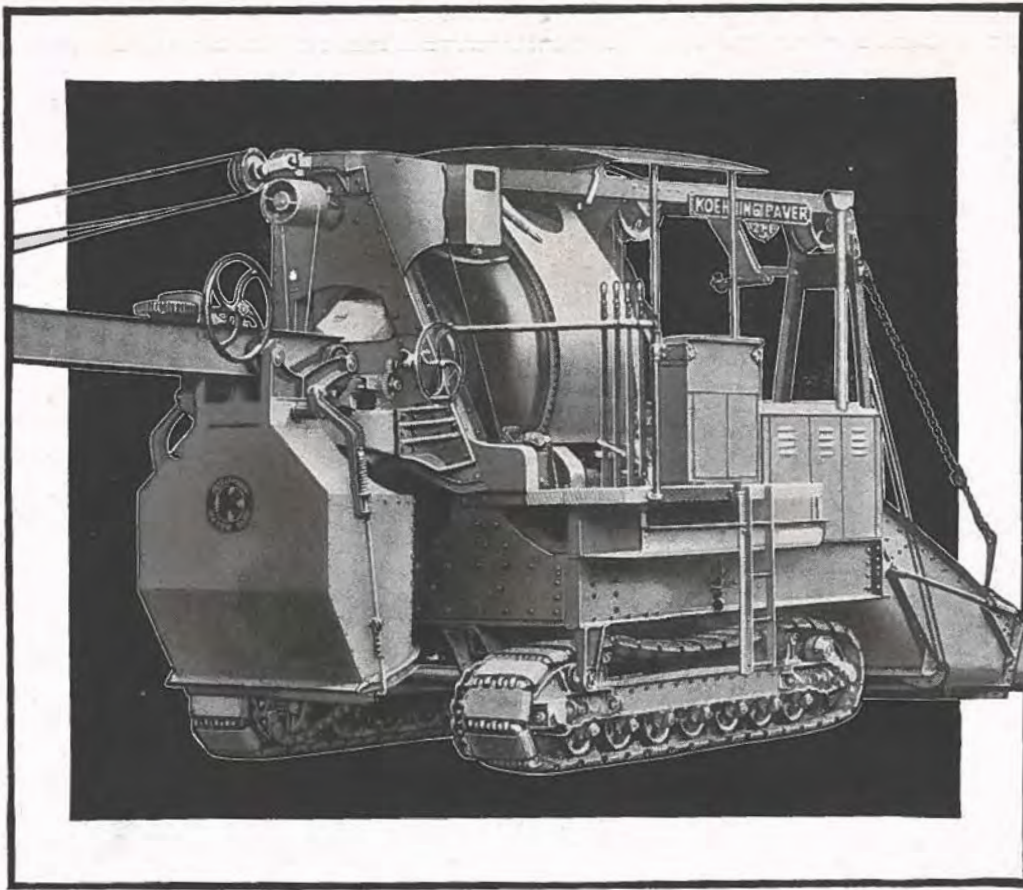
The new Generals come equipped with 6 cylinder motors (for extra power and faster operation) at the same price as the 4 cylinder motor equipped General. One-third of orders received for new Generals come from "General" owners.

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PIONEER GRAVEL EQUIPMENT



No. 12 Pioneer Screening, Crushing and Loading Plant hooked up with drag line and Caterpillar 60 H. P. unit, operating on regraveling job on section of Stillwater cutoff. Roth Construction Company of St. Paul, contractors and owners of this equipment.

Endorsement Plus!

John Roth's road graveling outfit is pictured above, on the job. The following conversation took place:

We—"Mr. Roth, we are taking a few pictures of your graveling outfit for our client, Pioneer Gravel Equipment Manufacturing Co. of Minneapolis."

Mr. Roth (just getting out of his car to look things over)—"Help yourself—go to it!"

We—"By the way—how's this Pioneer Screening, Crushing and Loading Plant working out?"

A complete line of 11 different sizes of Screening and Crushing Plants, also Loading Plants, Storage Bins, Drag Lines, Conveyors, Shakers, Revolving Screens, etc.

Mr. Roth (with a lot of enthusiasm): "Well, it's working out 100 per cent. We are getting 500 cubic yards of one inch reduction per day out of it. There is not a better plant made."

This is endorsement plus! Performance is what counts! Pioneer Screening, Crushing and Loading Plants are portable and economical to operate. They give required capacities of crushed gravel of uniform size. They are rugged and built to stand up under hard use.

Write for Pioneer Gravel Equipment Catalog.

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Official Publication of the
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 Denver, Colorado

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 State Highway Engineer.

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Published Monthly by the

COLORADO HIGHWAYS PUBLISHING COMPANY,
 1803 1/2 Broadway, Denver, Colo.
 Phone Main 4962

M. W. BENNETT, Editor

Articles on the subject of road building and highway development in Colorado are solicited. Manuscripts should be addressed to the Editor, with return postage. Photographs should accompany articles whenever possible.
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Our Cover Picture

A VIEW of Ironton Park, showing the newly completed Federal Aid road, forming a link in the famous Million Dollar Ouray-Silverton Highway, is printed on this month's cover of COLORADO HIGHWAYS. During the summer months this highway is a source of keen interest to thousands of motorists. Red Mountain, one of the noted landmarks of the San Juan country, is seen in the distance. During the early days Ironton Park was the scene of considerable mining activity. *Photo courtesy Colorado Association.*



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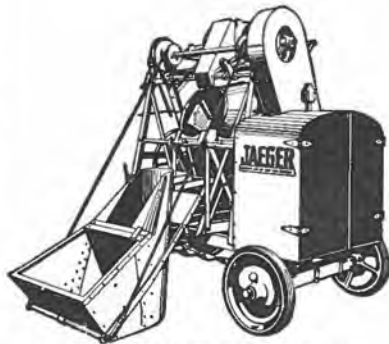
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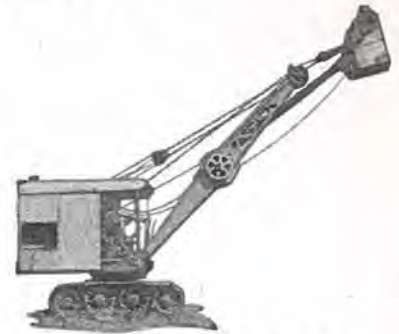
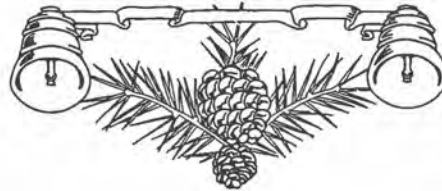


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To You All



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THE "HUSKY DIGGER"



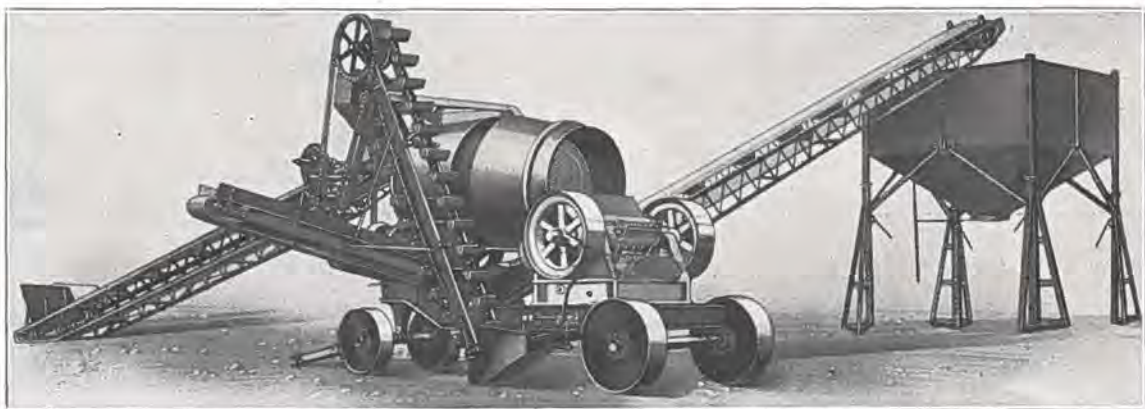
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The Highway Message

By LOUIS VARNUM WOULFE

THE THREE WISE MEN left a heritage of unselfishness. From that momentous day individuals have been concerned about the welfare of others. The motorist, among other classes, takes prominent rank because of his ever-ready willingness to render "first aid." As civilization has advanced, the highway has held its contested place as the democratic means of "getting there." Wherever progress is there also is the road, leading in development and insistently urging the people to be neighborly. The selfish and the unselfish now vie with each other to keep the heart of humanity sympathetic. Many years will pass before the highway loses its prestige as the connecting link between the city and farmside and home and home. The "first call" to mankind to be "just human" is associated with that historic star-lighted pilgrimage. No home is built but in time an "infant" road leads to the door; later the town road, the market road, the pleasure road, the friendly road, and the lovers' lane. Modern times have christened these common ways "good roads," and rightly so, because they bring much benefit to all classes. The example of these eastern philosophers will be imitated at this time. Business men now close up their desks, followers of labor cease their accustomed toil, car owners "oil up" and all take the Road to Somewhere—that feeling may be enriched and hearts throb with cheerfulness. Hundreds of itinerant folk realize, perhaps for the first time, that benevolence characterizes the highway. Every route of popular travel, whether city or rural, serves to intensify Christmas happiness and disseminate good will. Let the shrill appeal of the auto siren bring to you, Mr. Motorist, and to everyone far and near, the message of the highway—

Merry Christmas

State to Spend \$9,000,000 On Roads

The state highway budget for 1930, accounting for \$5,901,202 to be spent on Colorado roads, was presented to Governor W. H. Adams on December 11 for approval.

The new budget is in addition to approximately \$3,000,000 which will be carried over from the uncompleted projects of this year.

Governor Adams received the budget after meetings of the state highway advisory board. He may change it before it is finally accepted. He has indicated that he will sign the budget at an early date in order to get the state road work started without delay in the spring.

The new budget exceeds the 1929 estimates by approximately \$750,000. The increase is made possible by additional revenue from the new gasoline tax and a saving of \$175,000 from the budget of last year.

The largest item on the general budget is \$3,362,040 to be spent in Federal Aid highway projects, to which the government will contribute \$1,681,202.

Receipts for the department during 1930 are estimated as follows:

From gasoline tax, \$3,900,000 as compared with \$2,930,000 last year.

From Federal government, \$1,681,202 as compared with \$1,405,000 in 1929.

From state bus tax, \$60,000, twice the amount received in 1929.

From the internal improvement fund, \$60,000 as compared with \$50,000 in 1929.

From county participation, \$25,000.

From the balance left over from 1929, \$175,000.

The department during 1930 will receive no money from the one-half mill levy, which yielded \$765,000 for the department in 1929. The levy has been discontinued.

Expenditures for 1930 will be:

For Federal Aid projects, \$3,362,404 as compared with \$2,810,000 in 1929.

For Federal Aid regaveling and renewals, \$200,000 as against \$150,000 spent for such work in 1929.

For state projects, \$488,798 as against half a million dollars in 1929.

For maintenance, \$1,475,000—\$75,000 more than in 1929.

For advanced surveys, \$25,000 as against \$15,000 last year.

For compensation insurance, \$20,000, the same as in 1929.

For traffic signs and census, \$20,000 as against \$30,000 in 1929.

For property and equipment, \$30,000, the same as in 1929.

For contingent fund, \$100,000, the same as last year.

For administration, \$180,000 as compared with \$125,000 in 1929.

In the state projects one of the most important planned is the opening of the Loveland Pass road, completing a short route to the western slope. The highway department reached the top of the pass this year. Now, the aim is to extend the road down the west slope. It will not be an improved highway for the present.

The new type of oil surfacing will be applied to approximately 150 miles of highway in the state. Included in the main projects under Federal Aid are:

Completion of the paving between Colorado Springs and Pueblo, twenty-six miles, at a cost of \$650,000. This road is graded and ready for the paving, which probably will be started early in the spring.

Application of oil surfacing to fifteen to twenty miles of highway between Denver and Limon at a cost of \$200,000.

Application of oil surfacing to twelve to fourteen miles between Limon and Burlington, \$100,000.

Oil treatment of sixty to seventy miles of highway between Pueblo and Lamar, Colo., \$150,000.

Grading of fourteen miles of highway south from Trinidad to the state line.

Paving of six miles of road between Greeley and Kersey, \$150,000.

Oiling of fourteen miles of highway between Eaton and Nunn on the Denver-Cheyenne highway.

The Victory highway will be improved to Muddy Pass, and \$80,000 will be expended west of Craig, and other expenditures will be made between Hayden and Craig.



Section of Federal Aid highway located near Durango in La Plata county.

Highway Building Recommended to Foster Prosperity

PRESIDENT Hoover's support of proposed legislation for the creation of a commission to study proposals for a national system of express motor highways as a means of promoting continued prosperity and aiding in the solution of the unemployment problem was requested by a congressional delegation who called at the White House on November 18.

The delegation consisted of Senator Lawrence C. Phipps of Colorado, chairman of the Senate Committee on Postoffices and Post Roads; Representative Tilson of New Haven, Conn., House majority leader; Representative Robinson of Bourbonville, Ky., ranking majority member of the House Committee on Roads, and Lester P. Barlow, of Detroit, Mich., an engineer and president of the Union Highway Association.

President Hoover's attention was called by the delegation to the Phipps-Robinson joint resolution introduced in Congress on June 4, 1929, which provides for a commissioner to study the advisability of the Federal government's aid in the construction of express motor highways. Copies of the resolution were laid before the President, together with suggestions regarding the proposal and a memorandum of the plan for an express highway system, as worked out by Mr. Barlow.

The members of the delegation united in statements urging the necessity for the creation of a commission to study the proposal as a means to relieve traffic congestion.

"There is urgent need," said Senator Phipps after the conference, "for Federal action to straighten out the national traffic tangle. The proposed commission would make a thorough and impartial inquiry, as its members would consist of representatives of the public and of all interested government departments, including the House and Senate. Such research work might save years of haphazard investigation, as well as hundreds of millions of dollars to the taxpayers of the nation.

"It is time to consider the feasibility of public-owned express highways, especially in view of recent efforts to obtain private concessions of this nature. Roadways on which faster and more direct traffic will be permitted are becoming a national necessity, and I believe that the Federal government should take the lead in this important work."

Representative Tilson stated orally that numerous suggestions have been made lately looking to the establishment of a national system of express motor highways connecting large centers of population throughout the country.

"Experts on highway problems agree," he said, "that many links in a system of this character could now be built and the cost of them amortized over a period of years out of tolls. The large income derived from toll bridges, of which there are now hundreds throughout the country, and of small stretches of road at various places, offers proof that the opinion of experts on this question is sound.

"A program of this character could be carried out, it would seem, in such a manner as to stabilize employment conditions, work being reduced to a minimum when the labor demands of private industry are large, and expanded when private industry is depressed. Mr. Barlow, of Detroit, who called upon the President with us, has suggested one plan which seems to have merit.

"The problem is too vast to be hastily considered. All we are suggesting at this time is the creation of a commission to study the proposal of Mr. Barlow and others.

"No one wishes toll roads or toll bridges, if they can be avoided, but it is better to have a system of publicly-owned national express motorways which shall be toll roads for a time and then become free than to have our arteries of transportation blocked by numerous toll bridges and perhaps later by stretches of toll roads which are privately owned and operated."

"Those who have made a careful study of the subject," said Representative Robinson, "assert that our motor transportation is less than 25 per cent efficient, due to the congestion and lack of improved highways. The great congested districts of the country extend from New York to Boston and from New York to Philadelphia; also in and about Chicago, Detroit and other points. Ordinary highways cannot carry the traffic. Transportation is held up and tens of millions of dollars are lost every year because of these congested conditions. Already private individuals have sought and will continue to press claims before state legislatures to give them the right to construct express motorways with the toll-charge privileges.

"Our 25,000,000 motor vehicles have created a great need for bridges across our rivers and streams, and private toll bridge interests have been very busy to secure rights to construct, own and control these bridges. The people of the nation have become alive to the situation and are urging that they be constructed, owned and controlled by the public, even though it may be necessary to issue bonds against the revenues to construct them.

"Many of us insist that if express motorways are to be built they should be laid out, constructed, owned and controlled by the states with the co-operation of the Federal government, thereby limiting these motorways to the places where needed and looking to a co-ordination and a unified system, forming a part of our present Federal and state highway systems, likewise in aid of our program of national defense, and, furthermore, to keep the public from being exploited by private interests.

"We consider this one of the pressing problems of the nation, and it is proposed to create a commission of 11 members—composed of two members of the Senate, two members of the House, and made up both of the major parties and appointed, respectively, by the President of the Senate and the Speaker of the House, and one each from the Departments of Agriculture, Post-

office, Commerce, Treasury, War and Labor, and one person not connected with the government thoroughly familiar with traffic problems, these seven members to be appointed by the President with the advice and consent of the Senate. No member of this commission will receive any compensation for his services as such member.

"Among other things this commission will make a careful survey as to the necessity of these highways; and second, whether they should be constructed, controlled and operated by private interests or the public; third, if constructed, controlled and operated by the public, should the funds be secured from public revenues or bonds issued, tolls charged and collected until the cost of the highway is met, and if this plan is adopted should the Federal government loan to the states sufficient money at a low rate of interest to construct the highways; four, make a study of a co-ordinated, unified system, each section to be built as traffic demands may require; fifth, also to make a study of how these highways may be constructed to furnish employment during unemployment periods of the nation.

"We feel that there should be a careful study made of these questions so that the Congress and the country may have proper information on which to base sane legislation, if it should be determined that Congress should legislate on this question. We are hopeful that the building of these express motorways may help in President Hoover's program to promote continued prosperity and afford employment for the unemployed."

The plan proposed by Mr. Barlow which, it was said, will be one of those considered by the motorways commission if created, is substantially as follows:

"The laying out of a system of express motorways throughout the country, designated to take and expedite motor travel and transportation between large centers of population.

"The building of links in this network by co-operation between the Federal, state and municipal governments as soon as such links can be operated on a toll basis at a profit.

"Amortization of the cost of such links by tolls, the roads ultimately to become free, but not to become free until they have paid their own cost and aided in financing of adjoining links.

"Each link to be financed on the basis of state and/or municipal bonds at a low rate of interest (perhaps as low as 1 or 1½ per cent) deposited with the Federal reserve system and against which Federal reserve notes should be issued, the tolls to be used to pay off both interest and principal, so that each link which is built at a point where the travel warrants it will in the end cost neither the Federal government, the states nor the municipalities anything."

Prepared statements authorized by Senator Phipps and Representative Robinson, calling attention to the importance of this proposed legislation, also were made public. Senator Phipps said:

"If this commission is created, it will handle the problem in scope which will be nation-wide. The plans will call for a great system of express motorways, the initial projects will be put into operation where traffic conditions most demand. It is time to consider feasibility of public-owned express highways, especially in view of the recent efforts to obtain private concessions of this nature. Roadways upon which faster and more direct travel will be permitted are becoming a necessity. The question involved is whether the United States should take a hand. The proposed investigation will aid congress to determine that matter with a view not only toward solving the traffic problems, but also the question of unemployment. I understand the resolution has the approval of the Federal Bureau of Public Roads and early action by congress is expected."

"Creation of such a commission," said Representative Robinson, "would undoubtedly save years of time and study and hundreds of millions of dollars to taxpayers. Congress would have sufficient confidence in such a report to give the nation quick action tending to relieve present traffic chaos. The plan should be nation-wide, and although the initial projects put into operation should be where traffic conditions most demand, these should be carefully planned as part of a national hook-up scheme before construction starts."



Treated timber pile bridge located east of Bennett on Denver-Limon highway, constructed with Federal Aid funds.

Road Building to Be Given New Impetus

IMPELLED by forces now getting behind public work of every character, and especially under the leadership of President Hoover, plans are in the making for increased activity in road building as one of the most far-reaching and constructive agencies in national progress.

In preparation for this objective, and for the consideration of other matters concerning highway improvement, members of the American Association of State Highway Officials have just held their regular annual meeting at San Antonio, Texas. This body is composed exclusively of highway officials who represent every state in the Union and who also co-operate closely with the Federal government in the administration of Federal Aid. At this meeting, legislative and financial needs in highway work for the immediate future were discussed and a resolution was passed recommending to congress that the Federal Aid appropriation be increased to \$125,000,000.

In carrying on their part of the nation's work, highway officials are stressing the importance of completing the main Federal Aid project as originally planned. This plan, it will be recalled, was to complete state and interstate routes first in order to save motor vehicle revenues from the drain of excessive repair costs where roads are not built sufficiently strong in the first instance to sustain frequent and heavy traffic.

As to the wisdom of proceeding with increased activity on the original program, those in highway leadership assert that they are in line with President Hoover's engineering views on such matters. These views were expressed in one of his pre-election speeches at St. Louis and again on his recent visit to Cincinnati and Louisville in connection with waterway improvement. Tersely stated, it was the President's expressed judgment that trunk line waterways should be improved first, and highway officials in their recent conferences at San Antonio have again attested to the soundness of that principle as a means of conserving and making the safest possible use of highway construction capital.

Taking the country as a whole, the use of public highways is increasing at an amazing rate, likewise motor vehicle operating waste is increasing where highways have not yet been brought up to modern standards in construction. This situation may be taken as a lesson that not only should there be no let-up in road building, especially on routes that are heavily traveled, but that public work of this character should be intensified. It may be taken also as a reminder that there should be no evasion of the obligation due to motorists who have acquiesced in gasoline tax levies in the various states upon the assurance that the main traffic channels of the country would be pressed to completion as early as possible and thus take care of between 75 and 85 per cent of the country's traffic before attempting to stretch the Federal Aid principle beyond its present scope.

All attendance records were broken at the convention of the highway officials. Due to the illness of Maj. L. D. Blauvelt, the Colorado Highway Department was represented at the convention by Oliver T. Reedy,

senior assistant engineer.

The association of highway officials is a clearing house for highway research and information for the entire nation. It co-operates closely with the U. S. Bureau of Public Roads in collecting data on improved road building methods. Only a few formal papers are presented at the convention, most of the work being done through committees.

From the reports submitted by the various states, the association attempts to select the best policies and practices and adopt them as standard. The system of U. S. numbers on interstate highways and the standardization of warning signs and highway markers are two examples of work done by the association. Signs bearing the U. S. numbers are now found in all the states and all but one or two have adopted the uniform warnings signs. In a similar manner paving materials, bridge materials and designs, and a number of other matters entering into road construction are studied. In such matters as signs and markers, the standards adopted have proven a great convenience to the traveling public, while in matters like materials and design of roads and bridges, the work of the association has probably resulted in savings of hundreds of thousands of dollars.

A total of 1,263 miles of concrete pavement were laid in the state of Illinois during the year 1928. A chart prepared by the Illinois Division of Highways shows a daily output of concrete of 1,400 square yards. In 1921 the average was 600 square yards per day on all projects. This tremendous increase is attributed to better hauling equipment and more efficient operation. Out of a total of 146 mixers used, 92 were 6-bag pavers and 44 5-bag mixers.

The first reinforced concrete arch hangar on the American continent was recently placed in service at Point aux Trembles Airport, Montreal, Canada.



Typical concrete mixer outfit employed in construction of Colorado state roads.

Careless Faults of Careful Drivers

By EUGENE W. BISCAILUZ
Superintendent of the California Highway Patrol

MY FRIEND, John —, is a traveling salesman and wears out one car every year. He is a careful driver. John was in my office recently.

"I've never been in an accident although I've driven cars since they began making 'em," said John. "I never drive over about 40 and I seldom ever take any chances."

Two days later John was driving over a rolling country in the hills not far from Bakersfield, trying to get home that night. Just at the bottom of a short hill he overtook a truck loaded with farm produce. The truck was going exasperatingly slow. John fell in behind, shifted into second. Near the top the truck almost stopped. John was now in low and angry. He stepped hard on the gas, threw the car into second again, swerved sharply to the left and zoomed by the truck just in time to meet a touring car head-on that was coming over the hill.

The Price of Folly

Fortunately, neither car was going very fast. John came out with a few scratches and the other driver had a broken leg. John's insurance company paid the hospital bills and had both cars repaired.

"I knew when I was doing it that I shouldn't," John confided to me afterward. "But, dang it all, I got a little sore. I took the first chance in my life and got hooked."

But John is a careful driver!

Not long ago I was talking to George —, a theatrical agent. He buys big cars and drives them hard. He is an expert at the wheel and has an eye that measures distance and the approach of other cars to the inch. He told me he had never had an accident of any kind.

"How fast do you drive?" I asked.

"Oh, not so fast," he said. "Thirty-five or forty on the curves. Fifty and sometimes sixty on the straight-away if none of your men are around."

"That's pretty fast, old boy," I warned. "You may get away with it, but you're taking a chance."

Disregards Judgment

One hot afternoon about a week later George headed south from Fresno. Stopping for gas at a service station near the edge of the town, he noted one of his tires had worn clear through the tread into the inner fabric.

"Hang it, I ought to have that tire taken off and my spare put on," he said to himself. "But I guess it'll be all right. I'm in an awful hurry."

On a level road with not a car in sight George for-

got all about the weak tire and stepped his machine up to sixty.

He struck a small chuckhole and the tire went out with a bang. Before he could control it, the car headed into a telephone pole and turned over twice. George crawled out, not badly hurt, but he will carry a scar the rest of his life over the right eye from flying glass. The car was a wreck.

All Have Faults

I could go on giving examples of this kind from now until doomsday. The point of it is that every man, no matter how careful he thinks he is as a driver, has some faults that ought to be corrected or will make a slip that will spell disaster unless he is continuously on the alert.

John lost his temper; George was careless. And there you are.

Somebody does make slips, every day in the year. If you want proof, look at our statistical records. More than 1,000 killed in auto crashes during the first six months of the year and the total climbing steadily toward the 2,000 mark! More than 25,000 persons injured in the state in motor mishaps in eight months!

Are Avoidable

It is not idle talk when we say 95 per cent of the accidents are avoidable. Out of the thousands of cases we have examined very few have been found where the circumstances were such as to make the accident unavoidable.

The automobile as it is built today is practically foolproof. The accidents due to faulty construction or to breakdowns in vital points, such as the steering gear, are almost negligible. Always, it is the driver; not the car.

It has been most interesting for us to find out that, as in John's case, most of the drivers involved in accidents, when pinned right down, will admit they were doing something they shouldn't have been doing and that they knew it beforehand.

Plenty of Excuses

"Yes, I had a feeling I was going a little too fast." * * * "Well, I was about even with the train and I was a little afraid I couldn't make it, but I took a chance." * * * "The hill did look a little steep, but I thought I could make it all right in high and I would have been all right if I hadn't hit that gravel just as I put the brakes on." * * * "Sure, I knew I'd have to cut in, but I didn't know the other car was coming quite so fast."

TEN CARELESS FAULTS OF CAREFUL DRIVERS; ARE YOU GUILTY?

In this article Eugene M. Biscailuz, Superintendent of the California Highway Patrol, tells of accident-causing practices of motorists who consider themselves as careful drivers. Here is the list:

Attempt to pass cars (not always, but occasionally) without knowing that you are in the clear;

Take a chance on weak tires;

"Go nowhere in a hurry"—in other words, speed without anything to be gained by speed;

Give signals in a sloppy manner;

Cut corners at corners where you think traffic is light;

Follow other cars too closely;

Endanger coming traffic by glaring lights on your car, at the same time "cussing" other drivers for their lights;

Allow your rear light to be dimmed by dust or dirt;

Drive down steep grades in high gear;

Do your driving according to your mood; today carefully, tomorrow recklessly.

These are only a few of the excuses.

The truth of it is that thousands of persons who pride themselves on being careful drivers are guilty every now and then of "taking a chance." And no person is entitled to be called a careful driver unless he drives carefully 100 per cent of his time.

What would it have availed John had he passed the truck without accident? He possibly would have saved from 10 to 25 seconds.

Speed Gains Nothing

How much time does the man who drives at fifty save over the man who drives at the legal rate of forty? In the course of eight hours of driving he will only be about eighty miles ahead.

Too many people are driving fast and going nowhere. A few days ago a car passed me at breakneck speed on a narrow mountain road. I overtook it only a quarter of a mile ahead, parked alongside the road with the family preparing for a picnic lunch!

Upon inquiry I learned this family was staying at a resort less than five miles away and had all day to make the trip. Why that driver was risking the lives of all in the car merely to get nowhere particularly is incomprehensible.

"Going Nowhere in a Hurry"

Everyone has witnessed the spectacle of drivers dodging madly into and out of traffic in the cities and has jogged along and caught up with these same drivers at the next automatic signal. Simply another case of going nowhere in an awful hurry.

Most careful drivers are extremely punctilious about the manner in which they give the hand signals. Yet I have noticed a great many who pride themselves on being careful who do not give the right turn signal at all except in the presence of a traffic officer.

Although not as important as the left turn signal, it is, nevertheless, important. It is particularly so at intersections where pedestrian traffic is heavy, for it lets the pedestrian know what the driver is going to do.

Sloppy Signals

Some otherwise careful drivers give the left turn signal in a very sloppy manner. Many apparently think it is sufficient to poke the arm out of the window, making it impossible for those behind to tell whether the driver is merely slowing down or going to make the turn. A very large number give the signal entirely too late.

Cutting the corners is another practice of many "careful" drivers. It's an easy habit to get into, especially at intersections where traffic is light. If indulged in continuously it is sure to get the driver into trouble, sooner or later.

Following too close is another bad habit indulged in by a lot of otherwise careful persons. Our records show it causes a very large percentage of the accidents in the crowded cities.

Headlight Nuisance

The glaring headlight nuisance is largely the fault of the driver who thinks he is careful. If every man who swears and raves about the many glaring lights he meets on the road would take the trouble to examine his own lights, the nuisance would disappear over night.

Lights should be checked often. A good, heavy jar

will sometimes throw them out of focus. So the careful driver can never be sure he has anything to brag about concerning his lights unless he checks them up regularly. Walk about a hundred feet up the road some night, take a look at your lights and judge for yourself.

During the last six months our officers have stopped more than 30,000 persons with glaring lights. Almost invariably it was a complete surprise to the driver to find out that his lights were out of focus.

Watch the Details!

You can't neglect the little things and be a careful driver. Some otherwise careful persons let dirt and mud collect on the lens of their rear lights until they are almost obscured. Others neglect to check the connections and drive for miles without a rear light until stopped by some officer.

Most careful drivers turn their lights on early in the evening as dusk approaches. Others do not, however, and accidents are frequent, particularly accidents involving pedestrians. Our records show a very large percentage of accidents occur in the "half-light" period just before dark.

Don't be afraid to turn on your lights. If your battery is low, speed up your generator a bit.

A most common fault of nearly all who believe they can handle a car well is that they travel too much over crooked mountain roads on the down-grade with their ears in high gear. They make a little better time that way, but are compelled to use their brakes constantly.

Use Lower Gears

It is very dangerous to use the brakes to their full capacity when a car is traveling with any degree of speed in sand or gravel. The wheels lock and the car is very likely to skid to one side. Low and intermediate gears are meant for just such situations. Why not make use of them?

It is very possible that few if any of us are 100 per cent careful drivers. Many drive according to their moods; today careful and watchful, tomorrow reckless.

Few serious accidents happen to the initiate driver. It is the old-timer who thinks he can drive well—and perhaps he can. But he can no more afford to take chances than the novice.

California highway fatalities in 1928 totaled 1,876 persons. Colorado's total was 214, of which 53 were in Denver. Figures for 1929 are not available. However, 60 have been killed in Denver auto accidents so far this year.

On January 11 to 18, 1930, road builders will gather for their twenty-seventh annual convention and road show. The meeting will be held in Atlantic City, N. J. A feature of the convention will be the group meetings and round table discussions of subjects which have been selected as most important in the highway industry. Special committees will report on finance, legislation, equipment and grade crossings. The County Highway Officials Division will cover practically every phase of road improvement, while the City Officials Division will undertake an intensive discussion of the many problems present-day traffic and construction bring to the fore. The contractors will have their own series of meetings.

Development of Low-Cost Surfaces

TO DETERMINE how best to use light oil products in the construction of low-cost roads with smooth, dustless, year-round surfaces, a joint technical committee created in March and representing the asphalt industry and the Bureau of Public Roads of the U. S. Department of Agriculture, has outlined four principal lines of investigation, said H. S. Fairbank, highway engineer of the bureau and chairman of the bureau's research committee, at the recent Asphalt Paving Conference held at West Baden, Ind.

The committee proposes to make a detailed study of the results of the methods of bituminous treatment developed in many parts of the country, to study the efficacy of the methods of applying and mixing asphalt and aggregates, to analyze the asphaltic materials actually used in work done to date and all available materials which might be used, and to build and study experimental roads of various types. Some of this work has been under way for some time.

A detailed analysis of the methods, materials, cost and service of the various types of low-cost surfaces thus far developed in various localities will be made, Mr. Fairbank stated. Among the types to be studied are the sand-clay and topsoil surface treatments in the southeastern states; sand-asphalt surfaces in Massachusetts, North Carolina, and other states; bituminous treatments of clay roads in Illinois and elsewhere; the retread method of Indiana and somewhat similar treatment of stone roads in other states; the so-called blotter treatment of gravel roads in Minnesota and adjacent states; oiled sand roads in California, Nebraska, Nevada, and elsewhere; and the mixed-in-place treatment of fine-crushed rock and gravel surfaces, which has reached its highest development in the western states. Colorado laid fifty miles of this type surfacing during 1929.

Studies have already been made of surfacing treatments of sand-clay and topsoil in Florida and South Carolina, and also of oil treatments of clay roads in Illinois and of the retread method in Indiana, the Federal engineer reported. The data gathered by engineers of the bureau, the asphalt industry, and the respective states are being analyzed and reports on the three types will be published shortly, he stated.

Studies of the efficiency of construction methods and equipment are being conducted by the bureau with the advice and assistance of the asphalt industry, Mr. Fairbank reported. These studies are similar to those previously made by the bureau in grading and concrete and bituminous pavement construction.

The study and analysis of the available bituminous materials is the particular responsibility of the industry, under the plan of co-operation that has been agreed upon.

The construction and study of experimental roads has been started and will be actively prosecuted, mainly by the Bureau of Public Roads, Mr. Fairbank stated, in co-operation with several of the state highway departments, but always with the active assistance and advice of representatives of the asphalt industry.

Three experiments are now in progress, he said.

One is the continuation of surface treatments of topsoil in South Carolina; another is a series of experiments in California involving the treatment of fine-crushed rock and gravel surfaces with several types of bituminous materials by surface treatment and mixing-in-place; the third is a series of experiments in the treatment of sandy soil in the sand-hill section of Nebraska with various asphaltic materials.

There is today a need for low-cost methods of improving hundreds of thousands of miles of highways in the country, consisting of gravel, sand-clay and topsoil and graded and drained earth roads, Mr. Fairbank said. The traffic on these roads is such as to require a smooth, dustless, year-round surface, but not great enough to justify the costlier high-type surfaces, he stated.

About six years ago the bureau first became interested in the development of low-cost surfacings, using bituminous materials to lay the dust and reduce the cost of surfacing material. At that time increase in traffic on the forest roads, which had been constructed under supervision of the bureau, gave rise to a dust nuisance and loss of surfacing material. The forest roads had a surfacing of finely crushed rock or gravel, which had been adequate for traffic up to that time. A similar type of surface had been adopted by a number of the western states and a rather considerable mileage had been built.

SENATOR PHIPPS ASKS 50 MILLIONS FOR HIGHWAYS

Senator Lawrence C. Phipps of Colorado has introduced a bill in congress asking that 50 million dollars annually for three years be appropriated for Federal Aid highways. The same bill has been introduced in the house by Representative C. C. Dowell, of Iowa.

Senator Phipps is chairman of the senate committee on postoffices and post roads and Representative Dowell is chairman of the house committee on roads.

Under the terms of the Phipps-Dowell bill the present appropriation for Federal Aid highways for the fiscal year 1931 would be increased \$50,000,000, while \$125,000,000 would be appropriated for both 1932 and 1933.

Senator Phipps has also endorsed bills to increase the annual appropriations for roads in the national forests from \$7,500,000 to \$12,500,000.

Secretary of Agriculture Hyde, in his annual report, announced that Colorado would receive an apportionment of \$1,390,000 for Federal Aid projects for the fiscal year of 1931.

Colorado's share of the sums to be appropriated under the terms of the bills sponsored by Messrs. Phipps and Dowell is over \$2,000,000.

The road budget which will be submitted to Governor Adams on December 15 will not be affected by the increased appropriations proposed to congress.

Co-operation Is Keynote of Annual Rocky Mountain Motorists' Meeting

THAT Colorado will prosper only in proportion to the degree of co-operation shown by all parts of the state was the keynote of the addresses by the principal speakers at the annual meeting of Rocky Mountain Motorists, Inc., held in Denver November 22nd.

The automobile association was particularly lauded for its part in marking the roads of the state by Dr. B. M. Rastall, of the Colorado Association, who pointed out that motor visitors to the Rockies would be lost without these markers. Dr. Rastall stated also that the complete travel service available through the club gives the visitor the confidence in his information which is necessary to make his trip a success, and consequently no duplication of this work is contemplated by the Colorado Association.

Officers and directors from all parts of the state were elected as follows:

President, H. M. Allison, Denver; 1st Vice-President, J. A. Clay, Durango; 2nd Vice-President, Spencer Penrose, Colorado Springs; 3rd Vice-President, U. J. Warren, Fort Morgan; Treasurer, Harry James, Denver.

Directors: H. T. Carroll, Brush; William Weiser, Grand Junction; W. M. Moses, Alamosa; Charles F. Rumbaugh, Pagosa Springs; W. H. Fassett, Monte Vista; O. H. Clark, Greeley; Walter Mathis, Pueblo; Dr. Geo. Curfman, Salida; Frank S. Hoage, Pueblo; F. D. Willoughby, Aspen; Jackson Taylor, Jr., Florence; W. O. Ball, Meeker; M. S. Wheeler, Steamboat

Springs; D. R. MacArthur, Greeley; Erle Kistler, I. F. Downer, Frank Dutton, John P. Brooks, S. N. Hicks, Denver; Frank H. Blair, Sterling; C. B. Lansing, Colorado Springs; Lee Bonnell, Loveland; David L. Robinson, Canon City; L. D. Blauvelt, John W. Morey, Clare Stannard, Denver; Charles Rump, Grand Junction; Fred G. Bonfils, Denver; Joe Hartman, Montrose; Westal Wallace, Monte Vista; J. C. Russell, Del Norte; Dr. E. W. R. Morelock, Rifle; J. F. Meador, Craig; F. W. Henson, Leadville; F. C. Yerkes, Sterling; W. I. Howbert, Colorado Springs; H. D. MacDonald, Colorado Springs; W. W. Milhoan, Cheyenne Wells; John W. Rowlings, Las Animas; Warren F. Bleecker, Boulder; W. P. Finley, Craig; W. A. Insinger, Greeley; J. R. Eckles, Lamar; F. C. Crider, Ft. Collins; Ralph W. Unger, Longmont; C. R. McCarthy, Glenwood Springs; J. C. Caldwell, Trinidad.

Executive Committee: The officers and W. K. Brown, John Huntington, Dean Gillespie, C. C. Gates, Finlay MacFarland, Clarence Werthan, H. W. Newcomb, Wm. V. Hodges, Ralph Fishel.

The first all-paved Minnesota-Chicago highway became a reality on October 22, when the new pavement between Owen and Abbotsford, Wis., was opened to traffic. The pavement extends from St. Paul and Minneapolis to Milwaukee, and thence to Chicago. The new road is not merely a Twin Cities-Chicago highway, but it provides an all-paved route from a number of points in Minnesota through Chicago all the way to the Atlantic coast.

STATE HIGHWAY DEPARTMENT

Financial Statement December 1, 1929

BALANCES 12-1-28

State Treasurer.....	\$ 715,660.23
County Time Warrants.....	14,678.82
Revolving Fund.....	9,500.00
Total Balances	\$ 739,839.05

RECEIPTS

½ Mill Levy.....	\$ 432,872.22
Internal Improvement.....	60,300.00
Gas Tax.....	3,606,004.28
U. S. Government.....	1,633,655.64
Bus Licenses	35,533.98
Highway Receipts.....	38,429.74
Total Receipts	\$5,806,795.86
Total Balances and Receipts.....	\$6,546,634.91

DISBURSEMENTS

Federal Aid Projects.....	\$2,743,898.61
State Projects.....	480,611.73
Maintenance	1,069,523.11
Maintenance, Equip. and Repairs.....	287,472.50
Property and Equipment.....	39,555.08
Construction Equipment.....	33,440.31
Surveys	18,984.33
Traffic Signs and Census.....	20,004.73
Administration	158,012.76
Federal Aid Renewals.....	91,048.15
Compensation Insurance	10,618.30
Total Disbursements	\$4,953,169.61

BALANCES 11-30-29

State Treasurer.....	\$1,572,851.15
County Time Warrants.....	11,114.15
Revolving Fund.....	9,500.00
Total Balances.....	\$1,593,465.30
Total Disbursements and Balances	\$6,546,634.91

78,800 MILES HIGHWAY CONSTRUCTED UNDER U. S. PROGRAM

A total of 78,797.6 miles of Federal Aid highways had been completed August 31, according to figures compiled and made public on October 7 by the Bureau of Public Roads.

Three states having the highest amount of Federal Aid roads completed on that date, according to the bureau, were: Texas, 6,141.1 miles; Minnesota, 3,854 miles, and Nebraska, 3,559.4 miles.

Two states and a territory having the lowest mileage completed were: Rhode Island, 172.1 miles; Delaware, 212.9 miles, and Hawaii, 172.1 miles.

A total of 10,321.7 miles, of which 8,724.4 were initial, and 1,597.3 were stage, was under construction at a total estimated cost of \$259,691,965.90, and with a Federal Aid allotment of \$104,613,910.33.

Texas had the largest mileage, 966, under construction; North Dakota was second, with 561.6 miles, and South Dakota third, with 546.1 miles.

Hawaii, with 6.6 miles under construction; Connecticut, with 12.5 miles under construction, and Rhode Island, with 17.1 miles under construction, were lowest in mileage.

A total of 2,347.6 miles at a total cost of \$50,731,365.23 and a Federal Aid allotment of \$19,839,505.36 was approved for construction on August 31, the bureau said.

Of the total mileage approved for construction, according to the bureau, North Dakota had the largest

mileage, 288.2; Montana next, 221.8 miles, and Kansas third, 157.5 miles.

Three states having the smallest mileage approved for construction were: Mississippi, 0.1 mile; Rhode Island, 1.5, and Massachusetts, 5.

There remained a total of \$41,566,632.59 as a balance of Federal Aid funds available for new projects, according to the bureau.

Six states having the largest balances of Federal Aid funds available for new projects, according to the bureau's figures, were: New York, \$3,679,100.66; Montana, \$2,724,032.48; Illinois, \$2,606,225; Arizona, \$2,133,144.66; Georgia, \$2,023,796.56, and Alabama, \$1,969,823.58.

JAPANESE "RULES OF THE ROAD AND HINTS TO MOTORISTS"

- (1) At the rise of the hand of policeman, stop rapidly. Do not pass or otherwise disrespect him.
- (2) When passenger of the foot hove in sight, tootle the horn. Trumpet melodiously at first. Then tootle with vigor, and express by word of mouth the warning, "HI! HI!"
- (3) Beware of the wandering horse that he shall not take fright. Go soothingly by.
- (4) Give space to the festive dog that makes sport in the roadway. Avoid entanglement of the dog with your wheel spokes.
- (5) Go soothingly on the grease-mud as there lurks the skid demon. Press the brake of the foot as you roll around the corners to save the collapse and tie-up.—*Clipped.*

There is now a positive means of distinguishing between the male and female worm. The latter makes no signal when turning.

PLANS FINISHED BUT PROJECT NOT YET ADVERTISED FOR BIDS

Proj. No.	Length	Type	Location
149-B	4.893 mi.	Oil Processed Surfacing	East of Denver
151-A	6.472 mi.	Gravel Surfacing	West of Tabernash
243-C	3.837 mi.	Gravel Surfacing	West of Dyke
267-C	4.491 mi.	Gravel Surfacing	Northeast of Model
272-E	2.562 mi.	Gravel Surfacing	West of Rocky Ford
296-E	5.467 mi.	Gravel Surfacing	South of Greenhorn

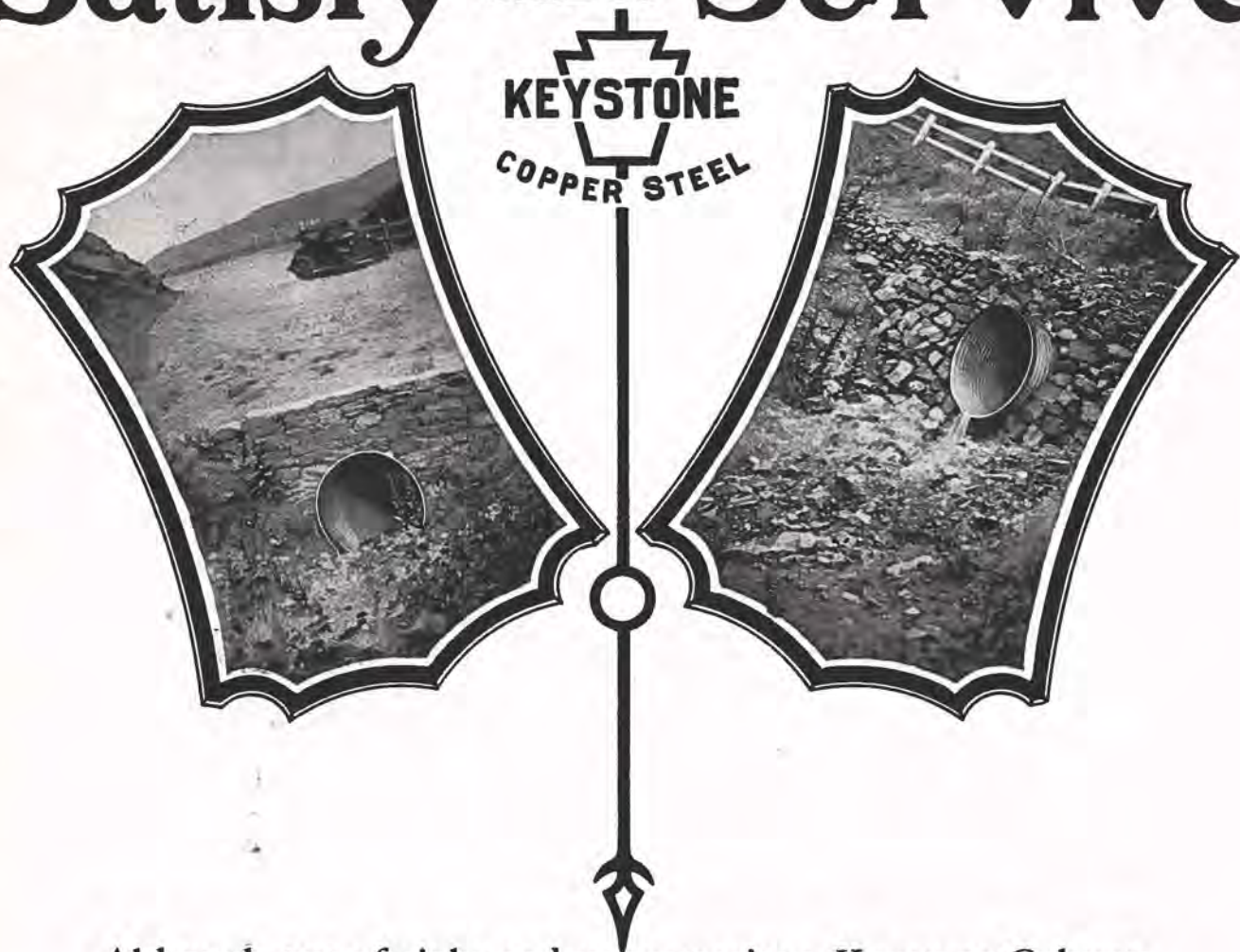
PLANS BEING DRAFTED

Proj. No.	Length	Type	Location
165-R	9 mi.	Oil Processed Surfacing	East of Canon City
279-H	3 mi.	Grading	North of Kenosha Pass
298-C	4 mi.	Grading	East of Wolf Creek Pass

STATUS OF FEDERAL AID PROJECTS UNDER CONTRACT

Proj. No.	Location	Length	Type	Contractor	Approx. Cost	Per Cent Complete	Proj. No.
57-R2	North of Lamar	0.502 mi.	Bridge	J. Fred Roberts & Sons	\$140,102.96	0	57-R2
68-R1	North of Monte Vista	1.900 mi.	Gravel Surfaced	J. Finger & Son	24,124.00	39	68-R1
78-R	Near Minturn	0.709 mi.	Gravel Surfaced	J. Fred Roberts & Sons	96,342.90	6	78-R
97-R1	East of Lamar	0.275	Bridge	W. A. Colt & Son	24,237.50	100	97-R1
138-A	North of Kremmling	10.916 mi.	Grading	F. L. Hoffman	201,262.80	99	138-A
138-B	North of Kremmling	3.133 mi.	Gravel Surfaced	F. L. Hoffman	76,363.35	66	138-B
144-D	Northwest of Ft. Collins	2.834 mi.	Gravel Surfaced	J. Fred Roberts & Sons	66,430.10	14	144-D
147-C	South of Cortez	3.428 mi.	Gravel Surfaced	E. J. Maloney	86,182.75	82	147-C
149-A1	Between Deertrail and Agate	4.716 mi.	Gravel Surfaced	Fred Kentz H'ghw'y Const. Co.	26,004.36	100	149-A1
150-A	West of Craig	8.227 mi.	Gravel Surfaced	Gardner Bros. & Glenn	93,477.35	11	150-A
175-A	Between Sterling and Ovid	41.979 mi.	Graded	Cole Bros.	193,055.75	23	175-A
208AR2-CR1	East of Grand Junction	9.254 mi.	Oil Processed Gravel Surface	Hinman Bros. Const. Co.	44,652.05	99	208AR2-CR1
253-D	West of Milner	2.547 mi.	Gravel Surfaced	Hamilton & Gleason Co.	147,192.00	24	253-D
258-F	Gunnison-Sapinero	5.689 mi.	Surfacing	Hinman Bros. Const. Co.	100,968.50	100	258-F
258-G	West Side of Cerro Summit	2.885 mi.	Gravel Surfaced	Mountain States Const. Co.	68,640.60	94	258-G
258-H	West of Sapinero	4.921 mi.	Gravel Surfaced	Cole Brothers	123,700.60	64	258-H
262-I	South of Russell	4.034 mi.	Gravel Surfaced	Mountain States Const. Co.	37,933.50	100	262-I
263-A	Betw. Mortimer & Ft. Garland	3.404 mi.	Gravel Surfaced	Mtn. States Constr. Co.	47,509.20	49	263-A
268-D	South of Bonad	4.111 mi.	Gravel Surfaced	Engler, Teyssier & Co.	96,075.30	89	268-D
270-C	Betw. Alamosa & Monte Vista	5.000 mi.	Oil Pro. Gravel Surf.	Mountain States Constr. Co.	38,485.50	96	270-C
272-D	East of Manzanola	1.950 mi.	Pav. & R. R. Underpass	Driscoll Construction Co.	85,237.50	100	272-D
277-D1	Betw. Colo. Springs & Pueblo	15.566 mi.	Grading	M. E. Carlson	218,277.80	98	277-D1
277-E1	South of Colorado Springs	10.2 mi.	Grading	J. L. Busselle	221,389.65	67	277-E1
282-G	South of Craig	5.147 mi.	Gravel Surfaced	Chas. B. Owen	61,645.22	0	282-G
282-H	Between Rifle and Meeker	7.029 mi.	Gravel Surfaced	Winterburn & Lumsden	82,589.74	78	282-H
287-A5	Between Greeley & Ft. Morgan	6.590 mi.	Concrete Pavement	Edw. Selander	154,682.85	100	287-A5
292-B	Between Gilman and Minturn	2.640 mi.	Gravel Surfaced	O. J. Dorsey	29,146.80	86	292-B
292-C	West of Avon	1.646 mi.	Gravel Surfaced	Ed. H. Honnen	39,663.10	87	292-C
293-C	North of Ouray	3.661 mi.	Grading	C. V. Hollenbeck	62,997.80	99	293-C
295-BR1	South of La Jara	6.622 mi.	Oil Pro. Gravel Surf.	People Bros. Const. Co.	14,226.50	100	295-BR1
295-D	North of Antonito	2.460 mi.	Oil Pro. Gravel Surf.	Levy Const. Co.	73,676.75	72	295-D
297-C	Southwest of De Beque	9.953 mi.	Gravel Surfaced	Hinman Bros. Const. Co.	312,453.50	39	297-C
298-B	North of Pagosa Springs	2.414 mi.	Surfacing	Engler & Teyssier	38,426.00	49	298-B
300-B	North of Silverton	2.828 mi.	Graded	Hamilton & Gleason Co.	35,647.80	31	300-B

Built to Serve Satisfy *and* Survive



Although out of sight and unpretentious, Keystone Culverts are adding much to the safety and permanence of Western Highways. Since they are covered with concrete, rock or earth when installed, they are always subject to the corrosive action of alkali, mineral salts and water. To resist this corrosion we construct all of our culverts from Keystone Copper Steel.

COLORADO CULVERT & FLUME Co.

DURANGO, COLORADO



"Ray"
R. E. CORSON



"H. P." (Himself)
HARRY P. WILSON, President



"Mac"
E. E. McKELVIE

**Xmas Greetings and
Best Wishes for A Happy New Year**

*from The Sales Organization
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