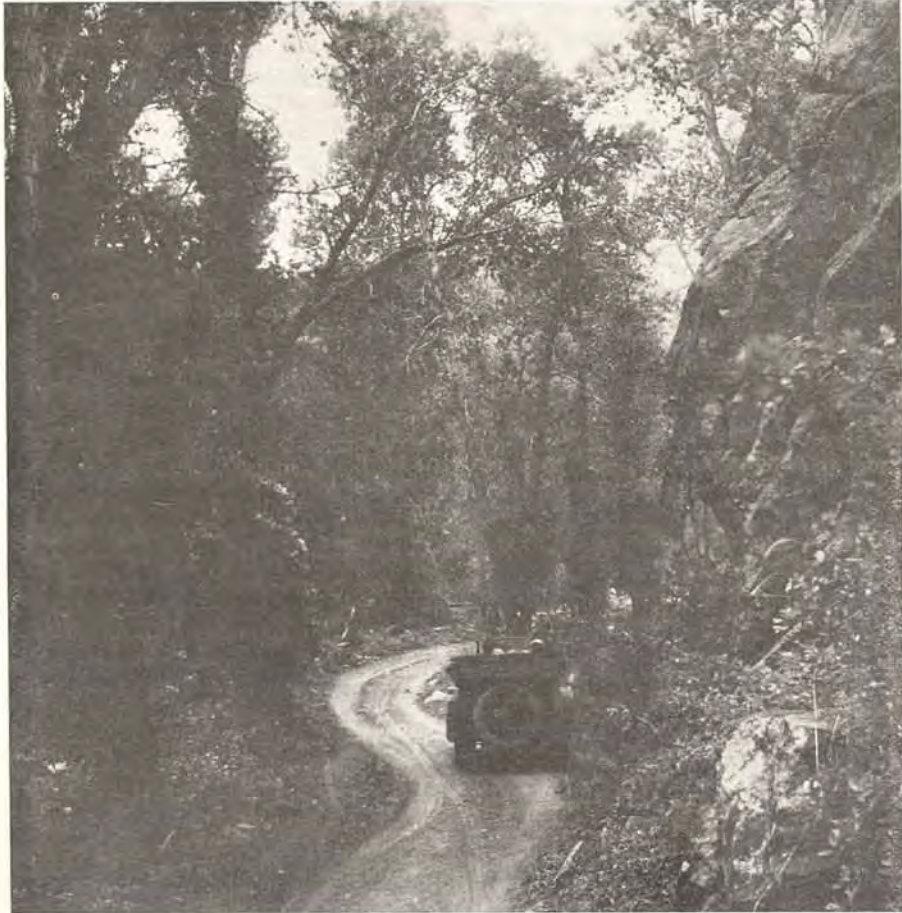


BUY LIBERTY BONDS!

# Colorado Highways

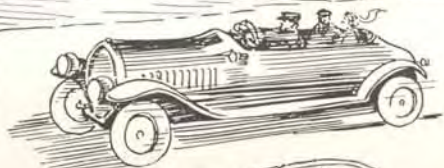
BULLETIN

Issued by the State Highway Department



A Striking Vista on the Hardscrabble Road. Entering the range back of Florence in Custer county, this road climbs to the heights then drops down to Westcliffe.

October, 1918





# U. S. Takes Over Supervision of All Roads

THE United States Highways Council makes the following announcement with reference to policy and procedure as to highway and street work during the period of the war: (First made effective Sept. 10, 1918, but postponed to Nov. 1.)

1. All proposed highway, street, culvert, and bridge construction, reconstruction, and maintenance involving: (a) the issuance of bonds; (b) the use of rail or water transportation; (c) the use of coal or oil as fuel; or, (d) the use of cement, brick, asphalt, oil, tar, crushed stone, or steel (also sand and gravel where shortage exists) as highway material, should first be submitted for approval to the United States Highways Council through the appropriate State highway department. Forms have been prepared for this purpose and a supply placed with each State highway department. No manufacturer will furnish any road building material until the project has been approved by the United States Highways Council.

2. The Council again urges that new highway and street construction be confined to the most essential needs. If this is done there will be a far greater probability that the work thus selected can be promptly and effectively carried through to completion than if an amount far in excess of the available facilities were to be undertaken.

The Council in passing upon the projects which come before it will give first consideration to maintenance with a view to conserving all the highways already completed if possible.

Reconstruction will be favorably considered by the Council only where it is clearly established that maintenance is no longer possible except at prohibitive cost.

New construction will be given consideration by the Council in the following relative order of importance:

- (1) Highways and streets of military value;
- (2) Highways and streets of National economic value;
- (3) Unfinished contracts involving contractual obligations (incurred prior to April 5, 1918, where bond issue is involved) which may not be disturbed without serious consequences;
- (4) Streets and highways which, although not of National economic importance, are of such extreme local importance or the construction of which has progressed to such a point as to cause serious hardship if their construction or completion is postponed.

The Council is hopeful that the selective consideration of new highway and street construction by the township, county, and municipal officials and in turn by the State highway departments will so materially eliminate the less essential projects as to make it possible for the Council to render active aid on the projects it approves. The aid contemplated will be in the form of such action by the other government agencies involved as will remove obstacles to the speedy completion of the projects.

3. By way of definition of highways of military and National economic value, the Council offers the following:

(a) A highway of military value is one used regularly for the transportation of military supplies in considerable quantity; for the movement as an established practice of army truck trains, or which is essential to the efficient operation of a military cantonment, post, or plant.

(b) A highway of National economic value is one which serves or will serve, if properly improved, directly to promote the welfare of the Nation and not merely the local welfare. As examples it may be stated that in this class would be placed: (1) highways which although not directly used for military purposes yet serve to help win the war by greatly facilitating the output or movement of war munitions and supplies; (2) highways which can clearly be shown to relieve congestion on railroad lines in a territory which is actually in need of such

relief; (3) highways which give access to or promote the output of natural products needed by the Nation to a marked degree; (4) highways which further housing operations undertaken by the Federal Government or by other agencies with the approval of the Federal Government would justify at times this designation.

4. State highway departments are requested to give most careful consideration to each application on its merits in the light of the policy announced by the Council and to exercise the power of disapproval freely. Only the projects approved by the State highway department will be considered by the Council unless the department itself is in doubt and wishes a decision in the nature of a precedent.

5. The Council will shortly begin, in co-operation with the Office of Public Roads of the Department of Agriculture, and the State highway departments of the several States, the preparation of a program of road and street construction, reconstruction and maintenance throughout the United States for the working season of 1919. The purpose of the program is to obtain an approximation of the character and amount of street and highway work deemed essential in 1919, together with an approximation of the amount and character of financing required, the amount and character of the various materials entering into the work, the extent to which rail and water transportation will be involved, and the probable demands upon the labor supply. The preparation of the program in each State will be directed by the State highway department, and will cover all State, county, township, and municipal highway and street work.

6. For the information of the State highway departments as to procedure, forms are attached as follows:

Form H. C.-3, application to United States Highways Council for approval of project. This form should be filled out and signed by the public officials who are seeking approval of the project, and should then be filed with the State highway department. If the State highway department approves the application, it enters appropriate recommendation and certification on the last sheet of the form and transmits the application in duplicate to the United States Highways Council. The application is then given a serial number and its receipt acknowledged. It is then considered by the Council and appropriate references made to the respective government agencies interested. The applicant and the State highway department are duly advised as to action taken. Forms F. 1 and F. 2 comprise application for approval of delivery of bituminous materials and certification of the application by the State highway department. These forms have been superseded by Form H. C.-3, but may be used if so desired where only bituminous materials are required.

Form H. C.-4, schedule for use in submitting program of proposed highway and street work during the working season of 1919. This schedule is to be made up in four groups, namely: (1) State, (2) counties, (3) towns, townships, or districts, and (4) municipalities. For each of these groups three schedules, respectively, construction, reconstruction, and maintenance, are to be submitted. Definitions of construction, reconstruction and maintenance, respectively, are given on Form H. C.-4.

Circular No. C. S. 13, United States Railroad Administration, rules promulgated to govern car supply for stone, sand and gravel, showing conditions under which open top cars may be supplied by railroads and providing for application to the Director of the Bureau of Public Roads, United States Department of Agriculture, where local car supply is insufficient. The Representatives of the organization mentioned in paragraph 5 of this circular comprise the United States Highways Council.



## Where the Wary Trout Hides in Deep Pools---Poudre River Canon Scene



## Kansas City Business Men Ask National Road System

**R**ECOGNIZING that a crisis exists in road building which will finally result in a break-down of the entire highway transportation system of the United States, unless remedied, the Young Men's Division of the Chamber of Commerce of Kansas City, recently passed a resolution calling upon the national government to relieve the present critical condition. The action was taken after a strong address delivered by Judge J. M. Lowe, president of the National Old Trails association. The resolution:

**BE IT RESOLVED**, By the Young Men's Division of the Chamber of Commerce of Kansas City, Missouri, that this meeting hereby recommends the adoption of the national government of a definite highway policy, and the establishment of a national highway system—this system to include only the main arteries of travel of the nation, and to be constructed and maintained by the National Government. Such system to extend from coast to coast, with adequate lateral highways, from the northern to the southern boundaries of this country; and

**BE IT FURTHER RESOLVED**, That we recommend to the government the creation of a permanent highway commission, for the purpose of preparing plans and provisions for the construction of such National Highway System, under the immediate charge and supervision of government engineers; and

**BE IT FURTHER RESOLVED**, That the common roads of the country are a vital part of the system of transportation; hence of great and transcendent importance to the speedy winning of the war; Therefore, we call upon the President, Woodrow Wilson, and the Congress of the United States to take immediate steps to encourage, expedite, and promote the building of such a National System rather than to continue the policy of discouragement and suppression as heretofore practiced; and

**BE IT FURTHER RESOLVED**, That if it is practical and profitable to appropriate the public funds to the extent of

billions of dollars for the betterment of the railroads of the country, which, however necessary and important, belong to private individuals and corporations, it is certainly both practical and important that the public moneys should also be appropriated to the building and maintenance of the common roads of the country, which belong to the general public; and

**BE IT FURTHER RESOLVED**, That regarding it therefore of an all-compelling and supreme interest for the winning of the war that now, not next week or next year, there should be planned and carried out a broad National Highway building program; hence Congress, should, without a moment's delay, establish some organization in Washington committed absolutely to the building of highways and nothing else. This organization should not be dependent upon the Department of Agriculture in which road work is now handled; it should not be connected with the Railroad Administration, nor with any other department. But it should have the power to plan and build highways to meet the needs of the government for the handling of war materials, whether this be food, fuel, arms, or ammunition.

The chaotic condition which now prevails throughout the country in highway work, at a time when every mile of bad road of main highways lessens our fighting power and increases the cost of our food and fuel situation, and lengthens the duration of the war, is intolerable and inexcusable.

The railroads of the country have absolutely broken down, and proven their utter incompetency to handle the traffic of the country. It has been demonstrated that the utmost stretch of work that can be given to their expansion will scarcely more than take care of their deterioration under the strain under which they are working.

Motor-trucks over our highways can materially aid the situation, supplemented by waterways and railroads, but is arrant nonsense to encourage the building of trucks if there are no roads over which they can run.



# Grade Limits and Traffic Conditions

By James E. Maloney, Chief Engineer, State Highway Department

IN considering the grade limit that shall be established, the probable future use of the road must be taken into consideration as well as the present use.

The traffic conditions on all of the roads have been revolutionized in the past generation; in fact, during the last decade, the automobile has displaced horse-drawn vehicles, and now the auto truck is taking its place as an assistant to the other transportation agencies. This fact should be recognized—for with the haulage over the roads of much freight or passengers, the extra work entailed by the grades, enters as an important factor into the cost of such transportation.

It has been stated in some recent articles on the subject of grades, that, as long as the alignment was straight and a momentum can be obtained, a grade of 8 or even 10% was not objectionable for auto traffic, as the cars could get a run at the grade and pass over without any trouble. Such a position in my judgment is wrong, as no person, horse, or any machine can lift a weight over any height without exerting the power necessary to do that work. Whether you can run at it or not, you are not relieved from the necessity of doing the work called for by the task of getting over the rise. We will therefore assume that climbing a grade means work and also that work costs money.

Haulage on a level or practically level road calls for an expenditure of energy (due to the resistance of the surface to the traction, and this same energy would be expended, if the road was tipped up at an angle), and in addition to this is the energy necessary to climb the incline.

There is a great difference in the resistance offered to traction by earth gravel, macadam, asphalts and concrete roadway

surfaces;—and the resistance in pounds per ton as determined by recent experiments in California are as follows:

Type of Surface—all level	Pull in lbs. per ton gross Wt.
Concrete. . . . .	27.6
Three-quarter inch skin top coat of oil and screening. . . . .	49.2 to 51.6
Water bound macadam (good condition). . . . .	64.3
One and a half inch Topeka top (good condition). . . . .	68.5
Gravel road (good condition) . . . . .	78.2 to 81.3
Earth road, fine dust . . . . .	92. to 99.3
Earth road, stiff mud on top, but firm beneath. . . . .	218
Gravel road, loose, not packed, new road. . . . .	263

These figures are by Prof. J. B. Davidson, University of California, and were made for the Good Roads Bureau of the California State Automobile Association.

As this is the most recent determination of these resistance figures, I have included the table for reference. For my present purpose, I have assumed that the surface condition on the grade is exactly the same as on the level stretch.

In the matter of curvature for the purpose of comparison with a straight alignment, a reduction in grade and consequent increase in length must be made to compensate for the curvature, or a proportionate increase made in the grade.

To obtain an approximation as to how much additional mileage and therefor what investment is justifiable to keep the grade within certain limits, the following factors must be considered:

1. The traffic, its character and amount, limits of loading, wear and tear—cost of operation.

(Continued on Page 20.)

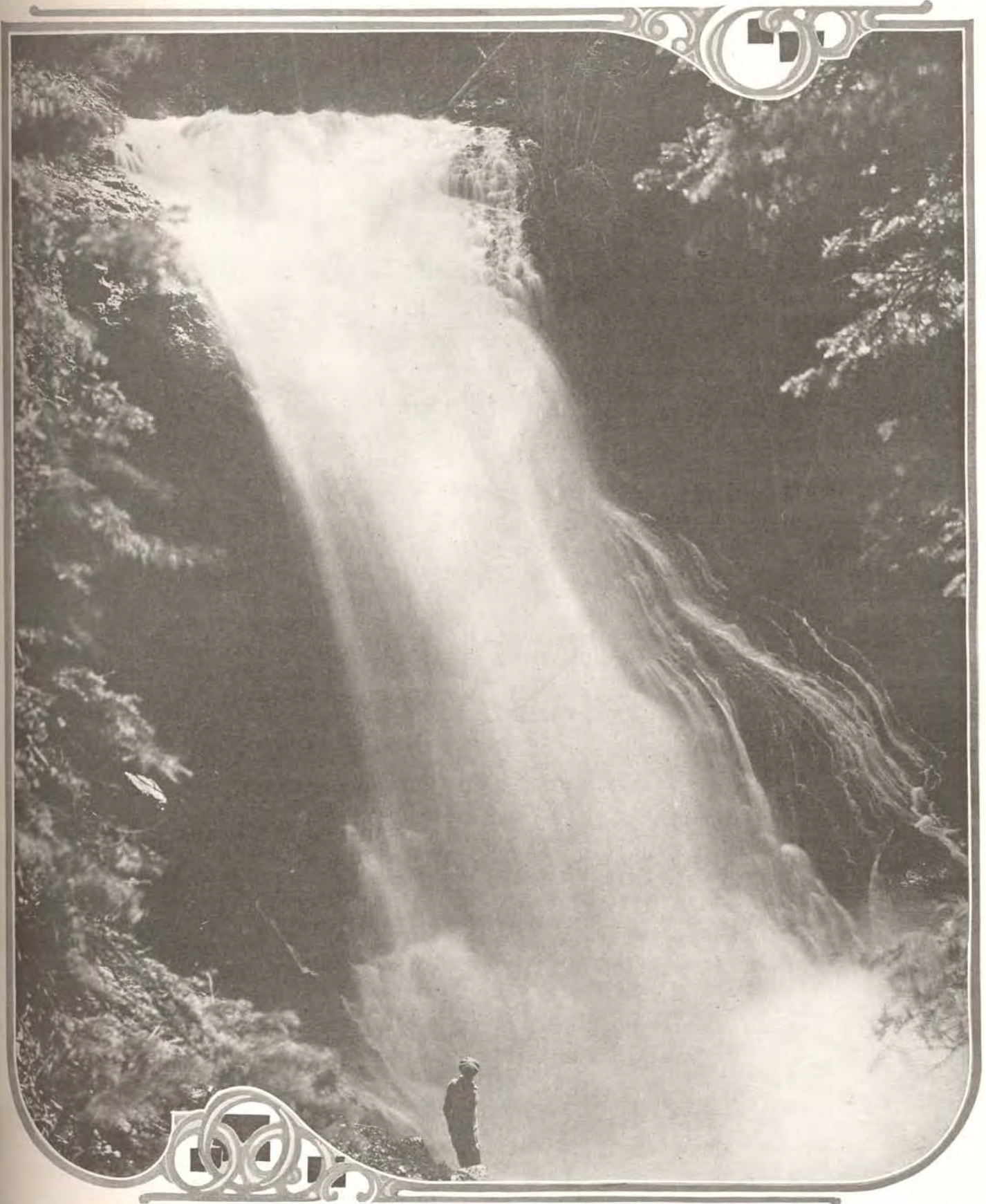
## Travel on Typical Colorado Highways During August, 1918

Location	Road	Horse Drawn			Remarks	
		Auto	Truck	Vehicle Total		
Lamar	Santa Fe Trail	355	23	118	496	} Prairie or Valley Road
Rocky Ford	Santa Fe Trail	488	61	61	610	
Springfield	Springfield to Lamar	42	5	12	59	
Hugo	Hugo to Kansas line	80	3	5	88	
Littleton	Denver-Colorado Springs	531	20	13	564	
Burlington	Pike's Peak Ocean to Ocean Hwy.	255	13	12	280	
Wray	Ft. Morgan to Wray	131	6	26	163	
Sterling	Lincoln Highway	460	58	97	615	
Penrose	Pueblo-Florence	108	6	15	129	
Ft. Garland	Ft. Garland-San Luis	125	3	28	156	
Saguache	Saguache-Villa Grove	63	1-15	3	66	
Montrose	Montrose-Delta	125	6	50	181	
Walsenburg	Walsenburg-Pueblo	287	10	73	370	
Florence	Florence-Colorado Springs	221	30	44	295	
Thompson Canyon	Big Thompson Canyon	192	12	3	207	
Craig	Craig-Steamboat Springs	55	3	18	76	
Craig	Craig-Maybell	96	4	41	141	
Craig	Craig-Meeker	50	5	76	131	
Ouray	Ouray-Silverton	90	3	10	103	
Breckenridge	Blue River Road	41	...	5	46	
Salida	Salida-Buena Vista	106	28	47	181	
Buena Vista	Buena Vista-Leadville	87	1	16	104	
Divide	Divide Cripple Creek	50	2	13	65	
Gypsum	Midland Trail	55	1	18	74	
Idlewild	Six miles east of Fraser	117	...	...	117	
Hot Sulphur Springs	Grand Canyon	56	1	2	59	
Montrose	Rainbow Road	54	6	24	84	
Mancos	Cancos-Cortez	54	1	14	69	
Dolores	Cortez-Dolores	82	11	37	130	
Aspen	Ute City	49	1/4	39	88	
Palisade	Midland Trail	168	28	138	334	
Fairplay	Road 35	45	1	2	48	
Fairplay	Road 18	37	1	2	40	
Durango	Road to South State Line	25	3	17	45	
Durango	Pagosa Springs Road	53	4	10	67	
Durango	Rd. to Mancoes & Mesa Verde Pk.	56	16	66	138	

} Mountain Road



“Rumbling and Tumbling, Mumbling and Grumbling, the Water Comes Down”



One of the many waterfalls which mark the road over Wolf Creek pass between Del Norte and Pagosa Springs in Rio Grande and Mineral counties.



# A Playground on the Roof of the World

Completion of Grand Mesa Road Adds Another Link to Colorado's Chain of Wonderful Summer Playgrounds

THE most important road construction program before the people of Mesa and Delta Counties was brought to a successful conclusion on Saturday, August 24th, when a hundred motor cars from a dozen western slope towns and cities participated in the sociability run to the Alexander Lakes. This project linking the eastern ends of the counties with a road across the Grand Mesa has been under way for the past five years. Built primarily to serve the stock, reservoir and lumber interests it has opened to the public the finest lake region in the state and placed it within three to five hours' auto run from Delta to Grand Junction.

The Grand Mesa is an immense plateau, the western end of which rises abruptly from the Grand and Gunnison valleys and thirty miles to the east becomes a mountain range that joins the continental divide. The plateau is roughly 100 square miles in extent and is of a rolling nature at an elevation of 10,000 feet. The little hills are covered with spruce and fire, and the valleys between harbor hundreds of natural lakes, artificial reservoirs, grassy meadows and many streams. Nearly all of the natural lakes and all of the streams are well stocked with eastern brook, rainbow and native trout, and the whole mesa in a natural range for grouse and duck. A myriad of grassy camping grounds fringed with mighty spruce and bordering clear lakes are offered to the tourist while the Alexander group rustic cabins ready furnished may be had.

The auto road crosses the eastern end of the plateau but trails that can be traveled horseback follow the top of the perpendicular cliff of lava one thousand feet high that edges the south, west and north sides, and from these trails the traveler looks down upon the Grand and Gunnison valleys over a mile below and across them and their bordering hills into Utah and Wyoming.

Following the road from Delta to Grand Junction the trip is one of never-ending delight. From Delta to Cedaredge it passes through the fertile farming section of Delta County and the gentle, continual rise permits an ever-widening view of field and orchard. Leaving Cedaredge, which lies at the foot of the mesa's lower slopes, the climb through the foothills begins the road on a 6% grade built along the side of an oak-covered spur that joins the mesa at an altitude of 9,000 feet. From this section the view to the south and west is magnificent, the snow-capped peaks of the San Miguel, San Juan and La Salle ranges filling the horizon.

It then enters the encircling belt of quaking aspen that girdles the flank of the mesa and winds around many curves along the course of a clear stream through aisles of immense white trunks and quivering green foliage that filters the sunlight into ever-changing patterns.

At 10,000 feet it emerges from the aspen into a rolling country of spruce and meadow, and still following the stream through a notch between small hills skirts the shore of Barren Lake, of the Alexander group. Here are many rustic cabins and in summer the shores are dotted with the tents of campers who heretofore reached the top over little more than cattle trails.

The trip across the top from this point to the Big Creek group on the northern side should be made at a slow speed, as the road winds through wood and meadow, along lake shores and stream, over hills and through parks presenting a thousand views that would be lost to the fast driver. When the Big Creek lakes are reached, the descent begins first through the aspen, this time along the side of the gash cut through the foothills by the creek in its descent of a mile in elevation for five miles of distance.

The view to the north and west on emerging from the timber extends across three counties to Wyoming and to the Wasatch Range that guards the Salt Lake valley in Utah. To the north the flat tops of the book cliffs and the mountains that guard the White and Bear rivers appear as a level plain and the fertile valleys lying between them are unsuspected.

Descending through the oak the Plateau Valley lies below, the cultivated mesas being a series of terraces planted to hay and grain, one below another until the Plateau Creek is reached at Collbran. The road then follows the course of Plateau Creek down a sandstone canyon that becomes steadily deeper and more precipitous until from between walls a thousand feet in height it joins the Grand.

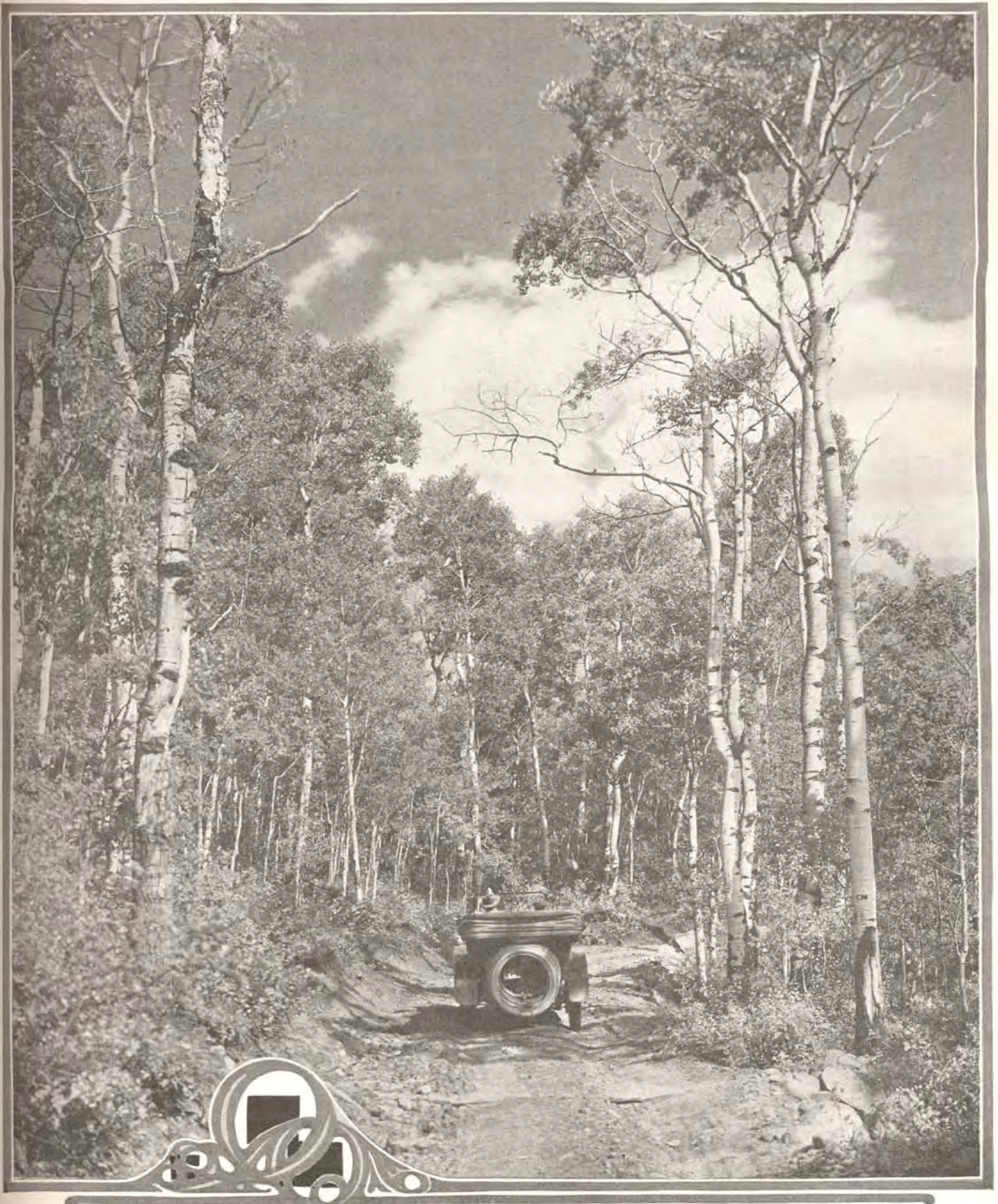
Just above the confluence on the Grand is located the immense roller crest diversion dam of the U. S. R. S. Grand Valley project that diverts the water from the river to irrigate the thousands of acres of reclaimed desert below. Continuing down the canyon of the Grand to Palisade the Grand Valley opens into a gently sloping plain bisected by the river, and the road following long straight-aways bordered by peach, pear and apple orchards reaches west to Grand Junction.

From Grand Junction via the Rainbow Route, State Road No. 12, Delta lies only three hours to the south by auto and makes possible the complete circle trip in the daylight hours of a summer day with plenty of time for slow driving and appreciation of the wonderful scenery. The final completion of the road system on the top of the mesa as at present outlined by the county commissioners and the Forest Service officials will link several other groups of lakes to the existing road and will permit the drive around the lava rim to be made by auto.

J. H. BERTHOLF.



An Etching From the Hand of Nature on the Grand Mesa of Colorado



Lanes of quaking aspen line the road everywhere from Delta to Collbran in Delta and Mesa counties. In the fall no more beautiful scenes are to be found anywhere.



# Road Maintenance Overlooked in Truck Costs

By T. H. Mac Donald, Chief Engineer, Iowa State Highway Commission

THE item of highway construction and maintenance cost is being almost entirely overlooked by motor truck producers and advocates. Enthusiasts hail the motor truck as the instant solution of all transportation problems. They seem utterly to forget or ignore the impossibility let alone the prohibitive cost of providing almost overnight, roads and streets capable of withstanding the traffic they propose to put upon them. It is demanded by them that the public instantly furnish a roadbed over which heavy freight may be moved by motor trucks in competition with railroads.

It can't be done. It is time that a little judgment should govern the demands of the ultra-enthusiastic motor truckers. The average highway, of either earth or paved surfaces, especially those of the middle west, can not even begin to carry motor truck traffic, these enthusiasts would put upon them. Unless such traffic is held in check and within reasonable bounds, the entire highway systems of every state would be utterly wrecked and destroyed. The very purpose which it is hoped to gain would be defeated

by trucks has been greater than the value of the entire product transported, not even counting these additional charges.

The building of roads and the limitation of road materials and available road finances is the real motor truck transportation problem. The weight and speed of the rolling equipment of the railroad is proportioned to the carrying capacity of the tracks. It would be the height of business folly for a railroad management to put trains of a weight and a speed too great for the rails of the track and the bridges of the line to withstand. Before trains of a weight and speed which would wreck the existing roadway and put the line entirely out of business are put on, tracks and bridges are rebuilt and strengthened. It will be the height of business folly to allow the use of the highways to motor trucks of a weight and speed that will destroy the highways and reduce present usefulness. Just as fast as we can improve these highways and strengthen the bridges, it will be practical to allow the weight and speed of motor trucks to increase, and not until then.

## DEMAND OF SALES DEPARTMENT OF MOTOR TRUCK COMPANY.

"We want a road surface at least twenty feet wide, capable of sustaining vehicles with axle loads of fourteen tons, wheel loads of seven tons and tire loads of one thousand pounds per inch of width, running at fifteen miles per hour and no detours."

and at a cost in destroyed highways which would be appalling.

The motor truck we believe would and ultimately will be nearly all that is claimed for it if we had the highways to withstand the traffic. But we have not, and it will take time and an appalling amount of money to build them. We can not build any great mileage of roads now in time to be a decisive factor in the present war emergency. We must continue to use the highway systems as we have them.

We must, to gain the greatest efficiency in such transportation, hold the motor truck development, both as to weight and speed, to the point where our highways can carry the traffic without being utterly destroyed. To prevent great economic loss, both highways and motor trucks must advance together. As we can replace our highway surfaces with something better, the size and speed of the motor trucks can be increased.

The cost of transportation by rail includes the cost of roadway building and roadway maintenance. The same must be just as true of motor truck transportation. This is the item of cost the motor truck enthusiasts are apparently entirely overlooking.

I have been impressed by information given out on costs of truck transportation. In none of these statements has maintenance cost or repair charges for road surfaces been figured as part of the transportation charges. As a matter of fact, the actual cost of some freight movements

Truck transportation must be adjusted to this the same as the railroads adjust the size and weight of their trains to their grades, roadbeds and bridges.

We are at war. Our highways and motor trucks must serve to relieve and assist our railways. But we must use our present highways with the best maintenance we can give them. And our present highways with only a few miles of new construction must serve until the war ends.

The situation in every state is the same. We can not build under present conditions a sufficient mileage of new paved roads to become a factor in the winning of the war. The most careful use of highways possible is the best method of obtaining from them the largest amount of service. War emergencies, war necessities, make demands that must be met by our highways almost entirely as they exist today.

Our great period of building new roads will follow the war. Plans and programs for the new road building are being made by every highway department. In making these plans, sane account should be made of the service to be rendered by each new highway and of its relation to the railways. For the highways will not and can not supersede the railroads for heavy or long distance transportation. The cost of transportation by rail, it must be remembered, includes roadbed and track costs. This item can not be neglected when transportation costs by motor truck are computed.



# Over the Hard Pan, Today and 38 Years Ago

A Description of Two Trips Across the Range by Fred P. Johnson

IN this modern era of gasoline, thousands of motor cars are every day dashing along well constructed motor roads through the Rockies, the occupants of the cars having little knowledge of the history of the roads they are traveling, and because the roads bear evidence of recent work many are convinced that the roads are of recent construction. While this is true as to the road as it exists today, there is hardly a road entering the mountains out of Denver, that has not a history in many instances extending back to the old Indian trails.

In June of this year I had occasion to make a trip to the Western Slope. In selecting a route, my mind drifted back to June, 1880, just 38 years ago, when as a young man, I accompanied my father on a trip to Leadville. Leadville was then at the very top of its boom. The railroads were still building, but had not yet reached the great mining camp. The Denver & South Park Railroad was in course of construction and the line had been completed from Denver up Platte Canyon, over Kenosha to Como and was still building towards Buena Vista, down through South Park from Como. The Denver & Rio Grande was coming up the Arkansas to Buena Vista and plans had already been made for the South Park line to use the joint narrow gauge track from Buena Vista up to Leadville.

Traffic from Denver to Leadville was largely going from Denver via Turkey Creek and across into Platte Canon, over Kenosha hill into South Park and from Fairplay up to Alma, and then over Mosquito pass into Leadville. My recollection is that it took us five days of hard travel with a string of five wagons, to reach Leadville.

The Turkey Creek Canyon road, about three miles south of Bear Creek at Morrison, was originally an old Indian trail. Early in the seventies some farmers succeeded in making a rough wagon road from Conifer postoffice down through the canyon, as a short cut to the plains. The Leadville boom caused the county to improve this road, but in those days it was little more than an excuse of a wagon road. Still, we had a curiosity to retrace this old road in a modern way, and as State Highway Commissioner Ehrhart frequently made the trip, we decided that it was probably a fair auto road.

We left Denver about 9 o'clock Monday, July 8. In our trip by wagon we left Denver about noon and taking the road that now runs by Ft. Logan, we camped the first night near the mouth of Turkey Creek Canyon. This time we took the better road through Morrison and in about 40 minutes we were

entering the canyon over a well graded auto road several hundred feet above the creek, where it leaves the canyon. As we flew up the canon at an average speed of 20 miles per hour, we could catch glimpses of the old original road, where the new road had taken short cuts through points of hills that the old road used to climb.

With the exception of great improvements in the road tending to lighten the grade in bad spots, the canyon has not changed in the 38 years. It is too narrow to permit of farming, and beyond the road itself, there is no evidence of man's occupation until the first farm is reached about eight miles up the canyon. There are only a few farms, two or three, in the canyon, although occasionally a road debouches into a side canyon to reach a farm on the hills above.

It was not yet 11 o'clock when we reached the head of the canyon and plunged down a hill to the old postoffice of Conifer, which used to be at the junction of the road that came up through Bear Creek Canyon and across from Evergreen. In the early days, there were a number of buildings at this point and there was once a hotel here. They are gone now. It was the stopping place for wagons and marked the first stage out from Denver. It used to be a full day's hard drive from Denver and I remember that we made it back in 1880 in a full day from the mouth of the canyon and camped on the hill a mile or two above. We made it this time in less than two hours from Denver.

Less than two miles above Conifer we were on top of the divide and from here the road runs along the top of the hills, through farms and timber with occasional glimpses of the wooded hills beyond the Platte to the south. Here we found many improvements had been

made. As we recollect the old road, it was very rough and rocky, while the new road has been graded around bad hills and no place did we find any bad grade until we reached the top of the hill that plunges down into the Platte Canyon. The road showed evidences of having been kept in good repair and the scenic view at times was superb.

It was 11:45 when we entered the Platte Canyon at Baileys. Here the old narrow gauge railroad that was built in 1878, was reached and our road was up the canyon, dodging the short rocky places by taking to hills on either side. Here we were among the summer resorts and the road was simply perfect as we flew along up past Shawnee, Cassells, Grant and Webster.

(To Be Continued Next Month.)



Looking into the Continental Divide, Kenosha pass, Park county.



# The History of Road Building in Colorado

By F. L. Bartlett, Chairman Good Roads Committee, Civic Association

I HAVE been asked to continue the history of Colorado road building, bringing the same up to date.

The former articles were finished in the fall of 1913. Up to January 1, 1913, the improvement of our highways had not been very great. A system had been laid out and some 4,500 miles of the more important roads declared "state roads." Under the original highway law little money was available. Under the 1913 amendment, as stated in my former article, the accumulated funds were released. Of these funds some \$800,000 was immediately available.

The new highway law divided the state into five districts and on March 25th, 1913, Governor Ammons appointed T. J. Ehrhart State Commissioner, with the following named gentlemen on the advisory board for the five districts:

District No. 1—J. M. Kuykendall.

District No. 2—L. E. Curtis.

District No. 3—C. R. McLain.

District No. 4—C. H. Herr.

District No. 5—L. B. Walbridge.

The former secretary and engineer, J. E. Maloney, was reinstated.

The commission lost no time in allotting the funds, and work was prosecuted vigorously during the years 1913-14, resulting in the expenditure of approximately \$2,000,000 on our state roads of combined funds of state and counties.

The results were almost instantaneous; people began to see that roads built under intelligent supervision and under a proper system were not only cheaper and better, but that they formed a continuous and complete linking up the entire state.

Even the most ardent "pork barrel" advocates of former years could now see the error of their ways and got onto the band wagon shouting for more roads and better roads.

Early in 1914 it became evident that more money must be had for roads. A bond issue had failed to carry, therefore a bill was initiated for a direct tax of one-half mill. This carried, the City of Denver voting nearly four to one in its favor, and the first levy was made in November, 1915, amounting to \$570,735.13. Meantime the motor tax had increased until the state highways proportion reached in 1916, \$90,560.00; while the road fund for 1915 was only \$196,000.00, it increased in 1916 to \$753,000.00, by reason of the half mill tax and increased motor tax.

The counties met the 1915-16 state funds with sufficient funds to bring the total state road expenditure up to about \$1,500,000 for those two years. Meantime the mileage of state roads had increased to 7,083.

The results as usual were increased interest in getting more roads. Auto travel had increased, other states were sending thousands of autoists into Colorado. Their enthusiasm bid fair to make an endless chain of automobile tourists coming into Colorado to spend the summer months in our scenic mountains.

Notwithstanding the war, all of us know how this travel has increased, how it is bound to increase from year to year, so long as the automobile exists and gasoline can be secured.

The citizens of Kansas, Nebraska, Oklahoma, Texas and all the southern and mid-western states can think of but one place to go during the hot months—the Rocky Mountains—Colorado the mecca of the overworked the overheated and the sickly. They bring the children, the cats and the dogs and the canary birds.

The writer has seen a procession of 22 automobiles coming in from one small town in Kansas, taking along practically the entire population.

Who can foresee the ultimate results? All that we are

sure of is that our mountains are large enough to accommodate them without crowding.

Late in 1916 agitation was begun for a better state highway law. Some of the counties could not get away from the old "pork barrel" idea; they wanted to spend their road money in their own way. It is only fair to add that these were in the minority, most of the counties were only too glad to work under the highway act.

At all events the 1913 act was too much out of date. It did not give the commission proper authority over the expenditure of the money—they had to do team work with the county commissions, and if the county commissions kicked over the traces, the highway commission had to wait until they got ready to pull again.

Therefore a new highway bill was drawn up and presented to the legislature. It had a stormy passage and when finally passed was considerably worse for the wear. However, it was an improvement on the old act and was approved by the Governor, April 20, 1917.

Under the new act better progress has been made and the engineering force greatly increased. It puts the building and maintenance of the state roads practically in the hands of the highway commission.

This brings the chronology of road building in Colorado up to date. The income for roads is too small. In round figures it gives the highway commission funds at the present time as follows:

From the half mill levy.....	\$600,000
From the Auto license tax .....	155,000
From the Int. improvement fund .....	75,000
Forest Service (approx. yearly) .....	25,000
	\$855,000

In addition there is the U. S. Government appropriation running from \$83,000 the first year and increasing rapidly to something like \$350,000 yearly to be used on special road projects, the state furnishing an equal amount.

Summing up, there is available yearly from the state and county road funds about \$1,400,000 to be expended upon state roads, as this must be distributed over about 8,000 miles, it is barely enough for maintenance, therefore it follows that if new roads are attempted maintenance must suffer.

A bond issue to yield \$500,000 yearly for 20 years is almost imperative, if we would meet the demands of the times in keeping Colorado up to the mark in road building.

## SIDE HISTORY.

Many notable achievements in road building have been carried out in Colorado. Some of these have been partially private, some have been built co-jointly by the state and counties supplemented by private subscriptions. Some have been built for advertising the scenic features of our state, some for both utility and scenic attractions.

I shall endeavor to point out that these roads mark an era in the history of scenic road building, not only in Colorado, but in the whole United States.

To Canon City belongs the honor of starting the first local scenic road project. In 1906 the citizens of that town raised money by public subscription and built with convict labor the now famous "Sky Line Drive." The fame of this drive extended all over the country. Since that time local scenic drives have been built leading out of many cities, California, Washington, Oregon, New Mexico, New York, New Hampshire, Maine, Michigan and in fact in all states where rugged mountain scenery can be reached.

(To Be Continued Next Month.)



# Over the Front Range on Railroad Grade!

NINETY-FIVE per cent of the time it is possible to travel over ninety-five per cent of the roads of Colorado with all of the enjoyment that rests with keen going, fine weather, good scenery and the other conditions which make for contentment with life in general and traveling in particular.

The other five per cent of the time and roads rest in the hands of the high gods and the traveler who encounters them must look to his own star. If it be that some evil planetary influence surrounds him, the five per cent may spoil the whole trip, but the chances will be that he will have the philosophical disposition of most seasoned travelers and will take the experiences that befall him as the sauce piquante for the rest of the scenic menu.

No man can travel endlessly in Colorado without meeting up at some time or another with one of those road landmarks which are at once the delight of the scenic lover and the threat to the eternal soul of the automobile driver. Usually these episodes take the shape of unutterably steep grades of washed roads and if they still persist in this state, it is simply because the ups and downs of journeying in Colorado are infinitely more numerous than they are in other states, and consequently present a problem to the state highway department which can only be gradually overcome as funds and other limiting conditions permit.

In the present instance these remarks, fortunately, are reminiscent since they are chiefly concerned with a landmark which is shortly to pass from the automobile annals of Colorado with nothing more comforting than a final anathema from the traveler who has at one time or another exhausted gasoline and tires in his efforts to get over it.

A matter of ten miles or so west from Sedalia rests Nighthawk hill, flat across the way to Decker Springs and the South Platte with its call to the fisherman. It is a deceptive looking bit of earth spewed forth at some unknown date from the earth's vitals and the unwary traveler is not unlikely to set forth trustingly even cockily to "show up" those who have warned him off of it.

He may make the summit easily going west, but ere he has found the foot on the other side he will have plenty of material for a fund of stories, for there is a stretch which reaches 33 per cent, everlastingly washed by rains, and requiring use of chains, brakes and almost of snubs.

But Nighthawk has seen its best or its worst days, for today a crew of hardened road men have worked their way through Jarr Canyon which leads to Nighthawk, making this section of the road one of the finest in the state, and shortly they will undertake a similar widening of the Sugar Creek road, leaving Nighthawk to one side, off the main highway until erosion shall have worn it down to a passable highway for some future generation.

The link is now a segment in the highway to Cripple Creek which carries the traveler from Sedalia on all the

way to the gold camp in the shadow of the hills or on their heights. Soon, when Sugar has been fully completed it will be a main highway cutting the distance from Denver to the camp by more than 20 miles as well as one of the finest and most accessible scenic trips in the state from any point on the eastern slope.

The road leaves the main north and south highway at Sedalia. Winding up through Jarr Canyon it makes its way to the backbone of the hills, then drops down along Sugar Creek, over a course travelable all the way but narrow in spots.

Beyond the Platte and Decker Springs the highway follows Horse Creek to West Creek, then bends around through Pike National forest to Manitou park, Woodland, Divide and so on to Cripple Creek.

Few views are finer, few roadbeds better than this from Decker's on, and the approach to Cripple Creek made on sweeping grades which gradually approach to the foot of Pike's Peak, then turn to climb the hills surrounding the famous district, is one which always will be remembered.

But it is when Cripple Creek and Victor are left behind and the new Phantom Canyon highway entered upon, that the real experience of the trip begins.

Built on the grade of the old Florence & Cripple Creek railroad, this highway today stands as one of the unique roadways of the world.

Looping its way down the rugged Phantom Canyon with its splendid setting of giant rocks and pinnaled heights, the road traverses the entire distance from Cripple Creek to Florence at a comfortable grade, crossing forty-five bridges in twenty miles, piercing the granite cliffs twice through long tunnels.

At points the highway looks down 1,000 feet or more into the creek bed below, again is lost to sight as it passes between giant cuts, then returns to view as it zigzags over long fills to bridges which bend around the hills.

The view is at all times a magnificent one, with the stern outlines of Pike's Peak at the head of the canyon and jagged corners facing the traveler all the way down, but the final word which makes the trip worth while in all of its aspects is the road, safe, wide, solidly constructed at all points.

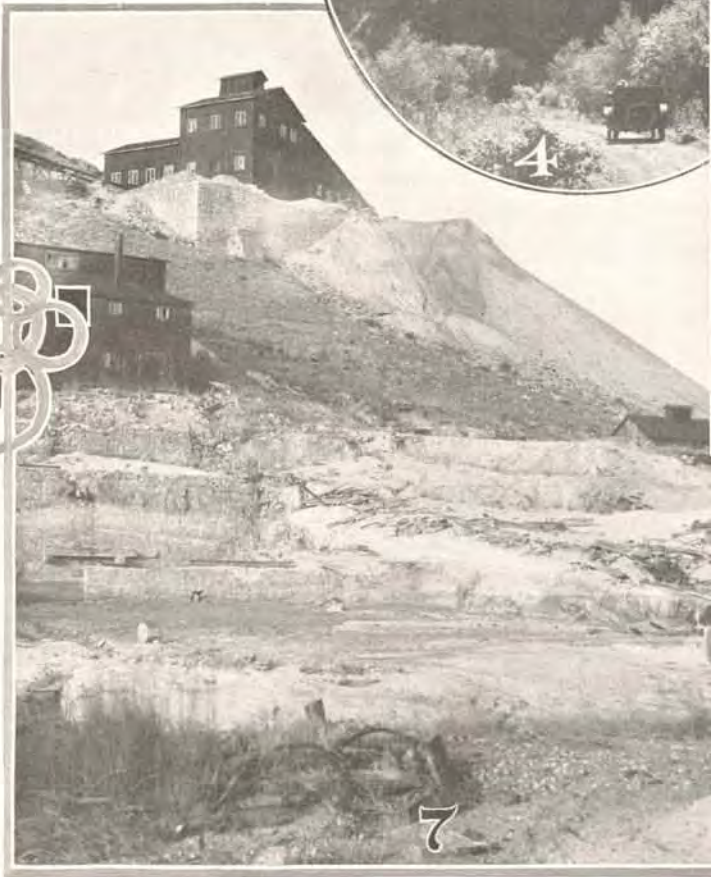
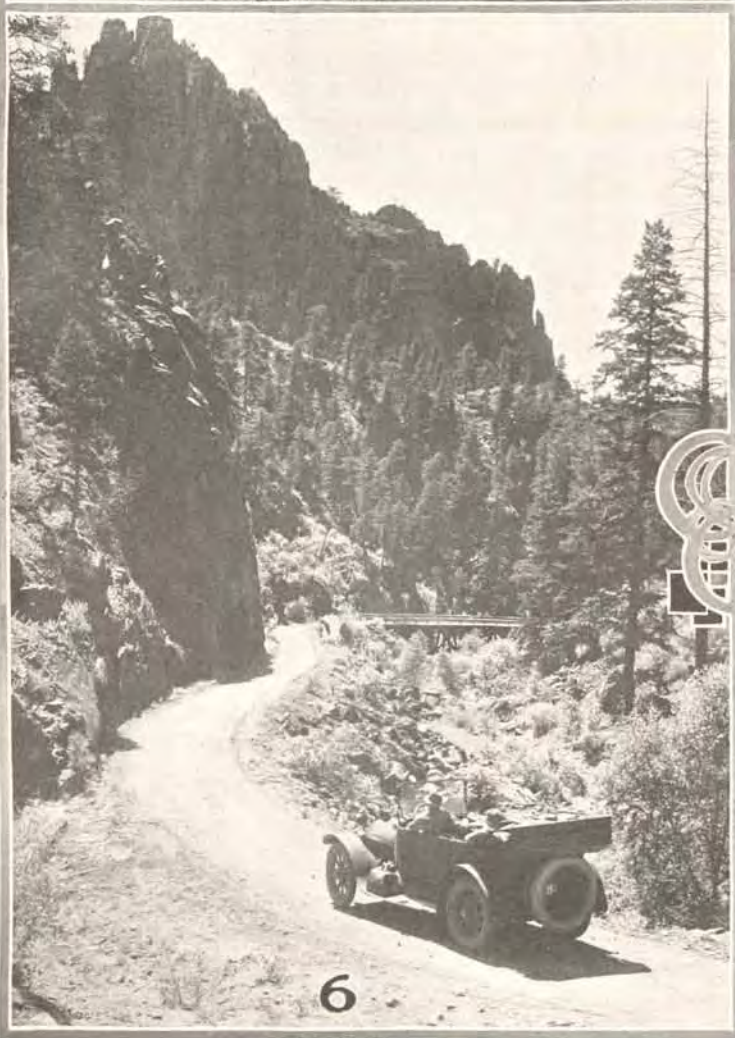
Given an appropriation of several hundreds of thousands of dollars and three or four years in which to complete his task, any road engineer could construct a highway thirty-seven miles long through the mountains at a grade say of 6 per cent. If he were normally efficient his work when completed would be heralded everywhere as a fine engineering feat and thousands of travelers would make his highway their objective.

But the Phantom Canyon highway surpasses such a feat as this one in all of its particulars, for the road today

(Continued on Page 14.)



# On the Foothill Road From the Banks of the Platte to the Sangre

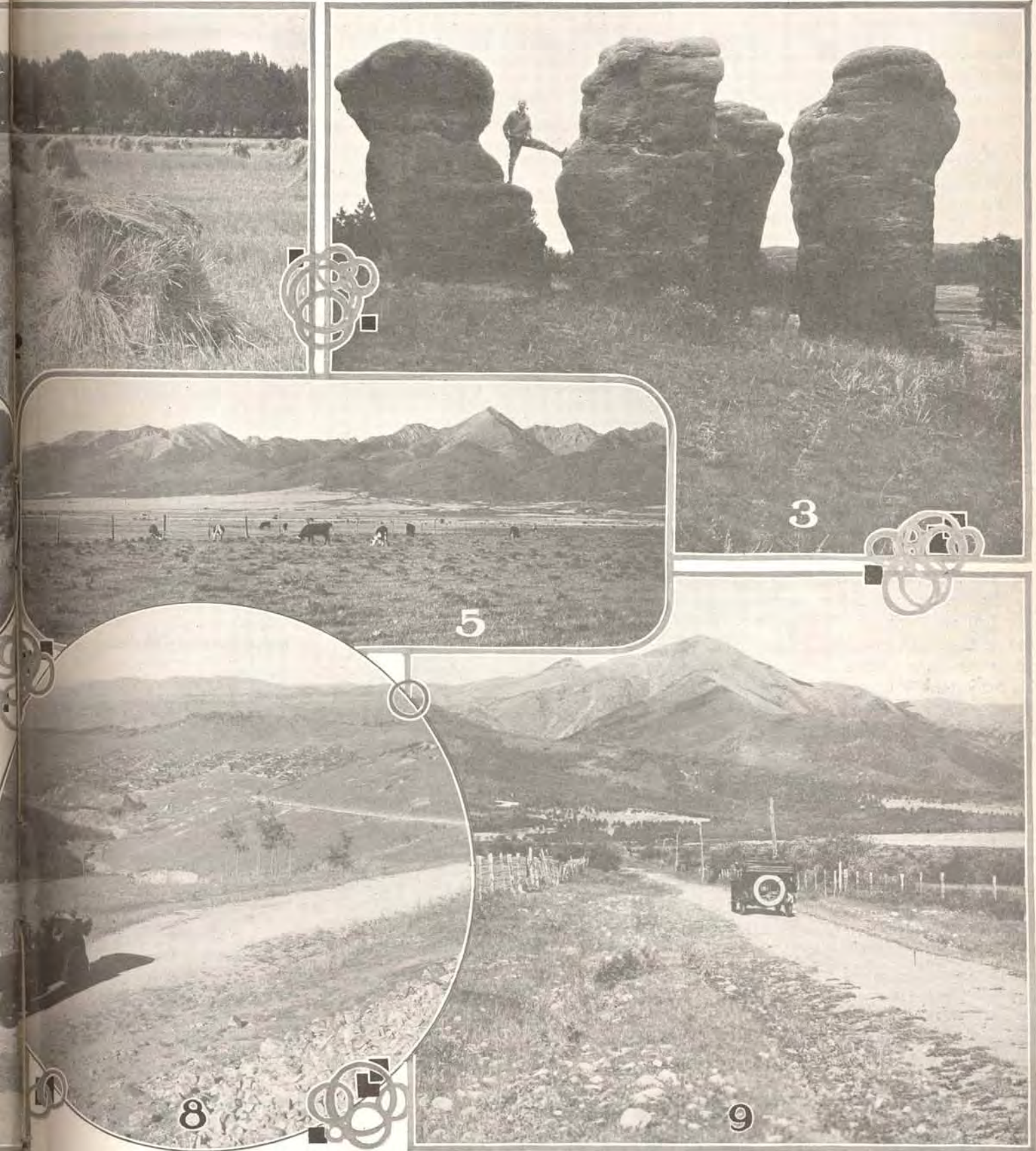


One of the highways of the state which is destined to become world-famous among travelers after the war, is that which proceeds from Denver via Jarr Canyon to Cripple Creek, thence to Florence via the new Phantom Canyon route and so on to Westcliffe, through

the Hardscrabble Canyon. Few roads afford a more varied picturesque scenery than does this as the views indicate. Sugar Creek to the Platte river, Douglas county. 2 A rich w just out of Florence, Fremont county. 3. Picturesque red ro



De Cristo Range via the New Phantom Canyon Railroad Bed Highway



1. A view of the De Cristo Range, Teller county. 2. A rugged cliff scene in Phantom Canyon, Fremont county. 3. A rugged cliff scene in Phantom Canyon, Fremont county. 4. Cattle grazing in the shadow of Sangre de Cristo, Custer county. 5. Approaching one of the 45 bridges in Phantom Canyon, Fremont county. 6. The famous old Bassic mine, near Querida, Custer county. 7. On the heights above Cripple Creek, center of Colorado's great gold district, Teller county. 8. The approach to Pike's Peak from Divide, Teller county. Photos, August, 1918, by Bruce Wiswall, Bulletin Staff photographer.



# A Description of the Phantom Canyon Route

(Continued from Page 11.)

is not only on an actual railroad grade, which places it almost alone among the highways of the United States, but the final cost to the state and counties was only around \$75,000, and even then war conditions enter into the final costs.

The construction of the highway forms one of the most interesting chapters in the history of road building in the world.

Year ago the Florence & Cripple Creek railroad was projected as a means of transportation of heavy ores from Cripple Creek to mills at Florence. Those were the boom days in the great gold camp and the road paid for itself several times over.

Followed the more modern methods of mining and the advent of the automobile and the railroad began to lose ground. Finally its board of directors decided to dismantle the road and immediately the question of what was to be done for a system of communication between Cripple Creek and the Arkansas valley arose.

The county commissioners of Fremont and Teller were equal to the occasion, and backed by the state highway department they decided to tear up the ties of the old railroad and to rebuild the rail right of way into a first-class highway, which should take its place among the great roads of the United States.

The problem was not an easy one. The railroad company had spent thousands upon thousands of dollars in locating their line, but three bridges had been burned out, each of the others had to be widened to twelve feet to provide for automobile travel, turns had to be cut to a wider radius. The right of way itself had to be widened for the entire distance through the canyon, fresh gravel had to be provided, and all in all there were plenty of questions to give the engineers in charge food for midnight thought.

The first six miles of the trip out of Cripple Creek was a comparatively simple one, since the railroad traversed the top of the ridge for most of that distance, and the only requirement was to widen the roadbed and to lessen danger of snow embankments in the cuts.

Beyond that point, however, the road spirals down the shelf of the hills of canyon level, then bends on its way along the course of the creek. For most of the distance the canyon walls close in on the highway, and it was impossible to avoid the crossings over the creeks save in a comparatively few instances. Every opportunity was taken advantage of, however, and in the remaining cases precautions were taken to make the bridges safe. Stout hand rails today guard every crossing, while all of the bridge construction, including the three new crossings as well as those of the railroad company, are of the heaviest type of construction.

In fact, in one case, that of a bridge some 200 feet long which passes over the creek at a height of sixty-five feet on a wide curve, the construction is of solid steel.

All along the right of way the traveler will encounter remnants of the railroad. Here and there appear old railroad stations. Again the railroad signs, blackened by the soot of years, tell the traveler of his distance from points which are today located in name only.

Railroad marks are painted on the bridges, and as the car passes through shady lanes between blasted cuts in the shadow of the peaks toward the southern entrance, the traveler finds ahead of him the first of the two tunnels constructed by the Florence & Cripple Creek, now used by the highway.

Straight through the cliff goes the road for a distance of 200 feet along a way blackened by the smoke of the engines wherein the sun finds its way but dimly.

Beyond a distance of a few miles the highway again plunges into the mountain side to come out upon a bridge over a high ravine. So it goes for its distance of twenty miles when it strikes out onto the plains and gradually descends into the valley. From this point the road takes its course straight across the flats to Florence, a junction point midway, serving as a connecting link with Canon City. Both roads are of the finest and the time made is governed only by the judgment of the driver.

From Florence the traveler can go east to Pueblo or west to Canon City and so on to the Western slope, the San Luis valley or back to Denver via Salida.

If he decides to go south he can take the Hardscrabble Canyon road, now a good trail, which is slowly but surely being improved with an eye to making it one day one of the great highways of the state, to Westcliffe, center of the thriving Wet Mountain country.

From there if he so elects he may go to Walsenburg and the south or he may turn toward Texas Creek, which will take him over a fine highway to the Arkansas valley at Texas Creek junction pointing either to Canon City or to Salida. Or, finally he may take the older road to Cotapaxi, which has the same general terminus as the other, but which reaches the valley at a point much closer to Salida.

Whichever way this whole trip is made; whether it be taken from Denver via Jarr Canyon and the return made from Florence to Pueblo and so to Denver via the main north and south highway; whether Jarr Canyon be eliminated and the trip made out of Colorado Springs up Ute pass and over to Cripple Creek; or whether any of the other numerous alternatives noted on the map are chosen, the journey is an entirely delightful one.

Only a few improvements now under way, remain to make the circle in its entirety a wonderful drive. Today with Phantom Canyon as one objective it ranks among the finest in the West, and if the war conditions make the trip impossible for many now, the route should be blue-pencilled for future reference as one which every traveler into Colorado in the days to come, should make.



# Keep the Commercial Highways Open

An Appeal to the County Commissioners by T. J. Ehrhart, State Highway Commissioner

EVERY bushel of grain, every pound of our agricultural products, almost every ton of metaliferous ore, in short, practically every product of Colorado must be transported over the roads at some time if it is to be used in winning the war.

Every strip of impassable road cuts down transportation and distribution of products and renders inefficient Colorado's labor in just the proportion of goods carried along that particular bit of highway.

Production is an essential to the winning of the war and it follows, logically and unmistakably that if this state is to be geared up to its highest efficiency that every one of our commercial arteries must be kept in the best possible condition during the war. Bad roads are a menace to the prosperity of the community in times of peace. In times of war they become a direct blow at the welfare of the entire country.

The time is approaching when the counties will make their road levies for 1919, and it is the writer's earnest plea that every county commissioner in the state will do the utmost within his power to maintain road levies in the case of those now at a high level, and to raise these levies wherever they are now at a low mark.

In times like the present the inclination is to economize in expenditures wherever possible, and it is a reasonable desire.

But there is a sharp distinction between true and false economy and it should be made in the case of road building.

We must have good roads. The government is calling now upon every possible agency for an increased use of the highways and this winter will see an enormous stimulus in motor truck transportation. We are told that there will probably be embargoes on railroad lines and if this is

true the matter of communication will rest finally upon the highways.

Every county commissioner knows what the effect of heavy motor truck travel is upon the roads. He knows that the highways will be cut to pieces in a short time but he knows also that transportation must go on if the country is to win this war.

The time for consideration of this problem is the present moment. The general public will perhaps not come to a realization of the need until the damage is done. It remains for the road officials to be prepared.

The best preparation is adequate funds and where possible the present building up of road gangs which can cope with the coming emergency.

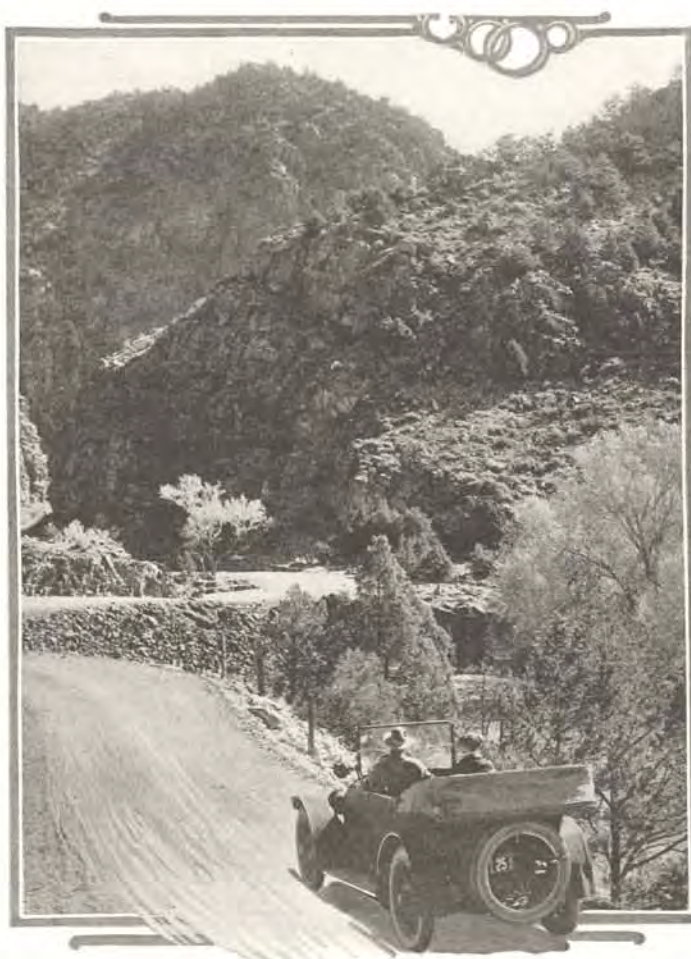
The state highway fund is not adequate to meet the situation, but it will be employed to the utmost value of every dollar. The legislature will also be requested to pass upon emergency measures which will aid the situation, yet these at the best will not serve to do more than supplement the efforts of the counties.

The case is one for co-operation and team work raised to the nth degree. It calls for increased effort in the face of war conditions which make both labor and funds difficult to secure.

May I suggest to the county commissioners that

the subject is one calling for their most serious consideration as a positive, win-the-war measure.

Only by concentrating all of our resources to the work, can we hope to push the war to an early conclusion. Colorado's major part now must be in geared-up production transported over the highways of the state, and those highways must be in shape to bear the enormous increase in traffic.



River and range. A view on the Upper Arkansas river road above Canon City, Fremont county.



# COLORADO HIGHWAYS BULLETIN

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Vol. I.

October, 1918

No. 5

## BUY LIBERTY BONDS!

It isn't a question of what you can "spare," it's a question of digging to the last cent. Buy Liberty Bonds today and buy all you can take. Then go back after more. Buy, buy, BUY.

## THE NATIONAL HIGHWAY COUNCIL.

National control of the highways of the United States has been brought about in the fullest sense of the word by the creation of the Highways Council at Washington. Working through the various governmental departments this body virtually has assumed complete control of highway construction in every town, city, county and state in the Union, and for the period of the war, at least, all projects, whether they contemplate construction and improvement or merely maintenance, will have to be submitted to Washington for approval. Rejection of any proposal will constitute an order which no community will be able to over-ride save in some very serious instance where a misunderstanding as to the importance of the work might arise.

Just what the effect of this order will be in Colorado it is difficult to tell at the present time. Work on projects which are purely scenic in nature may be expected to be eliminated, while it is not impossible that hard-surfaced roads will be banned save where there is very heavy traffic. It is assumed by this department that contracts now in force will probably be carried through, but even this is not certain, depending entirely upon the need of labor for work in purely military fields.

Decisions covering every road project in the United States, can only be made at a vast expense of time and labor, but probably it is the intent of the council to decentralize its efforts as much as possible and to the end of aiding the council, the Colorado department will do all in

its power to see that reports are received promptly from every point in this state.

The work is a war work made necessary by the heavy drafts upon the man-power of the country, and it should so be considered by every road official in the United States.

Co-operation now will serve to relieve the burden somewhat and every community is in duty bound to make its reports as expeditiously as is possible.

## THE "FORCE ACCOUNT."

One of the chief difficulties encountered in road work by highway departments everywhere, is that of maintaining an adequate field organization.

Common sense shows that road work done by men who are permanent units in the organization will in the long run be cheaper and more uniform than that let under contract, but past experience has also shown that such organizations are exceedingly difficult to create and maintain.

The most efficient system of road work is that which provides constant employment all the year around at a fair living wage for the laborers. If such a program can be worked out, there is less loss from "turn-over" in employment, the men become better trained to road work, and a more uniform system of highways can be constructed without the legitimate profit percentage which every contractor takes when he bids on a piece of work.

Unfortunately in many cases there is a tendency to spend the budget as it comes due without first outlining a road program for the year. In consequence a great many laborers may be picked up for one season, such funds as there are, are quickly disposed of and the crew is then dismissed.

Such a proceeding as this makes for waste and inefficiency as opposed to an orderly, systematic and economical expenditure. The subject is well worth study.

## THE IDEAL ROAD.

Every highway official would like to see every road built on an ideal grade with broad turns, wide beds, adequate drainage and deep surfacing.

But ideal roads cost huge sums for construction and were they undertaken by road officials in Colorado, one stretch would be built each year of say forty miles and the other 7,000 odd miles of state highway would be left without any maintenance at the mercy of floods, rain falls and what not.

The only practical policy in Western road building calls for a roughing out of trails which serve to open communication between points, together with as close a system of maintenance on other highways as is possible, where the total road fund only amounts to \$80 per mile per year.

Once the communication is established, the interest which will be taken by the communities so connected will serve in time to bring about improvement.

Short stretches of expensive road, built at the expense of other sections, would soon leave the entire state isolated.



**Keep Highways Open  
Urges Transport  
Head**

Motor truck transportation development is now proceeding more rapidly in Colorado than in any state in the Union according to advices from Washington.

At a recent meeting of the State Highways Transport Committee it was reported that fully 100 new motor truck lines have been organized in the past three months, while there has been a very material increase in the number of trucks employed all over the state.

S. E. Norton, chairman of the committee has recently reorganized the state body adding several important departments and the state has been thoroughly districted making possible a close campaign in every community.

The committee is wholeheartedly in the movement for good roads and will co-operate in every way with the state highway department in its plans for road betterment everywhere.

"No road is better than its worst mud-hole," said Mr. Norton the other day, "and we must eliminate poor highways if we are to carry on our work efficiently."

"In my trips of inspection over the state, I have found conditions generally good, but a uniform and constant system of dragging is badly needed."

"Of course this gets back to the problem of adequate funds and when our state is compared with others it is easy to see why we have not more and better highways everywhere than we have now."

"Appropriations should be made which will enable the highways transport committee to place trucks everywhere and keep them going at a minimum cost."

No one factor enters so closely into costs to the consumer as does poor roads and we must realize that it is economy to have good roads even at large expenditures."

THURSDAY, AUGUST 15, 1918.

*From The Rocky Mountain News*  
Give the iron in the men and care for the iron in the highways. Admiral Farragut.

**Highway Legislation**

Something has been gained in the agitation for a betterment of road conditions in the state. It is admitted by those in authority that there is plenty of room for improvement. At a conference the other day attended by members of the Colorado Good Roads association and the association of county commissioners steps were taken to interest the next general assembly, which will be in session in five months, in legislative measures to increase revenues for road work. It is proposed to amend the present highway law so as to increase the automobile tax materially, the same to be used for road improvement; to transfer the inheritance state tax to the highways department; and to take the preliminary steps toward a highway bond issue which would be voted on two or four years hence.

Every sensible person will admit that road repair and construction cost more today than they did two or three years ago. The highway department comes under the law of supply and demand equally with the private contractor. Labor is higher, material is higher and there it no letup in wear and tear. Further, the growing use of the motor truck as a common carrier, a connecting link between cities not far distant and between city and agricultural district, has added to the cost of road maintenance.

Purely as a war measure, the public highway must be upheld in the best possible condition. It should have closer attention now because it is in greater demand and more of a necessity. The more the turnpike takes the place of the railroad in transportation the more is required annually for its upkeep. In peace times the automobiles will join with the heavy motor truck to call for further obligations from the highway department.

The federal government is interested in post roads and forest roads and the general highway, because the post-office is using the road in its truck service connected with parcel post deliveries. But when Washington appropriates a dollar for roads it insists upon another dollar from the state and district where the federal money is to be expended.

What may be done by the incoming legislature depends upon public sentiment. If the people before November insist upon candidates taking a liberal view of the prevailing highway situation and vote only for those who so pledge themselves, a legislature favorable to good roads will be elected; otherwise it will be a case of pork barrel again.

Money properly spent on roads is money most excellently invested. Money spent on a political machine, in filling the state capitol and other buildings with political workers and useless employes is money thrown away. There is a rare opportunity at hand for candidates for executive, as well as legislative, offices to take a decisive stand on this question.

What has been done in the last six or eight years with the big sums collected annually as inheritance tax? Anything to show for them? A fine stretch of permanent road? A needed building?

Six Weeks Away

**"Good Roads Imperative," Says Tom Botterill**

Goods roads must and will shortly be given more consideration by the national government in the opinion of Tom Botterill, regional chairman of the Highways Transport division of the National Council of Defense, who returned recently from a conference at Washington.

"Our meeting was addressed by the biggest men in the country, including the President," said Mr. Botterill, "and every speaker urged the imperative need of an immediate development of highways transport to take care of the enormous overburden of traffic."

"Efficient motor transport is impossible without good roads and the need of adequate funds to take care of our roads cannot be too strongly urged. We must keep every by-way and every highway in shape if we are to avoid congestions which might easily result in serious hardships during the winter months. The only way in which this can be done is by constant maintenance which in turn costs money."

"There are some who still look upon motor truck transportation as an alternative to the railroads to be used only when necessary. That view-point must be set aside. The railroads will build no more branch lines and short hauls are going to be cut down to the absolute minimum. The highways transport committee is co-operating not competing with the railroads and the more quickly this is realized the better off each community will be since the time is not far away when we must depend almost entirely upon the highways for all domestic traffic."

"Good roads are today of essential importance and the need of them cannot be too strongly urged upon all officials and citizens in this state."

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# Vital Minor Road Projects in Colorado

By R. E. Pratt, District Engineer, U. S. Forest Service

IN discussing the road situation with the County Commissioners and road officials throughout the state, there is one question which almost invariably arises. It is this: How are we, with such inadequate funds, to provide roads for the rancher, the miner, and the timber operator, who is not so fortunate as to be situated upon one of the main highways of the State? To many of us, not closely in touch with the situation, the problem may seem abstract and rather unimportant; but those to whom these people look for relief realize that it is one of the most vital which they are called upon to answer. Particularly is this true in the mountainous counties of the state where natural difficulties are usually greater and valuations, and consequently revenues, are frequently less. The Forest Service is in a position to appreciate the situation, since it has equal application to National Forests of Colorado. The following suggestions are made in the hope that some of them at least may be found helpful:

In approaching the situation for any unit of area, as for instance a county, there are a number of features which must be considered. First, how much money can be made available for minor construction work. Second, what is the relative urgency of the different projects under consideration. These matters, which are absolutely essential, having been determined, information should be secured concerning the mileage, the natural difficulties, the general location, and the kind and direction of travel, together with an approximate estimate of costs for each of the different projects which are found to be of immediate urgency. Upon the basis of the information above mentioned a feasible and practicable plan covering the season's operations may be prepared. Such a plan should include, relative to each project, exact information as to what is to be done; when it is to be done; how well it is to be done, and who will do it. In financing the plan, a contingent fund should be provided which will serve to make necessary increases to the various projects and to take care of emergencies which may arise. The smaller the fund available and the larger the volume of work to be accomplished, the greater is the need for carefully prepared preliminary plans. Once decided upon, the plan should be adhered to as strictly as possible.

This brings us to the actual construction of the road. The result we are after is the greatest return for the minimum expenditure, not only from the standpoint of the immediate future, but also as it relates to the ultimate highway system for the region. First, the matter of location: Too often insufficient funds have been allowed to outweigh the desirability of preceding construction work by a location survey. The argument is made—there is only a few hundred dollars a mile available for expenditure on this road, and no part of it should be used in making surveys.

The answer to this argument is best expressed in a truism whose author escapes me:

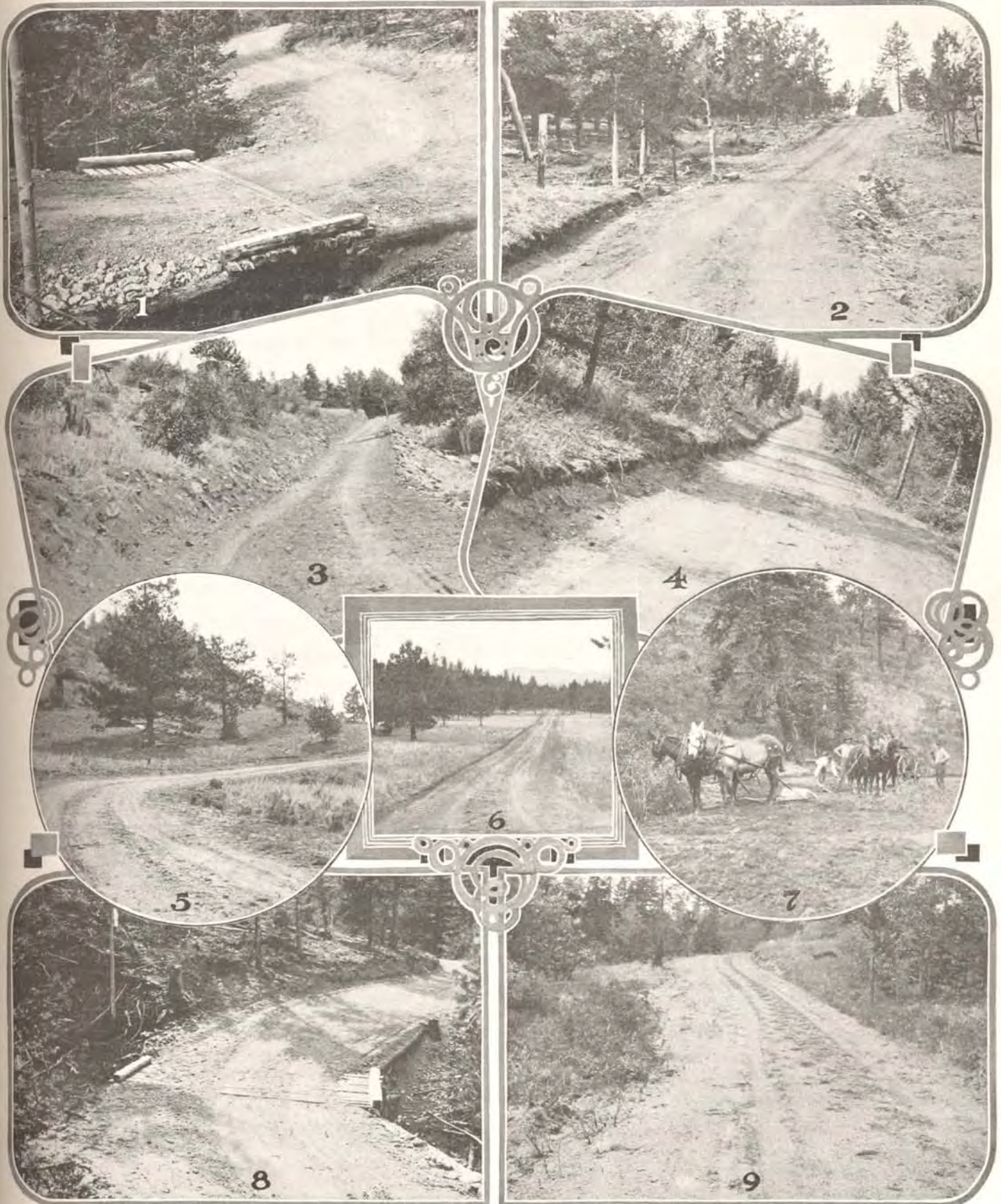
“Good highway construction consists in taking a shovelful of dirt from a place where it will never be needed and placing it where it will always be needed.” This result cannot be obtained without a survey, and the rule applies just as surely to a five-hundred-dollar as to a five-thousand-dollar project. The only difference is in the amount which we are justified in spending. The construction foreman who has been sent out to construct a job, even if only “scratch work,” without a survey, knows that if he had been supplied with a few stakes that he not only would have built a better road, but that he could have cut down the cost. Most of our minor roads are constructed with the idea that they will later be improved from time to time as additional funds become available. If future waste is to be avoided, it is absolutely imperative that first construction follow closely the line of the ultimate road. Since conditions vary greatly, the amount which can economically be expended for a location survey on each project will be a matter for individual decision in each case, but as a general proposition, an expenditure of 5 per cent for surveys and plans will be justified.

Next is the matter of methods. Construction work of minor character is ordinarily best handled by force account. The selection of proper equipment is also very important. The cost of labor of all kinds is advancing rapidly and hand work should be avoided as far as possible; hence, road machinery has become more and more essential in keeping our road cost to a minimum. There is also the question of the amount and kind of drainage which is to be installed. Adequate side and cross drainage is one of the requisites of highway construction, but shortage of funds may for the time being preclude the possibility of providing all that is required. In such cases first consideration should be given to those places which, if left uncared for, will result in making the road impassable after the first hard rain. Economy may also dictate an undulatory profile, short stretches of grades exceeding the maximum, and an alignment which would be unsatisfactory for high-speed auto travel. Such measures of economy can safely be used, however, only when the construction is preceded by location survey.

The accompanying photographs show the road between Lake George, Florissant and West Creek now under construction by the Forest Service in co-operation with Park and Teller Counties. This road is not advanced as an example of high-type mountain highway construction. It is offered, however, as a sample of what can be done under present conditions and prices for less than \$600 a mile and when funds are inadequate to provide a standard highway. This cost includes a charge of \$30 per mile for location surveys.



Scenes on Road Under Construction From Lake George to West Creek



1. Type of bridge construction on highway. 2. Graded work on pitch. 3. View on turn. 4. A wide straight stretch. 5. Around a bend. 6. Looking into the divide. 7. Grading team at work. 8. One of the numerous bridges. 9. Close up view of road.



# Road Work and Road Builders the State Over

J. H. Bertholf, assistant highway engineer, reports all retaining wall construction completed on the road from Ouray to Silverton and road conditions on the Western Slope, generally good.

County Engineer James Edward of Larimer, wrote in recently to say that the clearing is completed on a portion of the Jacobson-Seever contract on the eastern slope of the Fall River Pass road. The Hokosona contract work will be completed this fall unless exceptionally rigorous weather conditions set in.

R. G. Webster and H. G. Tiffany, Adams county commissioners, are keeping in close touch with the improvement work on the main north and south highway, north of Boulevard F., and the concrete surfacing on the Brighton highway.

Engineer W. Lea, of Eagle county, has requested the state highway department to send an engineer down to Gypsum to make an examination of a concrete bridge just outside of the city and to recommend improvement. A pier in the structure has settled, breaking loose one of the arches.

Commissioners Greenwood and Miller, of Boulder county, were in Denver recently in regard to the work on the North and South St. Vrain Canyon roads, both of which they are desirous of pushing through as rapidly as possible.

B. A. Banta and J. W. Potter, of El Paso county, have been making an inspection of roads.

Gus Johnson, R. L. Downs and J. R. Cruse, of Jefferson county, have been kept on edge by the improvement work on the Turkey Creek and Morrison roads, which is now well under way. The commissioners have made arrangements for the final payments to the contractors who had charge of the South and North Golden roads work.

The Engineering Journal of Chicago has been furnished a copy of the department's photograph of the Royal Gorge for use in an early issue of their magazine.

Fred Catchpole is back in Pagosa Springs after a trip east and is again looking after road conditions in his district.

A complete set of the Poudre Valley photographs taken by the state highway department has been ordered and delivered to the Commercial Club of Ft. Collins, which will use this material in its publicity work.

L. B. Harrison reports that construction work on the 300-foot strip crossing the interurban car line near Golden on the South Golden concrete highway, has been practically completed while the gravel shoulders are now in for almost the entire distance of the highway.

E. P. Rowe, Weld county commissioner, reports that the concrete bridge across the Platte is now half finished.

H. V. Shippey of Saguache has been making a close inspection of work on the Gun Barrel highway between Monte Vista and Saguache and says that the work is making satisfactory progress.

Commissioner Walter Philbin, of Chaffee county, now has work well under way on the concrete bridge across the Arkansas river and is expecting to have the structure open for travel before many weeks. The commissioner recently returned from a fishing trip down the Gunnison with John R. Williams of Denver and is now in a position to counter any road conversation with tales of his catch.

Commissioner J. M. Graham, of Larimer, was in Denver during the month to talk over conditions on the Larimer roads most of which are now in good shape where gravel can be secured.

John M. Cowden and Louis Worker, of Ordway, Crowley county commissioners, have been inspecting the road north of Ordway to Fowler and have succeeded in getting it back into condition.

Commissioner Morris, of Logan, has been making a thorough investigation in machine and motor truck costs and finds that operation of this is producing uniformly good results in his county. Roads through this section are in exceptional shape when weather conditions are taken into consideration.

Montezuma and Yuma counties were among the first districts in the state to make their returns required by the Highway Council on proposed work for the season of 1919.

Assistant engineer Randall has been on the Brighton highway work for the past two months. Conditions there have been generally good save that the contractor has had some trouble securing gravel. The work is progressing at a fair rate of speed.

J. H. Doran, of Ouray county, has been active in keeping the roads in his district in good shape during the season.

Edward Meyer, of Silverton, is interested in seeing the road over either Minnie or Maggie Gulch from Silverton to Lake City open in order to provide residents of his district with a short cut to Denver. No work will be attempted probably until the Silverton to Durango highway is completed, but the commissioner has the project in mind as the next big road improvement in that section.

The attention of county commissioner is called to the fact that figures on the road census taken all over the state in August, are coming in very slowly. The fact contained therein are greatly needed both by the state department and the state highway transport committee and early attention to them will be appreciated by the department.

## Grade Limits and Traffic Conditions

(Continued from Page 4.)

2. Cost of construction per unit of length—the cost of the road to be considered as an investment and charged with interest at 5% and maintenance, (maintenance to include all charges necessary to keep the road up); the cost of maintenance will be heavier on the grades than on the level stretch.

3. Cost of construction of different types of surfacing. For comparison—an 18-ft. graveled surfaced road is assumed as costing \$5,000.00 per mile, allowing \$2,000.00 per mile for the gravel on both level and grade, and \$3,000.00 per mile for the grading of the level stretch as against \$2,800.00 for a 2% grade; \$2,500.00 for a 4% grade, and \$1,800.00 for a 6% grade.

A graveled surface is selected as it is more nearly the surface of our Colorado main roads; the shale and sand clay roads being very much the same general character. The costs are taken as less on the higher grades, as it is thought that there is more latitude as to choice of ground in location when using the higher limits of grade.

The traffic way to be considered as running from 50 to 100 vehicles per day, and that the average gross load is two and one-half tons per vehicle. In connection with this traffic condition the table of traffic census on page 4 on some of our main roads will be interesting and give an idea as to the character of the traffic. The extracts are from the traffic census for the month of August, 1918, taken by the counties at the request of the state highway commission of Colorado:

Busses for passengers included in trucks.

Figures give daily average for 31 days, 8 a. m. to 6 p. m.

(To Be Continued Next Month.)



# The Blue Lodge of Colorado Road Builders

**M**ANY men have given years of their lives in the service of road building. Nicolaus Krohn of Montrose is one of the few who have given to the last great sacrifice.

Few have played a more important part in the road history of Colorado than did he and the Blue Lodge would be incomplete without his name on the roll-call.

Mr. Krohn was the inspiration for the Rainbow Route and built the road from Montrose to the Blue Canyon in Gunnison County. He then constructed the highway from the Blue to Sapinero for Gunnison County, going into camp with his men and sticking with them regardless of weather conditions. He was an expert in handling powder and under his direction the Black Canyon walls were shot off, dropped off into the Gunnison river and the road made where the river formerly ran.

This piece of road from the Lake City branch to the point where it leaves the canyon is said to have been the cheapest piece of rock work ever constructed, costing less than 21 cents a cubic yard. His next feat was the building of the connection to the Rainbow Route from Paradox Valley to the Utah state line. Not a graduate surveyor, he had natural ability to lay out grades as this work proved. It also disclosed his ability as a financier, as the accounts for the work, audited three times, because of a bitter political feud, were checked out to the penny each time.

His final achievement was the inauguration of work on a road down the San Miguel river from Dry Creek to the Dolores, and thence to Paradox valley.

While engaged in laying out work for his powder men, September 15, 1916, the bank gave way under him and Mr. Krohn fell to his death.

His road crew with whom he had lived in the tents under hot suns and wintry blasts for nearly three years, erected a monument to his memory at the point where he lost his life but he needs no granite to perpetuate his memory in Montrose.

There the citizens held him as a strong man, ready always to fight for the right, an expert in his chosen field and an upright citizen. The state lost one of its best road builders when he was taken and Montrose will ever remember him whenever highways are discussed.

**T**HE first active movement for scenic roads in Colorado originated with the good roads enthusiasts of Canon City, and one of the principal figures in the work was W. H. (Daddy) Le Grange.

A member of the board of county commissioners of Fremont County from 1904 to 1912, and chairman of that organization from 1908 to 1912 inclusive, Mr. Le Grange played an important part in the good road construction which paved the way for a similar campaign in other sections of the state.

During the entire time of his membership on the board he actively promoted and assisted in the Good Roads movement in Colorado, attended all Good Roads meetings, helped organize the Rainbow Route association and during his term in office was largely instrumental in the construction work of numerous important highways.

Among the pieces of road work, now known the world over as among the most attractive of Colorado's famed scenic highways, of which he had a part in the construction may be cited the Colorado Springs-Canon City cut-off, a fine piece of highway which takes the traveler direct to the Springs from Canon, the famous Royal Gorge boulevard, which wends its way through Priest Canon to the top of the hills; the Cottonwood road and the Rainbow Route up the Arkansas river from Canon City to Salida, which made possible all the year around travel between these points at river grade over a fine roadbed.

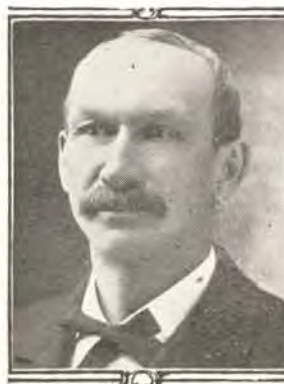
In addition to this work, Mr. Le Grange was instrumental in perfecting the organization of road gangs in his county and acquired for it, a complete equipment of modern machinery and tools which materially aided in perfecting the efficiency of the department.

He also brought the numerous other highways of Fremont into first class condition and later kept them in good repair, constructing many heavy type bridges and taking an active part in the construction of lateral roads between main highways.

While no longer in office, Mr. Le Grange retains an active interest in road work not only in Fremont, but in the state highways and any movement looking toward the betterment of highways, finds him the van guard of the road building.



Nicolaus Krohn.



W. H. Le Grange.



# Highway News and Notes on Work in Field

A Contract has been let, signed and approved for the bridge over Plum Creek in the southern end of Douglas county on the main north and south highway. Application for the cement necessary to complete the job has been made to the highway council at Washington.

Pueblo county is maintaining a force of men at work on the graveling of the road from Pueblo to the Huerfano river bridge. The work is about 75 per cent completed and when finished will bring the road to standard.

Assistant Engineer McBride, in charge of the Lamar-Springfield Federal aid project, reports satisfactory progress save for delay in bridge work, due to the difficulty in obtaining shipments of steel necessary to the work.

The Pitkin county commissioners are devoting a great deal of their time to construction of the Independence pass project. Work is progressing well under the conditions, but naturally Aspen residents are interested in seeing the project pushed through at the earliest possible moment.

A petition has been received from the board of county commissioners of Gunnison county asking that the highway diverting from the state route at the foot of Monarch pass and cutting through Waunita Springs, be declared a state highway. The petition will be placed before the next meeting of the state highway commission in November, but favorable action at this time is unlikely as the Bulletin No. 1, in the series of orders issued by the highway council expressly states that no project will be sanctioned on a highway, city, county, state or national, save where it is clearly established that maintenance of present highways is no longer possible except at a prohibitive cost or where there is at the present time no outlet for a district producing war essentials or foodstuffs. Under this ruling, while the highway commission might declare this route a state highway, it would still be impossible for the state to undertake any improvement of the present travelable road, until the end of the war.

Chief Engineer James E. Maloney, of the state highway department, has just returned from a trip to Gunnison, where he made an inspection of three bridges which have caused Gunnison commissioners serious trouble this year because of the high waters of the river.

One of these structures, three miles above Gunnison, will have to have a new pier and abutment at once, while the other two, both below Gunnison, will be temporarily repaired.

The Deer Creek Canyon road was opened to travel for its entire distance last week by the Jefferson county commissions. This road takes off from Chatfield crossing on the Platte Canyon road above Littleton, crossing the flats in a westerly direction to Williamson's Gulch and thence proceeding up the canyon to Phillipsburg.

There has been a wagon road here for years, but the grades ranged as high as 25 per cent, making freighting exceedingly difficult. The present improvement carries the road on grade from a point to the right of the school house above Phillipsburg for a distance of about three miles. Construction was almost entirely through solid rock and progress has been made slowly on the job on that account.

The present highway at the upper end is only about eight feet wide, crosses the shelf at a height of about 1,000 feet above the canyon and is not recommended for general automobile travel save by experienced mountain drivers.

The canyon is one of the most beautiful in the front range; reaches a high altitude through lanes of quaking aspens, which make the section a flame of color in the fall, and unquestionably in the future, when the highway is widened, the road will be one of the most popular out of Denver into the hills.

At the present time the primary purpose of the road is to furnish an outlet for the produce of farmers living in this section and the highway is a very decided improvement over the old road.

A circle trip can now be made on this road as it joins the Hard Pan Triangle highway at a point above Conifer.

Actual construction work on the Bardine-Redstone project, on which approval was withheld by the highway council, has been inaugurated by the Gunnison county road force. The work calls for the swamping out of a six mile stretch, beginning five miles north of Somerset and providing farmers in the Big Muddy valley with an all the year round outlet for their produce, something which they have not had in the past.

This work was not ordered stopped by the council, and since construction began a strong recommendation for its completion from the U. S. Forest Service and the state highway department has brought forth an informal statement that work will probably be approved later. Should it be determined, however, that the work is non-essential, the county will at least put in a temporary highway using box culverts in order to get away from the numerous crossings of the Big Muddy, which have made the road impassable for weeks at a time in the past.

Increased costs of material and labor have had their effect on construction of the new western gateway to the Rabbit Ears Pass, and as a result the funds appropriated by the U. S. Forest Service and the state highway commission have been found inadequate.

J. A. Whittaker, district engineer of the U. S. Office of Public Roads, estimates that \$24,000 in addition to the fund already expended will be necessary to the final completion of the project, while \$3,528 will be needed to complete the road to the top of the hill where it makes a junction with the present highway.

The U. S. Forest Service has obtained an additional sum of \$12,000 for the work upon recommendation by R. E. Pratt, district engineer, and if possible, the state highway department, will raise a corresponding sum by dipping into the appropriation for 1919.

Completion of the project in its entirety will probably extend well into next year under favorable conditions, but as the road is in first class condition at all points save on the western gateway, all that is actually needed at the present time is this work.

All improvement work on the Monarch Pass road has been discontinued by the U. S. Forest Service for the present season and probably for the duration of the war. The service officials were unable to get sufficient laborers to handle the job, while a further reason for the decision was that the cost of material has advanced so materially as to cut the work that could be done virtually in half. While it is hoped that a gang can be started next spring, prospects now point the other way.

Work on the improvement of the road from Loveland to Greeley has been discontinued by the Larimer county commissioners as the result of an increase in the freight rate on gravel from 30 cents to 90 cents per ton. The road is an important agricultural road, but the county has not sufficient funds to undertake the road at the increased rate.



# COLORADO HIGHWAY DEPARTMENT

## STATE HIGHWAY COMMISSION

L. BOYD WALDBRIDGE, Chairman, District No. 3, Meeker.  
LEONARD E. CURTIS, Vice-Chairman, District No. 2, Colorado Springs.

FRED J. RADFORD, District No. 3, Trinidad.  
FREDERICK GOBLE, District No. 4, Silverton.  
LAFAYETTE M. HUGHES, District No. 1, Denver.

T. J. EHRHART, Commissioner.

J. E. MALONEY, Chief Engineer.

## COUNTY COMMISSIONERS AND DENVER ROAD OFFICIALS

### ADAMS

R. G. Webster, Broomfield.  
H. G. Tiffany, Stockyards Station.  
Harry C. Flanders, Bennett.

### ALAMOSA

A. E. Headlee, Hooper.  
Cris Wallrich, Alamosa.  
George E. Lake, Alamosa.

### ARAPAHOE

Theodore Taylor, Englewood.  
D. J. Crockett, Littleton.  
Claude Cartwright, Aurora, R. F. D.

### ARCHULETA

Fred Catchpole, Pagosa Springs.  
Thos. S. Reavis, Pagosa Springs.  
R. L. Ewell, Chromo.

### BACA

C. A. Wiley, Richards.  
James A. Stinson, Springfield.  
Onda Young, Two Buttes.

### BENT

Levi Dumbauld, Las Animas.  
B. T. McClave, McClave.  
D. E. Heizer, Las Animas.

### BOULDER

S. A. Greenwood, Boulder.  
H. E. Miller, Longmont.  
Burns Will, Boulder.

### CHAFFEE

O. S. Mason, Buena Vista.  
J. I. Glenn, Salida.  
W. L. Philbin, Salida.

### CHEYENNE

Walter Ramsey, Kit Carson.  
A. I. Johnson, Wild Horse.  
J. W. Shy, Cheyenne Wells.

### CLEAR CREEK

John W. Green, Silver Plume.  
T. W. Cunningham, Georgetown.  
F. A. Miller, Idaho Springs.

### COSTILLA

J. M. Pacheco, San Pablo.  
T. Mancho, Garcia.  
W. R. Morris, Ft. Garland.

### CROWLEY

Wm. Broadhurst, Ordway.  
Frank McNary, Sugar City.  
John H. Cowden, Ordway.

### CONEJOS

W. F. McClure, Antonito.  
Frank Russell, La Jara.  
H. L. Sellers, Manassa.

### CUSTER

Harry Kettle, Westcliffe.  
Jacob Beck, Westcliffe.  
Chas. A. Barton, Silver Cliff.

### DELTA

W. A. Shepherd, Delta.  
Thomas J. Harshman, Cory.  
Charles T. Rule, Paonia.

### DENVER

Jas. A. Burnett, Mgr. Parks and Impts.  
Fred Steinhauer, Supt. Parks.  
F. J. Altwater, Highway Commissioner.

### DOLORES

G. L. Garren, Rico.  
Charles Engle, Rico.  
R. H. Bradfield, Lewis, Colo.

### DOUGLAS

S. H. Stream, Sedalia.  
G. F. B. Hood, Parker.  
Jas. P. McInroy, Larkspur.

### EAGLE

M. A. Walsh, Red Cliff.  
T. J. Dice, Eagle.  
Andrew Gleason, Gypsum.

### ELBERT

C. E. Shaver, Fondis.  
Fred L. Albin, Kiowa.  
John M. Wood, Kuhn's Crossing.

### EL PASO

J. W. Potter, Colorado Springs.  
Harry A. Scholton, Colorado Springs.  
B. A. Banta, Colorado Springs.

### FREMONT

J. V. McCandless, Florence.  
G. V. Hodglin, Canon City.  
Jas. Belknap, Hillside.

### GARFIELD

Silas L. Meadows, Glenwood Springs.  
R. P. Coulter, New Castle.  
George Newton, DeBeque.

### GILPIN

Joseph Borzago, Black Hawk.  
Neil McKay, Central City.  
R. I. Hughes, Russell Gulch.

### GRAND COUNTY

Simon Olson, Parshall.  
Ed. Becker, Troublesome.  
J. B. Stevens, Frazer.

### GUNNISON

W. H. Whalen, Crested Butte.  
Geo. L. Miller, Gunnison.  
C. L. McDonald, Doyleville.

### HINSDALE

O. D. Zeigler, Lake City.  
E. W. Wiley, Lake City.  
E. W. Soderholm, Lake City.

### HUERFANO

Walter Hamilton, La Veta.  
J. T. Trujillo, Red Wing.  
Robt. Young, Walsenburg.

### JACKSON

T. John Payne, Northgate.  
W. G. Mellen, Coalmont.  
Chas. L. P. Winscom, Walden.

### JEFFERSON

R. L. Downs, Evergreen.  
J. R. Cruse, Mt. Morrison.  
Gus. A. Johnson, Golden, R. F. D.

### KIOWA

A. S. Baldwin, Chivington.  
Wirt Bailey, Towner.  
Ed. Houston, Arlington.

### KIT CARSON

James Dunn, Stratton.  
A. L. Anderson, Burlington.  
J. O. Hendricks, Seibert.

### LAKE

B. H. Martin, Leadville.  
Dan Colahan, Leadville.  
Geo. Bennett, Leadville.

### LA PLATA

E. F. McCartney, Animas City.  
Geo. Olbert, Oxford.  
Jacob Fritz, Durango.

### LARIMER

J. M. Graham, Loveland.  
Harris Akin, Fort Collins.  
C. M. Garrett, Fort Collins.

### LAS ANIMAS

Frank Patterson, Alfalfa.  
J. D. Cordova, Gulnare.  
Robt. C. Scott, Segundo.

### LINCOLN

Alex. McCallum, Arriba.  
W. M. Smith, Rush.  
Ed. Reickenberg, Hugo.

### LOGAN

C. M. Morton, Sterling.  
C. M. Morris, Fleming.  
W. E. Henning, Peetz.

### MESA

C. Bower, Palisade.  
Geo. W. Masters, Mesa.  
Gover Rice, Grand Junction, R. F. D.

### MINERAL

John L. Peters, Creede.  
James Seward, Creede.  
A. M. Collins, Creede.

### MOFFAT

Thos. A. Forkner, Craig.  
R. S. Hamilton, Hamilton.  
R. B. Overholt, Maybell.

### MONTEZUMA

R. B. Dunham, Dolores.  
C. B. Kelly, Mancos.  
W. I. Myler, Dolores.

### MONTROSE

John W. Lamb, Montrose, R. F. D. No. 2.  
Howard P. Steel, Montrose, R. F. D. No. 4.  
Cary S. Heath, Montrose.

### MORGAN

Jas. Hurley, Fort Morgan.  
J. K. Samples, Brush.  
J. H. Osborne, Wiggins.

### OTERO

W. Frank Green, Rocky Ford.  
J. N. Johnston, Manzanola.  
Geo. Barr, La Junta.

### OURAY

J. H. Doran, Ouray.  
W. S. Rose, Ridgway.  
Geo. R. Croft, Ouray.

### PARK

J. S. Singleton, Shawnee.  
J. F. Rhodes, Fairplay.  
E. S. Clark, Florissant.

### PHILLIPS

Herman Poe, Holyoke.  
Albin Johnson, Haxtun.  
Lyman Foster, Holyoke.

### PITKIN

B. M. Strawbridge, Aspen.  
R. R. Bullock, Aspen.  
J. J. Gerbaz, Aspen.

### PROWERS

Fred Williams, Wiley.  
S. J. Higbee, Carlton.  
A. P. Knuckey, Holly.

### PUEBLO

Geo. Herrington, Pueblo.  
J. M. Sare, Pueblo.  
J. W. Thomson, Pueblo.

### RIO BLANCO

F. W. Miller, Meeker.  
J. A. Bills, Meeker.  
H. S. Harp, Meeker.

### RIO GRANDE

Aug. J. Weiss, Del Norte.  
W. W. Wright, Monte Vista.  
G. W. Gates, Monte Vista.

### ROUPE

Wm. Ellis, Steamboat Springs.  
Wm. Scheer, Pak Creek.  
Henry J. Summers, Hayden.

### SAGUACHE

Geo. Woodward, Saguache.  
A. V. Shippey, Villa Grove.  
Adam Deitrich, Center.

### SAN JUAN

Gail Munyon, Silverton.  
Edward Meyer, Silverton.  
J. Ernest Shaw, Silverton.

### SAN MIGUEL

T. B. McMahon, Telluride.  
Geo. G. Wagner, Telluride.  
J. R. Galloway, Norwood.

### SEDGWICK

Edward Fischer, Julesburg.  
Frank Nagel, Julesburg.  
J. G. Mowbray, Red Lion.

### SUMMIT

A. Lindstrom, Dillon.  
W. H. Hampton, Frawley.  
Eli Fletcher, Breckenridge.

### TELLER

Tom Foster, Woodland Park.  
H. J. Gehm, Cripple Creek.  
I. N. Riley, Victor.

### WASHINGTON

Homer Evans, Akron.  
R. M. Buckmaster, Abbott.  
E. A. Lewis, Burdette.

### WELD

W. C. Levis, Greeley.  
T. Elmer Rowe, Greeley.  
J. W. Birkle, Platteville.

### YUMA

Harry F. Strangways, Wray.  
H. W. Jackson, Yuma.  
Alex. Shaw, Kirk.



